

APPENDIX A: PRIORITY HIN PROJECTS: FACT SHEETS

APPENDIX B: FHWA PROVEN SAFETY COUNTERMEASURES

APPENDIX C: FUNDING SOURCES

APPENDIX D: OVERALL HIN CORRIDOR LIST

APPENDIX E: DESIGN GUIDANCE

APPENDIX F: SURVEY RESULTS



PLAN 89

# APPENDIXA: PRIORITY HIN PROJECTS: FACT SHEETS

This appendix contains information on each of the 13 priority HIN corridors, including the jurisdiction, speed limit, number of lanes, basic crash statistics (number of crashes, injury crashes, bicycle and pedestrian crashes), top crash types relative to West Orange as a whole, the most common crash factors, as well as the HIN score and composite score. Additionally, the Proven Safety Countermeasures recommended for each corridor are indicated.

LEC	GEND		
<b>CRAS</b>	SHTYPES	CRAS	SH FACTORS
	Animal		Distracted Driving
	Encroachment	i R.	Unsafe Speed
	Fixed Object		Lighting Conditions
<b>DO</b>	Left Turn/U Turn	MAP	ELEMENTS
	<b>Opposite Direction: Head-On</b>		Priority HIN
	<b>Opposite Direction: Sideswipe</b>		Bicyclist Crash
	Overturned		Pedestrian Crash
00	Bicyclist	$\checkmark$	High-Injury Intersection
Ŕ	Pedestrian	$\bigcirc$	No Apparent Injury
	Right Angle	$\bigcirc$	Possible Injury
	Same Direction: Rear-End		Suspected Minor Injury
	Same Direction: Sideswipe		Suspected Serious Injury
	Struck Parked Vehicle		Fatal Injury
		WEST ORA	NGE TOWNSHIP: VISION ZERO ACTION

### HIN CORRIDOR FACT SHEETS CORRIDOR A: MAIN STREET COUNTY ROUTE 659 SPEED

#### Represents 4% of HIN miles

#### **KEY CRASH FACTS**

	Ħ	%
*@	847 Crashes	10% of all West Orange Crashes
*~	45 Fatal, Severe & Minor Injury Crashes	10% of all Fatal, Severe & Minor Injury Crashes
Ŕ	21 Pedestrian Crashes	24% of all Pedestrian Crashes
റ്റ	5 Bicyclist Crashes	16% of all Bicyclist Crashes

#### **OVERREPRESENTED CRASH TYPES**



#### TOP CRASH FACTORS



#### **INTERSECTION CRASHES**



267 Crashes 13% of all Intersection Crashes



COUNTY ROUTE 659 I.4 MILES 48'WIDTH / 2 - 4 LANES SHOULDERS PARKING PERMITTED





Vision Zerø

















Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads

High-visibility crosswalks: 40% reduction in pedestrian injury crashes

> Intersection lighting: 42% reduction in pedestrian crashes

- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- 13% reduction in pedestrian/vehicle crashes at intersections

- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways

4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- 15% reduction in total crashes
  - Very low cost



Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

\*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/ uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR B: MT PLEASANT AVENUE

### Represents 1.6% of HIN miles

#### **KEY CRASH FACTS**

Vision Zerø

	#	%
*@	275 Crashes	3.2% of all West Orange Crashes
*~	15 Fatal, Severe & Minor Injury	3.3% of all Fatal, Severe & Minor Injury Crashes
Ŕ	3 Pedestrian Crashes	3.5% of all Pedestrian Crashes
റ്റ	4 Bicyclist Crashes	13% of all Bicyclist Crashes

### OVERREPRESENTED CRASH TYPES





**INTERSECTION CRASHES** 

144 Crashes

7% of all Intersection Crashes

COUNTY ROUTE 660 SPEED 0.6 MILES 40-50' WIDTH / 2 - 4 LANES SHOULDERS VARY PARKING PERMITTED AT SHOULDERS









Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.

92 WEST ORANGE TOWNSHIP: VISION ZERO ACTION PLAN











• High-visibility crosswalks: 40% reduction in pedestrian injury crashes



- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.
  - 15% reduction in total crashes
    - Very low cost
  - Added Left-Turn Lanes: 28-48% reduction in total crashes



- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes
- Right-Turn Lanes: 14-26% reduction in total crashes

Cost varies



• Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

\*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/ uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\*Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR C: PARK AVENUE

#### Represents 0.5% of HIN miles **KEY CRASH FACTS**

Vision Zerø



#### OVERREPRESENTED CRASH TYPES



### **TOP CRASH FACTORS**

#### **INTERSECTION CRASHES**



#### COUNTY ROUTE 658 SPEED 0.2 MILES 40'WIDTH / 4 LANES NO SHOULDERS PARKING PERMITTED











High-visibility crosswalks: 40% reduction in pedestrian injury crashes Vision Zerg

- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes

 Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways

- (Å
- SPEED LIMIT
- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
  - Very low cost



Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

### **Estimated Construction Cost:**



\*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/ uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\*Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR D: EAGLE ROCK AVENUE (MP 0-0.6)

# Represents 1.8% of HIN miles **KEY CRASH FACTS\***

	#	%
*2	525 Crashes	6.1% of all West Orange Crashes
*	32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
Ŕ	5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
റ്റ	2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

#### **OVERREPRESENTED CRASH TYPES**





#### **INTERSECTION CRASHES**



Vision Zerø

212 Crashes

10% of all Intersection Crashes

COUNTY ROUTE 611 0.6 MILES 40'WIDTH / 4 LANES NO SHOULDERS NO PARKING PERMITTED









\*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed





 Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads Vision Zerø

- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes

13% reduction in pedestrian/vehicle crashes at intersections

Reduction in pedestrian crashes by 47% Increase of motorist yielding rates up to 98% (depending on context)







• 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



• Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



 A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



Very low cost

### Estimated Construction Cost:

### ~\$800,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR E: EAGLE ROCK AVENUE (MP 2.3-3)

## Represents 2% of HIN miles **KEY CRASH FACTS\***

Vision Zerø

	#	%
*2	525 Crashes	6.1% of all West Orange Crashes
*	32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
Ķ	5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
റ്റ	2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

#### **OVERREPRESENTED CRASH TYPES**



#### **TOP CRASH FACTORS**



212 Crashes

10% of all Intersection Crashes

COUNTY ROUTE 611 0.7 MILES 40'WIDTH / 4 LANES NO SHOULDERS NO PARKING PERMITTED











\*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed





Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads

Vision Zer

High-visibility crosswalks: 40% reduction in pedestrian injury crashes

> Intersection lighting: 42% reduction in pedestrian crashes

> 13% reduction in pedestrian/vehicle crashes at intersections

Reduction in pedestrian crashes by 47% Increase of motorist yielding rates up to 98% (depending on context)

- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes





4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



2

A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



Very low cost

**Estimated Construction Cost:** 

### ~\$900,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR F: NORTHFIELD AVENUE (MP 3.8-4.4)

#### Represents 1.4% of HIN miles **KEY CRASH FACTS**

	#	%
*2	301 Crashes	3.5% of all West Orange Crashes
*	17 Fatal, Severe & Minor Injury Crashes	3.8% of all Fatal, Severe & Minor Injury Crashes
Ŕ	1 Pedestrian Crash	1.2% of all Pedestrian Crashes
റ്റ	0 Bicyclist Crashes	0% of all Bicyclist Crashes

#### **OVERREPRESENTED CRASH TYPES**



#### **TOP CRASH FACTORS**



Vision Zerø WEST ORANGE TOWNSHI

#### **INTERSECTION CRASHES**



90 Crashes



#### COUNTY ROUTE 508 SPEED 0.5 MILES 52' - 80' WIDTH / 4 LANES NO SHOULDERS PARKING PERMITTED











Estimated Construction Cost: ~\$600,000\*

#### RECOMMENDED PROVEN SAFETY COUNTERMEASURES\*\*

• High-visibility crosswalks: 40% reduction in pedestrian injury crashes Vision Zerg

- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes
- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways
  - A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.
    - 15% reduction in total crashes
      - Very low cost
    - Added Left-Turn Lanes: 28-48% reduction in total crashes



- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes
- Right-Turn Lanes: 14-26% reduction in total crashes

#### Cost varies

- Two-Way Stop-Controlled Intersection converted to Roundabout: 82% reduction in fatal and injury crashes
- Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

\*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wpcontent/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR G: PLEASANT VALLEY WAY



Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.

Any intersections and signals with Route 10/Mt. Pleasant Avenue are NJDOT jurisdiction and will be subject to coordination and review with NJDOT.

102 WEST ORANGE TOWNSHIP: VISION ZERO ACTION PLAN

Vision Zerø









\*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www. saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

#### **RECOMMENDED PROVEN SAFETY** COUNTERMEASURES\*\*



Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads

High-visibility crosswalks: 40% reduction in pedestrian injury crashes

> Intersection lighting: 42% reduction in pedestrian crashes



Advance yield or stop markings and signs: 25% reduction in pedestrian crashes

13% reduction in pedestrian/vehicle

crashes at intersections



*Reduction in pedestrian crashes by 47%* 

- Increase of motorist yielding rates up to 98% (depending on context)
- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes
- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.

- 15% reduction in total crashes
  - Very low cost
- Added Left-Turn Lanes: 28-48% reduction in total crashes
- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes
- Right-Turn Lanes: 14-26% reduction in total crashes
  - Cost varies



Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR H: EAGLE ROCK AVENUE (MPI.I-I.7)

#### Represents 1.8% of HIN miles **KEY CRASH FACTS**

	#	%
*2	525 Crashes	6.1% of all West Orange Crashes
*	32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
Ķ	5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
റ്റ	2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

#### OVERREPRESENTED CRASH TYPES



# **TOP CRASH FACTORS**

#### **INTERSECTION CRASHES**



Vision Zerø

212 Crashes

10% of all Intersection Crashes

COUNTY ROUTE 611 SPEED 0.6 MILES 40' WIDTH / 4 LANES NO SHOULDERS NO PARKING PERMITTED











\*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed





• Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads Vision Zerg

High-visibility crosswalks: 40% reduction in pedestrian injury crashes

Intersection lighting: 42% reduction

in pedestrian crashes

13% reduction in pedestrian/vehicle

- - Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- crashes at intersections
  - Reduction in pedestrian crashes by 47%
  - Increase of motorist yielding rates up to 98% (depending on context)



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.
  - 15% reduction in total crashes
    - Very low cost

Estimated Construction Cost: ~\$900,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR I: NORTHFIELD AVENUE (508 SPUR)

#### Represents 0.9% of HIN miles **KEY CRASH FACTS**

	#	%
*2	180 Crashes	2.1% of all West Orange Crashes
*	8 Fatal, Severe & Minor Injury Crashes	1.7% of all Fatal, Severe & Minor Injury Crashes
Ŕ	6 Pedestrian Crashes	7% of all Pedestrian Crashes
റ്റ	0 Bicyclist Crashes	0% of all Bicyclist Crashes

#### **OVERREPRESENTED CRASH TYPES**



#### **TOP CRASH FACTORS** SPEED

#### **INTERSECTION CRASHES**



Vision Zerø

108 Crashes

5.3% of all Intersection Crashes

COUNTY ROUTE 508 SPUR SPEED 0.3 MILES 40' - 50' WIDTH / 3 - 4 LANES NO SHOULDERS NO PARKING PERMITTED









Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.







- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
  - 13% reduction in pedestrian/vehicle crashes at intersections



4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways
- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
  - Very low cost
- Added Left-Turn Lanes: 28-48% reduction in total crashes
- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes
- Right-Turn Lanes: 14-26% reduction in total crashes
  - Cost varies

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\*Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR J:WHITTINGHAM PLACE

#### Represents 0.7% of HIN miles **KEY CRASH FACTS**

	#	%
*2	82 Crashes	1% of all West Orange Crashes
*	8 Fatal, Severe & Minor Injury Crashes	1.7% of all Fatal, Severe & Minor Injury Crashes
Ŕ	1 Pedestrian Crash	1.2% of all Pedestrian Crashes
റ്റ	0 Bicyclist Crashes	0% of all Bicyclist Crashes

#### OVERREPRESENTED CRASH TYPES



#### TOP CRASH FACTORS SPEED

		_	-	-	
	ΙΤΕΡΟ	CCT		CDA	СПЕС
11\	нгкз	гсн	IUN	LRA	



Vision Zerø

35 Crashes



COUNTY ROUTE 508 SPEED 0.2 MILES 30' - 45' WIDTH / 2 - 3 LANES NO SHOULDERS NO PARKING PERMITTED









Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.



High-visibility crosswalks: 40% reduction in pedestrian injury crashes Vision Zerø

- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
  - 13% reduction in pedestrian/vehicle crashes at intersections
- Reduction in pedestrian crashes by 47%
  - Increase of motorist yielding rates up to 98% (depending on context)



- Roadway reconfiguration
- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
  - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- 15% reduction in total crashes
  - Very low cost

### Estimated Construction Cost:

### ~\$140,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\*Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR K: GASTON STREET

#### Represents 0.3% of HIN miles MUNICIPAL ROAD 0.1 MILES **KEY CRASH FACTS** LIMIT 24' - 30' WIDTH / 1 - 2 LANES # % NO SHOULDERS 25 17 Crashes 0.2% of all West Orange PARKING PERMITTED Crashes 2 Fatal, Severe & 0.4% of all Fatal, Severe **HIN SCORE EQUITY + HIN SCORE** Minor Injury Crashes & Minor Injury Crashes 6 20 0 Pedestrian Crashes 0% of all Pedestrian Crashes 2 Bicyclist Crashes 6.4% of all Bicyclist Mount Pleasant Ave റ്റ Crashes OVERREPRESENTED CRASH TYPES s 🖓 🖓 🖓 🍂 ConditTer **TOP CRASH FACTORS INTERSECTION CRASHES** 6 Crashes Saston S 0.3% of all Intersection Crashes Interstate 280 Lindsley A 0

Vision Zerø



 High-visibility crosswalks: 40% reduction in pedestrian injury crashes Vision Zerø

- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- Roadway reconfiguration
- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



Added Left-Turn Lanes: 28-48% reduction in total crashes

### **Estimated Construction Cost:**

### ~\$70,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wpcontent/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR L: SAYERS STREET / PROSPECT PLACE

#### Represents 0.5% of HIN miles **KEY CRASH FACTS**

	#	%
*2	19 Crashes	0.2% of all West Orange Crashes
*	3 Fatal, Severe & Minor Injury Crashes	0.6% of all Fatal, Severe & Minor Injury Crashes
Ŕ	1 Pedestrian Crash	1.2% of all Pedestrian Crashes
റ്റ	0 Bicyclist Crashes	0% of all Bicyclist Crashes

#### OVERREPRESENTED CRASH TYPES





#### **INTERSECTION CRASHES**



Vision Zerø VEST ORANGE TOWNSHI

7 Crashes

0.3% of all Intersection Crashes



MUNICIPAL ROAD SPEED 0.2 MILES 24' - 30' WIDTH / I LANE SHOULDERS PARKING PERMITTED









**Estimated Construction** 

**Cost:** 

~\$250,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

Vision Zerg

\*\* Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

### HIN CORRIDOR FACT SHEETS CORRIDOR M:WHITTLESEY AVENUE

1,

#### *Represents 1.1% of HIN miles* **KEY CRASH FACTS**

	#	%
*2	39 Crashes	0.5% of all West Orange Crashes
*	3 Fatal, Severe & Minor Injury Crashes	0.6% of all Fatal, Severe & Minor Injury Crashes
Ŕ	1 Pedestrian Crash	1.2% of all Pedestrian Crashes
റ്റ	1 Bicyclist Crash	3.2% of all Bicyclist Crashes

# OVERREPRESENTED CRASH TYPES Image: Constraint of the second se



#### **INTERSECTION CRASHES**



Vision Zerø

16 Crashes

0.8% of all Intersection Crashes





**Ridge Ave** 

Nhittlesey

Ave

Washington St

William St

Main St

MUNICIPAL ROAD 0.4 MILES

30'WIDTH / 2 LANES

LIMIT



 High-visibility crosswalks: 40% reduction in pedestrian injury crashes Vision Zerø

- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)
- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways



 A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.

# Estimated Construction Cost: ~\$300,000\*

\*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. https://www.saferoutesnj.org/wp-content/ uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf

\*\*Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.



# APPENDIX B: FHWA PROVEN SAFETY COUNTERMEASURES

The FHWA Proven Safety Countermeasures are a collection of 28 countermeasures and strategies with data-supported effectiveness in reduing roadway fatalities and serious injuries. While some are resource- and time-intensive, others are low-cost and easy to implement quickly. The list of these countermeasures is as follows:

#### 1. Appropriate Speed Limits for All Road Users

- 2. Speed Safety Cameras
- 3. Variable Speed Limits
- 4. Bicycle Lanes
- 5. Crosswalk Visibility Enhancements
- 6. Leading Pedestrian Interval
- 7. Medians and Pedestrian Refuge Islands in Urban and Suburban Areas
- 8. Pedestrian Hybrid Beacons
- 9. Rectangular Rapid Flashing Beacons
- 10. Road Diets (Roadway Reconfiguration)
- 11. Walkways
- 12. Enhanced Delineation for Horizontal Curves
- 13. Longitudinal Rumble Strips and Stripes on Two-Lane Roads
- 14. Median Barriers

- 15. Roadside Design Improvements at Curves
- 16. SafetyEdge
- 17. Wider Edge Lines
- 18. Backplates with Retroreflective Borders
- 19. Corridor Access Management

#### 20. Dedicated Left- and Right-Turn Lanes at Intersections

Vision Zerg

- 21. Reduced Left-Turn Conflict Intersections
- 22. Roundabouts
- 23. Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections
- 24. Yellow Change Intervals
- 25. Lighting
- 26. Local Road Safety Plans
- 27. Pavement Friction Management
- 28. Road Safety Audit

Countermeasures listed in **bold** have been assessed for their suitability for each of the 13 Priority HIN Corridors (see pages 84-85 and Appendix A). Detailed information on the characteristics and effects of each of these countermeasures can be found on the following pages.

#### OFFICE OF SAFETY Proven Safety Countermeasures



Safety Benefits: Bicycle Lane Additions can reduce crashes up to:

for total crashes on urban 4-lane undivided collectors and local roads.<sup>6</sup>

**30%** for total crashes on urban 2-lane undivided collectors and local roads.<sup>6</sup>



Separated bicycle lane in Washington, DC. Source: Alex Baca, Washington Area Bicyclist Association

Separated bicycle lanes may provide further safety benefits. FHWA is anticipating completion of research in Fall 2022.

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://safety.fhwa.dot.gov/ provencountermeasures/ and https://safety.fhwa.dot.gov/ ped\_bike/tools\_solve/docs/ fhwasa18077.pdf.

#### **Bicycle Lanes**

Most fatal and serious injury bicyclist crashes occur at non-intersection locations. Nearly one-third of these crashes involve overtaking motorists<sup>1</sup>; the speed and size differential between vehicles and bicycles can lead to severe injury. To make bicycling safer and more comfortable for most types of bicyclists, State and local agencies should consider installing bicycle lanes. These dedicated facilities for the use of bicyclists along the roadway can take several forms. Providing bicycle facilities can mitigate or prevent interactions, conflicts, and crashes between bicyclists and motor vehicles, and create a network of safer roadways for bicycling. Bicycle Lanes align with the Safe System Approach principle of recognizing human vulnerability—where separating users in space can enhance safety for all road users.

#### **Applications**

FHWA's <u>Bikeway Selection Guide</u> and <u>Incorporating On-Road Bicycle Networks</u> <u>into Resurfacing Projects</u> assist agencies in determining which facilities provide the most benefit in various contexts. Bicycle lanes can be included on new roadways or created on existing roads by reallocating space in the right-of-way.

In addition to the paint stripe used for a typical bicycle lane, a lateral offset with painted buffer can help to further separate bicyclists from vehicle traffic. State and local agencies may also consider physical separation of the bicycle lane from motorized traffic lanes through the use of vertical elements like posts, curbs, or vegetation.<sup>2</sup> Based on international experience and implementation in the United States, there is potential for further safety benefits associated with separated bicycle lanes. FHWA is conducting research on separated bicycle lanes, which includes the development of crash modification factors, to be completed in 2022 to address significant interest on this topic.

