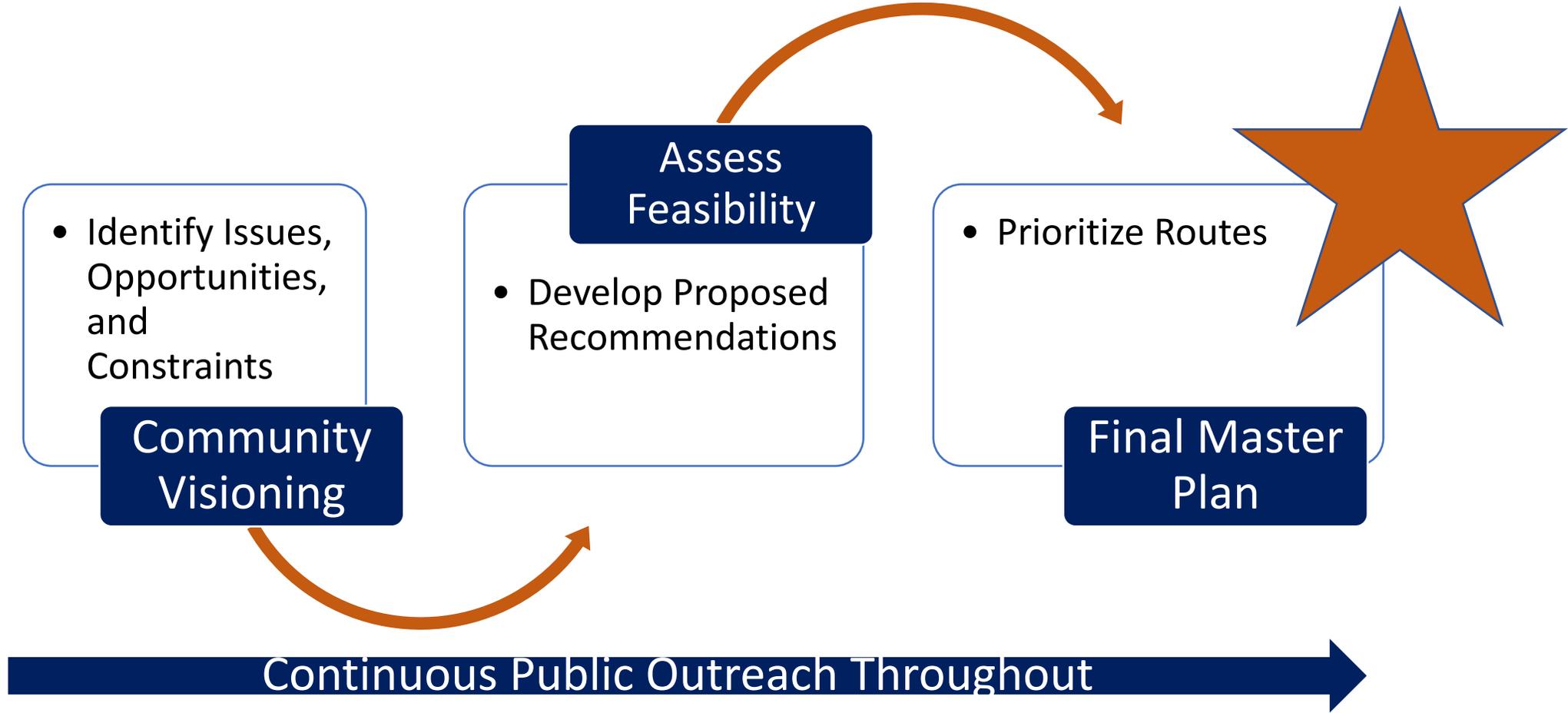


Milford Bicycle Master Plan

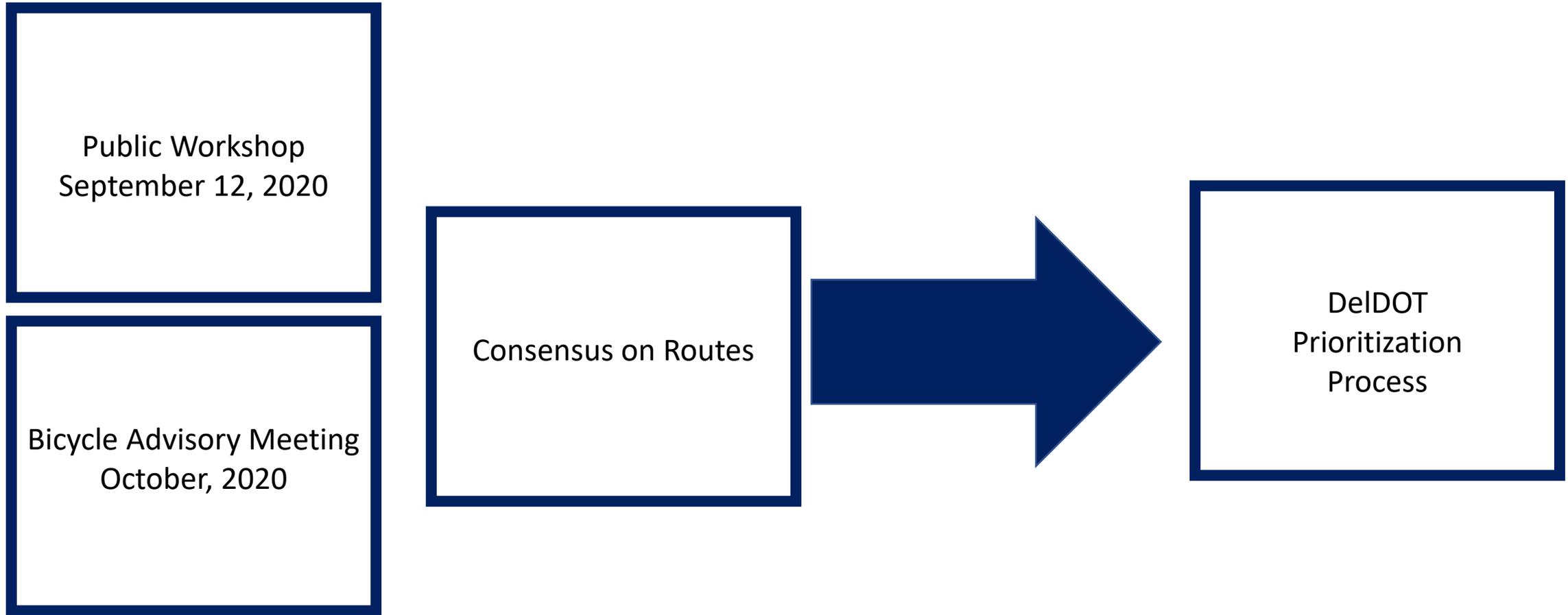
Bicycle Advisory Committee

March 10, 2021

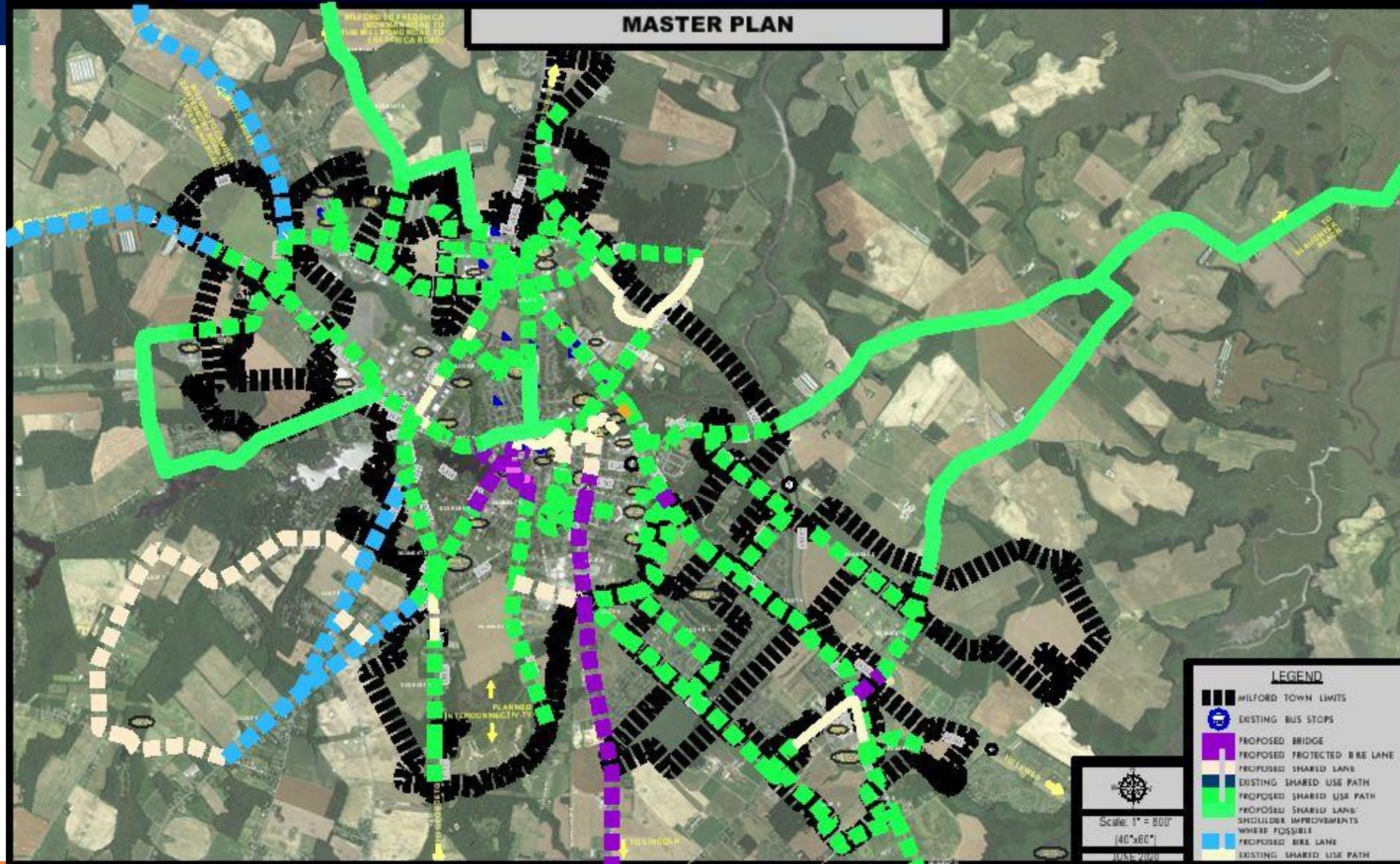
# Century Work Plan



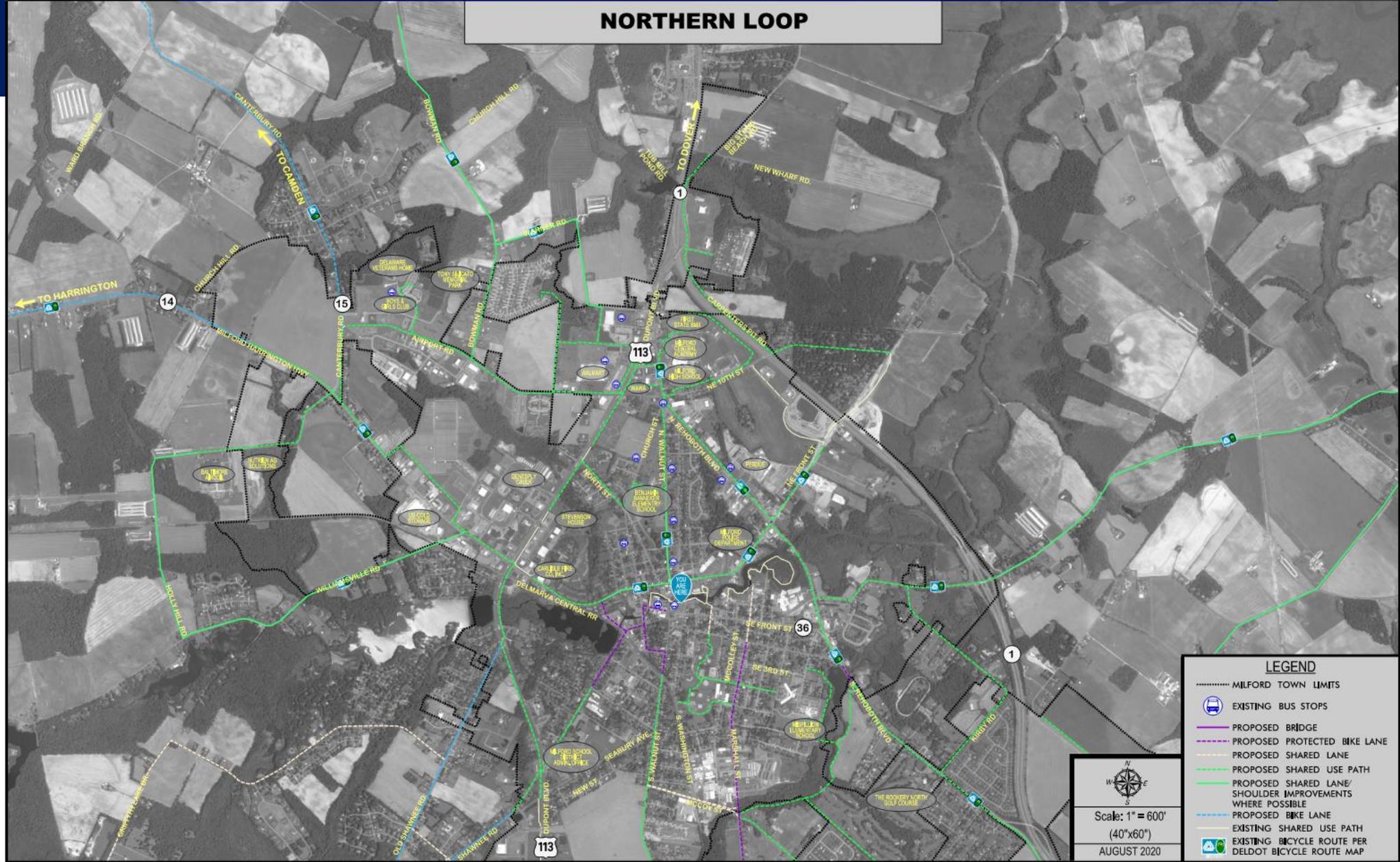
# Status



# Master Plan



# NORTHERN LOOP



**LEGEND**

- MILFORD TOWN LIMITS
- EXISTING BUS STOPS
- PROPOSED BRIDGE
- PROPOSED PROTECTED BIKE LANE
- PROPOSED SHARED LANE
- PROPOSED SHARED USE PATH
- PROPOSED SHARED LANE/SHOULDER IMPROVEMENTS WHERE POSSIBLE
- PROPOSED BIKE LANE
- EXISTING SHARED USE PATH
- EXISTING BICYCLE ROUTE PER DELDOT BICYCLE ROUTE MAP

