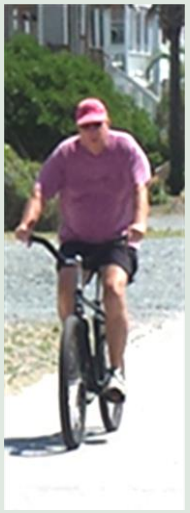
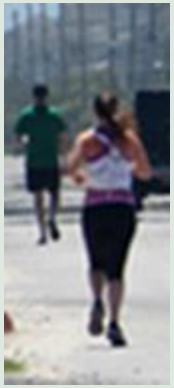
Comprehensive Bicycle and Pedestrian Master Plan - Final Draft





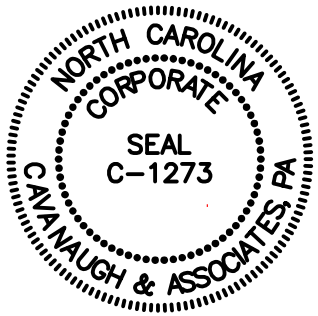
Division of Bicycle & Pedestrian Transportation
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAVANAUGH
Stewardship Through Innovation

alta
PLANNING + DESIGN

Comprehensive Bicycle and Pedestrian Master Plan

Project No. 41.13.007



Division of Bicycle & Pedestrian Transportation
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

CAVANAUGH
Stewardship Through Innovation

alta
PLANNING + DESIGN

Acknowledgments

The development of this Town of Surf City Comprehensive Bicycle & Pedestrian Plan was completed through a collaborative effort with numerous stakeholders, including Town representatives and staff, NCDOT, and a Steering Committee made up of citizens, and business representatives of Surf City, and engineering consultants.

Town of Surf City Officials

Mayor .....A.D. "Zander" Guy, Jr.

Mayor Pro Tem .....Douglas C. Medlin

Town Council.....Nelva R. Albury

Michael H. Curley

Donald R. Helms

William J. "Buddy" Fowler

Town Manager .....Larry Bergman

Assistant Town Manager .....Jane Kirk

Town Staff

Town Clerk.....Stephanie Hobbs
Director of Public Works .....Dean Wise
Director of Parks & Recreation.....Kristie Grubb
Tourism Director .....Allan Libby

Planning Department

Town Planning Director ……Todd Rademacher

Planning Board .....Barry Newsome (Chairman)
Larry Bartholomew (Vice-Chairman)
Teresa Batts
Rick Benton
James Campbell
Randy Cox
Sally Edens
Carl Johnson
Steven Pasquantonio
Doug Medlin (Council Liaison / Mayor Pro Tem)

Steering Committee

John Vine-Hodge, NCDOT Planning Program Manager,
Div. of Bicycle and Pedestrian Transportation
Patrick Riddle, Division 3, NCDOT Project Manager
Larry Bergman, Town of Surf City, Town Manager
Todd Rademacher, Town of Surf City, Planning Director
Carl Johnson
Barry Newsome
Larry Bartholomew
Steven Pasquantonio
Rocky Godwin
Steve Bailey
Rick Benton
Doug Medlin
Samatha Bradshaw
Randy Cox
Patti Arnold
George Howard
Patrick Miller

Engineering: Gus Simmons, Jeff Cappadona, Sharon Niemann,
and Rachel Harris of Cavanaugh & Associates, P.A.,
Jason Reyes & Stephen Bzomowski, Alta Planning & Design

Table of Contents

8

- Executive Summary
- Detailed Recommendations- Plan Outline and Cost Opinion
- Detailed Recommendations- Plan Outline by Phase and Cost Opinion

Section 7: Project Development and Recommendations

Section 8: System Maps

Section 9: Funding Recommendations

Section 10: Guidance on Plan Implementation

Appendices

Executive Summary

The Town of Surf City seeks to develop a Comprehensive Bicycle and Pedestrian Master Plan providing accessibility to attractions, beach, parks, recreation, community centers, the Central Business District, and other amenities by promoting interconnectivity of non-vehicular transportation modes, and increasing safety for bicyclists and pedestrians. The Town's vision for the plan materialized on 11-08-13, when the Town Council unanimously approved resolution 2013-11-08, endorsing the establishment of a Bicycle and Pedestrian Steering Advisory Committee under the direction of Todd Rademacher, Town Planning Director. The resolution also authorized Cavanaugh & Associates to assist them in applying to the NC Department of Transportation for Bicycle and Pedestrian Planning Grant Funds. The family-friendly Town desires to strengthen interconnectivity of existing and planned bikeways, greenways, and walking paths to promote wellness and healthy lifestyles, increased physical activity and livability among its residents and visitors.

Family-friendly environment, healthy lifestyles, livability, safety as a priority, accessibility, and network of mobility

The Town of Surf City is comprised of an area of approximately 5.3 miles within its jurisdictional limits, and borders the Town of Topsail Beach to the South, and North Topsail Beach to the North. These beautiful beaches, are a highly desired travel destination which attract thousands of summertime visitors. The last official Census of 2010 estimated the population of the Town at 1,853, however, the Town's seasonal population in the summer months brings thousands of visitors to the area per day, which can lead to bottlenecks and traffic congestion, which strains the existing infrastructure.

By increasing the availability of non-vehicular transportation assets, the Town will promote safety, mobility and accessibility, and will encourage visitors and residents to walk or bike to their desired destinations, rather than drive, in an effort to decrease accidents and injuries, while at the same time promoting environmental stewardship.

Two public Attitude Surveys and a Public Workshop were conducted to help determine the priorities of the plan, listen to safety concerns, and help determine what traffic patterns would aide in getting the Town's residents and visitors to their desired destinations. The engineering team also met with the town Planning Board to establish the goals and finalize the vision for the Plan.

Recommendations for Town of Surf City Comprehensive Bicycle and Pedestrian Plan Outline

Map ID	Recommendation	Location Start/End Point	Description/ Improvement	Immed. (I) Short Term (ST) Long Term (LT)	Details	Qty	Cost per unit	Project Cost Range
2	**Sidewalks**	Infill Downtown/ CBD	Completion of all sidewalks in CBD		Continue to connect sidewalks in the CBD (interconnectivity)		Per Existing Plan	
App		Existing Sidewalk Plan	Complete Sidewalk Plan	LT	Complete Sidewalk Plan adjust for Bike/Ped Plan modifications.	18.7 miles	$150,000 - $170,000/mile	$2,805,000 - $3,179,000
5	**Multi-Use Paths**	Tortuga Lane	Paved path at time of road paving	ST	Coordinate with road paving	0.4 miles	$220,000/mile	$ 55,000.00
5		Caretta Drive	Path from Tortuga to Harris Teeter Center	LT	In planning stages only - Road does not exist Total 8,031'	0.4 miles	$220,000/mile	$ 55,000.00
5		Community Center Footpath	Convert footpath to permanent path	ST	Footpath at this time	0.8 miles	$100,000/mile	$ 80,000.00
		Connect Cape Fear Community College and Greenway	At time of Greenway construction	LT	Add to Greenway Plan	0.2 miles	$220,000/mile	$ 4,400.00
		Connect Proposed School, Shepard Rd. and Greenway	At time of school construction	LT	Add to Greenway Plan	0.2 miles	$220,000/mile	$ 4,400.00
8		NC 210 (US 17 to NC 50)	Coordinate with Widening of NC 210	LT	Coordinate with road widening project	2.8 miles	$220,000/mile	$ 616,000.00
1, 5		NC 50 (from intersection of NC 210 and NC 50, south to new bridge)	Paved path on east side of NC 50	LT	On opposite side of road from existing boardwalk and sidewalk	1.2 miles	$220,000/mile	$ 264,000.00
		MC 50 from NC 210 (Roland Ave.) North towards Shepards Rd.	As funds allow	LT	Add to Side of Roadway	1.8 miles	$133,170/mile	$ 239,706.00
8		Atkinson Loop Rd.	As funds allow	LT	Alternate to riding on NC 210	0.7 miles	$133,170/mile	$ 93,219.00
4	**Buffered Bike Lanes**	Topsail Drive North	Lanes with Divided Lines 3' from Traffic	ST/LT	This need mentioned often in survey	4.8 miles	$111,320/mile	$ 400,000-$575,000
5	**Bike Lane**	JH Batts	Add bike lane alongside sidewalk	ST/LT	This will help with interconnection to Community Center area	0.3 miles	$133,170/mile	$39,951.00
7	**Bike Lane**	Turtle Creek Subdivision	To help with off-road interconnection	ST/LT	Alternate route to Greenway	1.7 miles	$133,170/mile	$226,389.00
	Crosswalks						Bridge Project	$ -
3	Crosswalks with signal	Across Roland Ave near IGA **(Priority #1)**	Short Term (Prior to Bridge Construction)	I/ST		1	$2,540	$ 2,540.00
3	Crosswalk with signal	Roland Ave at Welcome Center **(Priority #2)**	Short Term	I	Beach side of Road, adjacent to N. & S. Shore Drive	1	$2,540	$ 2,540.00
3	Crosswalks with signal	N. Shore and S. Shore Dr. Near Welcome Center & access **(#2)**	Short Term	ST	Crossing N. Shore and S. Shore Drive alongside Roland Ave.	2	$2,540	$ 5,080.00
NP	Crosswalks with signal and curb ramps	Handicapped Beach Access (9th Street and Kinston Ave.)	Immediate, signalized if warranted	I	Provide crosswalks ADA compliant for handicapped individuals	2	$2,540	$ 5,080.00
6	Crosswalk with signal	NC 210 and NC 50 Intersection	Two crosswalks with RRFB or a Roundabout	ST	Cost listed is for a Roundabout* (see Below)	1		
6	Crosswalk without signal	JH Batts	At time of Multi-use Path Construction	ST		1	$350	$ 350.00
6	Crosswalk with signal	Harris Teeter Shopping Center, across NC 210	As pedestrian Traffic demands	ST		1	$2,540	$ 2,540.00
4	Crosswalk at roundabouts	At Island Roundabouts and Mainland Roundabout	Included with bridge	ST/LT		2	Bridge Project	$ -
NP	Two painted crosswalk lines and signage	All Beach Accesses (32)	Long Term, unsignalized until warranted	ST/LT		32	$340/each	$ 10,880.00
7, 8	**Greenway**	Duke Powerline -Vicinity of Electric Lane from NC 210 to NC 50		ST/LT	21,233' 4.02 miles	4 miles	$220,000/mile	$ 884,400.00
		Connect to Greenway- Pender County Schools		LT	possible shared cost project		not estimated	
3	**One Way Conversion**	Convert two lanes into One traffic lane and a Bike and Pedestrian Lane						
3		From High Point Ave. to New Bern Ave.	Temporary (Pilot Demonstration/Trial)	I	Using paint & bollards, or planters for separation	0.6 miles	$2,000/mile	$ 1,200.00
			Permanent - Long Term	ST/LT	Permanent Infrastructure with signage	0.6 miles	$12,000/mile	$45,000 - $50,000
	Signage/Markings	Wayfinding	Trail markers, mapping	ST	When infrastructure is added		Total	$ 50,000.00
	Education	Safety	(Workshops, Hand-outs, Annual training)	I	Kiosk near Welcome Center		Annually	$ 10,000.00
		Mapping	Brochures and Maps	I	Kiosk near Welcome Center			
APP I.		Trail Etiquette	Multi-media, (videos, website, posters)	I	Kiosk near Welcome Center			
APP L.	**Bike Parking**	Beach Accesses	Determine most crucial spots	I	IGA, CBD, Some Beach Accesses, Places of Interest	10	$155 - $850	$1,550 - $8,500
		Destinations and Points of Interest	Poll residents to determine needs/desires	I		7 to 14	$155 - $850	$3,500 - $7,000
		CBD	Poll residents to determine needs/desires	ST		7 to 14	$155 - $850	$3,500 - $7000
4	**Pedestrian Boardwalk**	Under New Topsail Bridge	Included in Project?	ST	Same time as bridge construction so infrastrut. will be in place	200 feet	$2M per mile	$75,000 - $100,000
5		Across Community Center Pond	To be considered	LT		600 feet	$450,000 - $500,000/mile	$45,000 - $50,000
APP K.	**Lighting**	Low level on boardwalk	Upon Construction	ST	Similar to short bollards with top light	6 each	$550-675 each	$3,300 - $4,500
APP K.		One-Way Conversion	Upon Construction	ST	Lights on lampost	30 each	$1,500-$1800	$45,000 - $54,000
APP K.		Walking Tracks Pedestrian Loop at Soundside Park	Upon Construction	LT	Similar to short bollards with top light	10 each	$550-675 each	$5,500 - $6,750
APP K.		Street Level on Crosswalks	Upon Construction	ST/LT	Estimated 12 lights per crosswalk - 6 each crosswalks	6 each	$900 each	$ 5,400.00
APP E.	**Maintenance**	Removal of Sand/Debris	Regular basis	I				
APP E.		Pruning of Vegetation	Regular basis	I	Annual Budget		$1,600/mile	$ 50,000.00
APP E.		Painting	Divider lines	ST				
	Walking Tracks	Soundside Park (Blue Crush Stone, covered w/ 2" asphalt)		LT		0.6 miles	$121,390/mile	$ 72,834.00
Pg 96	**Curb Radius Reductions near Welcome Center**	Improvements and Curbing for Clear Sight Triangles	Incl. low growing plants separating crosswalks	ST	Improvements on both sides of Roland Ave.			$ 60,000 - 75,000
1	**Shade trees near Roland Ave. Multi-use path**	For beautification and break from sun	Between Soundside Park and Welcome Center	ST		10	$350 - $500 each	$3,500 - $5,000
	Roundabout*	At Roland Ave (NC 210 and NC 50 intersection)	Raised with plants	ST/LT		1	each	$200,000 - $400,000
					Improvements and C+E64:E78urbing for Clear Sight Triangles			
APP L.	**Information Kiosk**	Outside Welcome Center	Weatherproof, freestanding, digital LED	ST/LT		1	each	$5,000 - $15,000
	Wish list items:							
APP L.	**Water fountain**	Near Greenway	When funds allow/ crowdfunding	ST/LT	Stone, Outdoor	1	$620 + plumbing	$1,200 - $2,700
APP L.	**Park Bench**	Along Roland Ave., and at least one on Greenway Trail	When funds allow /Crowdfunding/donation	ST/LT	Have public decide where most needed	12	$250-$500	$1,500 - $6,000
	Bike Fix-It Station	Locations: Greenway, Community Center, Mainland side of bridge	When funds allow/ crowdfunding	ST/LT	Holds Bike and provides tools for repairs	3	$900-1200 each	$2,700 -$3,600