- 5 Sandt et al. <u>Pursuing Equity in Pedestrian and Bicycle</u> <u>Planning</u>. FHWA, (2016).
- 6 Avelar et al. Development of Crash Modification Factors for Bicycle Lane Additions While Reducing Lane and Shoulder Widths. FHWA, (2021).

#### Considerations

- City and State policies may require minimum bicycle lane widths, although these can differ by agency and functional classification of the road.
- Bicycle lane design should vary according to roadway characteristics (e.g., motor vehicle volumes and speed) in order to maximize the facility's suitability for riders of all ages and abilities and should consider the travel needs of low-income populations likely to use bicycles. The <u>Bikeway Selection Guide</u> is a useful resource.
- While some in the public may oppose travel lane narrowing if they believe it will slow traffic or increase congestion, studies have found that roadways did not experience an increase in injuries or congestion when travel lane widths were decreased to add a bicycle lane.<sup>3</sup>
- Studies and experience in US cities show that bicycle lanes increase ridership and may help jurisdictions better manage roadway capacity without increased risk.
- In rural areas, rumble strips can negatively impact bicyclists' ability to ride if not properly installed. Agencies should consider the dimensions, placement, and offset of rumble strips when adding a bicycle lane.<sup>4</sup>
- Strategies, practices, and processes can be used by agencies to enhance their ability to address equity in bicycle planning and design.<sup>5</sup>



Thomas et al. Bicyclist Crash Types on National, State, and Local Levels: A New Look. Transportation Research Record 673(6), 664-676, (2019).
Separated Bike Lane Planning and Design Guide.

FHWA-HEP-15-025, (2015). 3 Park and Abdel-Aty. "Evaluation of safety effectiveness of multiple cross sectional features on urban arterials". Accident Analysis and Prevention, Vol. 92, pp. 245-255, (2016).

A FHWA Tech Advisory <u>Shoulder and Edge Line Rumble</u> Strips, (2011).

#### OFFICE OF SAFETY Proven Safety Countermeasures



Safety Benefits: High-visibility crosswalks can reduce pedestrian injury crashes up to: 40%<sup>1</sup>

Intersection lighting can reduce pedestrian crashes



Advance yield or stop markings and signs can reduce pedestrian crashes up to:



For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter measures and https://high ways.dot.gov/sites/fhwa.dot. gov/files/2022-06/techSheet VizEnhancemt2018.pdf.

#### Crosswalk Visibility Enhancements

Poor lighting conditions, obstructions such as parked cars, and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to safety issues. For multilane roadway crossings where vehicle volumes are in excess of 10,000 Average Annual Daily Traffic (AADT), a marked crosswalk alone is typically not sufficient. Under such conditions, more substantial crossing improvements could prevent an increase in pedestrian crash potential.

Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross.

#### **High-visibility crosswalks**

High-visibility crosswalks use patterns (i.e., bar pairs, continental, ladder) that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks. They should be considered at all midblock pedestrian crossings and uncontrolled intersections. Agencies should use materials such as inlay or thermoplastic tape, instead of paint or brick, for highly reflective crosswalk markings.

#### **Improved Lighting**

The goal of crosswalk lighting should be to illuminate with positive contrast to make it easier for a driver to visually identify the pedestrian. This involves carefully placing the luminaires in forward locations to avoid a silhouette effect of the pedestrian.

#### Enhanced Signing and Pavement Markings

On multilane roadways, agencies can use "YIELD Here to Pedestrians" or "STOP Here for Pedestrians" signs 20 to 50 feet in advance of a marked crosswalk to indicate where a driver should stop or yield to pedestrians, depending on State law. To supplement the signing, agencies can also install a STOP or YIELD bar (commonly referred to as "shark's teeth") pavement markings.

In-street signing, such as "STOP Here for Pedestrians" or "YIELD Here to Pedestrians" may be appropriate on roads with two- or three-lane roads where speed limits are 30 miles per hour or less.



Source: FHWA

3 (CMF ID: <u>9017</u>) Zeeger et al. Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, FHWA, (2017).



<sup>1 (</sup>CMF ID: <u>4123</u>) Chen, L., C. Chen, and R. Ewing. The Relative Effectiveness of Pedestrian

Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience. (2012). 2 (CMF ID: <u>436</u>) Elvik, R. and Vaa, T. Handbook of Road Safety Measures. Oxford, United

Kingdom, Elsevier, (2004).

#### OFFICE OF SAFETY Proven Safety Countermeasures



Safety Benefits: 13% reduction in pedestrianvehicle crashes at intersections.<sup>1</sup>

#### Leading Pedestrian Interval

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.

#### LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.

FHWA's Handbook for Designing Roadways for the Aging Population recommends the use of the LPI at intersections with high turning vehicle volumes. Transportation agencies should refer to the Manual on Uniform Traffic Control Devices for guidance on LPI timing and ensure that pedestrian signals are accessible for all users. Costs for implementing LPIs are very low when only signal timing alteration is required.





An LPI allows a pedestrian to establish a presence in the crosswalk before vehicles are given a green indication. Source: FHWA

LPIs reduce potential conflicts between pedestrians and turning vehicles. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit <u>https://highways.dot.gov/</u> <u>safety/proven-safety-counter</u> <u>measures</u> and <u>https://highways.</u> <u>dot.gov/sites/fhwa.dot.gov/</u> files/2022-06/fhwasa19040.pdf.

<sup>1 (</sup>CMF ID: <u>9918</u>) Goughnour, E., D. Carter, C. Lyon, B. Persaud, B. Lan, P. Chun, I. Hamilton, and K. Signor. "Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety." Report No. FHWA-HRT-18-044. Federal Highway Administration. (October 2018)



#### office of safety Proven Safety Countermeasures



Safety Benefits: RRFBs can reduce crashes up to: 47% for pedestrian crashes.4

#### RRFBs can increase motorist yielding rates up to:

(varies by speed limit, number of lanes, crossing distance, and time of day).<sup>3</sup>



RRFBs used at a trail crossing. Source: LJB

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter measures and https://high ways.dot.gov/sites/fhwa.dot. gov/files/2022-06/techSheet RRFB 2018.pdf.

#### Rectangular Rapid Flashing Beacons (RRFB)

A marked crosswalk or pedestrian warning sign can improve safety for pedestrians crossing the road, but at times may not be sufficient for drivers to visibly locate crossing locations and yield to pedestrians. To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular-shaped yellow indications, each with a light-emitting diode (LED)-array-based light source.<sup>1</sup> RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers.

For more information on using RRFBs, see the Interim Approval in the *Manual* on Uniform Traffic Control Devices (MUTCD).<sup>1</sup>

#### **Applications**

The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multilane crossings with speed limits less than 40 miles per hour.<sup>2</sup> Research suggests RRFBs can result in motorist yielding rates as high at 98 percent at marked crosswalks, but varies depending on the location, posted speed limit, pedestrian crossing distance, one- versus two-way road, and the number of travel lanes.<sup>3</sup> RRFBs can also accompany school or trail crossing warning signs.

RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing.<sup>1</sup> The flashing pattern can be activated with pushbuttons or passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

#### Considerations

#### Agencies should:<sup>2</sup>

- Install RRFBs in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
- Use solar-power panels to eliminate the need for a power source.
- Reserve the use of RRFBs for locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.

#### Agencies shall not:<sup>2</sup>

- Use RRFBs without the presence of a pedestrian, school or trail crossing warning sign.
- Use RRFBs for crosswalks across approaches controlled by YIELD signs, STOP signs, traffic control signals, or pedestrian hybrid beacons, except for the approach or egress from a roundabout.

4 (CMF ID: <u>9024</u>) NCHRP Research Report 841 Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, (2017).



<sup>1</sup> MUTCD Interim Approval 21 - RRFBs at Crosswalks.

<sup>2 &</sup>quot;Rectangular Rapid Flash Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. FHWA, (2013).

<sup>3</sup> Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, (2016).

#### office of safety Proven Safety Countermeasures



Safety Benefits: 4-Lane to 3-Lane Road Diet Conversions

**19-47%** reduction in total crashes.<sup>1</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter <u>measures</u> and <u>https://</u> highways.dot.gov/safety/ other/road-diets.

#### Road Diets (Roadway Reconfiguration)

A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL).





Before and after example of a Road Diet. Source: FHWA

### Benefits of Road Diet installations may include:

- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane.
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes.
- Fewer lanes for pedestrians to cross.
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.
- Traffic calming and more consistent speeds.
- A more community-focused, Complete Streets environment that better accommodates the needs of all road users.

A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. Typically, a Road Diet is implemented on a roadway with a current and future average daily traffic of 25,000 or less.



Road Diet project in Honolulu, Hawaii. Source: Leidos

1 (CMF ID: <u>5554,2841</u>) Evaluation of Lane Reduction "Road Diet" Measures on Crashes, FHWA-HRT-10-053, (2010).



#### office of safety Proven Safety Countermeasures



Safety Benefits:

Sidewalks 65-89%

reduction in crashes involving pedestrians walking along roadways.<sup>3</sup>

Paved Shoulders 71%

reduction in crashes involving pedestrians walking along roadways.<sup>3</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter <u>measures</u> and <u>http://www.</u> pedbikesafe.org/PEDSAFE/ <u>countermeasures\_detail.</u> <u>cfm?CM\_NUM=1</u>.

#### Walkways

A walkway is any type of defined space or pathway for use by a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared use paths, sidewalks, or roadway shoulders.

With more than 6,200 pedestrian fatalities and 75,000 pedestrian injuries occurring in roadway crashes annually,<sup>1</sup> it is important for transportation agencies to improve conditions and safety for pedestrians and to integrate walkways more fully into the transportation system. Research shows people living in lowincome communities are less likely to encounter walkways and other pedestrian-friendly features.<sup>2</sup>

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. Pedestrians should have direct and connected network of walking routes to desired destinations without gaps or abrupt changes. In some rural or suburban areas, where these types of walkways are not feasible, roadway shoulders provide an area for pedestrians to walk next to the roadway, although these are not preferable.

Transportation agencies should work towards incorporating pedestrian facilities into all roadway projects unless exceptional circumstances exist. It is important to provide and maintain accessible walkways along both sides of the road in urban areas, particularly near school zones and transit locations, and where there is a large amount of pedestrian activity. Walkable shoulders should also be considered along both sides of rural highways when routinely used by pedestrians.