Scale: 1" = 600'  
(40"x60")  
AUGUST 2020

# SOUTH WEST LOOP





# Milford Bike Plan: Projects Evaluated

Milford\_Project\_Dissolved

## Legend

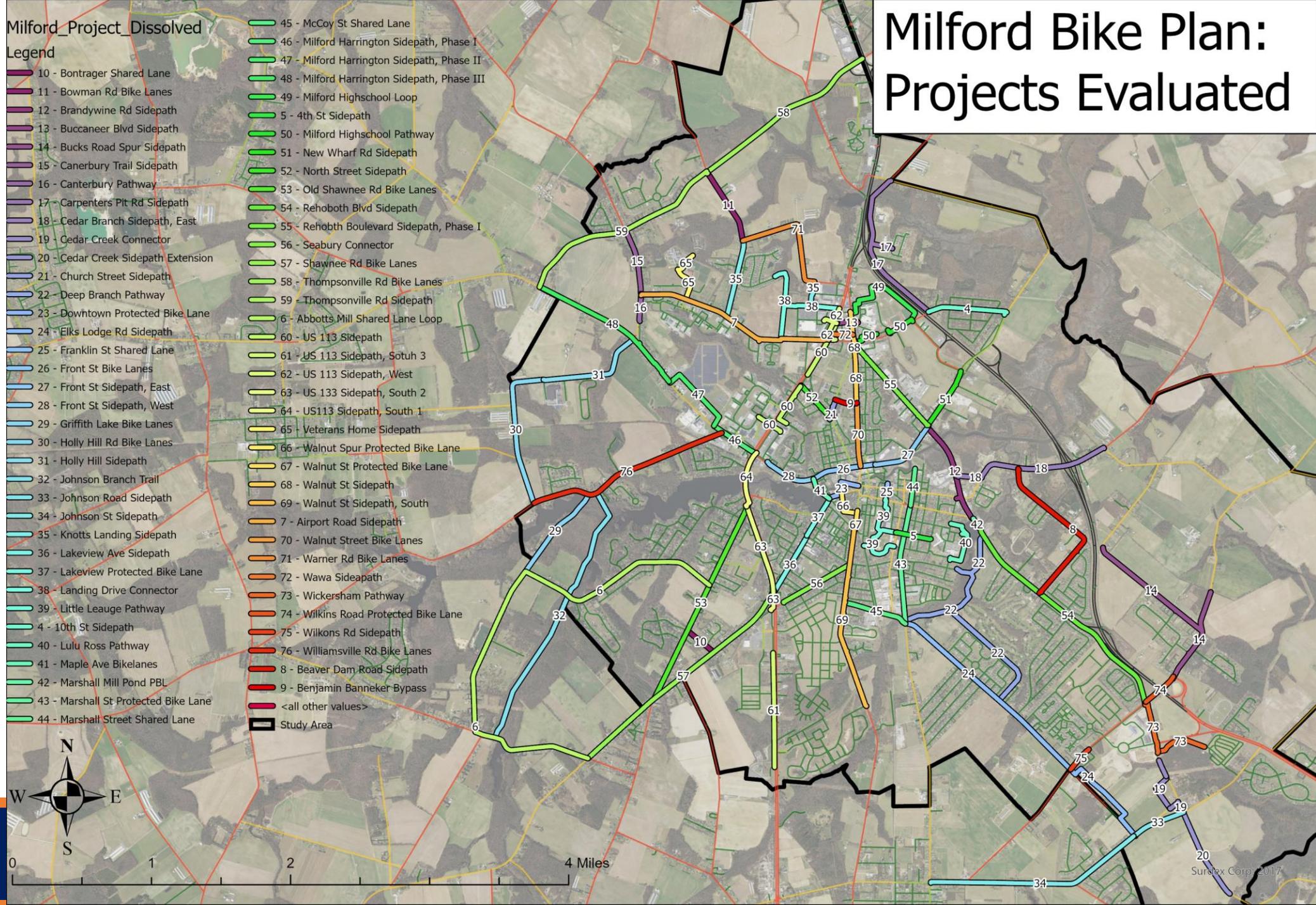
- 10 - Bontrager Shared Lane
- 11 - Bowman Rd Bike Lanes
- 12 - Brandywine Rd Sidepath
- 13 - Buccaneer Blvd Sidepath
- 14 - Bucks Road Spur Sidepath
- 15 - Canterbury Trail Sidepath
- 16 - Canterbury Pathway
- 17 - Carpenters Pit Rd Sidepath
- 18 - Cedar Branch Sidepath, East
- 19 - Cedar Creek Connector
- 20 - Cedar Creek Sidepath Extension
- 21 - Church Street Sidepath
- 22 - Deep Branch Pathway
- 23 - Downtown Protected Bike Lane
- 24 - Elks Lodge Rd Sidepath
- 25 - Franklin St Shared Lane
- 26 - Front St Bike Lanes
- 27 - Front St Sidepath, East
- 28 - Front St Sidepath, West
- 29 - Griffith Lake Bike Lanes
- 30 - Holly Hill Rd Bike Lanes
- 31 - Holly Hill Sidepath
- 32 - Johnson Branch Trail
- 33 - Johnson Road Sidepath
- 34 - Johnson St Sidepath
- 35 - Knotts Landing Sidepath
- 36 - Lakeview Ave Sidepath
- 37 - Lakeview Protected Bike Lane
- 38 - Landing Drive Connector
- 39 - Little Leauge Pathway
- 4 - 10th St Sidepath
- 40 - Lulu Ross Pathway
- 41 - Maple Ave Bikelanes
- 42 - Marshall Mill Pond PBL
- 43 - Marshall St Protected Bike Lane
- 44 - Marshall Street Shared Lane

- 45 - McCoy St Shared Lane
- 46 - Milford Harrington Sidepath, Phase I
- 47 - Milford Harrington Sidepath, Phase II
- 48 - Milford Harrington Sidepath, Phase III
- 49 - Milford Highschool Loop
- 5 - 4th St Sidepath
- 50 - Milford Highschool Pathway
- 51 - New Wharf Rd Sidepath
- 52 - North Street Sidepath
- 53 - Old Shawnee Rd Bike Lanes
- 54 - Rehoboth Blvd Sidepath
- 55 - Rehobth Boulevard Sidepath, Phase I
- 56 - Seabury Connector
- 57 - Shawnee Rd Bike Lanes
- 58 - Thompsonville Rd Bike Lanes
- 59 - Thompsonville Rd Sidepath
- 6 - Abbotts Mill Shared Lane Loop
- 60 - US 113 Sidepath
- 61 - US 113 Sidepath, Sotuh 3
- 62 - US 113 Sidepath, West
- 63 - US 133 Sidepath, South 2
- 64 - US113 Sidepath, South 1
- 65 - Veterans Home Sidepath
- 66 - Walnut Spur Protected Bike Lane
- 67 - Walnut St Protected Bike Lane
- 68 - Walnut St Sidepath
- 69 - Walnut St Sidepath, South
- 7 - Airport Road Sidepath
- 70 - Walnut Street Bike Lanes
- 71 - Warner Rd Bike Lanes
- 72 - Wawa Sidepath
- 73 - Wickersham Pathway
- 74 - Wilkins Road Protected Bike Lane
- 75 - Wilkons Rd Sidepath
- 76 - Williamsville Rd Bike Lanes
- 8 - Beaver Dam Road Sidepath
- 9 - Benjamin Banneker Bypass
- <all other values>

Study Area



0 1 2 4 Miles



# Projects evaluated with DeIDOT Bicycle Mobility Tool

- Looks at Existing and Proposed Bicycle Connectivity to
  - Transit
  - Schools
  - Community Centers
  - Employment Centers
  - Parks
- Looks at improvements at different *Levels of Traffic Stress*
- Allows us to directly compare the value of projects, for connecting people to places.

# Level of Traffic Stress

- A metric of suitability of a roadway for cycling
- Each level relates to a ***type of rider***
- Allows us to view mobility from perspective of casual cyclists and understand ***barriers*** to a useful, connected network

- Level of Traffic Stress

- LTS1: 12-year-old child
- LTS2: typical person able to bike
- LTS3: enthusiastic and willing to tolerate some stressful roadways and intersection
- LTS4: aggressive and willing to bike anywhere

INCREASING LEVEL OF COMFORT, SAFETY, AND INTEREST IN BICYCLING FOR TRANSPORTATION

## LTS 4

No bike lane on a busy street



## LTS 3

Narrow bike lane or shoulder on a busy street



## LTS 2

Buffered bike lane on a calm street



## LTS 1

Separated bike lane



# Milford Bike Plan: Existing Level of Traffic Stress

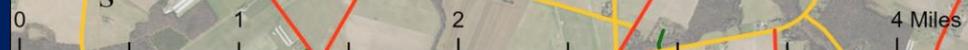
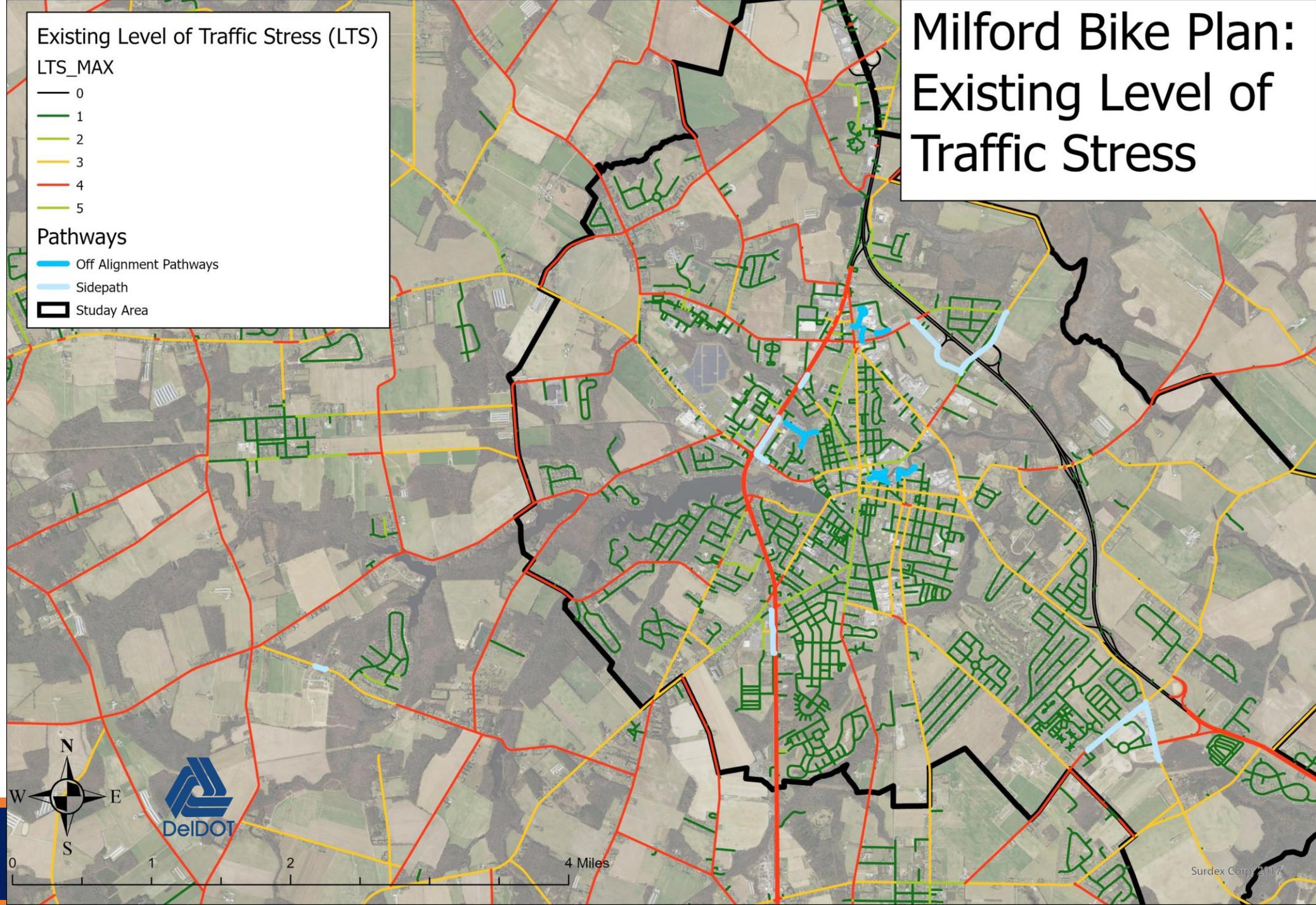
Existing Level of Traffic Stress (LTS)

LTS\_MAX

- 0
- 1
- 2
- 3
- 4
- 5

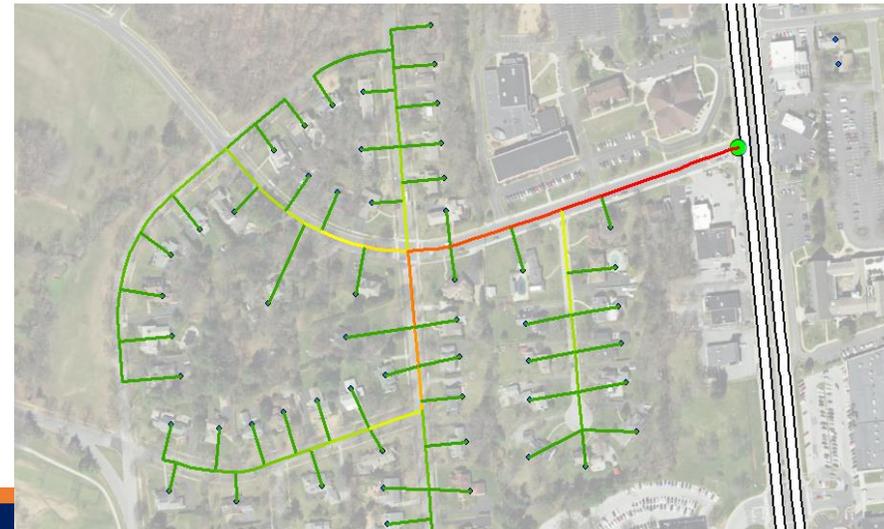
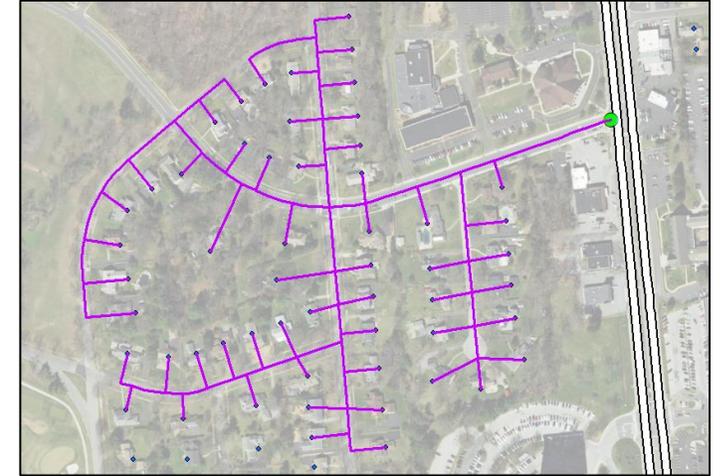
Pathways

- Off Alignment Pathways
- Sidepath
- Stoday Area



# Modeling household connectivity

- Origin-to-Destination (OD) routing, on each LTS level
- Evaluates **Propensity Score** (0-1), for each OD Pair, based on *route distance* and *detour from shortest possible route*
- Measure **improvement** between different scenarios
- Results scaled and ranked relative to one another



# Standalone Projects evaluated

- Evaluated each project as Standalone
- Many projects only show an improvement in connectivity when *in combination with other projects*
  - *Still working on Scenario results*
  - *Should have results in about a month*
  - *Projects which ranked low, for this reason, are not shown on results presented here*