* This consideration is for a crossing for bicyclists and pedestrians so they would not have to impede the traffic with a signalized crosswalk on Roland Ave.
More information on how ***Costs Estimates*** were determined can be found in Appendix D
NP - Not Pictured

TOTAL ESTIMATED PROJECT COSTS FOR RECOMMENDATIONS (Before Tunnel) **$6,487,159-$7,329,959**

APP J	**Tunnel**	Under New River Drive for Pedestrian and Bike Traffic (Or two crosswalks)*	This option provide as a consideration only if needed.	ST/LT				$3,000,000-6,000,000

(After Tunnel) **$9,487,159 - $13,329,959**

Recommendations for Town of Surf City

Map ID/ or Pg. No.	Recommendation	Location Start/End Point	Description/ Improvement	Immed. (I) Short Term (ST) Long Term (LT)	Details	Qty	Cost per unit	Project Cost Range
(I)	**IMMEDIATE RECOMMENDATIONS (Beginning now < 3 years)**							
6	**Education**	Safety	(Workshops, Hand-outs, Annual training)	I	Kiosk near Welcome Center			
6		Mapping	Brochures and Maps	I	Kiosk near Welcome Center		Annually	$ 10,000.00
APP I.		Trail Etiquette	Multi-media, (videos, website, posters)	I	Kiosk near Welcome Center			
APP L.	**Bike Parking**	Beach Accesses	Determine most crucial spots	I	IGA, CBD, Some Beach Accesses, Places of Interest	10	$155 - $850	$1,550 - $8,500
APP L.		Destinations and Points of Interest	Poll residents to determine needs/desires	I		7 to 14	$155 - $850	$3,500 - $7,000
APP E.	**Maintenance**	Removal of Sand/Debris	Regular basis	I				
APP E.		Pruning of Vegetation	Regular basis	I	Annual Budget		$1,600/mile	$ 50,000.00
	Crosswalks	At Island Roundabout and Mainland Roundabout	Included with Topsail Bridge construction					
3	Crosswalks with signal	Across Roland Ave near IGA **(Priority #1)**	Short Term (Prior to Topsail Bridge construction)	I/ST	RRFB - acuated warning beacons by pushing or sensor	1	$2,540	$ 2,540.00
3	Crosswalk with signal	Roland Ave at Welcome Center **(Priority #2)**	Short Term	I	Beach side of Road, adjacent to N. & S. Shore Drive	1	$2,540	$ 2,540.00
NP	Crosswalks with signal and curb ramps	Handicapped Beach Access (9th Street and Kinston Ave.)	Immediate, signalized if warranted	I	Provide crosswalks ADA compliant for handicapped individuals	2	$2,540	$ 5,080.00
3	**One Way Conversion**	Convert two lanes into One traffic lane and a Bike and Pedestrian Lane						
3	One Way Conversion - Temporary	From High Point Ave. to New Bern Ave.	Temporary (Pilot Demonstration/Trial)	I	Using paint & bollards, or planters for separation	0.6 miles	$12,000/mile	$ 1,200.00
		TOTAL IMMEDIATE RECOMMENDATIONS						**$76,410 - $86,860**
(ST)	**SHORT TERM RECOMMENDATIONS (3 to 5 years)**							
3	**Crosswalks with signal**	N. Shore and S. Shore Dr. Near Welcome Center & access **(#2)**	Short Term	ST	Crossing N. Shore and S. Shore Drive alongside Roland Ave.	2	$2,540	$ 5,080.00
6	Crosswalk with signal	NC 210 and NC 50 Intersection	Two crosswalks with RRFB or a Roundabout	ST	Cost listed is for a Roundabout * See Roundabout	1		$ -
6	Crosswalk without signal	JH Batts	At time of Multi-use Path Construction	ST		1	$350	$ 350.00
6	Crosswalk with signal	Harris Teeter Shopping Center, across NC 210	As pedestrian Traffic demands	ST		1	$2,540	$ 2,540.00
5	**Multi-Use Paths**	Tortuga Lane	Paved path at time of road paving	ST	Coordinate with road paving	0.4 miles	$220,000/mile	$ 55,000.00
5		Community Center Footpath	Convert footpath to permanent path	ST	Footpath at this time	0.8 miles	$100,000/mile	$ 80,000.00
APP L.	**Bike Parking**	CBD	Poll residents to determine needs/desires	ST		7 to 14	$155 - $850	$3,500 - $7000
4	**Pedestrian Boardwalk**	Under New Topsail Bridge	Included in Project?	ST	Same time as bridge construction so infrastrut. will be in place	200 feet	$2M per mile	$75,000 - $100,000
Pg. 76, 77	**Signage/Markings**	Wayfinding	Trail markers, mapping	ST	When infrastructure is added		Total	$ 50,000.00
APP N.	**Lighting**	Low level on boardwalk	Upon Construction	ST	Similar to short bollards with top light	6 each	$550-675 each	$3,300- $4,500
APP N.		One-Way Conversion	Upon Construction	ST	Lights on lampost	30 each	$1,500-$1800	$45,000-54,000
Pg. 96	**Curb Radius Reductions near Welcome Center**	Improvements and Curbing for Clear Sight Triangles	Incl. low growing plants separating crosswalks	ST	Improvements on both sides of Roland Ave.			$ 60,000 - 75,000
1, Pg. 77	**Shade trees near Roland Ave. Multi-use path**	For beautification and break from sun	Between Soundside Park and Welcome Center	ST		10	$350 - $500 each	$3,500 - $5,000
		TOTAL SHORT TERM RECOMMENDATIONS						**$ 383,270 - $438,470**
(ST/LT)	**SHORT TO LONG TERM RECOMMENDATIONS (as funding allows 3-7 years)**							
7, 8	**Greenway**	Duke Powerline -Vicinity of Electric Lane from NC 210 to NC 50		ST/LT	21,233' 4.02 miles	4 miles	$220,000/mile	$ 884,400.00
APP N.	**Lighting**	Street Level on Crosswalks	Upon Construction	ST/LT	Estimated 12 lights per crosswalk - 6 each crosswalks	6 crosswalks	900	$ 5,400.00
2	**Buffered Bike Lanes**	S. Topsail Drive (Roland Ave. to southern town limits)	Lanes with Divided Lines 3' from Traffic	ST/LT	This need mentioned often in survey	4.8 miles	$111,320/mile	$ 400,000-575,000
5	**Bike Lane**	JH Batts	Add Bike Lane alongside sidewalk	ST/LT	This will help with interconnection to Communicty Center	0.3	$133,170/mile	$39,951.00
7	**Bike Lane**	Turtle Creek Subdivision	Connect to Greenway	ST/LT	To help with offroad path interconnection	1.7	$133,170/mile	$226,389.00
3	**One Way Conversion**	From High Point to New Bern Ave.	Permanent - Long Term	ST/LT	Permanent Infrastructure with signage	0.6 miles	$45,000- $50,000	$45,000 - $50,000
4	**Crosswalk - at roundabouts**	At Island Roundabouts and Mainland Roundabout	Included with bridge	ST/LT		2	Bridge Project	$ -
Pg. 97	**Crosswalk - two painted lines and signage**	All Beach Accesses (32) (or Ladder style if adopted as standard by Town)	Short Term unsignalized until warranted	ST/LT		32	$340/each	$ 10,880.00
Pg. 74	**Multi-use Path**	Alongside Roland Ave. (Accomplished with Bridge construction.)	Path from Soundside Park to beach	ST/LT				
5	**Roundabout**	At Roland Ave (NC 210 and NC 50 intersection)	Raised with plants	ST/LT	Improvements and Curbing for Clear Sight Triangles	1	each	$200,000 - $400,000
APP M.	**Information Kiosk**	Outside Welcome Center	Weatherproof, freestanding, digital LED	ST/LT		1	each	$5,000-15,000
5	**Pedestrian Boardwalk**	Across Community Center Pond	To be considered	ST/LT		0.1 miles	$450,000 - $500,000/mile	$45,000 - $50,000
	Wish list items: Consider Crowdsourcing or Other Fundraising measures							
Pg. 77	**Water fountain**	Near Greenway	When funds allow/ crowdfunding	ST/LT	Stone, Outdoor	1	$620 + plumbing	$1,200- $2,700
Pg. 77	**Park Bench**	Along Roland Ave., and at least one on Greenway Trail	When funds allow /Crowdfunding/donation	ST/LT	Have public decide where most needed	12	$250-$500	$1,500 - $6,000
Pg. 78	**Bike Fix-It Station**	Locations: Greenway, Community Center, Mainland side of bridge	When funds allow/ crowdfunding	ST/LT	Holds Bike and provides tools for repairs	3	$900-1200 each	$2,700 -$3,600