Example of a sidewalk in a residential area. Source: <u>pedbikeimages.org</u> / Burden



Paved shoulder used as a walkway. Source: pedbikeimages.org / Burden

- 1 National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts. Report No. DOT HS 812 850). National Highway Traffic Safety Administration.
- 2 Gibbs, et all. Income Disparities in Street Features that Encourage Walking. Bridging the Gap, (2012, March).




### OFFICE OF SAFETY Proven Safety Countermeasures



#### Safety Benefits:

Traffic fatalities in the City of Seattle decreased 26 percent after the city implemented comprehensive, city-wide speed management strategies and countermeasures inspired by Vision Zero. This included setting speed limits on all non-arterial streets at 20 mph and 200 miles of arterial streets at 25 mph.<sup>5</sup>

One study found that on rural roads, when considering other relevant factors in the engineering study along with the speed distribution, setting a speed limit no more than 5 mph below the 85th-percentile speed may result in fewer total and fatal plus injury crashes, and lead to drivers complying closely with the posted speed limit.<sup>6</sup>

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter <u>measures</u> and <u>https://</u> highways.dot.gov/safety/ <u>speed-management/</u> reference-materials.

## Appropriate Speed Limits for All Road Users

There is broad consensus among global roadway safety experts that speed control is one of the most important methods for reducing fatalities and serious injuries. Speed is an especially important factor on non-limited access roadways where vehicles and vulnerable road users mix.

A driver may not see or be aware of the conditions within a corridor, and may drive at a speed that feels reasonable for themselves but may not be for all users of the system, especially vulnerable road users, including children and seniors. A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them.<sup>1</sup> At 20 miles per hour, that percentage drops to 5 percent.<sup>1</sup> A number of cities across the United States, including New York, Washington, Seattle and Minneapolis, have reduced their local speed limits in recent years in an effort to reduce fatalities and serious injuries, with most having to secure State legislative authorization to do so.

States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others—especially vulnerable road users—and on themselves. Addressing speed is fundamental to the Safe System Approach to making streets safer, and a growing body of research shows that speed limit changes alone can lead to measurable declines in speeds and crashes.<sup>2</sup>

#### **Applications**

Posted speed limits are often the same as the legislative statutory speed limit. Agencies with designated authorities to set speed limits, which include States, and sometimes local jurisdictions, can establish non-statutory speed limits or designate reduced speed zones, and a growing number are doing so. While non-statutory speed limits must be based on an engineering study, conducted in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) involving multiple factors and engineering judgment, FHWA is also encouraging agencies to use the following:<sup>3</sup>

- Expert Systems tools.
  - o <u>USLIMITS2</u>.
  - o <u>NCHRP 966: Posted Speed Limit</u> <u>Setting Procedure and Tool</u>.
- Safe System approach.

Based on international experience and implementation in the United States, the use of 20 mph speed zones or speed limits in urban core areas where vulnerable users share the road environment with motorists may result in further safety benefits.<sup>4</sup>

#### Considerations

When setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds.

To achieve desired speeds, agencies often implement other speed management strategies concurrently with setting speed limits, such as selfenforcing roadways, traffic calming, and speed safety cameras. Additional information is in the following FHWA resources:

- FHWA Speed Management website.
- <u>Self-Enforcing Roadways:</u> <u>A Guidance Report</u>.
- <u>Noteworthy Speed</u> <u>Management Practices</u>.
- Jurisdiction Speed Management Action Plan Development Package.
- Traffic Calming ePrimer.

- 2 Lowering the speed limit from 30 to 25 mph in Boston: effects on vehicle speeds. 3 FHWA's Methods and Practices for Setting Speed Limits: An Informational Report, (2012).
  - 3 FHWA's Methods and Practices for Setting Speed Limits: An Informational Report, (2012 4 Recommendations of the Academic Expert Group for the 3rd Global Ministerial.

6 Safety and Operational Impacts of Setting Speed Limits below\_

Engineering Recommendations.



<sup>1</sup> Reducing the speed limit to 20 mph in urban areas: Child deaths and injuries would be decreased.

Conference on Road Safety. 5 https://safety.fhwa.dot.gov/speedmgt/ref\_mats/fhwasa20047/sec8.cfm#foot813\_

### office of safety Proven Safety Countermeasures





For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/ safety/proven-safety-counter <u>measures</u> and <u>https://rosap.</u> ntl.bts.gov/view/dot/42807.

### Backplates with Retroreflective Borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions.

This treatment is recognized as a human factors enhancement of traffic signal visibility, conspicuity, and orientation for both older and color vision deficient drivers. This countermeasure is also advantageous during periods of power outages when the signals would otherwise be dark, providing a visible cue for motorists to stop at the intersection ahead.



Retroreflective borders are highly visible during the night. Source: South Carolina DOT

#### **Considerations**

Transportation agencies should consider backplates with retroreflective borders as part of their efforts to systematically improve safety performance at signalized intersections. Adding a retroreflective border to an existing signal backplate is a very low-cost safety treatment. This can be done by either adding retroreflective tape to an existing backplate or purchasing a new backplate with a retroreflective border already incorporated. The most efficient means of implementing this proven safety countermeasure is to adopt it as a standard treatment for signalized intersections across a jurisdiction or State.

Implementation challenges include minimizing installation time, accessing existing signal heads, and structural limitations due to added wind load in instances where an entire backplate is added. Agencies should consider the design of the existing signal support structure to determine if the design is sufficient to support the added wind load.



Signal backplate framed with a retroreflective border. Source: FHWA

1 (CMF ID: <u>1410</u>) Sayed, T., Leur, P., and Pump, J., "Safety Impact of Increased Traffic Signal Backboards Conspicuity." 2005 TRB 84th Annual Meeting: Compendium of Papers CD-ROM, Vol. TRB#05-16, Washington, D.C., (2005).



# OFFICE OF SAFETY Proven Safety Countermeasures



**Safety Benefits:** Left-Turn Lanes 28-48% reduction in total crashes.<sup>1</sup>

> **Positive Offset** Left-Turn Lanes 36%

reduction in fatal and injury crashes.<sup>2</sup>

**Right-Turn Lanes** 14-26% reduction in total crashes.<sup>1</sup>



Left- and right-turn lanes at a two-way stop-controlled intersection. Source: City of Greeley, CO

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/ proven-safety-countermeasures and https://www.fhwa.dot.gov/ publications/research/safety /02103/02103techbrief.pdf.

### **Dedicated Left- and Right-Turn Lanes at Intersections**

Auxiliary turn lanes—either for left turns or right turns—provide physical separation between turning traffic that is slowing or stopped and adjacent through traffic at approaches to intersections. Turn lanes can be designed to provide for deceleration prior to a turn, as well as for storage of vehicles that are stopped and waiting for the opportunity to complete a turn.

While turn lanes provide measurable safety and operational benefits at many types of intersections, they are particularly helpful at two-way stop-controlled intersections. Crashes occurring at these intersections are often related to turning maneuvers. Since the major route traffic is free flowing and typically travels at higher speeds, crashes that do occur are often severe. The main crash types include collisions of vehicles turning left across opposing through traffic and rear-end collisions of vehicles turning left or right with other vehicles following closely behind. Turn lanes reduce the potential for these types of crashes.

Installing left-turn lanes and/or rightturn lanes should be considered for the major road approaches for improving safety at both threeand four-leg intersections with stop control on the minor road, where significant turning volumes exist, or where there is a history of turnrelated crashes. Pedestrian and bicyclist safety and convenience should also be considered when adding turn lanes at an intersection. Specifically, offset left- and right-turn

lanes will lengthen crossing distances for pedestrians.

#### **Offset Turn Lanes**

Providing offset of left- and rightturn lanes to increase visibility can provide added safety benefits, and is preferable in many situations, particularly at locations with higher speeds, or where free-flow or permissive movements are possible.

At turn lanes with zero or negative offset, turning vehicles can block sightlines. For left-turn lanes, this usually involves opposing left-turning vehicles occupying the turn lanes at the same time. For right-turn lanes, this typically involves rightturning vehicles from the major road and vehicles entering the intersection from the minor road. In both scenarios, adding positive offset to turn lanes enhances the sight distance to approaching vehicles that conflict with the turning movement. Offset turn lanes should be considered when there is a high frequency of these types of conflicts in order to reduce the likelihood of a severe crash.



Illustration comparing zero offset to positive offset of left- and right-turn lanes. Source: FHWA

1 (CMF ID: 260, 268, 285, 289) Harwood et al. Safety Effectiveness of Intersection Left- and Right-Turn Lanes. FHWA-HRD-02-089, (2002). 2 (CMF ID: <u>6096</u>) Persaud et al. Safety Evaluation of Offset Improvements

for Left-Turn Lanes. FHWA-HRT-09-035, (2009).



U.S. Department of Transportation Federal Highway Administration

### OFFICE OF SAFETY Proven Safety Countermeasures



Safety Benefits: Two-Way Stop-Controlled Intersection to a Roundabout



reduction in fatal and injury crashes.<sup>1</sup>

#### Signalized Intersection to a Roundabout



For more information on this and other FHWA Proven Safety Countermeasures, please visit <u>https://highways. dot.gov/safety/provensafety-countermeasures</u> and <u>https://highways.dot.gov/ safety/intersection-safety/</u> intersection-types/roundabouts.

## Roundabouts

The modern roundabout is an intersection with a circular configuration that safely and efficiently moves traffic. Roundabouts feature channelized, curved approaches that reduce vehicle speed, entry yield control that gives right-ofway to circulating traffic, and counterclockwise flow around a central island that minimizes conflict points. The net result of lower speeds and reduced conflicts at roundabouts is an environment where crashes that cause injury or fatality are substantially reduced.

Roundabouts are not only a safer type of intersection; they are also efficient in terms of keeping people moving. Even while calming traffic, they can reduce delay and queuing when compared to other intersection alternatives. Furthermore, the lower vehicular speeds and reduced conflict environment can create a more suitable environment for walking and bicycling.

Roundabouts can be implemented in both urban and rural areas under a wide range of traffic conditions. They can replace signals, twoway stop controls, and all-way stop controls. Roundabouts are an effective option for managing speed and transitioning traffic from highspeed to low-speed environments, such as freeway interchange ramp terminals, and rural intersections along high-speed roads.