# Milford Bike Plan: Projects Evaluated

Milford\_Project\_Dissolved

## Legend

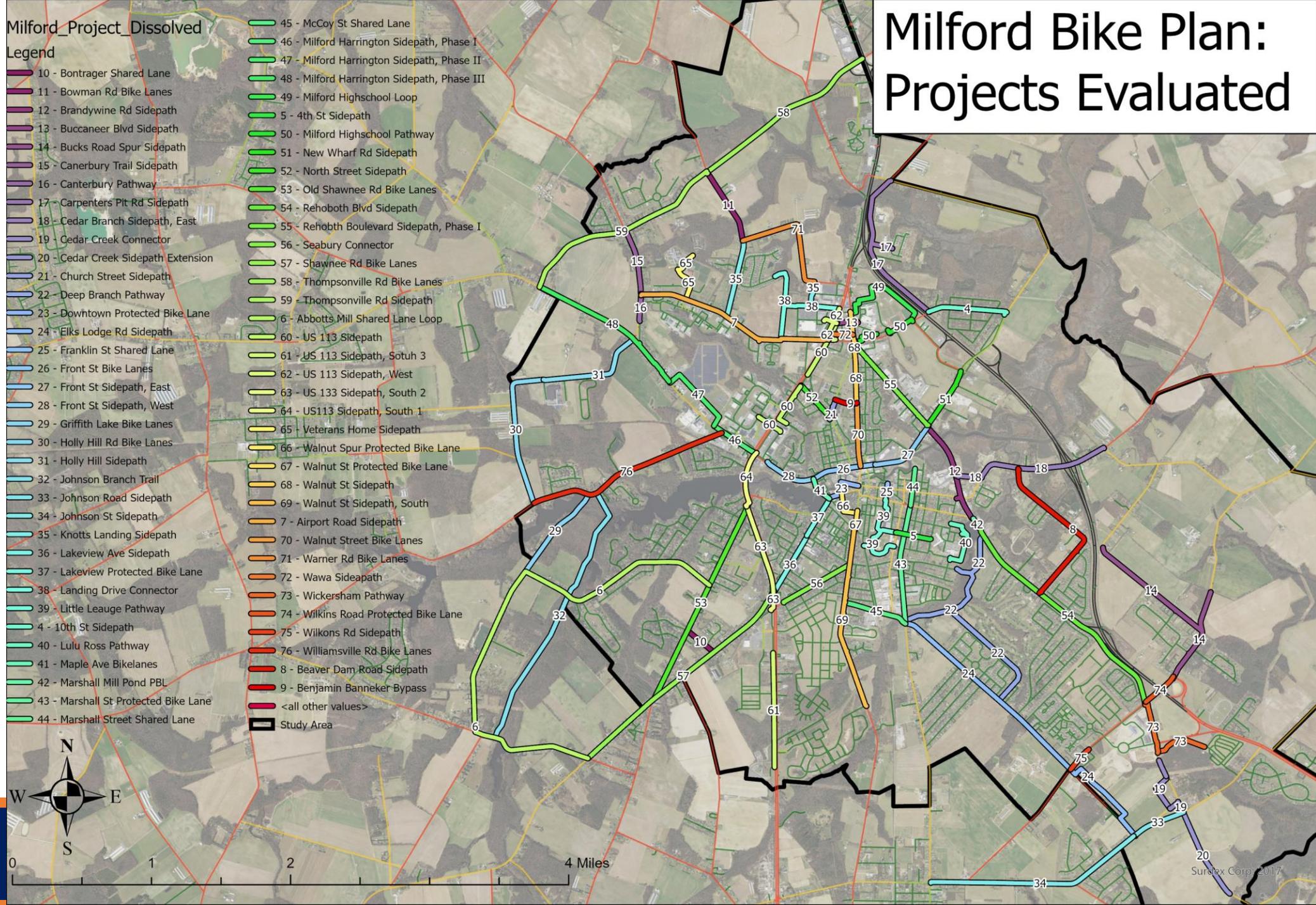
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- 28 - Front St Sidepath, West
- 29 - Griffith Lake Bike Lanes
- 30 - Holly Hill Rd Bike Lanes
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- 59 - Thompsonville Rd Sidepath
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- 62 - US 113 Sidepath, West
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- 75 - Wilkons Rd Sidepath
- 76 - Williamsville Rd Bike Lanes
- 8 - Beaver Dam Road Sidepath
- 9 - Benjamin Banneker Bypass
- <all other values>

Study Area



0 1 2 4 Miles



# Milford Bike Plan: Existing Level of Traffic Stress

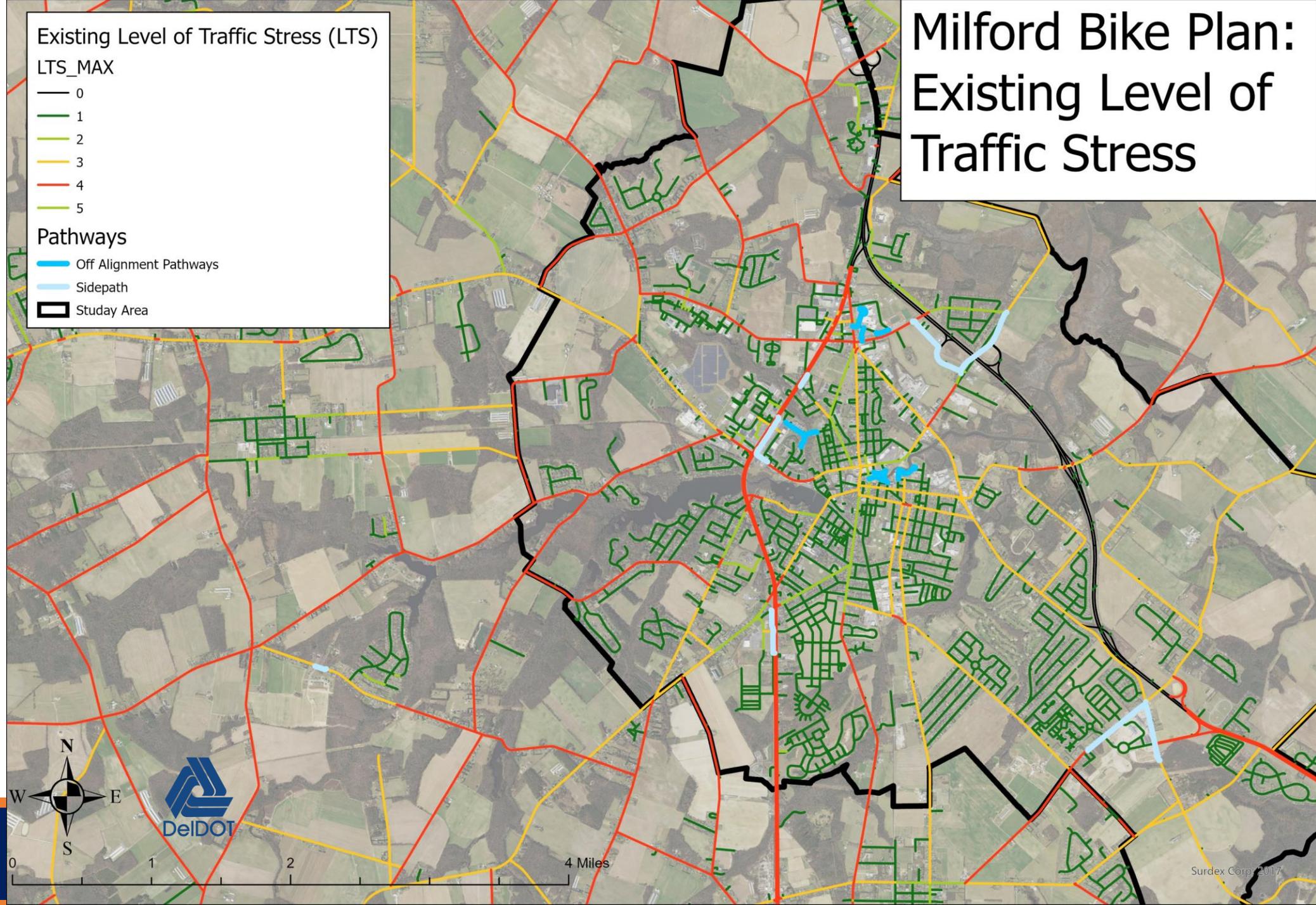
Existing Level of Traffic Stress (LTS)

LTS\_MAX

- 0
- 1
- 2
- 3
- 4
- 5

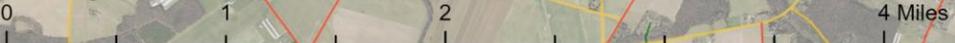
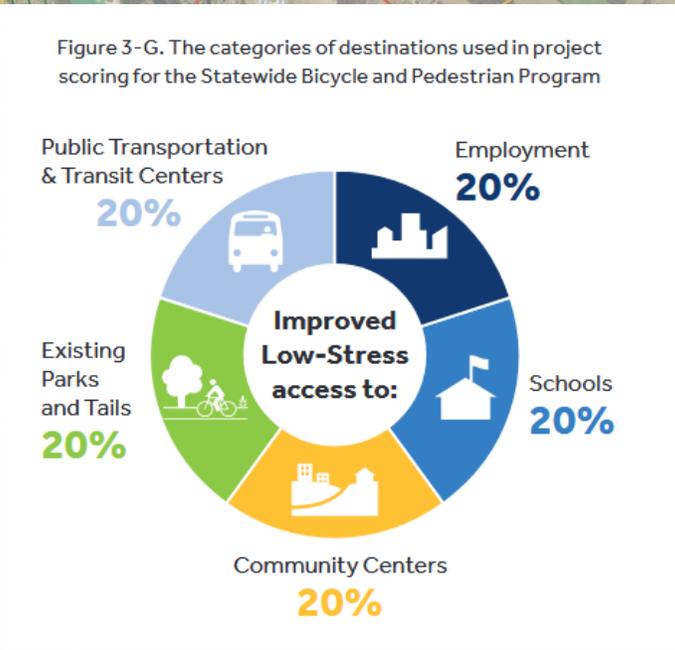
Pathways

- Off Alignment Pathways
- Sidepath
- Stoday Area

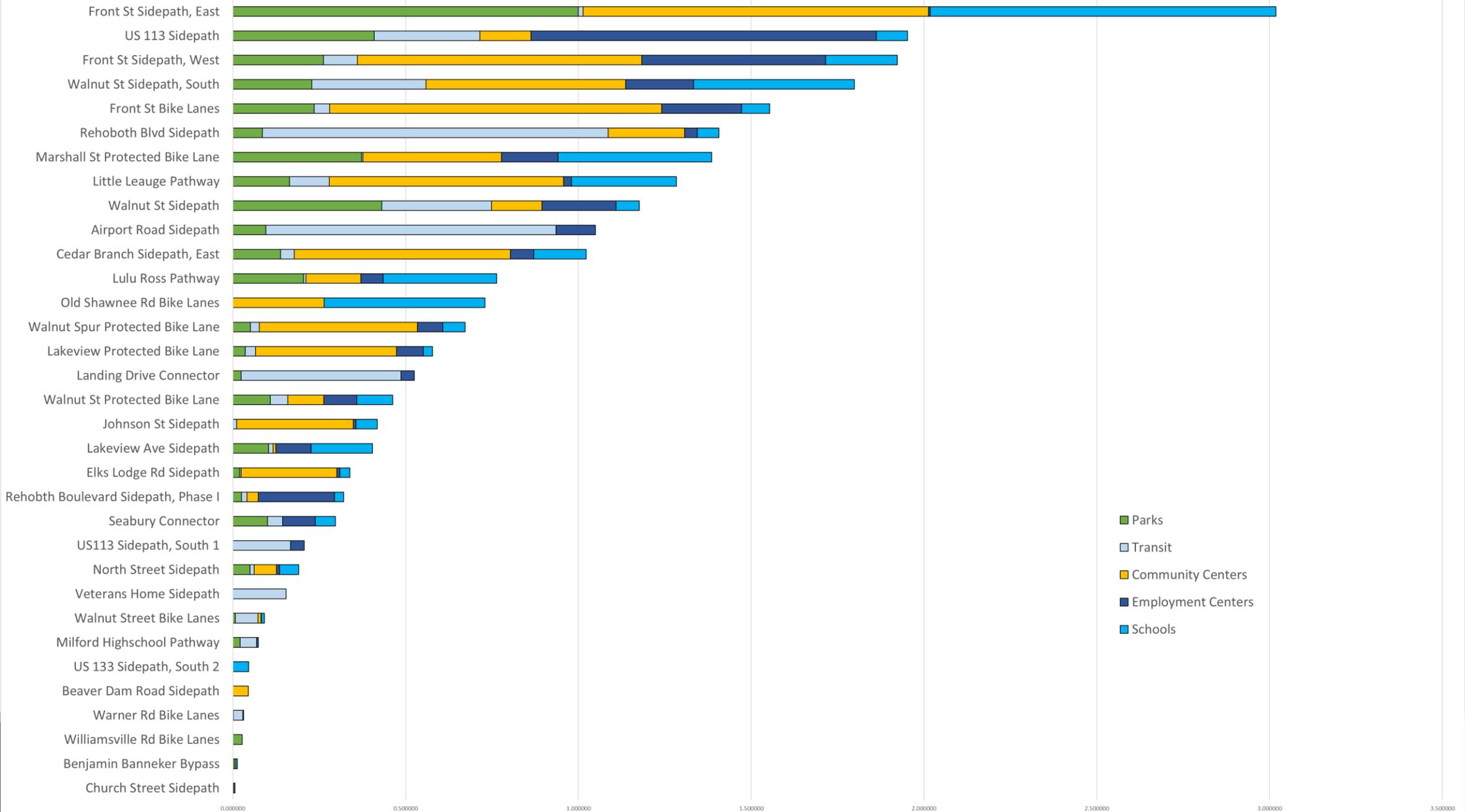


# Milford Bike Plan: Points of Interest (POI)

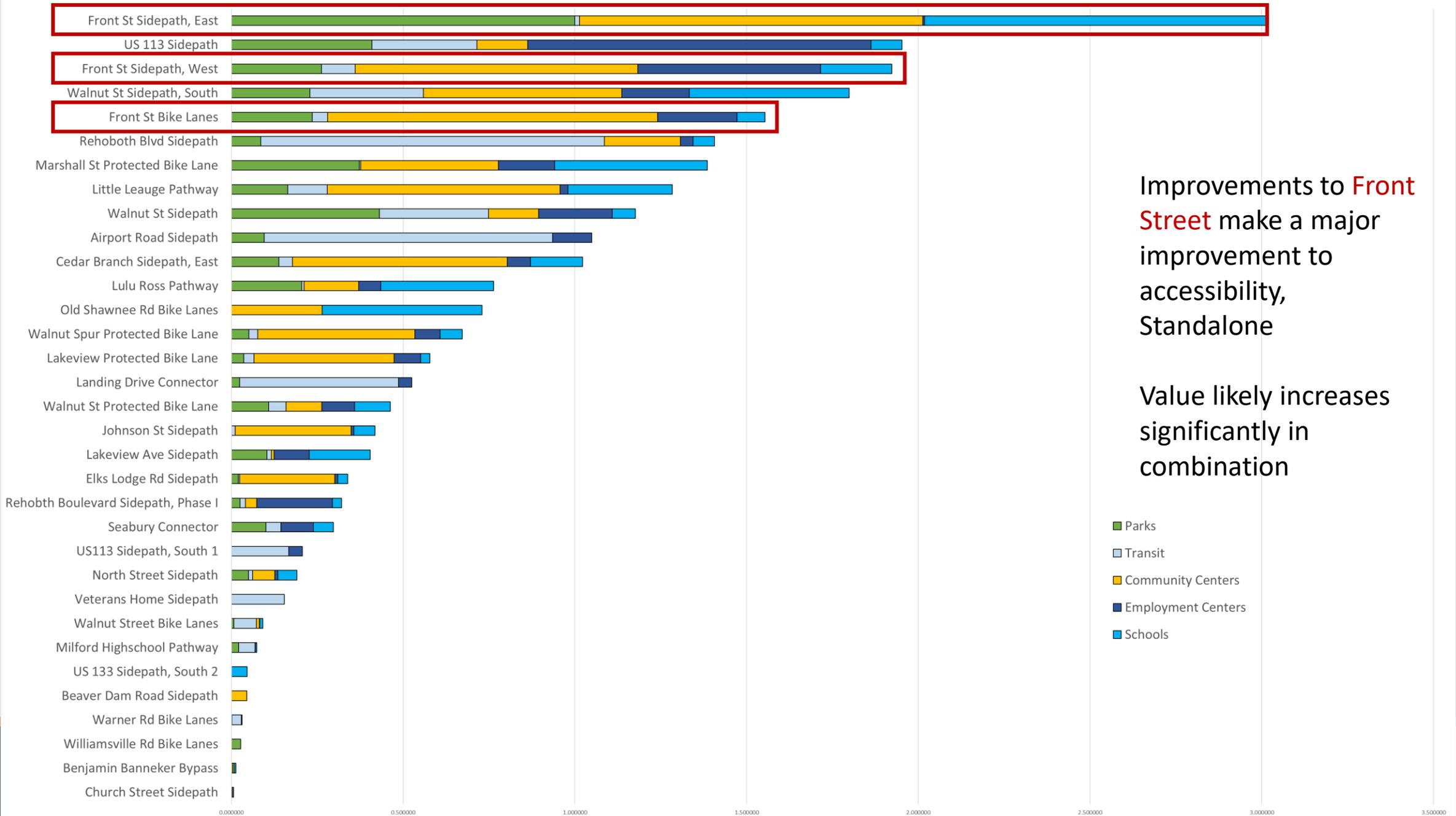
- Transit
- Parks
- Community\_Centers
- Schools
- Employment\_Centers
- ▭ Study Area



# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores



# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores

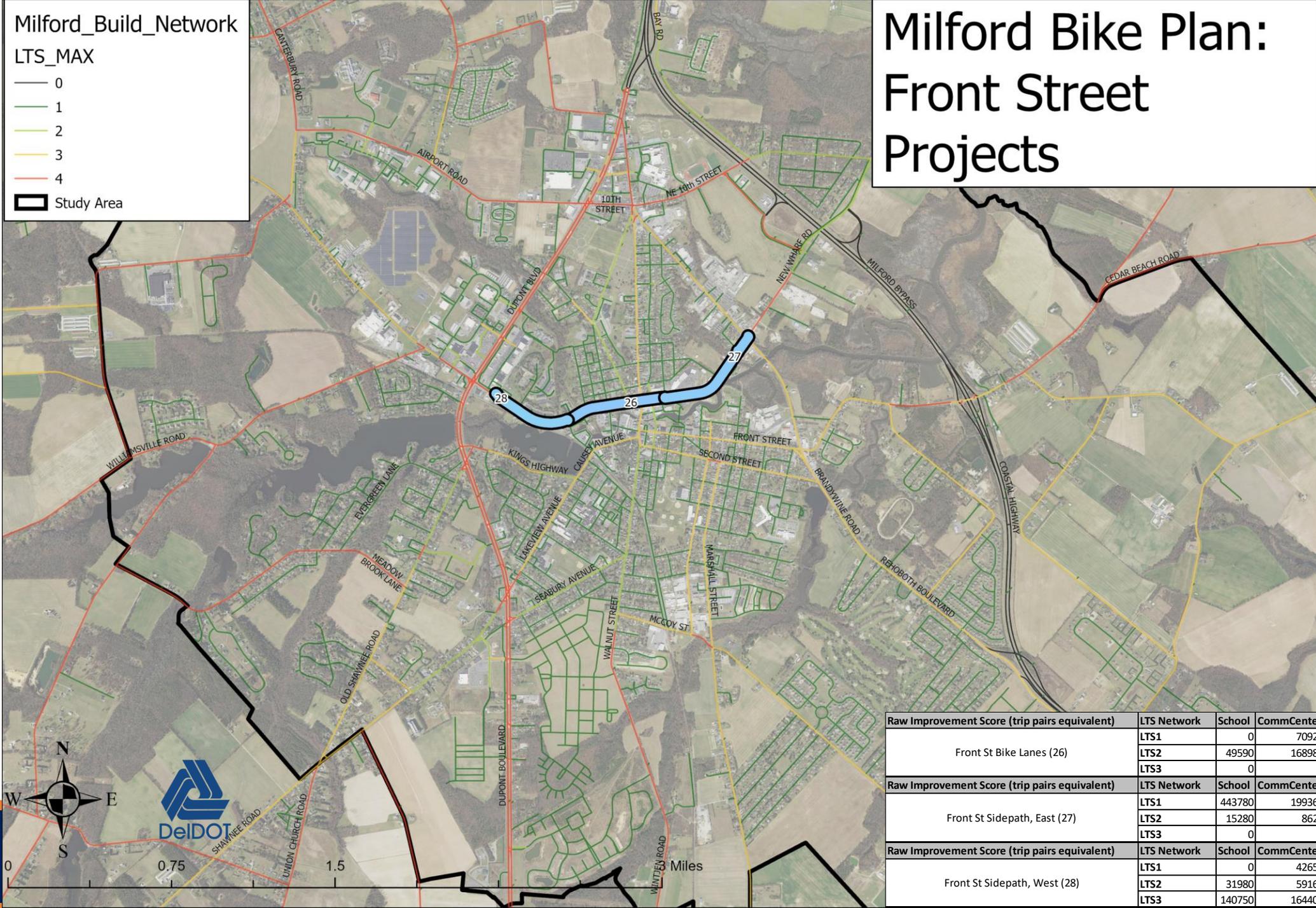
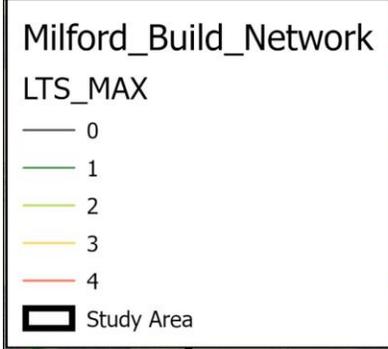


Improvements to **Front Street** make a major improvement to accessibility, Standalone

Value likely increases significantly in combination

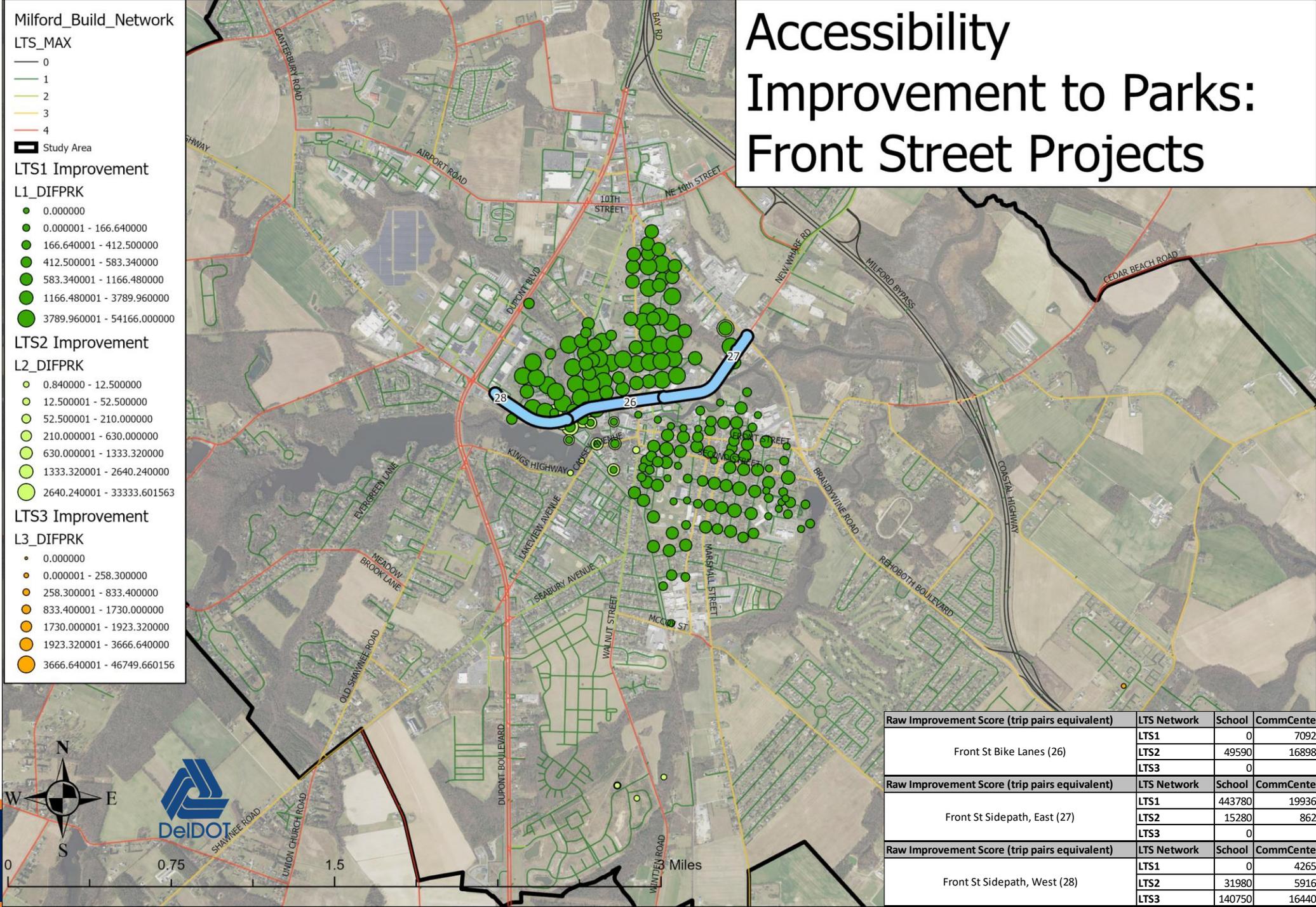
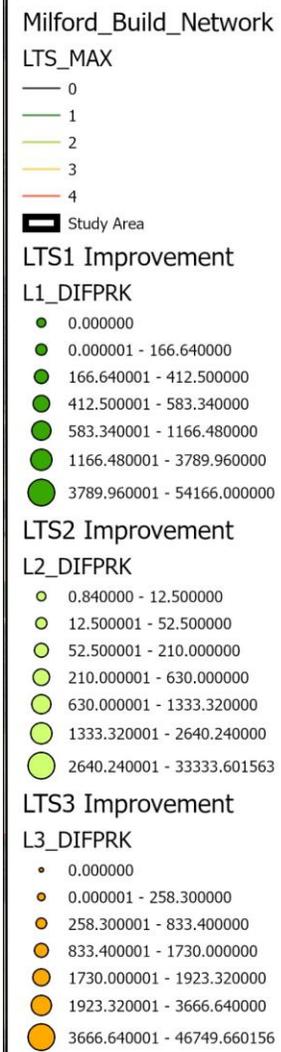
- Parks
- Transit
- Community Centers
- Employment Centers
- Schools

# Milford Bike Plan: Front Street Projects



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Front St Bike Lanes (26)	LTS1	0	70920	182370	44270	58530
	LTS2	49590	168980	201150	54360	79790
	LTS3	0	0	0	0	0
Front St Sidepath, East (27)	LTS1	443780	199360	0	15290	492420
	LTS2	15280	8620	10020	12650	15300
	LTS3	0	0	0	0	30
Front St Sidepath, West (28)	LTS1	0	42650	163060	68270	39060
	LTS2	31980	59160	303690	65950	56890
	LTS3	140750	164400	751630	135120	100570

# Accessibility Improvement to Parks: Front Street Projects

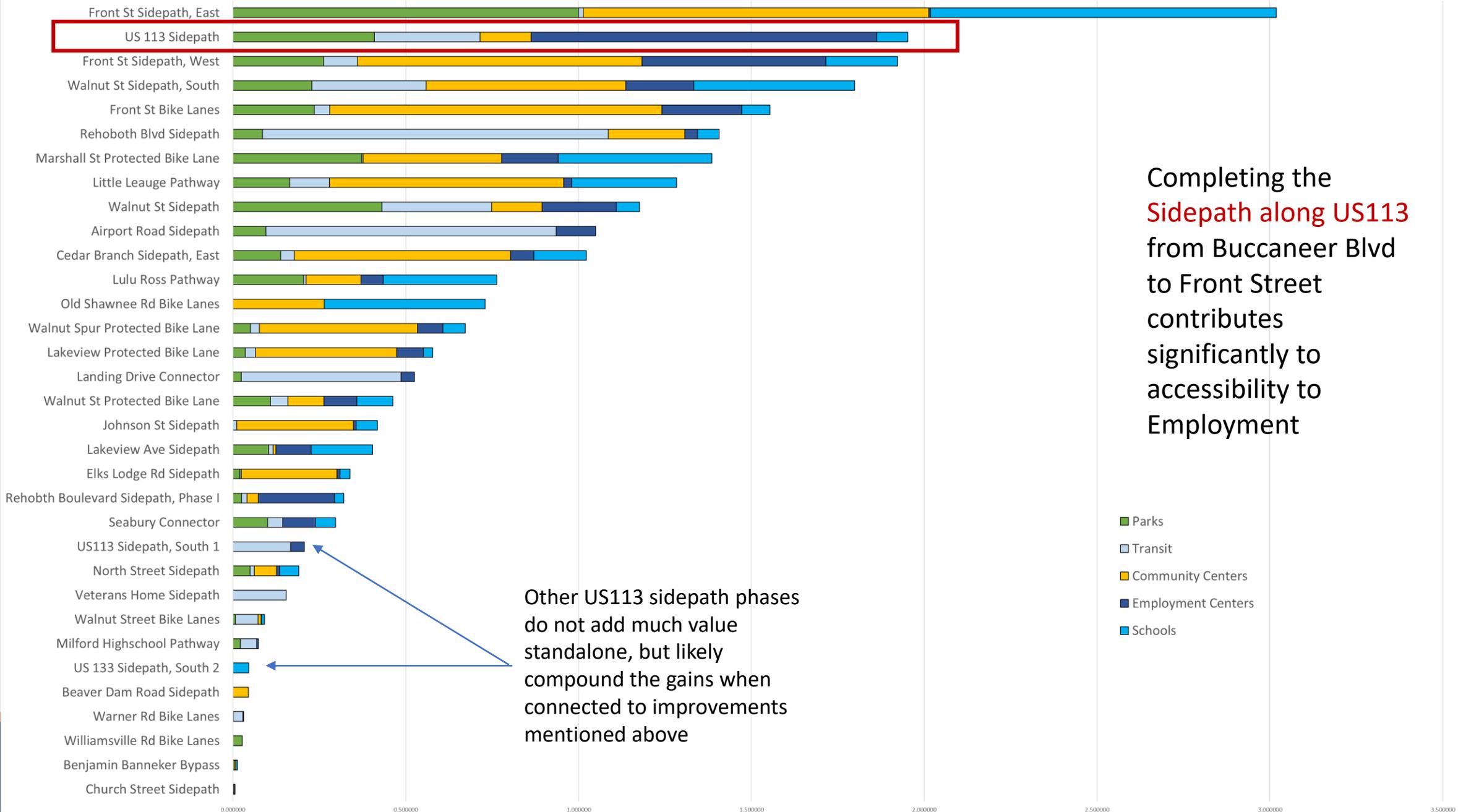


Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Front St Bike Lanes (26)	LTS1	0	70920	182370	44270	58530
	LTS2	49590	168980	201150	54360	79790
	LTS3	0	0	0	0	0
Front St Sidepath, East (27)	LTS1	443780	199360	0	15290	492420
	LTS2	15280	8620	10020	12650	15300
	LTS3	0	0	0	0	30
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	LTS2	31980	59160	303690	65950	56890
	LTS3	140750	164400	751630	135120	100570

\*Visualization represents standalone project results overlaid, not scenario accessibility improvement results