	TOTAL ST/LT RRECOMMENDATIONS							**$ 1,867,420 - $ 2,269,320**
(LT)	**LONG TERM RECOMMENDATIONS - As funding allows 7-10+ years**							
2	**Sidewalks**	Existing Sidewalk Plan	Complete Sidewalk Plan	**Now - LT**	Complete Sidewalk Plan adjust for Bike/Ped Plan modifications.	18.7 miles	$150,000 - $170,000/mile	$2,805,000 - $3,179,000
5	**Multi-Use Paths**	Caretta Drive (future road)	Path from Tortuga to Harris Teeter Center	**LT**	In planning stages only - Road does not exist Total 8,031'	0.4 miles	$220,000/mile	$55,000.00
7		Connect Cape Fear Community College and Greenway	At time of Greenway construction	**LT**	At time of Greenway Construction	0.2 miles	$220,000/mile	$4,400.00
7		Connect Proposed School, Shepard Rd. and Greenway	At time of school construction	**LT**	As school is constructed, connect to Greenway	0.2 miles	$220,000/mile	$4,400.00
8		NC 210 (US 17 to NC 50)	Coordinate with Widening of NC 210	**LT**	Coordinate with road widening project NC 210	2.8 miles	$220,000/mile	$616,000.00
1, 5		NC 50 (from intersection of NC 210 and NC 50, south to new bridge)	Paved path on east side of NC 50	**LT**	On opposite side of road from existing boardwalk and sidewalk	1.2 miles	$220,000/mile	$264,000.00
7		NC 50 from NC 210 (Roland Ave.) North towards Shepards Rd.	As funds allow	**LT**	Add to Side of Roadway	1.8 miles	$133,170/mile	$239,706.00
8		Atkinson Loop Rd.	As funds allow	**LT**	Alternate to riding on NC 210	0.7 miles	$133,170/mile	$93,219.00
APP N.	**Lighting**	Walking Tracks Pedestrian Loop at Soundside Park	Upon Construction	**LT**	Similar to short bollards with top light	10 each	$550-675 each	$5,500 - $6,750
4	**Walking Tracks**	Soundside Park (Blue Crush Stone, covered w/ 2" asphalt)		**LT**		0.6 miles	$121,390/mile	$72,834
		TOTAL LONG TERM RECOMMENDATIONS (Includes exsiting Sidewalk Plan)						**$4,160,059 - $4,535,309.00**
			TOTAL ESTIMATED RANGE OF COSTS PER PLAN					**$6,487,159 - $7,329,959**
	Other possible costs							
7, 8	**Greenway**	Connect to Greenway- Pender County Schools		**LT**	**Possible shared cost project**		not estimated	depends on distance
	Mentioned in case future needs require							
APP. J	**Tunnel**	Under New River Dr. for Pedestrian and Bike Traffic (Or two RRFB crosswalks)*		**ST/LT**	**IF FUTURE NEEDS REQUIRE PASSAGE**			$3,000,000-6,000,000

If tunnel is considered TOTAL WITH TUNNEL **$9,487,159 - $13,329,959**

* This consideration is for a crossing for bicyclists and pedestrians so they would not have to impede the traffic with a signalized crosswalk on Roland Ave.

More information on how Costs Estimates were determined can be found in Appendix D

NP - Not Pictured

Section 1: Introduction

I. Vision Statement

The Town's vision is to create and maintain a safe, family-friendly Town that provides accessibility to the many scenic, recreational, and commercial destinations. This will be achieved through a network of bikeways, greenways, pedestrian walkways and trails for the use and enjoyment of the Town's residents and visitors. The Town of Surf City recognizes that a safe and efficient pedestrian and bicycle transportation system will promote wellness and healthy lifestyles for the residents and visitors of the Town. It will also decrease accidents and injuries brought about by seasonal traffic congestion. The Town wishes to incorporate NCDOT's goals and five pillars noted below into its plan, to make our Town safer, increase non-vehicular mobility, while promoting, healthy activities which will have a more positive effect on the environment, while stimulating the economy.

NCDOT's 5 Pillars for Walk Bike NC program

1. Mobility
2. Safety
3. Health
4. Economy
5. Environment

Surf City Pier

II. History

Over the past 60 years, automobiles have become the dominant mode of transportation, replacing walking and bicycling to a large extent. As automobiles became more prevalent, bicycle and pedestrian infrastructure suffered in the process. Much more planning focus and taxpayer dollars went into automobile infrastructure while bicycle and pedestrian infrastructure saw very little improvement. As society has progressed, there has been a renewed demand for bicycle and pedestrian accessibility due to various changes in walking and bicycling trends. Among others, some of the factors affecting the changes are: health consciousness and exercise, affordability, environmental consciousness, and improved living environment and community life. This revitalized interest in biking and walking infrastructure has led the State of North Carolina Department of Transportation to create the Walk-Bike NC Program incentivizing, educating and promoting walking and bicycling. They are working to support policies, projects, and programs that encourage increased mobility by non-vehicular methods, increased interconnectivity, environmental stewardship, and resource conservation, using the five pillars listed on the left, which the Town has worked incorporate in this plan.

History Continued

In 2008, the Town created and adopted a Parking and Transportation Master Plan to address the needs of the Town and forecast where future improvements would be needed. In the same year, the Town also created and adopted a Sidewalk Infrastructure Expansion plan to assess the existing sidewalk infrastructure on the island portion of the Town, and to provide an estimate of the sidewalk needed that would safely grant access to pedestrian travel within the Town's boundaries. Since that time, the Town has made progress on connecting the patchwork of sidewalk on the island, particularly within their Central Business District (CBD) area. However, the Town does not have the funding to install all of the sidewalk necessary to complete the existing patchwork.

The Town has also pursued and completed larger projects on the mainland, to connect previously unconnected portions of sidewalk, and have recently completed a sidewalk project to provide pedestrian access from Little Kinston Rd. north to NC 210, a distance of approx. 1.2 miles.

There are a few companies around the Town that rent bicycles to interested patrons. The existing companies are on the island, so the majority of patrons are beach visitors looking to rent cruiser bikes to ride around the beach.

As part of the preparation for this plan, the Town held a public workshop meeting on April 2, 2014, in order to involve citizens in the decision making process for future bicycle and pedestrian access. The workshop resulted in several suggestions for future access, where many of the areas were suggested by several participants. Prior to the workshop, the Town conducted an online survey to gain insight from people around the area regarding their perspectives on the existing and future bicycle and pedestrian access within the Town. The survey received 1,024 responses, which is quite impressive considering the Town's full time population. It is likely that visitors also answered the survey.

III. Overall Goals

The Town's vision is to create and maintain a safe, family-friendly Town that provides accessibility to the many scenic, recreational, and commercial destinations through a network of bikeways, greenways, pedestrian walkways and trails for the use and enjoyment of the Town's residents and visitors. The Town of Surf City recognizes that a safe and efficient pedestrian and bicycle transportation system will promote wellness and healthy lifestyles for the residents and visitors of the Town. The Town also recognizes that establishing safe traffic flow, creating interconnectivity of off-road trails, and increasing separation from motor vehicles will reduce the risk of accidents and injuries brought about by seasonal traffic congestion. Given this vision, the Town has identified the following goals for this planning initiative:

Short-Range Objectives:

- Identify high priority bicycle and pedestrian projects in order to provide guidance on the selection of future projects. Progress will be realized by the adoption of the plan.
- Provide crossing areas that include signage or lights for safe interaction between walkers, bicyclists, and motorists. Progress will be measured by counts of installed crossings, and comparative count of accidents and injuries.
- Identify the need for, and location of additional bicycle racks to promote accessibility to the Central Business District, beach accesses, blueways, recreational areas and points of interest. A physical count or inventory of bike racks at these locations will monitor success of this objective.

Long-Range Objectives and Performance Monitoring

A. Reduce seasonal automobile traffic congestion to popular Town destinations, such as beach accesses, commercial areas, restaurants, shops, parks, and blueways by increasing interconnectivity of, and accessibility to, pedestrian and bicycle transportation assets. Success will be measured by comparative traffic counts and parking assays to determine effectiveness and use of non-vehicular Transportation assets. (i.e., Counts of bike in racks, on a semi-frequent basis to determine how many are using bikes versus cars will also aide in this assessment.)

B. Promote use of designated, public parking areas by providing sidewalks and bike paths that interconnect to popular destinations; and by providing bike racks at destination areas. Success will be measured through comparative parking and use assays, and count of bikes in racks.

C. Provide safer and wider routes for pedestrians and bicyclists in order to reduce risk of vehicle/bike/pedestrian-involved accidents and injuries. Success will be measured by reduction in reported accidents and injuries involving vehicles and pedestrians/bicycles. Percentages of walkers to incidents will help to monitor this figure, as more walkers could equal higher possible interactions, but counts may be less with safer infrastructure. The linear feet of sidewalk accomplished which is up to code, or a measure of gap reduction over time, will help to keep track of the progress for this objective.

D. Educate residents and visitors of safe use of pedestrian and bicycle assets through signage, publications, wayfinding, and community outreach. Success will be measured by public surveys and material participation. The success of this objective could be measured by measuring the number of publications distributed in the safety campaign, such as Watch4Me-NC.

E. Help the economy by continuing to expand the walking and bicycling alternatives for visitors. A success indicator would by a count of bike rentals, a count of bicycles parked at businesses, or an increase in tourism, reported by increase in rental properties.

F. Provide accessibility for individuals with special needs. Success will be measured by a count of ADA compliant facilities.

G. Increase the quality of life of residents and visitors by providing walkways, greenways and multi-use paths to increase the mobility, exercise, health, and quality of life in our Town. This measure could be established through surveys after improvements are installed, and observations of how frequently the new infrastructure is being utilized by counts of non-motorized transportation.

IV. Scope and Purpose of Plan

The scope of this plan is to provide a comprehensive assessment of the Town's bicycle and pedestrian infrastructure, including the analysis of the existing infrastructure as well as potential future projects, and to designate areas for improvement.

The focus of the plan is to prioritize and implement strategies and route recommendations, which would create interconnectivity of both biking and walking assets throughout the Town, to develop both on-road and off-road infrastructure to accommodate all ages and levels, and provide cost estimates for planning purposes.

The study area for this plan includes the entirety of Surf City's town limits. While certain areas will receive more emphasis than others, such as the CBD area where much of the bicycle and pedestrian activities occur, the plan considers the entire Town's limits and boundaries in order to include all citizens and areas within the plan.

Section 2: Evaluating Current Conditions

I. Overview

The Town of Surf City is located in southeastern North Carolina, approximately 30 miles north of Wilmington, in Pender and Onslow counties and borders the Atlantic Ocean. The Town was incorporated in 1949. Prior to World War II, the only access to the island was by boat. During the war, the island was used as a rocket launch testing site. When the testing program ended in 1948, the government sold the island to the public.

Since that time, the Town has grown to be a small beach community whose tourism is the livelihood of the economy. As of the 2010 US Census, the Town's population is 1,853 and the average citizen age is 43 years old. The Pender County portion of the Town is part of the Wilmington Metropolitan Statistical Area, whereas the Onslow County portion is part of the Jacksonville Metropolitan Statistical Area. According to the 2008-2012 American Community Survey 5-Year Estimates, the median household income is $60,972, which is higher than the state's median household income of $45,814. Compared to the Town's population in 2000 of 1,393, the area realized a 33% increase in population during those 10 years, which has contributed to the traffic congestion. The population growth rate is much higher than the state average rate of 18%. According to the United States Census Bureau, the Town has a total area of 5.3 square miles, with 4.2 square miles of land and 1.1 square miles of water. This small space accommodates thousands of seasonal visitors particularly in the summer months, which brings safety of bicyclists, pedestrians, and motorists to the forefront, signifying the main reason for this comprehensive plan. Because of its lovely beaches, and the natural beauty of this barrier island, the Town has become a vacation haven for people, not only in the surrounding area, but all over North Carolina, and around the country, who flock to the coast to bask in the sun and enjoy the coastal resources in the summertime. The area is experiencing growth and development partially due to the close proximity to coastal resources just outside the hubs of Wilmington and Jacksonville.