Illustration of a multilane roundabout. Source: FHWA



Example of a single-lane roundabout. Source: FHWA

 (CMF ID: <u>211,226</u>) AASHTO. The Highway Safety Manual, American Association of State Highway Transportation Professionals, Washington, D.C., (2010).





# APPENDIX C: FUNDING SOURCES

#### **Funding Sources**

The following is a general compilation of funding sources that have been or could be used to fund improvements in West Orange Township. The list is not exhaustive, but identifies a selection of federal, state, and private/non-profit funding sources for pedestrian and bicycle planning, project development, and construction. For each source, links are provided to program websites that contain additional information related to: how to apply for funding, typical grant amounts, application deadlines, and eligible activities. Some funding sources may also be used to fund programmatic activities, related to safety, enforcement, and education. Potential funding sources are listed below followed by a detailed description of each source on subsequent pages.

#### **Federal Funding Opportunities**

- The Fixing America's Surface Transportation (FAST) ACT
  - » Safe Streets and Roads for All Program (SS4A)
  - » Congestion Mitigation and Air Quality Improvement (CMAQ) Program
  - » Transportation Alternatives Set-Aside
  - » Highway Safety Improvement Program (HSIP)
  - » Safe Routes to School Program (SRTS)
  - » Recreational Trails Program
  - » Reconnecting Communities Pilot Program (RCP)
  - » Thriving Communities Program (TCP)
  - » Neighborhood Access and Equity Grant Program
- Road to Zero Community Traffic Safety Grants

#### **State Funding Opportunities**

- State Infrastructure Grant Programs
  - » NJDOT Municipal Aid
  - » NJDOT County Aid
  - » NJDOT Bikeway Grant Program
  - » NJDOT Safe Streets to Transit Program

- » NJDOT Transit Village Program
- New Jersey Transportation Infrastructure Bank

Vision Zerg

- NJ Division of Highway Traffic Safety Grants (HTS Grants)
  - » Comprehensive Traffic Safety Programs (CTSPs)
  - » Pedestrian Safety
  - » Other Eligible Programs

#### **Private or Non-Profit Funding Sources**

- Sustainable Jersey
- Sustainable Jersey for Schools
- Robert Wood Johnson Foundation
- The Geraldine R. Dodge Foundation

#### Other

- Impact Fees
- County and Municipal Open Space Trust Funds
- County and Municipal Capital Programs



### **Federal Funding Opportunities**

#### Infrastructure Investment and Jobs Act

On November 6, 2021, President Biden signed the Infrastructure Investment and Jobs Act, also referred to as the Bipartisan Infrastracture Law, into law. Alongside funding for utilities, internet, electricity, resiliency and pollution cleanup, transportation funding was a central piece of this bill. This included funding for airports and rail, but also allocated \$110 billion to repairs and improvements to roads and bridges. (The previous relevant federal program was known as the Fixing America's Surface Transportation Act, or "FAST Act"). Funding programs under the Infrastructure Investment and Jobs Arc, many of which are continued from the FAST Act from 2016-2020, are summarized below.

#### https://www.fhwa.dot.gov/bipartisan-infrastructure-law/

#### Safe Streets and Roads for All (SS4A) Program

This program was established out of the Infrastructure Investment and Jobs Act of 2021 (IIJA). It funds planning and implementation of projects and strategies which share a goal of eliminating roadway deaths and serious injuries. Many Complete Streets-related measures are eligible. Funding can be used to produce a comprehensive safety action plan, undergo demonstration projects, and implement permanent measures. Congress has appropriated \$5 billion for the program through fiscal year 2026, and all grants require a 20 percent local match. The SS4A program supports the National Roadway Safety Strategy and the United States Department of Transportation's goal of zero deaths and serious injuries on our nation's roadways. Counties, municipalities, and other non-State government entities are eligible to apply.

#### https://www.transportation.gov/grants/SS4A

#### Congestion Mitigation and Air Quality Improvement (CMAQ) Program

The CMAQ program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funds may be used for a transportation project or program such as construction of bicycle and pedestrian facilities that are not exclusively recreational (as they must reduce vehicle trips and therefore vehicle emissions), outreach promoting safe bicycle use, and other bicycle and pedestrian programs. CMAQ eligibilities include public transit, bicycle and pedestrian facilities, travel demand management strategies, alternative fuel vehicles, and facilities serving electric or natural gasfueled vehicles.

#### https://www.fhwa.dot.gov/bipartisan-infrastructure-law/cmaq.cfm

#### Transportation Alternatives Set-Aside

The Transportation Alternatives Set-Aside (TA Set-Aside, or TA) authorizes funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.

https://www.fhwa.dot.gov/environment/transportation\_alternatives/

#### Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

#### https://safety.fhwa.dot.gov/hsip/

#### Safe Routes to School Program (SRTS)

The Safe Routes to School Program (SRTS) is a federally funded reimbursement program administered by the New Jersey Department of Transportation (NJDOT), in partnership with the North Jersey Transportation Planning Authority (NJTPA). Under MAP-21 legislation, the Transportation Alternatives Program (TAP) funding does not provide for a standalone Safe Routes to School Program. The New Jersey Department of Transportation (NJDOT) has elected to continue funding the SRTS program separately.

Infrastructure projects may include the installation of sidewalks, crosswalks, bike lanes, multi-use paths, traffic calming measures, and other means to ensure the ease and safety of children walking or biking to school. Projects must be located within two miles of a school that serves students in grades K-8 and involve the school commute.

Any municipality, school district, or county is eligible to apply for funding after a solicitation is announced. Non-profit organizations are not eligible as direct grant recipients for the solicitation. However, non-profit organizations may partner with a local public agency that will assume responsibility and administration for the grant.

In 2016, NJDOT announced a pilot program called "Design Assistance." The program assists municipalities which received funding with development of plans, specifications and estimates for their SRTS projects.

http://www.state.nj.us/transportation/business/localaid/srts.shtm

https://www.njtpa.org/Projects-Programs/Local-Programs/Safe-Routes-To-School.aspx

#### Recreational Trails Program

Recreational Trails Program: The Recreational Trails Grant Program administered by the NJDEP Green Acres Program provides federal funds for developing new trails and maintaining and restoring existing trails and trail facilities including trails for non-motorized, multi-use (including land and water) and motorized purposes. The program is currently on hold as it undergoes revisions.

https://dep.nj.gov/greenacres/trails-program-home/

#### Reconnecting Communities Pilot Program (RCP)

The Reconnecting Communities Pilot Program was established by the Infrastructure Investment and Jobs Act of 2021 (IIJA). The program aims to correct wrongs of past transportation projects that have isolated or otherwise cut off communities from jobs and other amenities. Ideal projects improve access in one or more ways, increasing opportunities for residents of impacted communities. Congress has appropriated \$1 billion for this program through fiscal year 2026. States, counties, and local units of government are eligible to apply for funding to plan and implement projects on facilities of which the applicant is the owner. Non-owners may apply for planning grants, as well as capital construction grants, provided that the facility owner has appropriately endorsed the application. All grants require a 20 percent local match.

https://www.transportation.gov/grants/reconnecting-communities

Vision Zerg



#### Thriving Communities Program (TCP)

The Thriving Communities Program provides technical assistance to governments and transit agencies. The program focuses on communities that have suffered historic disinvestment and lack the resources and capacity to successfully engage, develop, design, and deliver infrastructure projects. The program provides planning, technical assistance, and capacity building to better navigate federal requirements, identify financing and funding opportunities, and grow long-term capacity to leverage transportation investments to achieve broader economic and community development goals.

https://www.transportation.gov/grants/thriving-communities

#### Neighborhood Access and Equity Grant Program

This program was created by the Inflation Reduction Act of 2022 (IRA). Much of the eligibility and criteria are similar to the Reconnecting Communities Pilot (RCP, see above). It appropriates over \$3 billion to reconnecting communities by supporting neighborhood equity, safety, and affordable transportation access as well as mitigating negative environmental impacts.

#### **Road to Zero Community Traffic Safety Grants**

The Road to Zero Coalition was formed in 2016 as a partnership between the US Department of Transportation and the National Safety Council, with the goal of ending fatalities on the nation's roads by 2050. The Road to Zero Community Safety Grant Program supports innovative and promising approaches to implementing evidence-based countermeasures, supporting a Safe System approach, and performing necessary research to eliminate traffic fatalities. Grants are for one year, and supplanting the effort with federal funds is prohibited. Proposals are due on January 14, 2024.

#### **State Funding Opportunities**

The New Jersey Department of Transportation (NJDOT) Division of Local Aid and Economic Development administers funds to local public agencies such as county and municipal governments for construction projects to improve the state's transportation system. Grant support and technical assistance is provided through the Local Aid Resource Center's Help Desk (https://njdotlocalaidrc.com/). The New Jersey Transportation Trust Fund and the 2021 Bipartisan Infrastructure Law provide the opportunity for funding assistance to local governments for road, bridge, and other transportation projects. While NJDOT and the three metropolitan planning organizations that cover the state administer many federal aid programs, including Transportation Alternatives and Safe Routes to School, the USDOT administers some grant programs directly. NJDOT administers state aid programs. Below are some options for funding infrastructure projects through NJDOT.

#### State Aid Infrastructure Grant Programs

#### NJDOT – Municipal Aid

In the Municipal Aid program, funds are appropriated by the Legislature for municipalities in each county based on a formula contained in legislation. Additionally, \$10 million is allotted for those municipalities that qualify for Urban Aid. Urban Aid is distributed by a formula that is computed by the New Jersey Department of Community Affairs. Each spring, the NJDOT announces the program for that fiscal year and invites municipalities to apply. Road improvement projects such as resurfacing, rehabilitation or reconstruction and signalization are funded and distributed by formula.



Applications receive points based on various criteria including existing road conditions, Average Daily Traffic (ADT), safety improvements, and access to nodes (schools, residential areas, employment centers, etc.). Other important criteria include the project's readiness to construct, whether the municipality has received an allotment within the last three years, and the municipality's award and close-out performance on previously awarded State grants.

The State pays 75% of the funds at the time of bid approval and the remainder on a reimbursement basis after acceptance by the municipality and the State of the work completed.

http://www.state.nj.us/transportation/business/localaid/municaid.shtm

#### NJDOT – County Aid

County Aid funds are appropriated by the Legislature annually for the improvement of public roads and bridges under county jurisdiction. Public transportation and other transportation projects are also included.