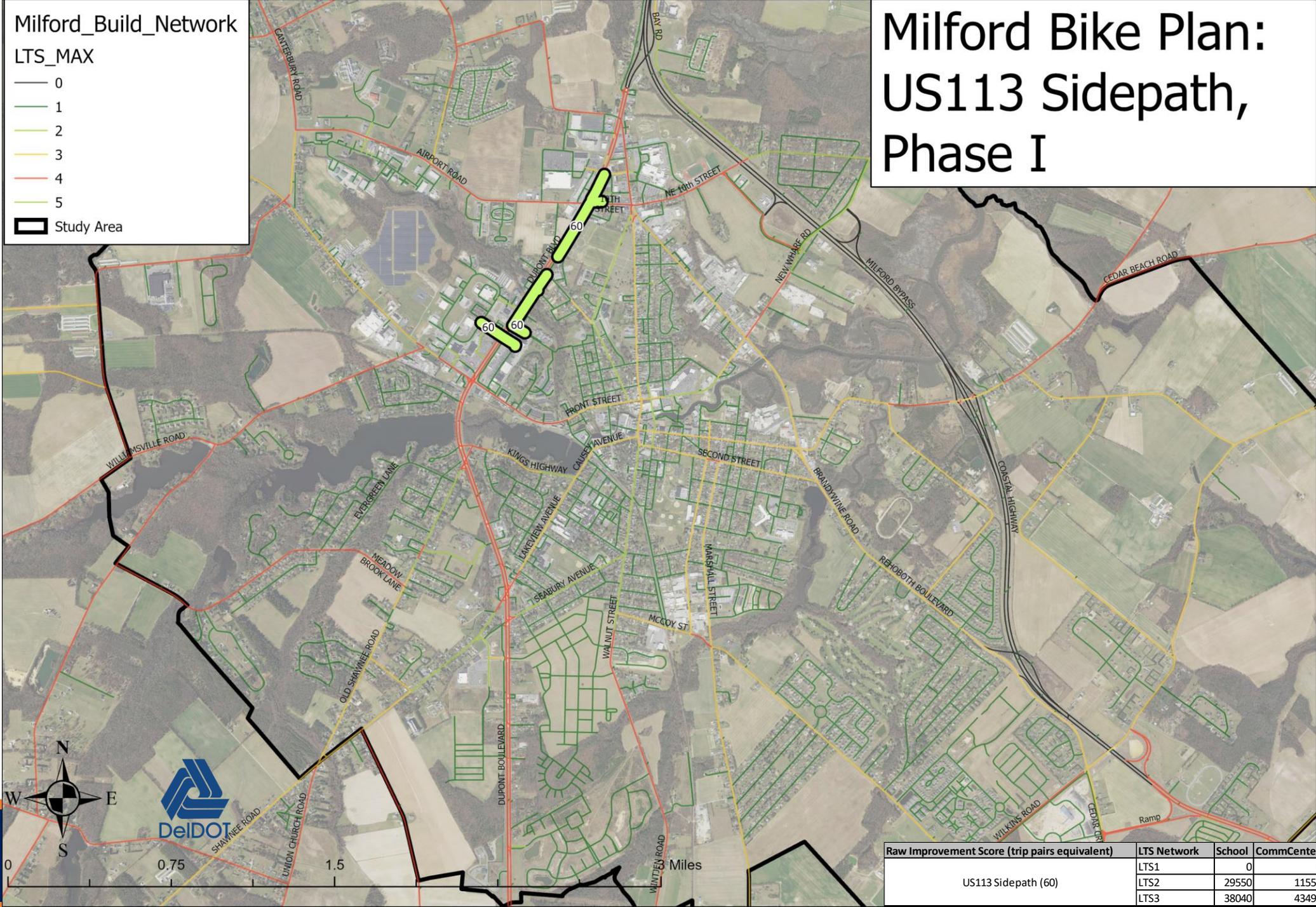
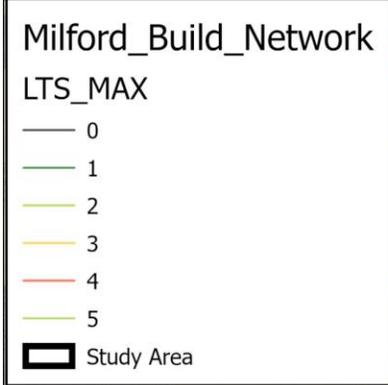
# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores



Completing the Sidepath along US113 from Buccaneer Blvd to Front Street contributes significantly to accessibility to Employment

Other US113 sidepath phases do not add much value standalone, but likely compound the gains when connected to improvements mentioned above

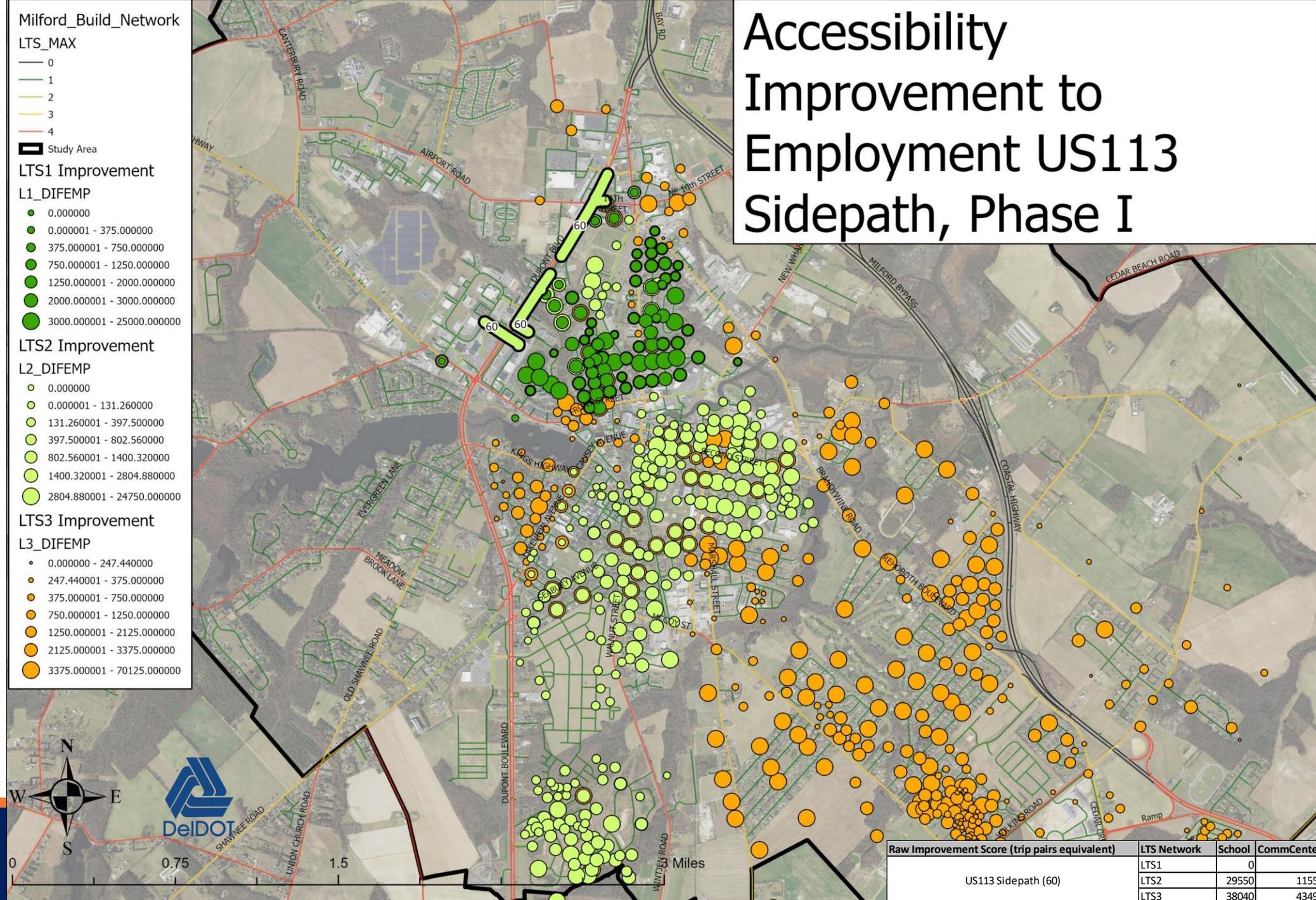
# Milford Bike Plan: US113 Sidepath, Phase I



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
US113 Sidepath (60)	LTS1	0	0	188880	21070	2560
	LTS2	29550	11550	537490	21370	26500
	LTS3	38040	43490	1697580	1071600	367480

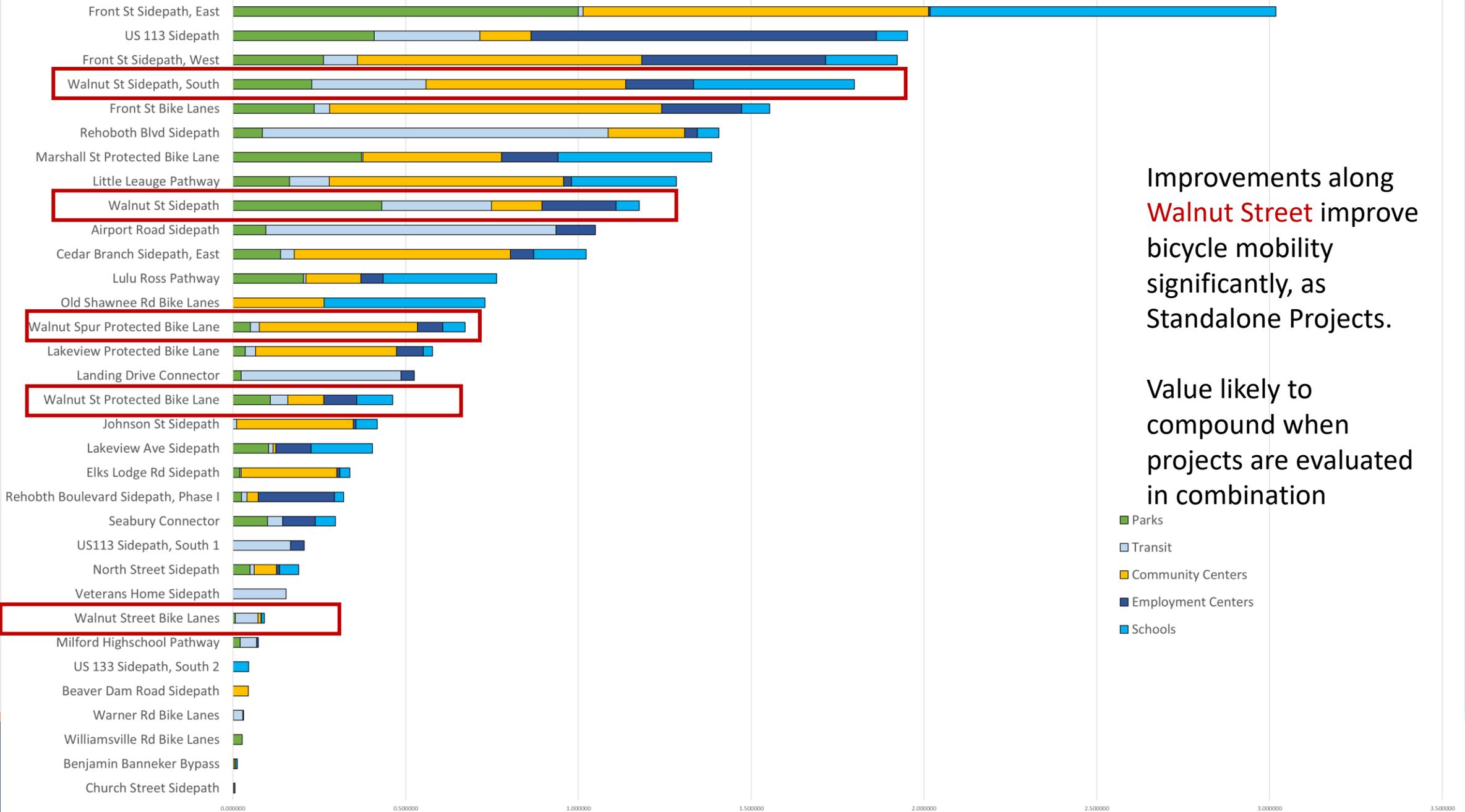
# Accessibility Improvement to Employment US113 Sidepath, Phase I

- Milford\_Build\_Network
- LTS\_MAX
- 0
  - 1
  - 2
  - 3
  - 4
- Study Area
- LTS1 Improvement
- L1\_DIFEMP
- 0.000000
  - 0.000001 - 375.000000
  - 375.000001 - 750.000000
  - 750.000001 - 1250.000000
  - 1250.000001 - 2000.000000
  - 2000.000001 - 3000.000000
  - 3000.000001 - 25000.000000
- LTS2 Improvement
- L2\_DIFEMP
- 0.000000
  - 0.000001 - 131.260000
  - 131.260001 - 397.500000
  - 397.500001 - 802.560000
  - 802.560001 - 1400.320000
  - 1400.320001 - 2804.880000
  - 2804.880001 - 24750.000000
- LTS3 Improvement
- L3\_DIFEMP
- 0.000000 - 247.440000
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  - 375.000001 - 750.000000
  - 750.000001 - 1250.000000
  - 1250.000001 - 2125.000000
  - 2125.000001 - 3375.000000
  - 3375.000001 - 70125.000000



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
US113 Sidepath (60)	LTS1	0	0	188880	21070	2560
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	LTS3	38040	43490	1697580	1071600	367480

# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores

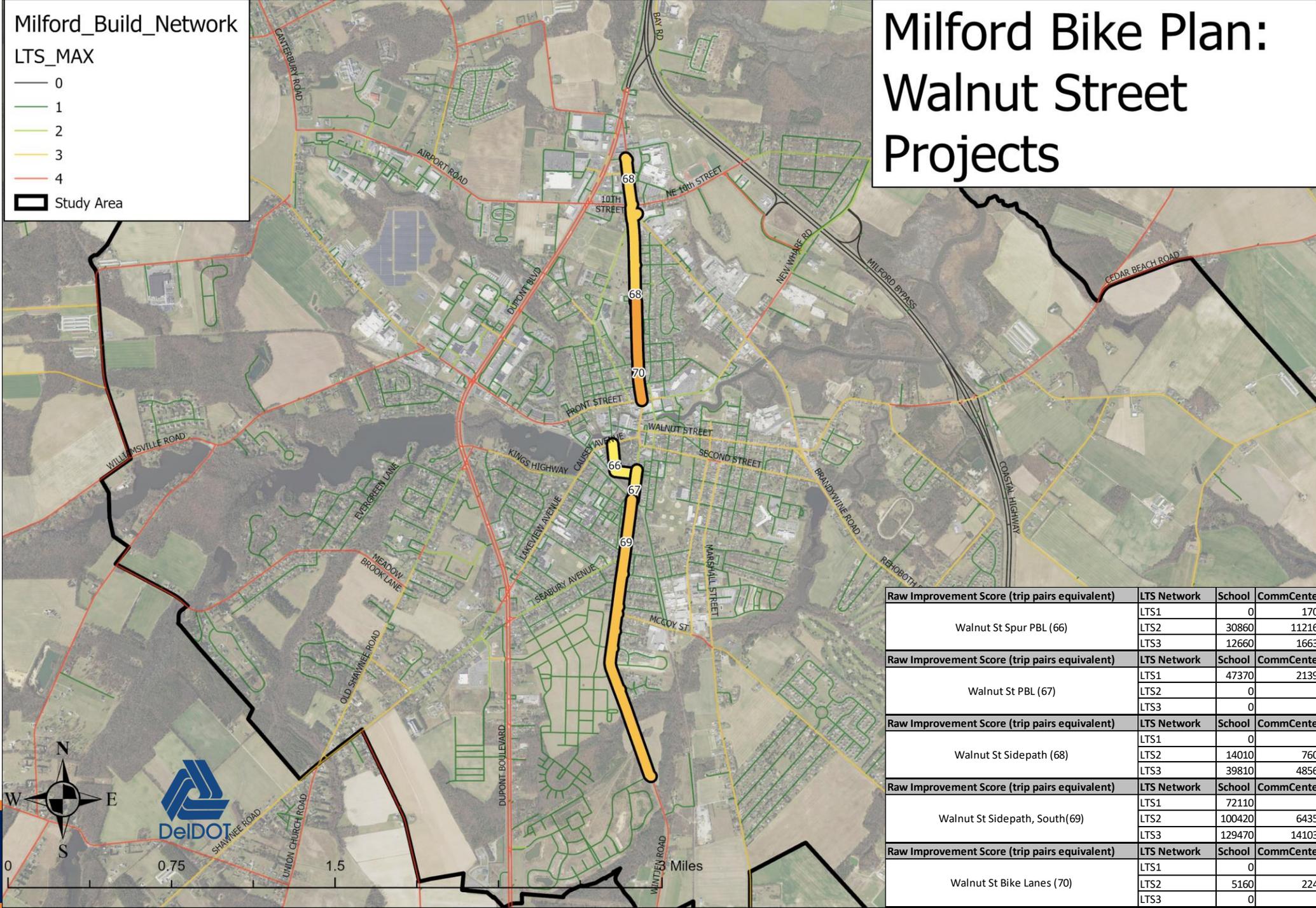
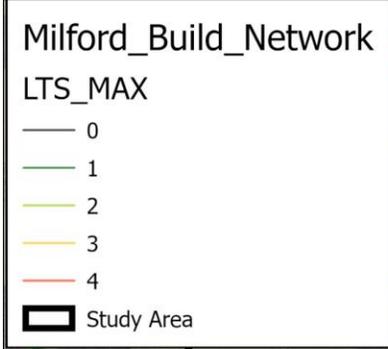


Improvements along **Walnut Street** improve bicycle mobility significantly, as Standalone Projects.