By developing a contiguous bicycle/pedestrian transportation network, the Town will be able to better connect the mainland with the island, enabling residents and visitors to commute to the CBD or primary areas of interest without driving. Tourism is essential to Surf City as it generates revenues for the Town. Residents and businesses have also previously expressed the need for connectivity, and mobilization, so those on the mainland will not feel "landlocked" or isolated. By implementing key strategies, the Town can promote safety and healthy lifestyles via walking or biking, by providing non-motorized access to the island amenities for leisurely enjoyment.

The table below shows a breakdown of the population age, according to the 2010 Census of Surf City residents, which indicates average age is 43, while the state's median average is 37.

Table 2.1 - Age Of Citizens (US 2010 Census)

Age	Number	Percent
Total	1,853	100
Under 5 years	83	4.5
5 to 9 years	59	3.2
10 to 14 years	49	2.6
15 to 19 years	89	4.8
20 to 24 years	215	11.6
25 to 29 years	154	8.3
30 to 34 years	94	5.1
35 to 39 years	110	5.9
40 to 44 years	114	6.2
45 to 49 years	115	6.2
50 to 54 years	144	7.8
55 to 59 years	168	9.1
60 to 64 years	146	7.9
65 to 69 years	137	7.4
70 to 74 years	74	4.0
75 to 79 years	56	3.0
80 to 84 years	27	1.5
85 years and over	19	1.0
Median age (years)	43.1	X

While these were the latest official census figures, the Town's permanent population in 2013 was estimated to be 2,081 by City-Data.com. It is important to mention that these figures do not include the thousands of seasonal visitors in Town of Surf City, see Appendix G for summer traffic counts.

A viable plan with pedestrian and bicycle interconnectivity will help to resolve some of the existing conditions. Shown here, the pedestrians are walking on both sides of the roadway, squeezing by parked vehicles and in between motorized traffic. The area lacks sidewalk infrastructure on both sides of the road in this section of N. Shore Dr. An option which recommends One Way Lanes in this area, with a designated bike and pedestrian area will be introduced as a recommendation.

Left, a sidewalk exists, however the vehicle parked in front of it, is obstructing pedestrians who may want to cross. The *Existing Conditions* section will examine what problems currently exist, and will discuss relevant plans, and *the Recommendations Section* will relay alternatives for creating a bicycle and walking friendly community.

According to the Census for Pender County, shown at right, 30% of households had only one vehicle available, and 5% had no vehicles available, which indicates other modes of commuting would be welcome.

Table 2.6: Vehicles Available Per Household in Pender County		
Occupied housing units	19,107	100%
No vehicles available	966	5.10%
1 vehicle available	5,914	30.00%
2 vehicles available	7,390	38.70%
3 or more vehicles available	4,837	25.30%
Source: US Census Bureau 2005-2007 American Community Survey www.census.gov		

The U.S. and NC State Data Center shows significant population growth in Pender County, and predicts a projected population of 80,558 by the year 2030, which is a growth rate of 96.10% since the year 2000's population of 41,082, with coastal areas absorbing significantly higher growth rates for the region. Sources: www.census.gov; http://www.sdc.state.nc.us

In 2008, The Town of Surf City created and adopted a Parking and Transportation Master Plan to address the needs of the town and forecast where future improvements would be needed. Since that time, both residential and tourists' populations, and businesses to support the tourism economy have grown in leaps and bounds. The increase in number of drivers and vehicular traffic, particularly in the summer months threatens the safety of pedestrians and bicyclists, and to address this need, the Town in its strategic plan named the importance of developing a Bicycle and Pedestrian Master Plan, to construct and maintain infrastructure related to bike and pedestrian transportation. This effort will involve the planning to construct sidewalk and bikeways, and multi-use paths to safely separate the pedestrians and bicyclists from the motorists, as well as a strategy for networking and connecting existing sidewalks and paths, which focus on continuity of movement of pedestrians and bicyclists from recreational areas to beach access, to shopping and businesses, restaurants, and areas of interest and attractions.

Since 2013, interested citizens and Town staff have collaborated to address their vision, which is to

- Improve and encourage healthy lifestyle modes of transportation such as biking and walking
- Improve the network of bikeways and paths, and increase multi-modal transportation options
- Provide educational safety programs and signage
- Address the long and short term goals by identifying those areas which require necessary and immediate change, and those that can be implemented when funds are fiscally available

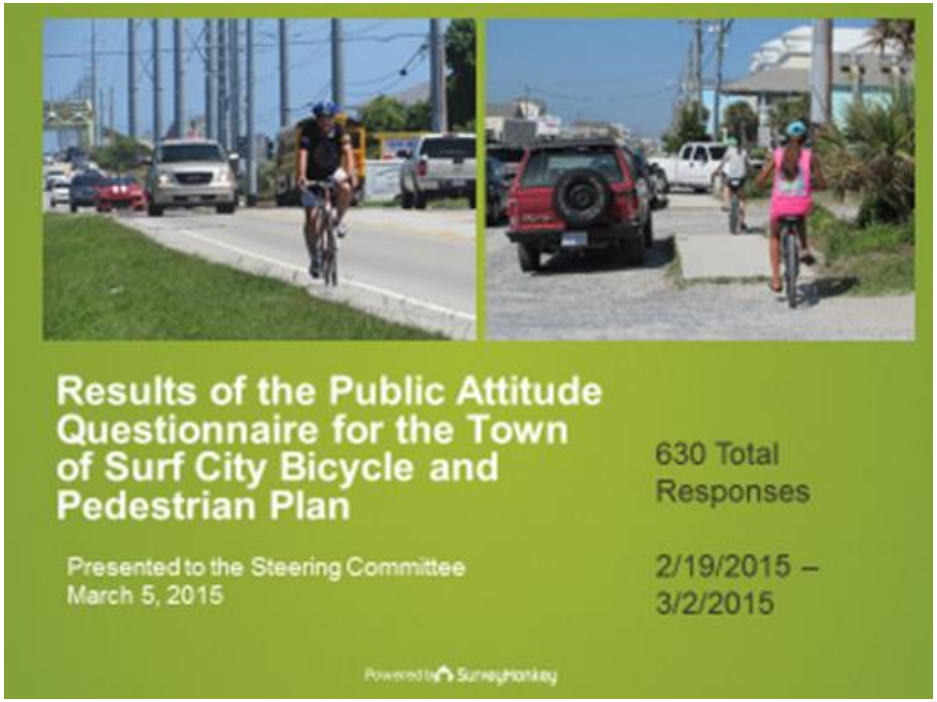
The Town can be described as bordered by the Atlantic Ocean on its east and US 17 on its west side, as US 17 generally parallels the North Carolina coastline. For Surf City and the areas surrounding Surf City, US 17 is approximately 4 miles from the coastline. As will be discussed later in this plan, the access to US 17 presents a unique opportunity for both short-range and long-range travelers to access the beach and the Town's resources. There are two main arteries that lead travelers into the Town, both of which are accessed from US 17. NC 210 is the more southern access to US 17, while NC 50 provides a northern access to US 17. Both NC 210 and NC 50 converge at an intersection as they lead into the Town towards the beach, where the road becomes NC 50/210, otherwise known as Roland Avenue. The vast majority of the Town's businesses are located starting from this intersection and leading to the beach. The Town's main access to the island portion of the Town is utilized by a swing bridge on this road, which allows travelers to cross the Intracoastal Waterway. The only other access to the island is the high-rise bridge at North Topsail Beach, which is approximately 8 miles along the coast from Surf City's bridge.

In 2013, the swing bridge was inspected and classified as 'functionally obsolete and structurally deficient with load restrictions of 19 tons for single vehicles and 25 tons for truck tractors with semi-trailers.' NCDOT is scheduled to replace the swing bridge with a new high-rise bridge that is proposed to include a 10' multi-use path as well as two shoulder bike lanes, each seven foot six inches wide (7'6"). (See Page 73)

Increasing multi-modal transportation options, will allow for expansion of residential and commercial establishments, while enhancing the area in an environmentally-friendly way. Then the island can be accessed on foot or by bike, reducing traffic congestion. Ideally, once vacationers arrive on the island, these assets will make it feasible to get around the Town by non-vehicular modes of transportation. This which will encourage visitors to leave their vehicles parked and will also work to preserve the natural beauty of the area. The Town was polled to get their opinions on current transportation modes, and needed infrastructure improvements.

Town Participation

As part of the preparation for the Comprehensive Bike and Pedestrian Plan, the Town conducted two online surveys to gain perspective from residents and visitors on the existing and future bicycle and pedestrian access within the Town. The first survey received 1,024 responses, which is quite impressive considering the Town has a population of 1,853 as of the 2010 US Census. The respondents indicated that 93% of them ride a bike or walk on a regular basis, while only 7% do not. The survey indicated many commonalities, (see synopsis on right column) and revealed that bicycle and pedestrian improvements are greatly desired throughout the Town and throughout the area as a whole. More information regarding the survey can be found in Appendix B. The second Public Attitude Survey was directed toward residents and discussed priorities of the plan, zeroed in on goals, and asked questions relating to funding and crosswalk locations. The results of The Public Attitude Survey (which had 630 responses) were conveyed to the Steering Committee by way of a PowerPoint presentation, the cover of which is shown below. The results from both surveys can be accessed at Surf City Town Hall.



Analysis of the survey results has indicated several trends and commonalities some which are noted below. The respondents indicated that especially in summer months:

- It is very dangerous to walk or ride bikes in the Town
- Improving safety is a huge concern
- Improved pedestrian access within the CBD is desired
- The current bike lane on S. Topsail Drive is not wide enough, and needs to be better maintained
- Improved separation from traffic lanes on S. Topsail Drive is desired
- Many are not advanced cyclists, and desire additional off-road biking alternatives.
- Almost all encourage sidewalk connectivity
- About 80% indicated they would be more likely to ride or walk if shoulders were wider and better separated from roads
- Crosswalks should be considered in a few areas for safe passage

Traffic is especially a concern in the summer months when the population climbs to an estimated 60,000* visiting the Topsail area beaches. The area pictured above is the main entrance to the Town across the Swing Bridge. When the bridge turns to allow boat passage, it is common for traffic to back-up and cause congestion. In the Central Business District, designated parking spaces and sidewalks, or multi-use paths are needed to help convey safe passage for pedestrians and bicyclists. The second arrow points to cones which are being used to divert traffic from making a left turn in an effort to reduce traffic congestion. *Source: http://www.the-ospreynest.com/Reviews.html

On a popular holiday weekend, you can visualize the problems as a bicyclist tries to maneuver his way through the traffic.

This photo depicts the main entrance off the swing bridge into Surf City on Roland Ave. As you can see, there is no pedestrian infrastructure or clearly marked bikepath on either side of the roadway. Clearly marked, shared bike lanes would help this bicyclist (pictured in the forefront with a straw hat) know how to proceed, and also help drivers know where the bicyclists should be. Once a plan is in place, safety education is critical and should be initiated, so motorists as well as pedestrians and bicyclists, will understand who has the right-of-way. This view of Roland Ave. also displays that there are no sidewalks in place for pedestrians, and very little room to get around the vehicles.