Each project must be included in the County's Annual Transportation Program (ATP). In accordance with the County Aid regulations N.J.A.C. 16:20A, the ATP shall list a pool of eligible projects by name and location, including municipality, with a brief description of each project, project limits and an estimate of the construction cost.

#### NJDOT – Bikeway Grant Program

The New Jersey Department of Transportation's (NJDOT) Bikeway Grant Program provides funds to counties and municipalities to promote bicycling as an alternate mode of transportation in New Jersey. A primary objective of the Bikeway Grant Program is to support the State's goal of constructing 1,000 new miles of dedicated bike paths (facilities that are physically separated from motorized vehicular traffic by an open space or barrier either within the highway right of way or within an independent right of way). In an effort to establish regionally connected bicycle networks, this program is available to every municipality and county throughout New Jersey. Although priority will be given to construction of new bike paths, the proposed construction or delineation of any new bicycle facility will be considered.

http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm

#### NJDOT – Safe Streets to Transit Program

This program encourages counties and municipalities to construct safe and accessible pedestrian linkages to all types of transit facilities and stations, to promote increased usage of transit by all segments of the population and decrease private vehicle use.

https://njdotlocalaidrc.com/state-funded-programs/safe-streets-to-transit

#### NJDOT – Transit Village Program

This program awards grants for transportation projects that enhance walking, biking, and/or transit ridership within a ½ mile of the transit facility. Municipalities must already be designated as a Transit Village by the NJDOT Commissioner and the inter-agency Transit Village Task Force to be eligible to apply.

https://njdotlocalaidrc.com/state-funded-programs/transit-village



#### New Jersey Transportation Infrastructure Bank

The Transportation Bank is a partnership between the NJ Department of Transportation (NJDOT) and the New Jersey Infrastructure Bank (I-Bank). The goal of the Transportation Bank is to provide low interest financing for a variety of capital projects including public highways, approach roadways and other necessary land-side improvements, ramps, signal systems, roadbeds, transit lanes or rights of way, pedestrian walkways and bridges connecting to passenger stations and servicing facilities, bridges, and grade crossings.

Applications are accepted on a quarterly basis and funding is available to any local government unit (defined as county, municipality, municipal, county or regional transportation authority, or any other political subdivision of the State authorized to construct, operate, and maintain public highways or Transportation Projects) within the state.

#### NJ Division of Highway Traffic Safety Grants (HTS Grants)

The NJ Division of Highway Traffic Safety offers, on an annual basis, federal grant funding to agencies that wish to undertake programs designed to reduce motor vehicle crashes, injuries, and fatalities on the roads of New Jersey. Municipal, county, state government and law enforcement agencies, as well as non-profit organizations, are encouraged to apply for NJDHTS grant funding to address specific, local traffic safety issues.

Grant funding will only be awarded to programs that are in line with federal and state traffic and safety priorities to reduce car crashes, injuries and deaths.

#### https://www.njoag.gov/about/divisions-and-offices/division-of-highway-traffic-safety-home/hts-grants/

The grant funding is distributed under the following programs:

- Comprehensive Traffic Safety Programs (CTSPs)
  - » Comprehensive Traffic Safety Program grants address multiple traffic safety concerns within a county or region. CTSP grants include numerous tasks and strategies involving enforcement, education and engineering.
  - » Any CTSPs for the state of New Jersey fall under the Division of Highway Traffic Safety Grants. The CTSP grants include tasks involving enforcement, education and engineering to improve traffic safety. Other eligible programs for these grants include speeding, bicycle safety, school bus/pupil transportation and traffic engineering.
- Pedestrian Safety
  - » Because the proportion of crash fatalities involving pedestrians in New Jersey is 30.2% (well above the national average), pedestrian safety is a continuing priority. The goal of the pedestrian safety program area is to lower the pedestrian fatality and injury crash rates. In New Jersey, municipalities that are statistically high for pedestrian injury crashes are eligible to apply for our Pedestrian Safety Grant. The grant includes funding for overtime enforcement at pedestrian safety hot spots in the community and educational outreach throughout the community.
- Other Eligible Programs
  - » Grant applications may also be submitted that utilize enforcement, education or engineering countermeasures to address other specific traffic safety issues including:
    - Speed
    - Aggressive Driving
    - Bicycling Safety



- Crash Investigation
- Distractions
- EMS Training relating to crash response
- Motorcycle Safety
- School Bus/Pupil Transportation
- Traffic Engineering primarily pedestrian pavement markings and pedestrian signs, but some traffic studies will be considered.

#### **Private or Non-Profit Funding Sources**

#### Sustainable Jersey

Sustainable Jersey is a nonprofit organization that provides tools, training and financial incentives for sustainable community initiatives. Their statewide certification program helps municipalities take steps to sustain their quality of life over the long term. In 2014, the Sustainable Jersey for Schools certification program was launched for New Jersey public schools interested in "going green" and conserving resources.

Participating local governments and schools voluntarily complete and document actions to earn points toward certification. Sustainable Jersey offers small grants ranging from \$2,000 to \$20,000 to assist communities and schools with completing Sustainable Jersey and Sustainable Jersey for Schools actions. To be eligible for a Sustainable Jersey or Sustainable Jersey for Schools Small Grant, a community or school must be registered or certified with Sustainable Jersey or Sustainable Jersey for Schools and have an active Green Team. The funds can only be used to implement actions that earn points in the Sustainable Jersey or Sustainable Jersey for Schools program.

Several Sustainable Jersey action items help provide sustainable transportation options. Safe Routes to School, Complete Streets Programs, Bicycle and/or Pedestrian Audits, and Bicycle and/or Pedestrian Plans can be funded. Sustainable Jersey for Schools actions related to active transportation include Pedestrian and Bicycle Safety Promotion Initiatives, Safe Routes to School District Policy, and School Travel Plan for Walking and Bicycling.

#### www.sustainablejersey.com/grants-resources/

#### Sustaibable Jersey for Schools

Sustainable Jersey for Schools grants are intended to help districts and schools make progress toward Sustainable Jersey for Schools certification.

http://www.sustainablejerseyschools.com/

#### Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation (RWJF) invests in grantees (e.g., public agencies, universities, and public charities) that are working to improve the health of all Americans. Current or past projects in the topic area "walking and biking" include greenway plans, trail projects, advocacy initiatives, and policy development.

New Jersey Health Initiatives (www.njhi.org/) is the statewide grant making program of the Robert Wood Johnson Foundation. New Jersey Health Initiatives supports innovations and drives conversations to build healthier communities through grant making across New Jersey.

www.rwjf.org/



#### The Geraldine R. Dodge Foundation

The Geraldine R. Dodge Foundation provides funding for Arts, Education, Environment and Informed Communities initiatives that are innovative and promote collaboration and community-driven decision making.

Recipients may include nonprofit, community, government, and business leaders.

http://www.grdodge.org/what-we-fund/

#### **Other Funding Sources**

#### Impact Fees

Regulated by subdivision polices, impact fees require residential, industrial and commercial development project leaders to provide sites, improvements, and/or funds to support public amenities such as open space and trails. Impact fees may be allocated to a particular trail or greenway from land development projects if the fund is a dedicated set-aside account established to help develop a county- or municipality-wide system of trails or pedestrian/bicycle infrastructure facilities.

#### County and Municipal Capital Programs

All New Jersey counties and many New Jersey municipalities have an Open Space Trust Fund, which is a dedicated program supporting open space land acquisition. The trust funds are established by ballot measure. Depending on the fund parameters, other development projects can be eligible including trails, historical preservation, and farmland protection.

#### https://tpl.quickbase.com/db/bbqna2qct?a=dbpage&pageID=8

#### County and Municipal Open Space Trust Funds

In the case where alternative funds are not available but there is community consensus and political will to move forward with a project, county and municipal capital programs should be considered. Local budgets may have the ability to support some projects, especially if other state and federal programs provide budget relief in other areas.

# APPENDIX D: OVERALL HIN CORRIDOR LIST

This appendix includes the entire list of High-Injury Network segments in West Orange based on the crash and equity analysis. The project team developed the HIN using the Safer Streets Priority tool by Toole Design Group that utilizes a sliding window analysis to develop high-injury corridors for pedestrians, bicyclists and vehicles (or other crashes). The sliding window analysis uses a 1/2 mile window and 1/10th mile increment across all corridors to identify high-injury crash concentration for each segment of roads in West Orange.

The HIN score assigns a higher weight to the most severe crashes. The HIN score is calculated by multiplying the number of Fatal (K) and Incapacitating Injury (A) crashes by 3, and multiplying the number of Non-Incapacitating Injury (B) crashes by 1. Once the weights are established and applied to the crashes, the total number of crashes are aggregated along a corridor while incorporating the crash severity weighting. Possible Injury (C) crashes and Property Damage Only (O) crashes are not reflected.

Separate weighted HINs were developed for each mode (pedestrian, bicycle and motor vehicle) based on different thresholds. The Pedestrian HIN includes all segments with a score of 1 or greater and covers ~17 miles or 10% of West Orange roads. The Bicyclist HIN includes all segments with a score of 1 of greater and covers ~8 miles or 5% of West Orange roads. The Vehicular HIN includes all segments with a score of 5 or greater and covers ~22 miles or 13% of West Orange roads. The combined HIN included all three of the individual-mode HINs and covers about ~34 miles or 20% of all West Orange roads.

The team then developed an environmetal justice score to identify which network segments should be prioritized based on equity factors. All HIN network segments were given a composite score based on the highest average score for each factor.

As noted in the report, the project team then developed the final HIN score by combining the EJ composite score and the HIN crash score.