Value likely to compound when projects are evaluated in combination

- Parks
- Transit
- Community Centers
- Employment Centers
- Schools

# Milford Bike Plan: Walnut Street Projects



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St Spur PBL (66)	LTS1	0	1700	2120	0	1420
	LTS2	30860	112160	128030	54930	25830
	LTS3	12660	16630	14110	14700	9930
Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St PBL (67)	LTS1	47370	21390	137560	95230	54730
	LTS2	0	0	0	0	0
	LTS3	0	0	0	0	0
Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St Sidepath (68)	LTS1	0	0	0	0	1350
	LTS2	14010	7600	7580	0	13510
	LTS3	39810	48560	608690	1192220	411460
Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St Sidepath, South(69)	LTS1	72110	0	179590	297840	0
	LTS2	100420	64350	53070	225510	89800
	LTS3	129470	141030	128100	307610	95520
Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St Bike Lanes (70)	LTS1	0	0	0	0	0
	LTS2	5160	2240	3510	163730	5000
	LTS3	0	0	0	0	0



0.75  
1.5  
Miles

# Accessibility Improvement to Employment: Walnut Street Projects

Milford\_Build\_Network

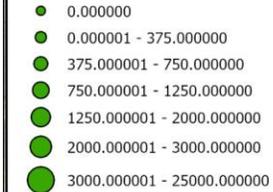
LTS\_MAX



Study Area

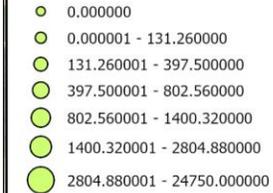
LTS1 Improvement

L1\_DIFEMP



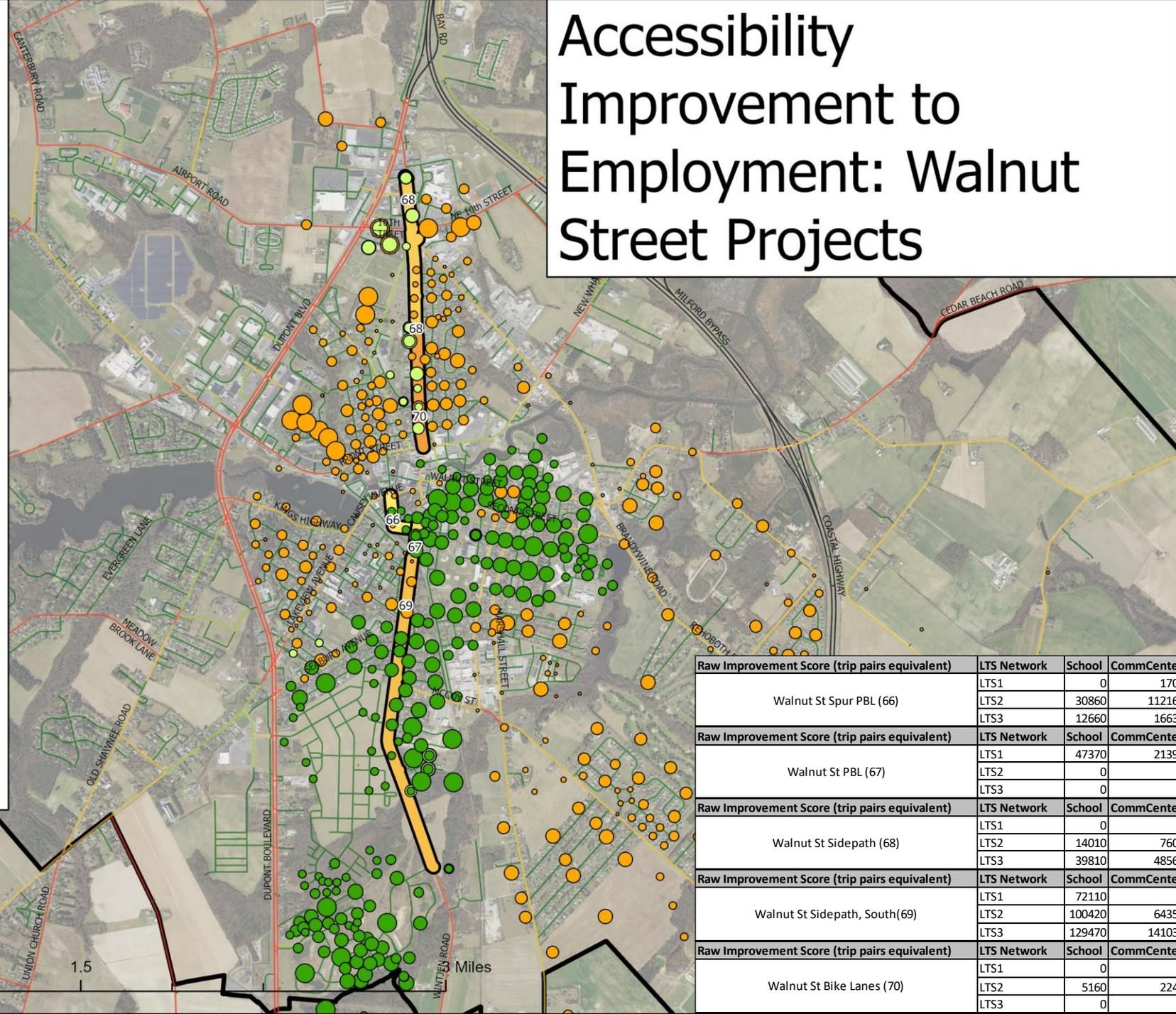
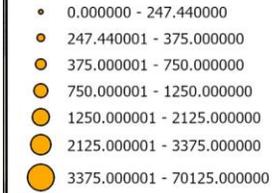
LTS2 Improvement

L2\_DIFEMP



LTS3 Improvement

L3\_DIFEMP

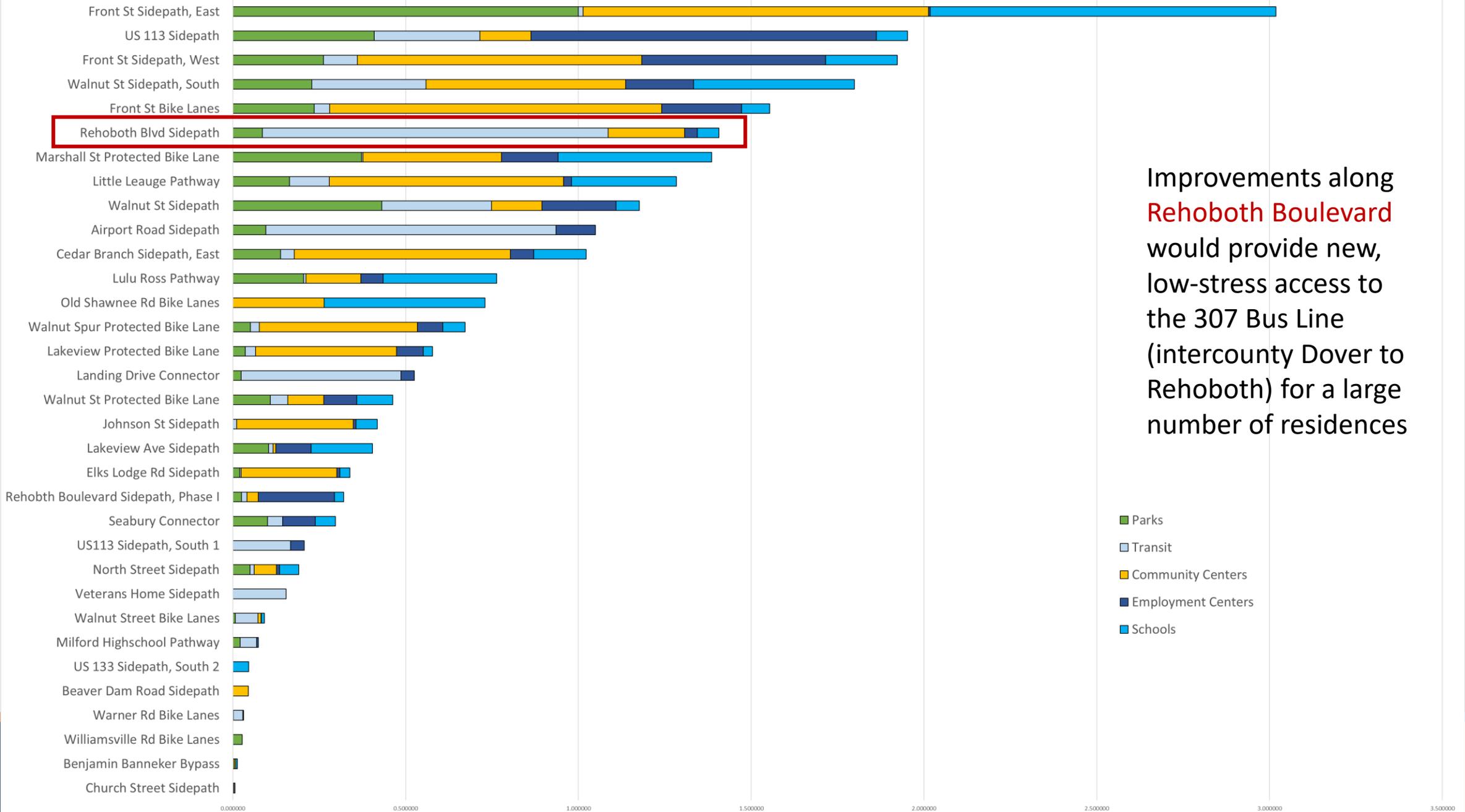


Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Walnut St Spur PBL (66)	LTS1	0	1700	2120	0	1420
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	LTS2	0	0	0	0	0
	LTS3	0	0	0	0	0
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	LTS2	100420	64350	53070	225510	89800
	LTS3	129470	141030	128100	307610	95520
Walnut St Bike Lanes (70)	LTS1	0	0	0	0	0
	LTS2	5160	2240	3510	163730	5000
	LTS3	0	0	0	0	0

\*Visualization represents standalone project results overlaid, not scenario accessibility improvement results



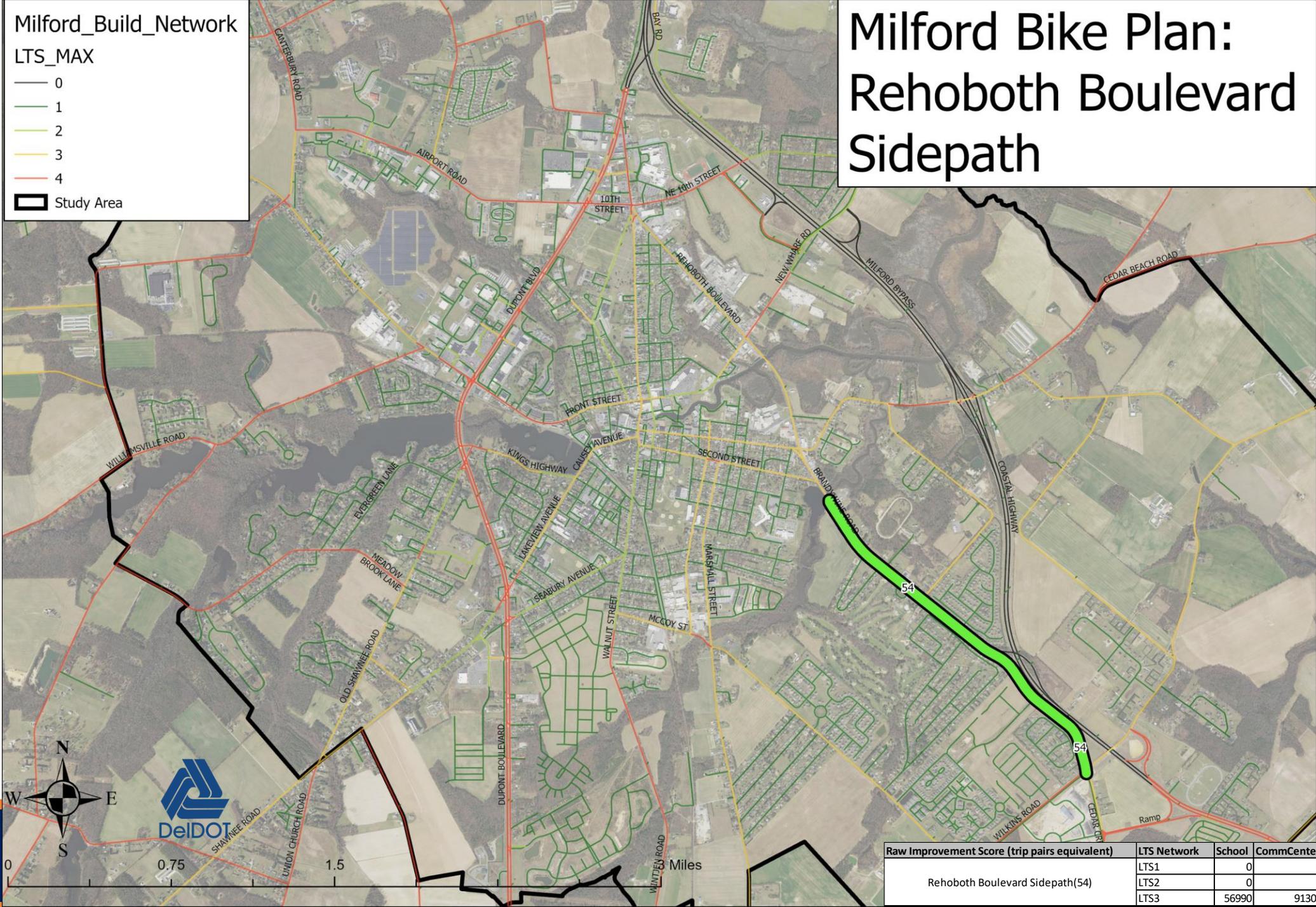
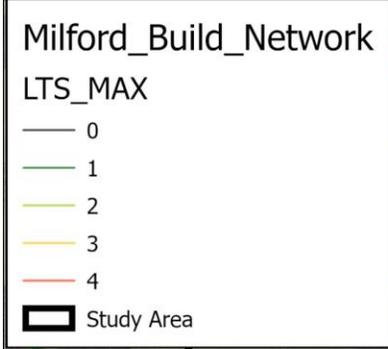
# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores



Improvements along **Rehoboth Boulevard** would provide new, low-stress access to the 307 Bus Line (intercounty Dover to Rehoboth) for a large number of residences