The Old Swing Bridge shown above, adds to traffic congestion on Roland Ave. The new bridge is designed to include a multi-use path separated from traffic, for pedestrians and cyclists. Additionally, a bike lane will exist on each side of vehicle lanes. The design allows for bicycle lanes to be converted to three traffic lanes if the need for evacuation arose. The current bridge structure (shown above) is very narrow, and crossing the traffic, either by walking or bicycling, is very difficult. The new Topsail Bridge Replacement project will be discussed in more detail on Page 39 of this plan, but plans for utility relocation are underway, with construction beginning in 2017, and completion projected for 2020. While the bicyclist and pedestrian pictured here appear to be comfortable alongside the traffic, the survey determined that the majority of riders are not advanced, and prefer off-road trails and bikepaths, and do not like to ride in traffic.

Public Workshop and Plan Participation

A Public Workshop was held on April 2, 2014 at the Welcome Center, in order to engage citizens in the decision making process for future bicycle and pedestrian improvements. Participants were invited to provide suggestions, view the sidewalk and bicycle infrastructure maps, discuss safety education needs, and talk to representatives about possible connections to the Mountains to Sea Trail and the East Coast Greenway projects. Participants were able to view the survey results and participate in the survey, if they had not yet done so. They were also encouraged to make suggestions and volunteer to be a part of the Steering Committee for the project. A previous survey had also been sent out via social media and emails. Many of the comments at the Workshop mirrored the concerns in the previous survey, and all participants were enthusiastic and in favor of the Comprehensive Bicycle and Pedestrian Master Plan moving forward. During the initial planning stage, and throughout the process, the Town's website encouraged public participation and feedback from interested parties, and encouraged them to both complete the surveys and join the Steering Committee. Many residents, business owners, Town staff and others participated on the Steering Committee.

Much of the Town's existing bicycle and pedestrian system is located within the Central Business District (CBD) located on the island side of the Town. Specifically, the CBD is bounded by High Point Ave. on the west side, New Bern Ave. on the east side, North Shore Dr. on the south side, and N. New River Dr. on the north side. The current pedestrian system in this area consists of a patchwork of sidewalk. Over the course of time, the Town has required developers to install sidewalk along the frontages of the properties, but many of the properties have not been developed/redeveloped in many years, resulting in small patches of unconnected sidewalk. The Town wishes to install sidewalks in order to connect the existing portions of sidewalk, to encourage walkability in the Town.

II. Bicycle and Pedestrian Compatibility with Local Transportation System

A Public transportation system extends to Jacksonville, Camp Lejeune, and Wilmington, but is not currently available in Surf City, except for a small funding source for the "Pender Pass" provided by Pender County. A bus system will not likely exist in the foreseeable future due to the lack of demand, or a consistent population. Shuttles and carpools are sometimes arranged for public events such as the Polar Plunge, or 2016 Marathon and Half Marathon. Planning for multi-modal transportation assets will help visitors to reach restaurants, shopping areas and businesses, and other areas of interest. If tourism increases exponentially and local bike shops cannot accommodate the number of visitors who wish to rent bikes, a ***Bike Share*** system could be considered which is further explained in Appendix H.

III. Current Usage and Existing Conditions

The CBD is by far the most used portion of the town's pedestrian system. Much of the beach traffic comes through this area, and the public beach access areas and surrounding public parking is a large part of the economic drive that helps to support the CBD businesses. During summer months

Pedestrians run across Roland Avenue to avoid being hit by oncoming traffic.

when more tourists are in town, the CBD area can experience heavy congestion.

Increased interactions and the lack of pedestrian infrastructure puts both the pedestrians and motorists at risk of injury. With congestion, it becomes nearly impossible to cross the street, without risk of getting hit by a car. Pictured above, pedestrians wait for an opening in the traffic, and dash across Roland Avenue. Note – there is no specified crossing or warning to motorist of potential crossing by pedestrians. Possible crosswalks will be discussed.

The majority of the bicycle and pedestrian system outside of the CBD is located along the mainland portion of Roland Avenue (NC 50), particularly along the west side of the road. In an effort to connect previous gaps in the sidewalk, the Town has recently completed a sidewalk project to provide pedestrian access from Little Kinston Rd. north to NC 210, a distance of approx. 1.2 miles. The east side of the road, however, has very little pedestrian access, with unconnected portions of sidewalk existing along the frontages of recently developed properties.

The Town is using its Sidewalk Infrastructure Expansion Plan revised in 2009 to designate which sidewalks will be installed, and is making progress as funds become available. Outside of the CBD area, the sidewalks generally do not connect, which makes it hard for those in the surrounding neighborhoods to reach the island by anything other than vehicle. Even though the CBD is much more heavily used, these outside areas experience a significant amount of pedestrian traffic, usually from beach goers heading to and from the public beach accesses and from people heading to the CBD to access its resources. The Town has a long-term goal of connecting the sidewalks throughout the town, particularly in the CBD and extending beyond the CBD as funding is determined.

A 660-foot boardwalk for pedestrians was constructed in 2014, to provide access to an area west of the Swing Bridge on the mainland on NC 50 and NC 210, which was difficult to cross due to drainage, wetlands, slopes and uneven terrain. This boardwalk, pictured below, now connects some of the sidewalks on the mainland side of Surf City which greatly increased walking accessibility. With its ramps and railings, it provides a walkable asset in Surf City. This area behind the utility lines and close to the billboards was previously unnavigable, but can now be easily traversed, and is accessible for people with disabilities. The boardwalk provides a safe avenue for pedestrians as it is separated from the highway traffic, and has become a safe connector between neighborhoods on the mainland and the island. These improvements were initiated after the town residents commented that they felt annexed and disconnected, and suggested better integration of the mainland to the island.

[1]http://community-wealth.org/content/walking-walk-how-walkability-raises-home-values-us-cities

Connecting the island to the mainland in Surf City was mentioned as a concern for residents, and this infrastructure helped to make the Town more walkable. Towns and cities across the country are examining walkability and how it directly affects desirability for home ownership. While walking was formerly ignored in transportation studies, it has a renewed interest as concerns of urban sprawl, climate change, and carbon emissions are brought to our attention. A recent report called ***'Walking the Walk'***[1] gives neighborhoods and Towns a 'Walk Score' for being accessible to parks and recreation, shopping and services, and finds a direct correlation between 'walkability' and home values.[1]

IV. Existing Conditions -Current Usage and Public Comments

The existing bicycle and pedestrian infrastructure is marked in the ***Overall Proposed Map*** in Section 8, and measures approximately 17 miles. Most of the sidewalk is in good quality, with only minor defects, as a large percentage was constructed in the past 10 years. The challenge has been connecting the areas that have gaps, which are frequent throughout the Town. As new lots are developed they are required to install sidewalks, but empty lots and those which have been present for many years, have no installed sidewalks. This condition makes it hard to walk safely for a long distance. The multi-use path that is located along S. Topsail Drive is in poor quality, and in need of improvement. A mutual comment from the participants in the Town's public workshop and from survey respondents was that this path is un-rideable because of debris, gravel, broken glass, overgrown vegetation, and obstacles on the path such as trash cans, and occasional parked vehicles. These problems deter the bicyclists from riding on the paths. Many motorists complain that when cyclists are in the road, they believe it impedes traffic. Another frequently voiced opinion was that the current paths are multi-use; however, they are not wide enough for both pedestrians and bicyclists, suggesting they should be wider and that they should be better separated from the traffic.

Can we do better than this? The Town organized two surveys to get public opinions. The first one had 1,027 respondents. Overwhelmingly, people were in support of improvements in Bicycle and Pedestrian infrastructure. An important element revealed in the second survey which had 647 respondents was that fifty-five percent (55%) of those participating in the survey described themselves as 'Basic' riders, who avoid heavily trafficked roads, unless there is ample separation between them and vehicular traffic. Only eight percent (8%) described themselves as advanced, and twenty-two percent (22%) described themselves as a less confident adult rider, or one who rides with children, who rarely rides in traffic. (See descriptions of riders on page 28.) The remaining 15% were pedestrians only. Pedestrians and runners alike also requested wider paths, so passing bicyclists would be possible. Families with strollers and children want to feel safe in this area which is heavily trafficked by all transportation modes especially in the summer months. Safer, wider paths with regular maintenance to remove debris, as well as improvements to make them ADA compliant would eliminate barriers for those with disabilities and encourage non-vehicular mobility in the Town.

The above depicts pedestrians crossing the road haphazardly, at many different spots, in between the traffic. The sidewalk stops abruptly where vehicles are parked. This is very typical of a busy weekend, near the beach access on Roland Avenue. The road shown here is S. Shore Drive.

Existing Conditions -Continued

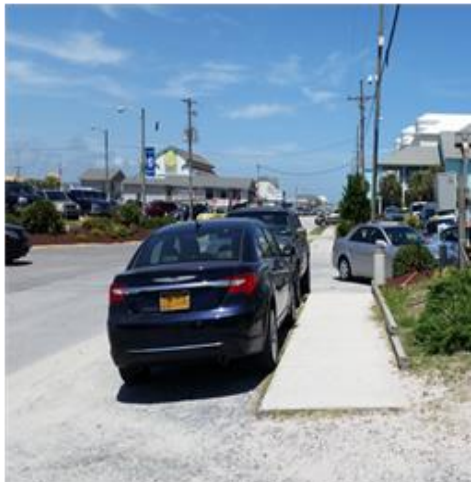
Since the new Topsail Bridge will bring an increase of bicycle and pedestrian traffic, the Town sees the issue as a priority that needs focus in order to address safety concerns.

In the proposed plans for the new Topsail Bridge, NCDOT has included a multi-use path alongside Roland Ave. from the roundabout landing toward Soundside Park. This lane will help to ensure the safety of pedestrians and bicyclists, and will be an asset for non-vehicular mobility in the Town. One goal of this plan was to get infrastructure in place so that when someone crosses the bridge on foot or by bike, they will be able to connect to their desired location. NCDOT is working with the Town to discuss utility relocation for area around the new bridge. The Recommendations section will discuss continuing the multi-use path on Roland Ave. from Soundside Park extending it to the beach.

Obstacles exist in certain areas, as shown below, where the sidewalks just stops. These areas need to be addressed for safe passage.