HIN Corridor	ROAD CLASSIFICATION	SICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Interstate 280	Expressway	0	0	30	0.50	30	14	44
Main Street	Major Arterial	1	8	15	0.44	24	20	44
Main Street	Major Arterial	1	8	15	0.50	24	20	44
Mount Pleasant Avenue	Major Arterial	7	3	15	0.50	25	14	39
Main Street	Major Arterial	1	5	13	0.50	19	20	39
Interstate 280	Expressway	0	0	24	0.50	24	14	38
Main Street	Major Arterial	1	7	7	0.50	15	20	35
Main Street	Major Arterial	1	2	11	0.50	14	20	34
Main Street	Major Arterial	0	3	13	0.50	16	17	33
Interstate 280	Expressway	0	0	26	0.50	26	5	31
Main Street	Major Arterial	0	2	12	0.50	14	17	31
Main Street	Major Arterial	0	3	11	0.50	14	17	31
Main Street	Major Arterial	0	2	10	0.50	12	17	29
Main Street	Major Arterial	0	3	9	0.50	12	17	29
Park Avenue	Major Arterial	0	1	10	0.43	11	17	28
Main Street	Major Arterial	0	1	10	0.47	11	17	28
Mount Pleasant Avenue	Major Arterial	6	3	13	0.50	22	5	27
Eagle Rock Avenue	Major Arterial	1	0	14	0.50	15	11	26
Main Street	Major Arterial	1	7	7	0.50	15	11	26
Main Street	Major Arterial	0	2	7	0.50	9	17	26
Interstate 280	Expressway	0	0	10	0.50	10	14	24
Eagle Rock Avenue	Major Arterial	0	0	16	0.16	16	8	24
Park Avenue	Local Road	0	1	2	0.50	3	20	23
Northfield Avenue	Major Arterial	0	1	17	0.50	18	5	23
Pleasant Valley Way	Major Arterial	0	3	12	0.50	15	8	23
Northfield Avenue	Major Arterial	0	1	17	0.50	18	5	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.50	15	8	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.50	15	8	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.07	15	8	23
Interstate 280	Expressway	0	0	11	0.50	11	11	22
Eagle Rock Avenue	Major Arterial	0	3	11	0.14	14	8	22
Pleasant Valley Way	Major Arterial	1	0	10	0.31	11	11	22
Interstate 280	Expressway	0	0	16	0.34	16	5	21
Northfield Avenue	Major Arterial	0	3	4	0.24	7	14	21
Whittingham Place	Major Arterial	0	0	7	0.50	7	14	21
Eagle Rock Avenue	Major Arterial	0	0	13	0.50	13	8	21
Eagle Rock Avenue	Major Arterial	0	3	10	0.50	13	8	21
Gaston Street	Local Road	6	0	0	0.13	6	14	20
Sayres Place	Local Road	0	1	2	0.17	3	17	20
Whittlesey Avenue	Local Road	0	1	2	0.49	3	17	20

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Interstate 280	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	3	3	3	3	3	0
Mount Pleasant Avenue	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Interstate 280	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Park Avenue	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	3	0	0	3	0
Main Street	0	0	2	3	3	0	0	3	0
Main Street	0	3	2	0	3	3	3	3	0
Interstate 280	3	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Park Avenue	3	3	2	0	3	3	3	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Interstate 280	0	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	3	3	0	0	3	0
Whittingham Place	3	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Gaston Street	3	0	2	3	3	0	0	3	0
Sayres Place	0	3	2	0	3	3	3	3	0
Whittlesev Avenue	0	3	2	0	3	3	3	3	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Pleasant Valley Way	Major Arterial	0	3	9	0.50	12	8	20
Interstate 280	Expressway	0	0	14	0.50	14	5	19
Llewellyn Avenue	Local Road	0	1	1	0.50	2	17	19
Lakeside Avenue	Local Road	0	1	1	0.50	2	17	19
Northfield Avenue	Major Arterial	0	1	13	0.50	14	5	19
Mount Pleasant Avenue	Major Arterial	0	3	11	0.50	14	5	19
Northfield Avenue	Major Arterial	0	1	13	0.50	14	5	19
Pleasant Valley Way	Major Arterial	0	3	8	0.50	11	8	19
Pleasant Valley Way	Major Arterial	0	3	8	0.46	11	8	19
Prospect Avenue	Major Arterial	0	0	11	0.50	11	8	19
Prospect Avenue	Major Arterial	0	0	11	0.17	11	8	19
Pleasant Valley Way	Major Arterial	1	3	4	0.03	8	11	19
Franklin Avenue	Major Collector	0	1	1	0.01	2	17	19
Franklin Avenue	Major Collector	0	1	1	0.49	2	17	19
Ridge Avenue	Local Road	0	1	0	0.50	1	17	18
Eagle Rock Avenue	Major Arterial	0	3	7	0.06	10	8	18
Eagle Rock Avenue	Major Arterial	0	3	7	0.50	10	8	18
Pleasant Valley Way	Major Arterial	1	3	3	0.50	7	11	18
Pleasant Valley Way	Major Arterial	1	3	3	0.50	7	11	18
Laurel Avenue	Minor Arterial	0	0	10	0.21	10	8	18
Interstate 280	Expressway	0	0	12	0.50	12	5	17
Interstate 280	Expressway	0	0	9	0.50	9	8	17
Interstate 280	Expressway	0	0	9	0.50	9	8	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.25	12	5	17
Eagle Rock Avenue	Major Arterial	0	3	6	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.46	9	8	17
Mount Pleasant Avenue	Major Arterial	0	3	6	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Eagle Rock Avenue	Major Arterial	0	0	6	0.50	6	11	17
Interstate 280	Expressway	0	0	11	0.50	11	5	16
Interstate 280	Expressway	0	0	8	0.50	8	8	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Llewellyn Avenue	0	3	2	0	3	3	3	3	0
Lakeside Avenue	0	3	2	0	3	3	3	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Franklin Avenue	0	3	2	0	3	3	3	3	0
Franklin Avenue	0	3	2	0	3	3	3	3	0
Ridge Avenue	0	3	2	0	3	3	3	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Laurel Avenue	3	0	2	0	0	0	0	0	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Mount Pleasant Avenue	Major Arterial	0	3	5	0.18	8	8	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16
Pleasant Valley Way	Major Arterial	1	3	4	0.50	8	8	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16
Kingsley Street	Major Arterial	0	0	5	0.19	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Pleasant Valley Way	Major Arterial	0	1	4	0.50	5	11	16
Pleasant Valley Way	Major Arterial	1	3	1	0.50	5	11	16
Pleasant Valley Way	Major Arterial	0	0	5	0.42	5	11	16
Interstate 280	Expressway	0	0	10	0.48	10	5	15
Interstate 280	Expressway	1	0	6	0.50	7	8	15
Interstate 280	Expressway	0	0	7	0.30	7	8	15
Woodland Avenue	Local Road	0	0	7	0.35	7	8	15
Lindsley Avenue	Local Road	0	4	0	0.50	4	11	15
Renna Plaza	Local Road	1	0	3	0.02	4	11	15
Pleasant Valley Way	Major Arterial	0	0	10	0.30	10	5	15
Pleasant Valley Way	Major Arterial	1	0	6	0.50	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.41	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.43	7	8	15
Prospect Avenue	Major Arterial	0	1	6	0.50	7	8	15
Prospect Avenue	Major Arterial	0	0	7	0.50	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.50	7	8	15
Pleasant Valley Way	Major Arterial	0	1	3	0.12	4	11	15
Valley Road	Major Arterial	1	0	3	0.42	4	11	15
Pleasant Valley Way	Major Arterial	0	1	3	0.03	4	11	15
Main Street	Major Collector	0	0	7	0.50	7	8	15
Rooney Circle	Local Road	0	3	3	0.50	6	8	14
Prospect Avenue	Major Arterial	0	0	6	0.50	6	8	14
Prospect Avenue	Major Arterial	0	0	6	0.47	6	8	14
Pleasant Valley Way	Major Arterial	0	1	2	0.50	3	11	14
Pleasant Valley Way	Major Arterial	0	1	2	0.48	3	11	14
Pleasant Valley Way	Major Arterial	0	1	2	0.50	3	11	14
Valley Way	Major Collector	1	0	2	0.50	3	11	14
Interstate 280	Expressway	0	0	8	0.50	8	5	13
Interstate 280	Expressway	0	0	8	0.50	8	5	13
Woodland Avenue	Local Road	0	1	1	0.49	2	11	13
Prospect Avenue	Major Arterial	0	0	5	0.50	5	8	13

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	3
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Kingsley Street	0	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Woodland Avenue	3	0	2	0	0	0	0	3	0
Lindsley Avenue	0	0	2	3	3	0	0	3	0
Renna Plaza	0	0	2	3	3	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant valley way	3	0	2	0	0	0	0	3	3
	0	0	2	3	3	0	0	3	0
Main Street	3	0	2	0	0	0	0	3	5
Rooney Circle	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Valley Way	3	0	2	0	3	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Woodland Avenue	3	0	2	0	0	0	0	3	3
Prospect Avenue	3	0	2	0	0	0	0	3	0

IN Corridor	ROAD LASSIFICATION	CYCLE HIN SCORE	EDESTRIAN HIN SCORE	/EHICULAR HIN SCORE	.ENGTH (Miles)	<b>JTAL HIN SCORE</b>	EJ SCORE	MPOSITE EJ/HIN SCORE
I	0	BIO	۹.	-	_	Ĕ		8
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	0	5	0.27	5	8	13
Central Avenue	Major Arterial	0	2	0	0.10	2	11	13
Valley Road	Major Arterial	1	0	1	0.49	2	11	13
Interstate 280	Expressway	0	0	7	0.30	7	5	12
Interstate 280	Expressway	0	0	7	0.43	7	5	12
Interstate 280	Expressway	0	0	7	0.42	7	5	12
Rooney Circle	Local Road	0	3	1	0.50	4	8	12
Brennan Drive	Major Arterial	0	3	4	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	7	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	/	0.50	/	5	12
Northfield Avenue	Major Arterial	0	0	/	0.40	/	5	12
Northfield Avenue	Major Arterial	1	0	6	0.50	/	5	12
Northfield Avenue	Major Arterial	0	0	/	0.50	/	5	12
Interstate 280	Expressway	0	0	6	0.50	6	5	11
Stanford Avenue	Local Road	0	3	0	0.50	3	8	11
Fitzrandolph Road	Local Road	0	1	2	0.41	3	8	11
Bloomfield way	Local Road	1	0	2	0.26	3	8	11
Northfield Avenue	Major Arterial	0	1	10	0.50	11	0	11
Northfield Avenue	Major Arterial	0	1	10	0.07	11	0	11
Northfield Avenue	Major Arterial	0	0	6	0.48	6	5	11
Northfield Avenue	Major Arterial	1	0	0	0.41	0	о О	11
Interstate 280	Exprosession	1	0	1	0.39	2	0	10
Interstate 280	Expressway	0	3	1	0.50	2	5	10
Suburban Drive	Local Road	0	1	-	0.50	1	8	9
Old Indian Boad	Local Road	1	0	0	0.50	1	8	9
Colony Drive East	Local Road	1	0	0	0.50	1	8	9
Northfield Avenue	Maior Arterial	-	0	9	0.50	9	0	9
Northfield Avenue	Major Arterial	0	0	9	0.50	9	0	9
Northfield Avenue	Major Arterial	0	1	8	0.50	9	0	9
Northfield Avenue	Maior Arterial	0	1	8	0.03	9	0	9
Northfield Avenue	Maior Arterial	0	0	9	0.35	9	0	9
Northfield Avenue	Major Arterial	0	1	8	0.49	9	0	9
Northfield Avenue	Major Arterial	0	0	9	0.33	9	0	9
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Central Avenue	0	0	2	3	3	0	0	3	0
Valley Road	0	0	2	3	3	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Rooney Circle	3	0	2	0	0	0	0	3	0
Brennan Drive	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Stanford Avenue	3	0	2	0	0	0	0	0	3
Fitzrandolph Road	3	0	2	0	0	0	0	3	0
Bloomfield Way	0	0	2	0	3	0	0	3	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Suburban Drive	3	0	2	0	0	0	0	3	0
Old Indian Road	3	0	2	0	0	0	0	3	0
Colony Drive East	3	3	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0



HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Northfield Avenue	Major Arterial	0	1	7	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	1	2	0.36	3	5	8
Pleasant Valley Way	Major Arterial	1	0	2	0.50	3	5	8
Pleasant Valley Way	Major Arterial	1	0	2	0.50	3	5	8
Northfield Avenue	Major Arterial	0	0	7	0.50	7	0	7
Northfield Avenue	Major Arterial	0	1	6	0.50	7	0	7
Northfield Avenue	Major Arterial	0	0	7	0.50	7	0	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Pleasant Valley Way	Major Arterial	1	0	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Pleasant Valley Way	Major Arterial	1	0	1	0.50	2	5	7
Vizcaya Boulevard	Local Road	0	1	0	0.50	1	5	6
Winding Way	Local Road	0	1	0	0.50	1	5	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Pleasant Valley Way	Major Arterial	1	0	0	0.48	1	5	6
Northfield Avenue	Major Arterial	0	0	5	0.50	5	0	5
Northfield Avenue	Major Arterial	0	0	5	0.50	5	0	5

0.50

5

0

5

5

Major Arterial

Northfield Avenue

0

0

5	e e	ė	ė	e e		ē		ė	e e
IN Corrido	Senior (65+) opulation Scor	Youth (5-17) opulation Scor	Disabled opulation Scor	Zero-Vehicle ousehold Scor	<b>Minority Score</b>	w Income Sco	LEP Score	Foreign-Born opulation Scor	Child (Under 5 opulation Scor
I	<u>م</u>	۲ ۲	۲ ۲	Ŧ		۲		ă.	<u> </u>
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Vizcaya Boulevard	3	0	2	0	0	0	0	0	0
Winding Way	0	3	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0





# ΝΑCΤΟ



Urban Street Design Guide https://nacto.org/publication/urban-street-design-guide/



Urban Bikeway Design Guide https://nacto.org/publication/urban-bikeway-design-guide/

Vision Zerø



Transit Street Design Guide https://nacto.org/publication/transit-street-design-guide/



Urban Street Stormwater Guide https://nacto.org/publication/urban-street-stormwater-guide/

Guidance List Credit: NJTPA



Vision

#### Global Street Design Guide https://nacto.org/publication/global-street-design-guide/



# Blueprint for Autonomous Urbanism https://nacto.org/publication/bau2/



#### Designing for All Ages & Abilities https://nacto.org/publication/urban-bikeway-design-guide/ designing-ages-abilities-new/



Designing Streets for Kids https://nacto.org/publication/designing-streets-for-kids/



#### Bikeshare Station Siting Guide

https://nacto.org/publication/bike-share-station-siting-guide/



Don't Give Up at the Intersection https://nacto.org/publication/dont-give-up-at-the-intersection/

Guidance List Credit: NJTPA

# NJDOT



#### Complete & Green Streets for All https://www.nj.gov/transportation/eng/completestreets/pdf/ CS\_Model\_Policy\_2019.pdf



Creating a Complete Streets Implementation Plan<sup>1</sup> https://www.nj.gov/transportation/eng/completestreets/pdf/ cscreateimplementationplan.pdf



#### School Bike Parking Guide



#### NJ Complete Streets Design Guide

https://www.nj.gov/transportation/eng/completestreets/pdf/ NJCS\_DesignGuide.pdf



https://www.nj.gov/transportation/eng/completestreets/pdf/ cspolicydevelopmentguide2012.pdf



New Jersey School Zone Design Guide https://www.saferoutesnj.org/new-jersey-school-zone-design-guide/

WEST ORANGE TOWNSHIP: **VISION ZERO ACTION PLAN** 151

# **FHWA**

Vision Zerø



## Making our Roads Safer One Countermeasure at a Time

https://safety.fhwa.dot.gov/provencountermeasures/pdf/ FHWA-SA-21-071\_PSC%20Booklet\_508.pdf



#### Road Diet Informational Guide

https://safety.fhwa.dot.gov/road\_diets/guidance/info\_guide/



Recommendations of the Safe System Consortium https://publichealth.jhu.edu/sites/default/files/2023-03/ recommendations-of-the-safe-system-consortium.pdf



#### Separated Bike Lane Planning and Design Guide https://www.fhwa.dot.gov/environment/bicycle pedestrian/

publications/separated\_bikelane\_pdg/separatedbikelane\_pdg.pdf

#### Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide

Program Manager: Barbara McMillen Authors: Bengficial Dosigns, Inc. Julie B. Kirschbaum, B.A. Peter W. Acelson, M.S.M.E., A.T.P. Patricia E. Longmuir, M.S.C. Kathleen M. Mispagel, M.S., C.T.R.S. Julie A. Stein, B.A. Denise A. Yamada, M.E., B.M.E.

#### Designing Sidewalks and Trails for Access, Part II

https://nacto.org/wp-content/uploads/2015/04/designing\_ sidewalks\_and\_trails\_access\_kirschbaum.pdf



A Safe System-Based Framework and Analytical Methodology for Assessing Intersections hhttps://safety.fhwa.dot.gov/intersection/ssi/fhwasa21008.pdf *Guidance List Credit: NJTPA* 

152 WEST ORANGE TOWNSHIP: VISION ZERO ACTION PLAN



Rural Roadway Departure Countermeasure Pocket Guide https://safety.fhwa.dot.gov/FoRRRwD/RwDPocketGuide.pdf

# ADA



2010 ADA Standards for Accessible Design https://www.ada.gov/assets/\_pdfs/2010-design-standards.pdf



Vision Zerg

The Access Board has published new guidelines under the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) that address access to sidewalks and streets, crosswalks, curb ramps, pedestrian signals, on-street parking, and other components of public right-of-way. These guidelines also review shared use paths, which are designed primarily for use by bicyclists and pedestrians for transportation and recreation purposes.

#### PROWAG- Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way

https://www.access-board.gov/prowag/

Guidance List Credit: NJTPA

# TACTICAL URBANISM GUIDES



#### Tactical Urbanism

Vision Zerø

> https://issuu.com/streetplanscollaborative/docs/tactical\_ urbanism\_vol.1



Urbanismo Tactico 3: Casos Latinoamericanos https://issuu.com/streetplanscollaborative/docs/ut\_ vol3\_2013\_0528\_17



#### Tactical Urbanism 5: Italia

154

https://issuu.com/streetplanscollaborative/docs/tu\_italy\_eng WEST\_ORANGE\_TOWNSHIP: VISION ZERO ACTION PLAN



#### Tactical Urbanism 2

https://issuu.com/streetplanscollaborative/docs/tactical\_urbanism\_vol\_2\_final



Tactical Urbanism 4: Australia & New Zealand https://issuu.com/streetplanscollaborative/docs/ tacticalurbanismvol4\_141020



MIKE LYDON & ANTHONY GARCIA

Tactical Urbanism: Short-term Action for Long-Term Change

Guidance List Credit: NJTPA

### The Open Streets Guide



#### The Open Streets Guide

https://nacto.org/docs/usdg/smaller\_open\_streets\_guide\_ final\_print\_alliance\_biking\_walking.pdf



Tactical Urbanist's Guide to Materials and Design http://tacticalurbanismguide.com/



#### Asphalt Art Guide

https://assets.bbhub.io/dotorg/sites/43/2019/10/asphalt-art-guide.pdf

Vision Zerø

## FAST-TRACKED () () A TACTICAL TRANSIT STUDY



Fast-Tracked: A Tactical Transit Study https://issuu.com/streetplanscollaborative/docs/fasttracked\_ finaldraft\_2



# APPENDIX F: SURVEY RESULTS

Q1. Have you heard of the Vision Zero and FHWA's Safe System Approach to traffic safety? The West Orange Vision Zero Action Plan will be adopting FHWA's Safe System Approach which focuses on a holistic view of the roadway system, noting that humans will make mistakes and are vulnerable, but the transportation system should be designed with multiple "safety nets" with the goal of eliminating deaths and serious injuries.



Q2. How important do you think it is to have a policy and plan in West Orange Township that aims to eliminate deaths and serious injuries from traffic crashes?



- Very important
- Important
- Moderately important

- Of little importance
- Not important at all











Q10: If you primarily drive to places in West Orange Township, let us know what are the major barriers to using nonmotorized travel modes such as walking or driving more. If driving is NOT the primary mode of travel, please SKIP this question.




Q11: Improving roadway and traffic safety requires some trade-offs such as: (list of trade-offs pictured below) Which trade-offs would you be willing to accept in order to prioritize safety, comfort and well-being of the West Orange Community?



Q12: Do you have any equity or environmental justice concerns relating to strategies that will increase traffic safety?



## Q14: The Township's Vision Zero Action Plan will focus on vulnerable users in developing actions to improve roadway safety. Do you identify with any of the following user groups?



## Q15: How are you connected to West Orange Township?



Vision Zerø



Q16: If you are a resident of West Orange Township, let us know which street you live on? We ask this question so we know if we have good representation from all parts of the Township. (word cloud of responses below)



Vision Zerø