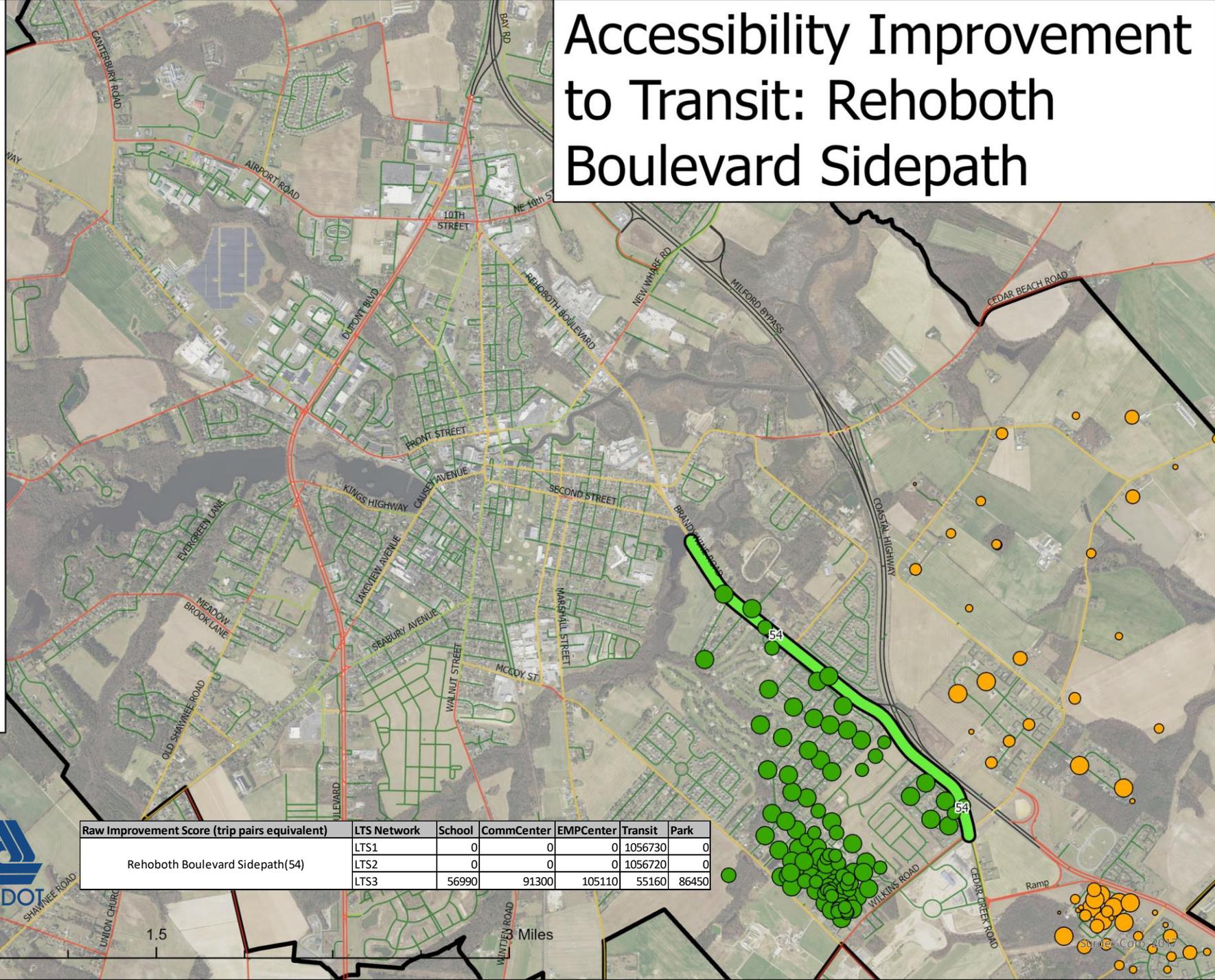
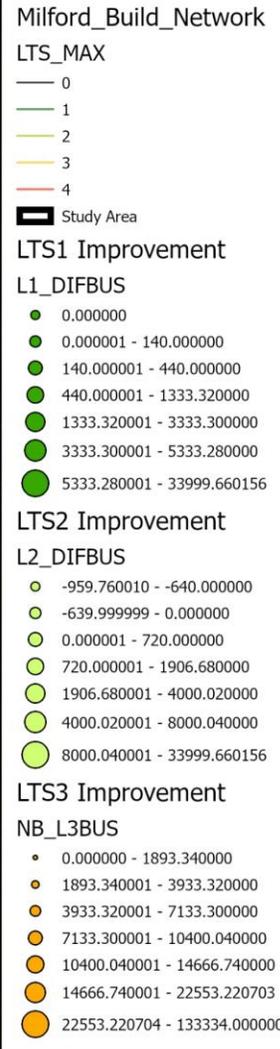
- Parks
- Transit
- Community Centers
- Employment Centers
- Schools

# Milford Bike Plan: Rehoboth Boulevard Sidepath



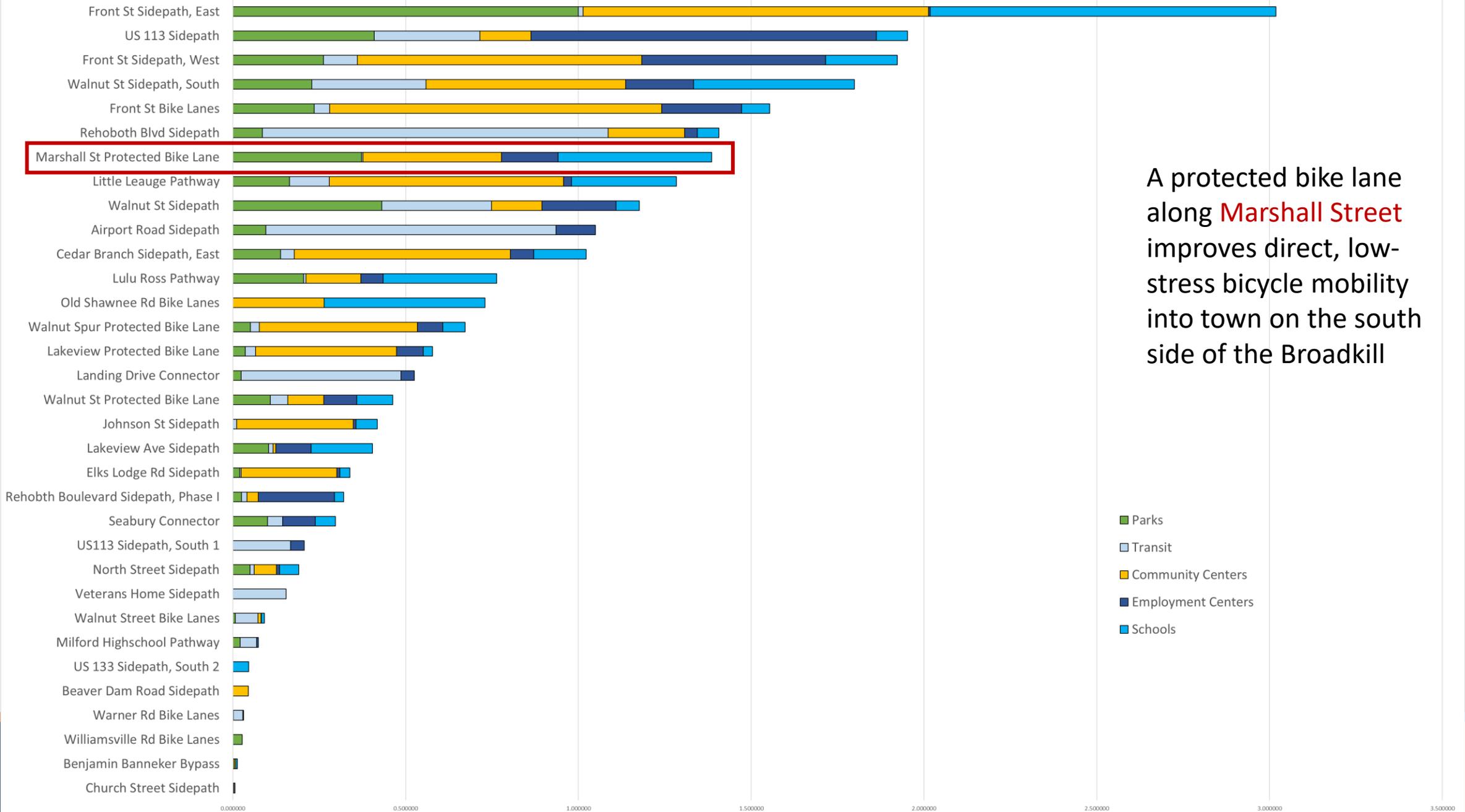
Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Rehoboth Boulevard Sidepath(54)	LTS1	0	0	0	1056730	0
	LTS2	0	0	0	1056720	0
	LTS3	56990	91300	105110	55160	86450

# Accessibility Improvement to Transit: Rehoboth Boulevard Sidepath



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Rehoboth Boulevard Sidepath(54)	LTS1	0	0	0	1056730	0
	LTS2	0	0	0	1056720	0
	LTS3	56990	91300	105110	55160	86450

# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores



A protected bike lane along **Marshall Street** improves direct, low-stress bicycle mobility into town on the south side of the Broadkill

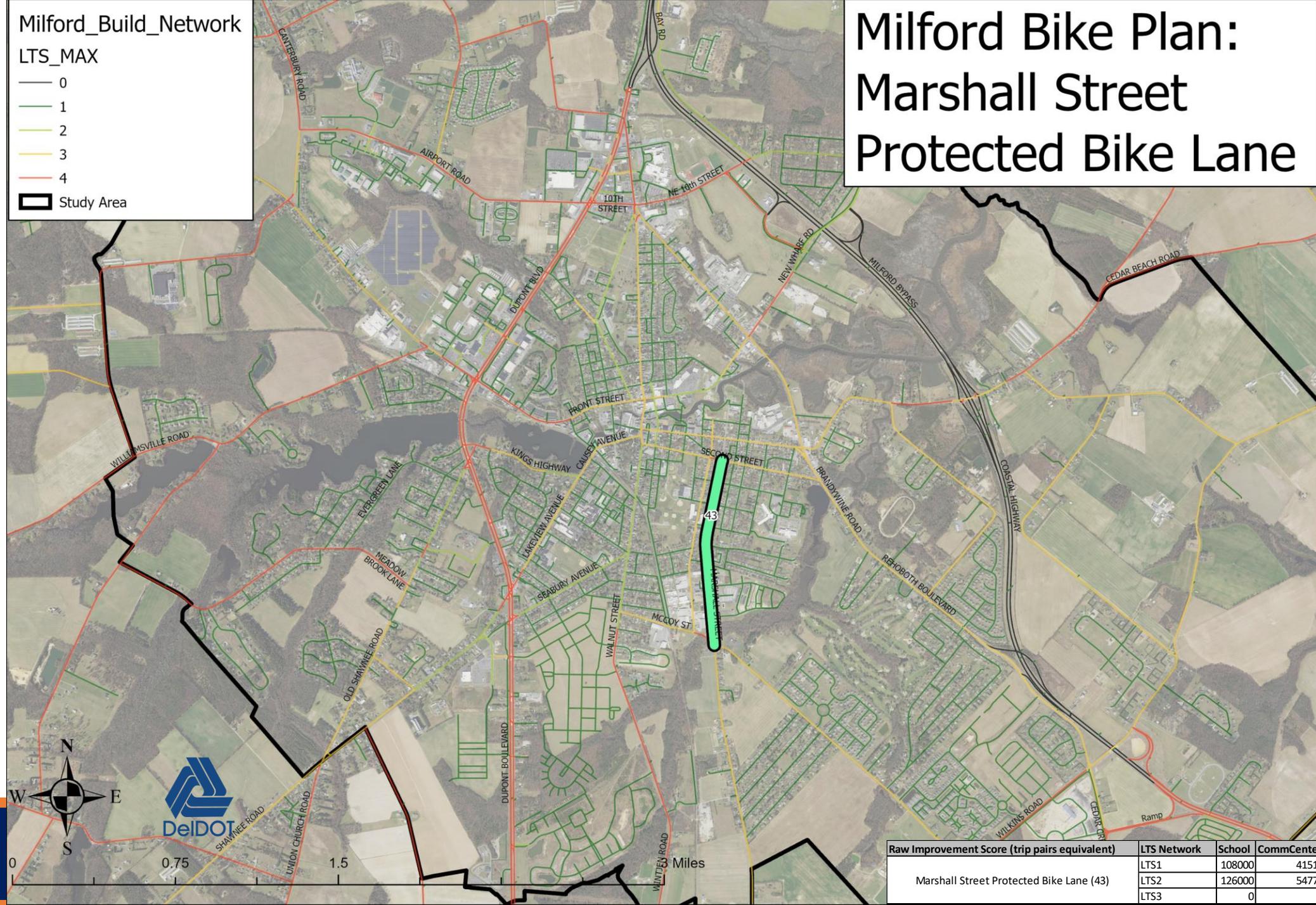
- Parks
- Transit
- Community Centers
- Employment Centers
- Schools

# Milford Bike Plan: Marshall Street Protected Bike Lane

Milford\_Build\_Network  
LTS\_MAX

- 0
- 1
- 2
- 3
- 4

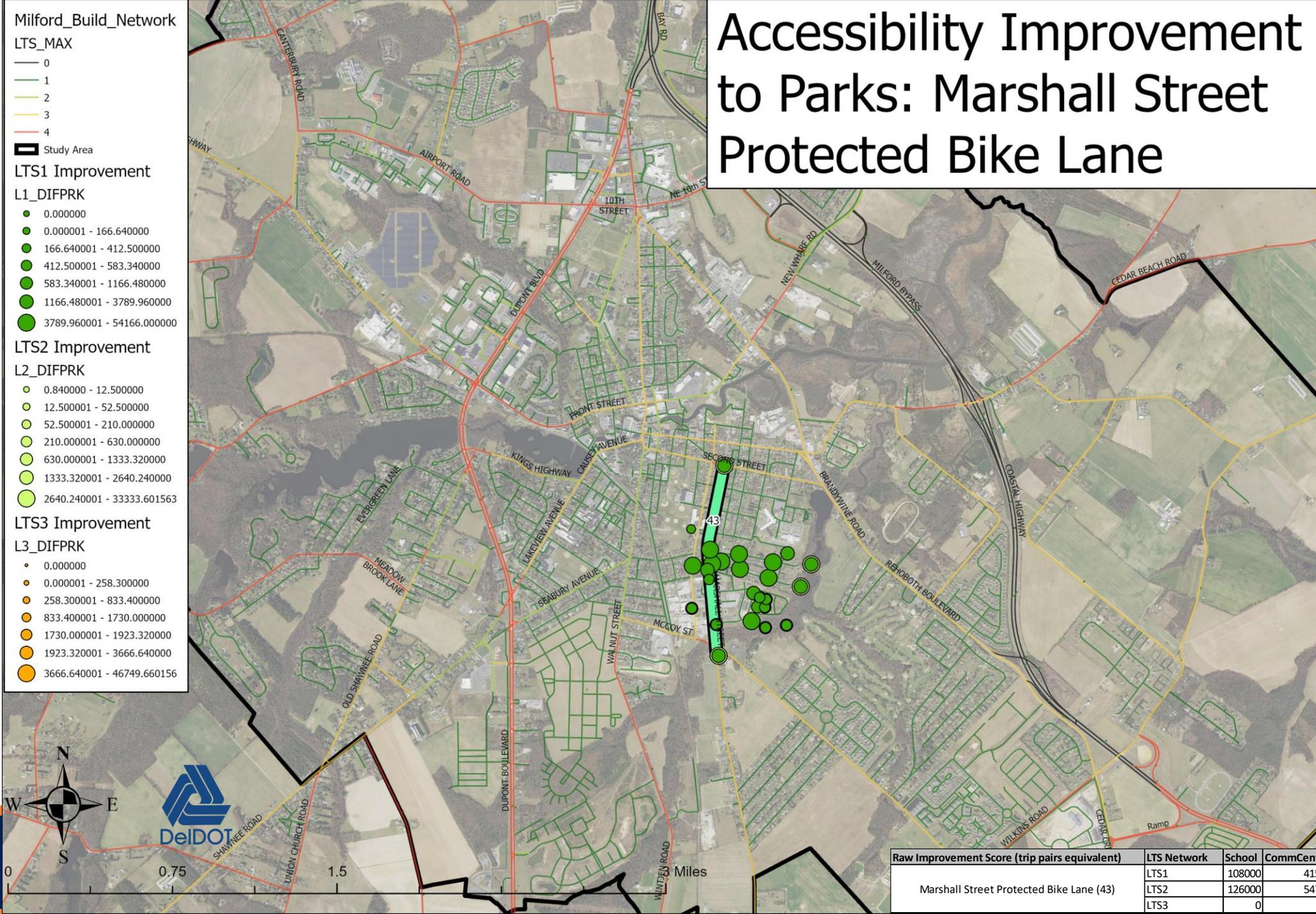
▭ Study Area



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Marshall Street Protected Bike Lane (43)	LTS1	108000	41510	72150	0	99300
	LTS2	126000	54770	217870	10090	117780
	LTS3	0	0	0	0	0