People voiced their opinions and desires:

- *"It would help to use the Town's sweeper for the bike lanes…as they are full of rocks and glass."*
- *"Want to feel safer with comfortable road conditions for road biking, and more bike racks at businesses"*
- *"WIDER BIKE PATHS, not so close to vehicular traffic."*
- *"Separate bike lanes leading to Surf City."*
- *"Separate sidewalk away from the road for my stroller, and a greenway for long distance walk/biking."*
- *"Better Enforcement of 'No Parking' on bike lanes/sidewalks. There should be a sidewalk or path on most roads in the area."*
- *"Lots of signage reminding drivers to share the road."*
- *"Keep sand and gravel off the paths"*
- *"Separate bike paths, and a smoother surface adjacent to highway, it is too dangerous now."*
- *"SLOW DOWN traffic – Reduce speed."*
- *"A network of interconnecting sidewalks."*
- *"Please remove debris including glass and large stones from people's driveways (which) make it unsafe to ride in lane."*
- *"Paths not so close to vehicular traffic."*
- *"Off-road paths, and crosswalks for safety."*
- *"Clean the gravel off more frequently."*
- *"More room for bikers and runners"*
- *"It is too dangerous – we need sidewalks and bike lane, slower speed for vehicles."*
- *"Wider and more off-road paths."*
- *"A Bike/Pedestrian Lane to get over the bridge."*
- *"Longer, better connected sidewalks or trails."*



Existing Conditions –Continued

The pictures above are indicative of existing conditions in Surf City, and show that there is a need for increased infrastructure for pedestrians, joggers, and bicyclists. Additionally, designated crossings and crosswalks are lacking. The two pictures at right show the area near the Welcome Center and Roland Ave. beach access which is a main artery in the CBD and is heavily trafficked. This area is lacking designated parking spaces, which leads to haphazard parking. As depicted above, two vehicles are obstructing the sidewalks, which are the only avenues to keep pedestrians and bicyclists off the roads. A suggested course of action to promote safety is to improve this area by designating one way lanes, and adding both bicycle and pedestrian lanes. This scenario would allow increased parking at the beach access, and will be discussed in more detail in Recommendations section. Another suggested improvement was crosswalks for safe passage across the streets. Residents and visitors were polled to determine if they felt crosswalks were necessary, and asked to give their opinions of where crosswalks should be located. Most agreed that because of the seasonality of the traffic congestion, that a push button access to stop traffic would be the best alternative to help pedestrians cross the street in a safe manner. The Steering Committee considered the areas which are priorities, and suggestions for crosswalk locations will also be discussed in more detail in the Recommendations section of this report. The Steering Committee also discussed how 'No Parking' signage followed up by enforcement with fines will help to deter those from parking in sidewalk crossing areas. Enforcement will help with pedestrian and bicyclists' mobility, and could create revenue for the Town.

Section 3: Existing Plans, Programs and Policies

I. Relevant Local, Regional and State Plans and Guidelines

NCDOT's Division of Bicycle and Transportation is dedicated to integrating bicycle and pedestrian safety, mobility and accessibility into the overall transportation program through engineering, planning, education and training. The Statewide Pedestrian & Bicycle Plan for North Carolina, known as ***WalkBikeNC***, is helping to increase the physical activity of the state. The Town of Surf City applied for a Planning Grant for funding to help launch its Comprehensive Bicycle and Pedestrian Plan, and was approved for funding in the third quarter of 2014. This has helped enable the Town to pay for this plan. The state designated a Project Administrator, NCDOT Division of Bicycle and Pedestrian Transportation representative, John Vine-Hodge, to participate in the Steering Committee meetings, and has developed templates and strategies to help municipalities move forward with their programs based on the following pillars of the program, described on the following page.

- Safety
- Mobility
- Environment
- Health
- Economy

Safety

Promote programs and education to eliminate the 200 bicyclists and pedestrians who are struck by automobiles each year in the state

Mobility

Increasing investment on interconnected network of pedestrian and bicycle facilities to improve mobility and accessibility reduces traffic congestion

Environment

Non-vehicular transportation that replaces driving improves the atmosphere, encourages healthy lifestyles, and healthy people, which has a positive impact on the environment.

Health

Physical activity in North Carolina is lacking behind other states, and leading to obesity which increases health costs

Economy

Bicycle & Pedestrian facilities yield economic returns and increased tourism

NCDOT's ***WalkBikeNC*** Statewide Plan incorporates the above pillars, and listed above is a synopsis of the efforts in each area.

The full plan can be found at: http://www.ncdot.gov/bikeped/download/FinalSummaryDoc110113WalkBikeNC.pdf

RESOLUTION 2013-11-08 authorized the Town of Surf City to support the development of a Bicycle and Pedestrian Comprehensive Infrastructure Plan, to form an Advisory Committee, which is referred to as the Steering Committee in this plan, and to secure grant funding for the Town. The Town voted this resolution into effect at its November 8, 2013 Town Council Meeting. See Appendix A.

The Steering Committee was made up of business owners and residents in the Town of Surf City who participated by attending meetings with the Town Planning Director, engineers, Town representatives, and NCDOT. The Steering Committee helped in the plan by:

- Attending Meetings
- Sharing opinions
- Voicing concerns
- Answering questions
- Analyzing survey results
- Drawing infrastructure
- Discussing guidelines
- Setting plan priorities
- Prioritizing crosswalks
- Editing the plan
- Identifying safety issues and concerns
- Evaluating alternatives
- Targeting problem areas
- Editing and revising the plan to meet the needs of the Town
- Sharing feedback and ideas to advance the plan

Sidewalk Infrastructure Expansion Plan 2-27-09

This Expansion Plan assessed the existing sidewalk infrastructure, and divided the desired sidewalk into phases of improvement. This plan provided cost estimates based on linear feet of sidewalk. While the main focus was in the Central Business District, other areas on the island were considered, but improvements did not include connecting to the mainland. The Town has been working to get this infrastructure completed, but due to funding, much of the infrastructure in the 2009 plan, still has not been completed.

The Town of Surf City Parking and Transportation Master Plan of August 2008

This Transportation Plan's objective was to assess the existing parking, roadway and transportation infrastructure to prioritize recommendations and alternatives to provide for future development, to accomodate increased populations. This plan conservatively projected the population to be about 2,200 by 2020., and provided a public forum questionnaire regarding the bridge replacement, which is projected to begin construction in 2017. The public also commented on the need for sidewalk interconnectivity, the desire and need for bicycle infrastructure, signage, and blueways, and underscored the need for parking on the island.

The Strategic Plan of the Town of Surf City, which is the Parks and Recreation Master Plan was updated 1-31-2009 – This plan considers land used for recreational activities and works to incorporate conservation areas for the enjoyment of residents and visitors.

Topsail Area Comprehensive Transportation Plan of February 2011 – The Town of Surf City participated in this plan to combine efforts by joining stakeholders from Onslow and Pender Counties, the Town of North Topsail Beach, Town of Holly Ridge, Town of Topsail Beach, Cape Fear RPO and the Down East Rural Planning Organization. This was a long-range, multi-modal transportation plan to cover transportation needs through 2030, which included bicycle and pedestrian infrastructure needs. Suggested improvements included widening NC 210 and adding bicycle and pedestrian lanes, and mentioned adding a possible roundabout at NC 50 and NC 210. It also described that Roland Ave was over capacity, and NC 210 was near capacity, and projected volumes of traffic compared to highway and road capacity.

This plan also identified the Topsail Area Greenway as 'a valuable connection,' which was referred to as NC Bicycle Route #3, which would run essentially parallel to US 17. The Greenway is not a new idea, and has previously been referred to as the Coastal Pender Greenway (in the ***Bicycle Facilities Study for the Blue Clay Corridor*** prepared in 2008 by the Wilmington Metropolitan Planning Organization, WMPO), and has also been referenced as the Powerline Trail Greenway. The WMPO boundary does not overlap Surf City's jurisdiction.

The **Cape Fear Rural Planning Organization** is the regional transportation planning organization for the portion of Surf City within Pender County, and the **Down East Rural Transportation Planning Organization**, covers the part of the Town that lies in Onslow County. By coordinating planning efforts with the efforts of these organizations, it will help the Town of Surf City to realize a longer bicycle pathway network, and mutually benefit surrounding communities.

II. Programs and Initiatives Currently Underway or Planned

The Town of Surf City recently applied and was accepted into **NCDOT's *Watch for Me-NC*** safety program, which is a statewide pedestrian and bicycle safety campaign. The Town received notice in April 2015 that they were accepted to receive funding. The Town is collaborating with all the organizations below who sent in a Letter of Support to encourage this target approach of public education and police enforcement aimed to make safety a priority in the community. This programming effort will hold public workshops to promote safety education and encourage attendance by all age groups.

The Watch for Me-NC campaign included Letter of Support from:

- **The Town of Surf City Police Department**, Chief Halstead, Chief of Police
- **Surf City Parks & Recreation,** Kristie Grubb, Director of Parks & Recreation
- **Pender County Schools**, William Rivenbark, Transportation Director
- **Pender County Park & Recreation,** Dee Turner, Executive Director
- **Surf City Fire Department,** Chief Joseph Rivenbark, Fire Chief
- **Pender County EMS and Fire, Inc.,** Chief Woodrow Sullivan, Chief and Director
- **Pender County Board of Commissioners,** David Williams, Chairman
- **Cape Fear Rural Planning Organization,** Allen Serkin, Rural Transportation Planning Director

These funds will enable the Town to spearhead its safety campaign, provide training for police officers and Town Staff, who will then train others on Bicycle and Pedestrian Safety and implementation. This plan will help to teach motorists, bicyclists and pedestrians the rules of the road, and convey safety procedures designed to prevent accidents from occurring. The Watch for Me-NC Campaign will also provide the safety materials for this initiative, and will

help to educate the public in an effort to form a safer community. As an outreach, the Town also hopes to include safety information with the tourists' check-in materials, so they will also be encouraged about safety programs in the town.

To support this initiative, this plan recommends coordinating a temporary One-Way Workshop in the Downtown section of Town in front of the Welcome Center. This will be a temporary site to help participants experience the scenario of converting two lanes of traffic into one-way lanes, and setting up temporary bike and pedestrian infrastructure. This Plan recommends that the Town consider the feasibility of these One-Way avenues to increase safety and mobility, and suggests implementation of this 'reality' experience as a great way to reach many people at once.

It was also recommended that the Town applies for funds in collaboration with Pender County from the Duke Energy Water Resources Fund to help with acquiring easements for the Pender County Surf City Coastal Greenway Project, and hopes to receive funding to move the greenway project forward.

Greenway design would minimize environmental impact, and use guidelines which include the 1994 North Carolina Bicycle Facilities Planning and Design Guidelines by NCDOT, and the Guide for the Development of Bicycle Facilities, published by the American Association of State Highway and Transportation Officials (AASHTO).

The Greenway would be an off-road multi-use trail which would be adjacent to the utility lines near Electric Lane which crosses NC 210 in the Town.

As mentioned previously, in March 2008 the Wilmington Metropolitan Planning Organization, mentioned the greenway, and referred to as the 'Coastal Pender Greenway,' defining it as a valuable connection' for multi-modal transportation utilizing the existing Progress Energy Company's easement' (now Duke Energy). The greenway project would be subject to Duke Energy's Transmission Line Right of Way Use Guidelines, (detailed in Appendix C) but would preserve an area for recreation and conservation. As Surf City encompasses only 5 miles, this easement that joins assets in Pender County would provide a longer stretch of infrastructure for those desiring a long-distance ride, or walk. The Greenway was recommended for the Topsail Area in the Comprehensive Transportation Plan Topsail Area dated February 2011. Utility line greenways across the state are providing environmental conservation of natural areas, protection of wetlands and forestry, while at the same time providing off-road trails to provide safe access for recreational usage for pedestrians and non-motorized transportation use. The design of greenways encourages safety as it removes bicyclists and pedestrians from areas of congested traffic, protects this land from development, and provides recreation that appeals to all ages.

III. Relevant Bicycle and Pedestrian Statutes and Ordinances

The Town's ordinance requires sidewalks to "be constructed to a minimum width of five (5) feet on both sides of collector streets and streets considered above the collector street status and on one (1) side of the street classified as residential streets as well as cul-de-sac bulbs. The sidewalk shall consist of a minimum thickness of four (4) inches of reinforced concrete. Sidewalks shall be of an approved hard surface and meet ADA requirements. All sidewalks shall be placed in the rights-of-way, unless the development is platted as a planned unit development" (see Part II, Article VI). Prior to this requirement, sidewalks were not required, which resulted in the patchwork of sidewalk that exists today.

The Town's ordinance includes landscaping requirements along property lines that are relevant to this plan since pedestrian infrastructure is typically located within or adjacent to the landscaped requirements (see Part II, Appendix A, Section 5.7).