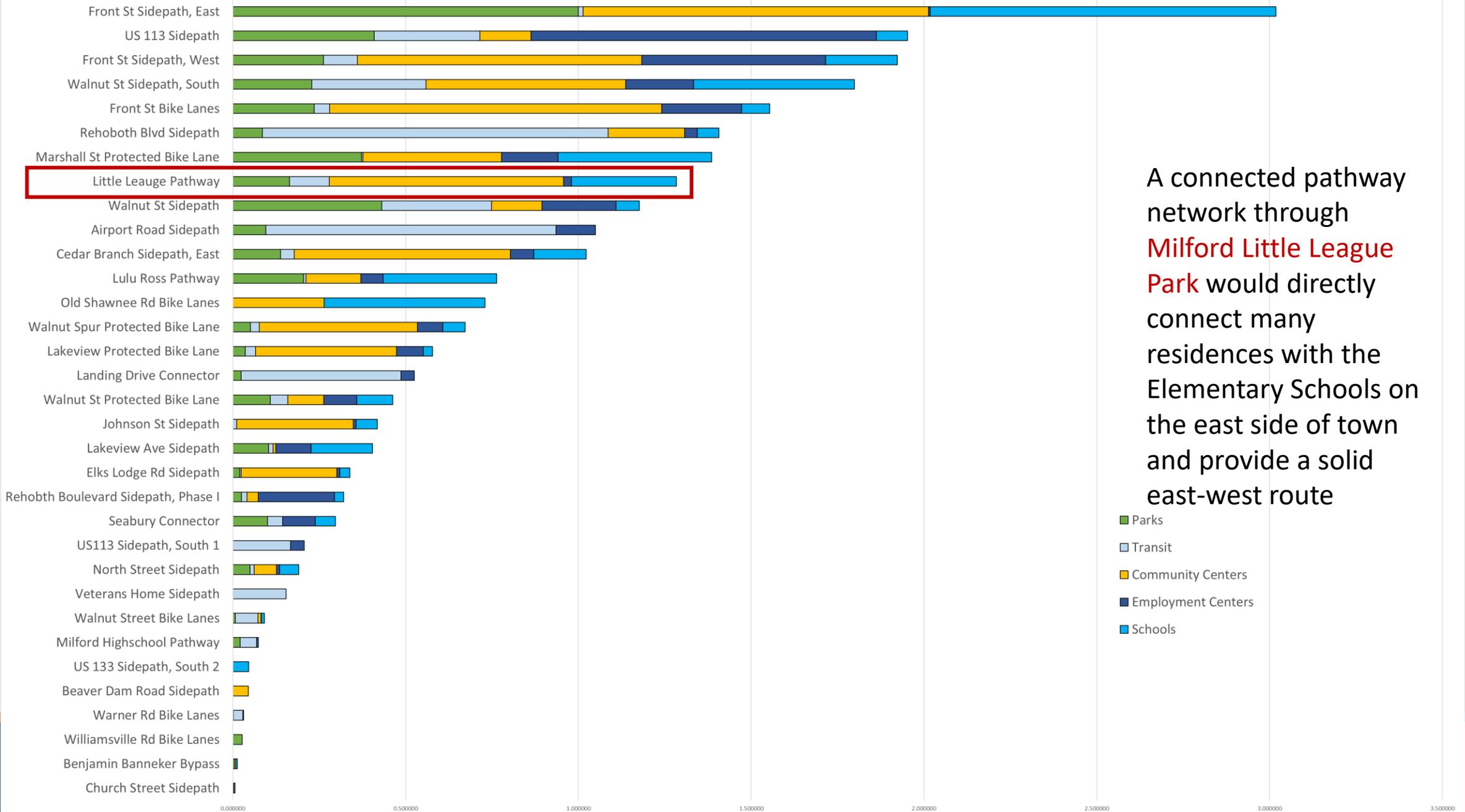
# Accessibility Improvement to Parks: Marshall Street Protected Bike Lane

- Milford\_Build\_Network
- LTS\_MAX
- 0
  - 1
  - 2
  - 3
  - 4
- Study Area
- LTS1 Improvement
- L1\_DIFPRK
- 0.000000
  - 0.000001 - 166.640000
  - 166.640001 - 412.500000
  - 412.500001 - 583.340000
  - 583.340001 - 1166.480000
  - 1166.480001 - 3789.960000
  - 3789.960001 - 54166.000000
- LTS2 Improvement
- L2\_DIFPRK
- 0.840000 - 12.500000
  - 12.500001 - 52.500000
  - 52.500001 - 210.000000
  - 210.000001 - 630.000000
  - 630.000001 - 1333.320000
  - 1333.320001 - 2640.240000
  - 2640.240001 - 33333.601563
- LTS3 Improvement
- L3\_DIFPRK
- 0.000000
  - 0.000001 - 258.300000
  - 258.300001 - 833.400000
  - 833.400001 - 1730.000000
  - 1730.000001 - 1923.320000
  - 1923.320001 - 3666.640000
  - 3666.640001 - 46749.660156



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Marshall Street Protected Bike Lane (43)	LTS1	108000	41510	72150	0	99300
	LTS2	126000	54770	217870	10090	117780
	LTS3	0	0	0	0	0

# Milford Bike Plan Bicycle Mobility Modeling - Scaled Improvement Scores



A connected pathway network through **Milford Little League Park** would directly connect many residences with the Elementary Schools on the east side of town and provide a solid east-west route

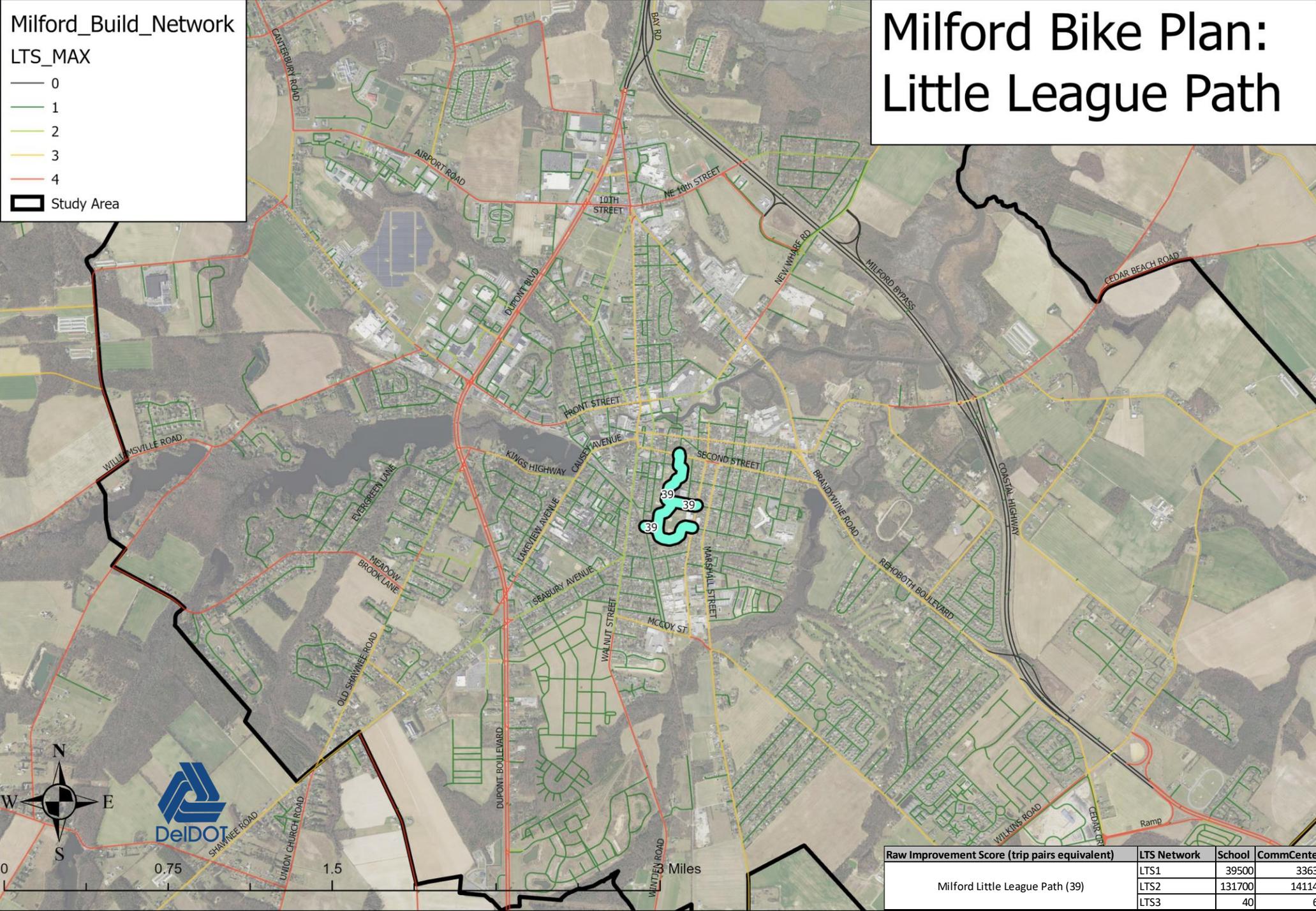
- Parks
- Transit
- Community Centers
- Employment Centers
- Schools

# Milford Bike Plan: Little League Path

Milford\_Build\_Network  
LTS\_MAX

- 0
- 1
- 2
- 3
- 4

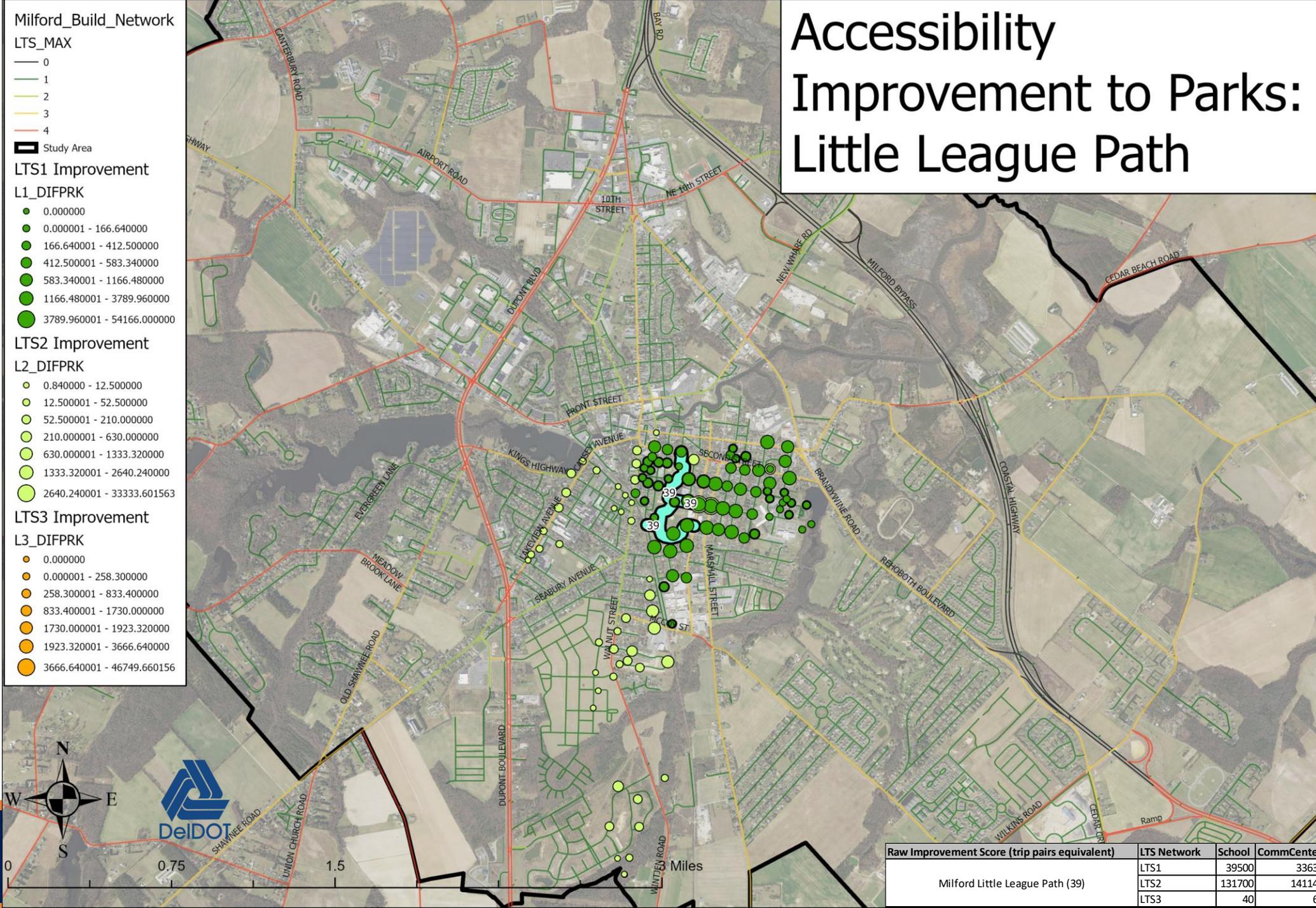
▭ Study Area



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Milford Little League Path (39)	LTS1	39500	33630	0	0	41220
	LTS2	131700	141140	43970	288470	54840
	LTS3	40	60	0	540	30

# Accessibility Improvement to Parks: Little League Path

- Milford\_Build\_Network
- LTS\_MAX
- 0
  - 1
  - 2
  - 3
  - 4
- Study Area
- LTS1 Improvement
- L1\_DIFPRK
- 0.000000
  - 0.000001 - 166.640000
  - 166.640001 - 412.500000
  - 412.500001 - 583.340000
  - 583.340001 - 1166.480000
  - 1166.480001 - 3789.960000
  - 3789.960001 - 54166.000000
- LTS2 Improvement
- L2\_DIFPRK
- 0.840000 - 12.500000
  - 12.500001 - 52.500000
  - 52.500001 - 210.000000
  - 210.000001 - 630.000000
  - 630.000001 - 1333.320000
  - 1333.320001 - 2640.240000
  - 2640.240001 - 33333.601563
- LTS3 Improvement
- L3\_DIFPRK
- 0.000000
  - 0.000001 - 258.300000
  - 258.300001 - 833.400000
  - 833.400001 - 1730.000000
  - 1730.000001 - 1923.320000
  - 1923.320001 - 3666.640000
  - 3666.640001 - 46749.660156



Raw Improvement Score (trip pairs equivalent)	LTS Network	School	CommCenter	EMPCenter	Transit	Park
Milford Little League Path (39)	LTS1	39500	33630	0	0	41220
	LTS2	131700	141140	43970	288470	54840
	LTS3	40	60	0	540	30



# Discussion



# Next Steps