Part II, Chapter 17, Article 5 deals with bicycles and requirements for their use within the Town. Once the bicycle and pedestrian assets are improved, safety education for increased understanding is a priority. Sidewalks were placed in areas where newer construction developed, the Town's challenge is connecting the gaps in undeveloped lots, as well as residential and commercial areas which were owned for a long period of time, and never had sidewalks. Due to traffic volumes and speeds, many concerned citizens voiced their opinions that pedestrian crosswalks were necessary, particularly in summer months. Since traffic during the year is not a large concern, "yield to pedestrian" signage, and possible push-button crossings were suggested.

Section 4: Development of Strategic Bicycle and Pedestrian System Plan

I. System Overview

The CBD, located on the island side of Town is the most heavily congested area within the Town, particularly in the summer months. This produces a steady flow of travelers, traffic accumulation due to several factors. The CBD is just south of the only bridge within 8 miles and therefore provides access to and from the island for a large portion of the population. The amount of traffic coming through this area contributes to the tourism, and helps to support the many businesses within the CBD. During the months of May through September, the roads are crowded with pedestrians, who walk to shopping, markets, beach accesses, and restaurants. Because of the lack of sidewalks, this creates a safety issue for pedestrians and motorists. The Town created a Parking and Transportation Plan in August of 2008 which addressed some of the limited space and parking issues, and predicted population increases and additional congestion, which have definitely come to fruition.

This sidewalk ends and overgrown vegetation prevents pedestrians from continuing on this route, causing pedestrians to walk in the roadway.

To further develop the Transportation Plan, a Sidewalk Infrastructure Expansion Plan was compiled in December 2008, in an effort to inventory the existing infrastructure, and plan for expansion, with a long-term goal of connecting all the existing sidewalk fragments in Town into a contiguous, walkable network for pedestrians. Since segments are constructed as funding becomes available, the process has been a long one. The entire forecast for construction of the sidewalk was one million two hundred eighty-one thousand dollars six hundred dollars, ($1,281,600), which has taken many years to accomplish, with significant progress being made in the last two years. Because the Multi-use path alongside Roland Ave. is included in the Topsail Bridge Project, the costs estimates are not included in this plan, but details will be discussed in the Recommendations Section of this report. Pictured below, North New River Dr. construction began in September 2014, and was completed in Nov.

By completing construction in the off-season, when traffic is at a minimum, it helps to avoid seasonal summer congestion.

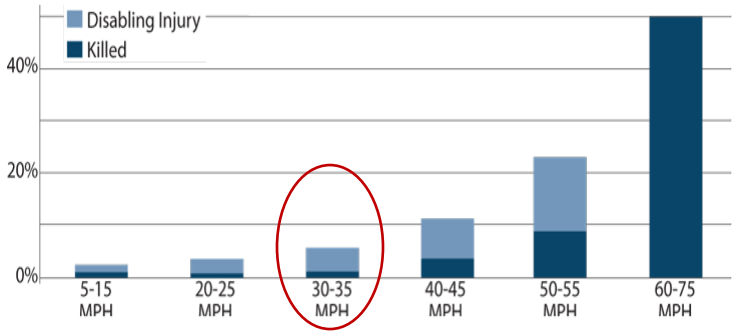
Photo credit: Maria Sestito/The Daily News, Jacksonville

The cyclists shown under the red arrow is riding in between parked cars and moving vehicles in this heavily trafficked area. The area where he is bicycling, at the left of Roland Ave. in the picture below, is in the vicinity of the future multi-use path that will be a part of the Topsail Bridge Project. This multi-use lane will enable cyclists and pedestrians to reach Soundside Park, and businesses along Roland Ave., and is highly desired by residents and visitors. Discussions are underway with the Town, NCDOT and RS&H, the bridge designers, to provide a boardwalk under the bridge, so that pedestrians and bicyclists can safely maneuver to the multi-use path on Roland, without having to cross several lanes of traffic at the roundabout. The original design of the roundabout encourages free-flowing transportation for motorists without stoppage, and the addition of the boardwalk was determined to be the safest alternative for those travelling on foot or bike, allowing them to avoid traffic.

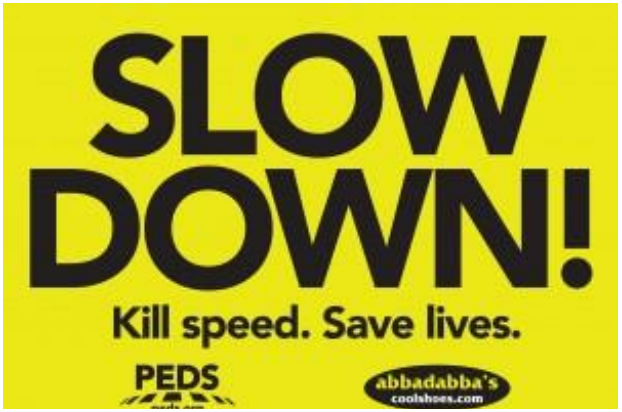
Safety is the Number One Concern

According to the Federal Highway Administration (FHWA), the 'severity of a crash between a cyclist and motorist increases exponentially with speed.' As shown in the chart below, there were far fewer accidents and fatalities, when the motor vehicle speed was reduced to 35 miles per hour or below. Appendix G notes that peak hour seasonal traffic counts are as high as 1800 vehicles per hour at the intersection of Roland Ave and Belt Rd (NC 210). Another realization is that the multi-state FHWA study noted 'a strong seasonal trend in crash with 69 percent of collisions occurring over the months of April to September (spring and summer).' After reviewing the number of seasonal visitors, the peak traffic counts in Appendix G, the pedestrian and pedalcyclist crashes in Appendix F, and the speed limit data below, the Town should consider lowering the speed limit. This decision should be viewed meticulously by NCDOT, the Town Officials, Planning Board, and residents. Many survey respondents suggested that motorists are driving over the speed limit, and efforts should be made to slow them down. There have been 16 crashes from 2000-2016 in Surf City, however, the incidents have increased in the last few years. In the 7 years from 2000 to 2007 there were only 5 crashes. In the three years from 2012 to 2015, there have been 11 crashes/incidents involving pedestrians and cyclists, which is a significant rise. As noted above, most of the incidents occurred during the vacation season, with only 1 of the 11 accidents occurring outside of the range (April to November months). Most of the incidents occurred on Roland Ave, NC 210, NC 50 or N. New River Drive, with a few in miscellaneous spots. There was not one major site for the incidents.

Figure 7. Percentage of Bicyclists Killed or Seriously Injured in Bicycle-Motor Vehicle Crash



Source: http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa12018/



Types of Cyclists -

According to the American Association of State Highway and Transportation Officials (AASHTO) an organization which sets standards, protocols and guidelines which are used in highway design and construction throughout the United States, most cyclists fall into one of these categories:

A - ***Advanced Bicyclist***

A=7%

- Strong and fearless able to ride in almost any traffic conditions
- Ride for advanced exercise activity
- Normally rides for longer distances, and rides at a faster pace
- Typically comfortable riding with traffic

B - ***Basic or Moderate***

B=55%

- Avoid heavily trafficked roads
- Ride on roadways where there is ample shoulder or roadway width to separate his/herself from the roadway
- May be using bicycle for transportation purposes.

C - ***Child, or Less Confident Adult***

C=22%

- Rarely rides in traffic, or prefers off-road trails
- Requires access to key destination in the community, such as schools, convenience stores, recreational areas
- Rides mostly for recreational activities
- May also be parent(s) who rides with a child or children

It is the goal of this Comprehensive Plan to recommend areas which apply to all cyclists, with varying capabilities listed above, so that all who desire to bike, can find an appropriate area for their comfort zone. It is important to include strategies which reflect the needs and desires of each group and appeal to every age group. In the ***Public Attitude Survey*** which had over 50% of residents and property owners, and about 20% of nearby residents, 55% fell into ***Category B*** above and considered themselves *Basic Bicyclists*. Nearly 22% fell into the ***C Category*** above, with only 7% in the ***Advanced Bicyclist*** category. Off-road pathways or significant separation between motorists and cyclists are desired for the majority of the bicyclists who responded to the survey.

II. Corridor Identification





Introduction

Through the public involvement process which included surveys and the Public Workshop, Steering Committee Meetings, and a meeting with the Town of Surf City Planning Board, several focus areas were highlighted where pedestrian and bicycling improvements are desired, with the ultimate goal of having an interconnected network enabling mobilization across the Town. Of those surveyed, 96% agreed that they would like to make the Town of Surf City safer for bicyclists and pedestrians, and 87% of those surveyed agreed that it is too dangerous for someone to ride their bikes or walk alongside the existing streets and road. In consideration of these desires and to incorporate all capabilities of cyclists named previously, the following corridors or focus areas have been named for improvements. The Corridors are outlined below, with detailed explanation following the outline.

Corridor 1. ***The Greenway Project*** **-** Another avenue for non-vehicular off-road transportation envisioned by the Town is a proposed Greenway project that would run somewhat parallel to US 17 through the Duke Energy electric lanes. The Town will work with Duke Energy and others to pursue right-of-ways and easements to conservation areas in an effort to construct this greenway for an additional green space. The trail will provide a longer avenue for those walking jogging and biking, and enable the pursuit of healthier lifestyles through recreation and exercise. ***(See Map 1 – Overall Proposed Plan)***

Corridor 2. ***Central Business District, Handicapped Accessibility, and Pedestrian Assets*** – Reaching the Central part of Town where businesses and restaurants are, without using a vehicle, would be a welcome asset for vacationers and their families, and this feat is certainly within reach with a few adjustments in consideration of safety of citizens and tourists. As the island is only 5 miles wide, the walkability of the Town could definitely benefit from improved accessibility. ***(See Map 3 – Central Business District)***

Corridor 3. ***One Way Lanes*** **–**This modification involves converting a small portion of Shore Drive from two vehicle lanes to a single one way lane with the addition of a pedestrian and bicycling multi-use lane on the ocean side of the street. Sometimes referred to as a 'Road Diet'- this transportation planning technique involves reducing or rechanneling the number of existing lanes to achieve systemic improvements. Specifically, the section that would be converted to one way is left on Roland Ave., NE on N. Shore ending at New Bern Ave., and right on Roland Ave., and SW on S. Shore, ending at High Point Ave. ***(See Map 3- Central Business District One Way Lanes)***

Corridor 4. ***The Topsail Bridge Replacement Project*** **–** As the Bridge is planned to replace the current Swing Bridge, infrastructure will need to be in place to connect to those who ride or bike across the new bridge. This will give those on the mainland an avenue to get to the island. Since funding for the bridge and a multi-use path on part of Roland Ave. will be included in the project itself, this plan will focus on infrastructure leading up to the bridge and routes to connect to the new roundabout, where the bridge lands on the island. ***(See Map 4- Bridge Replacement)***

Corridor 5. ***Overall Off-road Multi-Use Paths near the Surf City Community Center*** **–** The consensus of survey respondents is that there is a need and desire to improve pedestrian and bicycling assets to include off-road paths, that can connect to desired family places of interest, such as The Karen Beasley Sea Turtle Rescue and Rehabilitation Center and the Surf City Community Center, and provide a longer trail for the enjoyment of these facilities. ***(See Map 5 – Surf City Community Center)***

Corridor 6. ***Future Planning*** – In the previous 2011 Topsail Area Transportation Plan, it was recommended that Shepards Road be widened from two 10-foot lanes to two 12-foot lanes. The area near Shepards Road is currently undeveloped, but a new school is planned, and an additional loop is considered as a safer alternative to keep pedestrian and bicyclists off NC 210 and NC 50, which are the most highly trafficked areas. It is also recommended that conservation areas for greenway access, recreation and parking be acquired by the Town. At the time that NC 50 and Shepards Road are expanded to accommodate for increased development and transportation for students at the proposed school, a multi-use path is recommended for construction, which would run adjacent to Shepards Road and connect to the greenway. ***(See Map 1)***

Corridor 7. ***Hwy 210 Multi-use Lane*** **-** As part of NCDOT's Transportation Reform, they have established a strategic planning process called Strategic Transportation Investments Strategic Prioritization Process**.** The STI process combines input from Metropolitan Planning Organizations, Rural Planning Organizations, NCDOT, and the Division of Bicycle and Pedestrian Transportation, and works to identify funds and to prioritize projects. The 2015 STI for Surf City currently plans for the bridge, but does not yet mention the future expansion of NC 210 to multi-lanes. If this expansion is added to a future STI, preferred treatment would be to include a multi-use path alongside NC 210, for pedestrians and bicyclists. This improvement would be a great asset in the Town of Surf City, as it would rectify a solution to provide interconnection of the mainland and island, reducing the 'land-locked' feeling described by numerous survey respondents. This improvement would encourage non-motorized transportation.

Each corridor will be explained in more details in the following section.

Corridor 1 - The Greenway Project

The Town also has envisioned a greenway to be located along a Duke Energy power line right-of-way that cuts across Town, somewhat paralleling US 17, approx. ½ mile inland from US 17. The greenway would be a multi-use path to be used by both bicyclists and pedestrians and will primarily be designed for recreational purposes. The greenway will be a connector to a larger plan known as the Mountains-to-Sea Trail, which is an attempt to connect trails throughout the state from the Great Smoky Mountains in the west to the Atlantic Ocean, without the use of a motorized vehicle. In addition, the greenway is hoping to connect to and be part of another larger plan known as the East Coast Greenway, which, is a project to created nearly '3,000 mile urban greenway/rail linking 25 major cities along the eastern seaboard between Calais, Maine and Key West, Florida.' (www.greenway.org) Surf City's greenway will be an integral part to both of these plans. The power line right-of-way continues along the coast in both directions from Surf City and could potentially be used as the long distance access planned for the Mountains-to-Sea Trail and become part of it, once constructed. Surf City plans to start the improvements to the right-of-way at Electric Lane, which lies along the right-of-way and intersects with NC 210. The improvements would continue in the north east direction along the right-of-way and would eventually intersect with NC 50, which would create a significant off-road cut-through of the town, and cross US 17 in the other direction. For example, people living in Holly Ridge would be able to use the greenway to travel almost directly to the recently built Harris Teeter grocery store, as opposed to travelling down NC 50 and NC 210. The survey results indicated that the area on NC 210 is significantly dangerous, which results in infrequent use by alternate methods of travel other than vehicles. The Plan also recommends improvements to NC 210. The Town recently met with Pender County to discuss collaborating with them to acquire easements for this Pender County Surf City Coastal Greenway project, and has applied for funding from Duke Energy Water Resources Fund. (10/2015)

Both entities believe that preserving green-space and conservation areas for a recreational experience along the Duke Energy utility easement would help to protect the coastal ecosystems: tidal wetlands, lagoons, estuaries, marshes, coastal plant and wildlife habitats, specific to this area. They hope to increase citizen awareness of their role in conservation by implementing educational kiosks along the route. The Town will work with Duke Energy to make this greenway a viable solution for off-road walking and biking.

In the recent Public Attitude Survey for this plan, we asked respondents if they felt it is too dangerous for someone to ride a bike alongside the traffic on existing roads, and 86% of them agreed, it was. A very high percentage of respondents, 82%, also believed that the Town should invest in off-road paths connecting neighborhoods, shopping, restaurants and other destinations. About 80% also replied that they would use an off-road path or greenway if one existed, and most agreed that it should be between 5 and 10 miles long. Overall, the greenway was a highly desired asset for the Town. For more survey results, see Appendix B.

Corridor 2: Central Business District, Handicapped Accessibility, and Pedestrian Assets

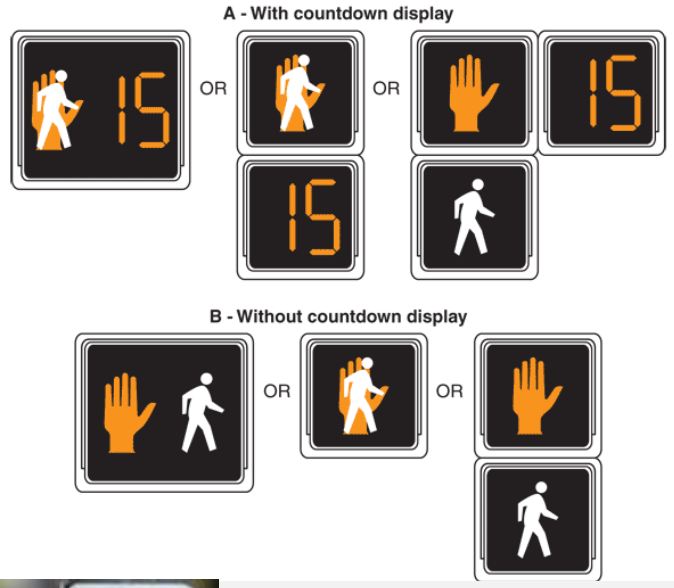
The Central Business District in the Town of Surf City is not your typical 'urban down-town employment center,' as described in the *North Carolina Complete Streets Planning and Design Guidelines*. Surf City would be better described as a lovely place to enjoy peaceful views of the ocean, fishing, and water adventures, and a popular destination for beach going travelers, many of which are regular visitors who vacation here every year. The Central Business District is characterized by businesses that cater to surfing, fishing, and outdoor and water adventures, boutiques, restaurants, markets, beach furnishings, banking and tourism. Beach homesites, many of which are rented out in the summers, align the streets and border the ocean, for a few blocks between it and the Intracoastal Waterway.

The CBD in Surf City is currently lacking sidewalk and bicycle infrastructure, and the purpose of the plan is to create a bicycling and walking network, so that visitors and residents who have driven over the bridge, can reach the businesses, and other places of interest, without having to get back into their cars. As the Town's trajectory covers about 5 miles, it should be a highly walkable town. When the residents and visitors filled out the survey, a high percentage mentioned that the speed of the motorists, and lack of clearly marked, well-maintained bike lanes, and lack of interconnected sidewalks caused safety concerns that prevented them from walking or biking. The respondents remarked that dedicated bicycle lanes and sidewalks, or multi-use lanes, better separated from motorists, without debris, broken glass, gravel, and obstacles would be a welcome change in the Town. The respondents also voiced their opinions that they would like to reach the CBD without having to drive.

Curbs and ramps for persons with limited mobility are also lacking in the Town. For safety reasons, especially due to high traffic volumes, the Americans with Disabilities Act requires level landings, ramps without steep slopes, and areas separated from traffic, along with crosswalks. The handicapped accessible beach accesses in the town, are located at 9th Street, Kinston Avenue and Roland Avenues. There are two handicapped accessible bathrooms at the Roland Avenue Access.

As previously mentioned, there are currently no signals for pedestrian crossings, which leads to individuals darting across the intersections in between oncoming cars, which makes it dangerous for all pedestrians, and especially those with special needs.

Figure 4E-1. Typical Pedestrian Signal Indications



The pedestrian signal indicators depicted here would enable citizens and visitors to cross the street in the CBD at a time when traffic is stopped.

The locations for crosswalks and signage are detailed in the *Recommendations section*.

Source: http://mutcd.fhwa.dot.gov/htm/2009/part4/fig4e_01_longdesc.htm

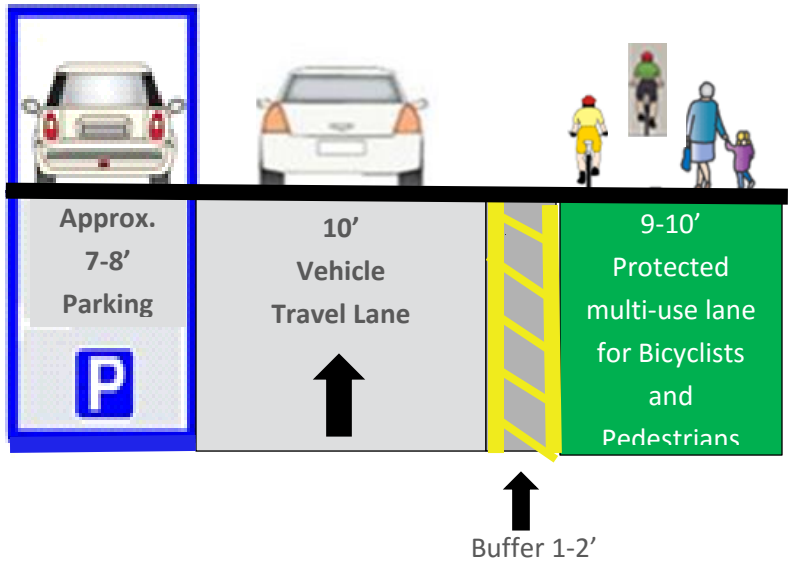
Existing Pedestrian Infrastructure

Soundside Park (pictured at left) has a scenic boardwalk for pedestrian access that reaches out over the Intracoastal Waterway, providing handicapped accessibility to individuals in a wheelchair, and also allows walkers a long path for admiring the natural beauty of the flora and fauna, some of which are specific only to this area, and enjoyment of the scenic blueway. The boardwalk from Soundside Park provides a nice long walk out over the waterway. One attribute of this amenity is that this beautiful area has been preserved for onlookers, while the pedestrian accessible walkway is only a short distance from the Central Business District. Soundside Park is a family-friendly spot, which has picnic tables, a playground, a boat ramp, fishing pier, an amphitheater, and bicycle parking. One goal of this plan is to make sure this area can still connect to the CBD once the new bridge is installed. The Town Manager and engineers have met to discuss the Town's desire to have a boardwalk under the new bridge which will deter interfacing with motorized traffic, and was determined to be the safest alternative to reduce pedestrian and motorist interactions. A request has been made to RS&H and NCDOT, to include this infrastructure in the bridge project, which will eliminate the necessity to cross several lanes of traffic, or cause motorists to stop.

Corridor 3: One Way Lanes

- **One Way Traffic Scenario** – Recognizing that the road space is limited, converting two lanes of traffic to a One Way lane has been suggested for a few blocks along Shore Drive, with the other lane converted to a bicycle and pedestrian multi-use lane. The current two lanes of traffic, gravel, side strip, and current pedestrian assets, could be replaced with the infrastructure pictured below.

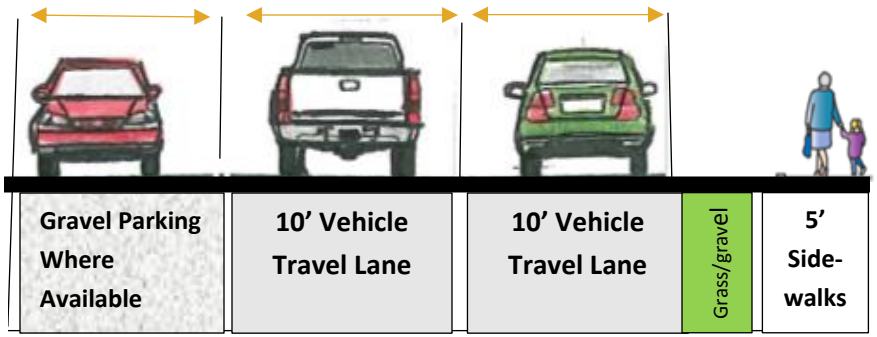
Proposed Cross section

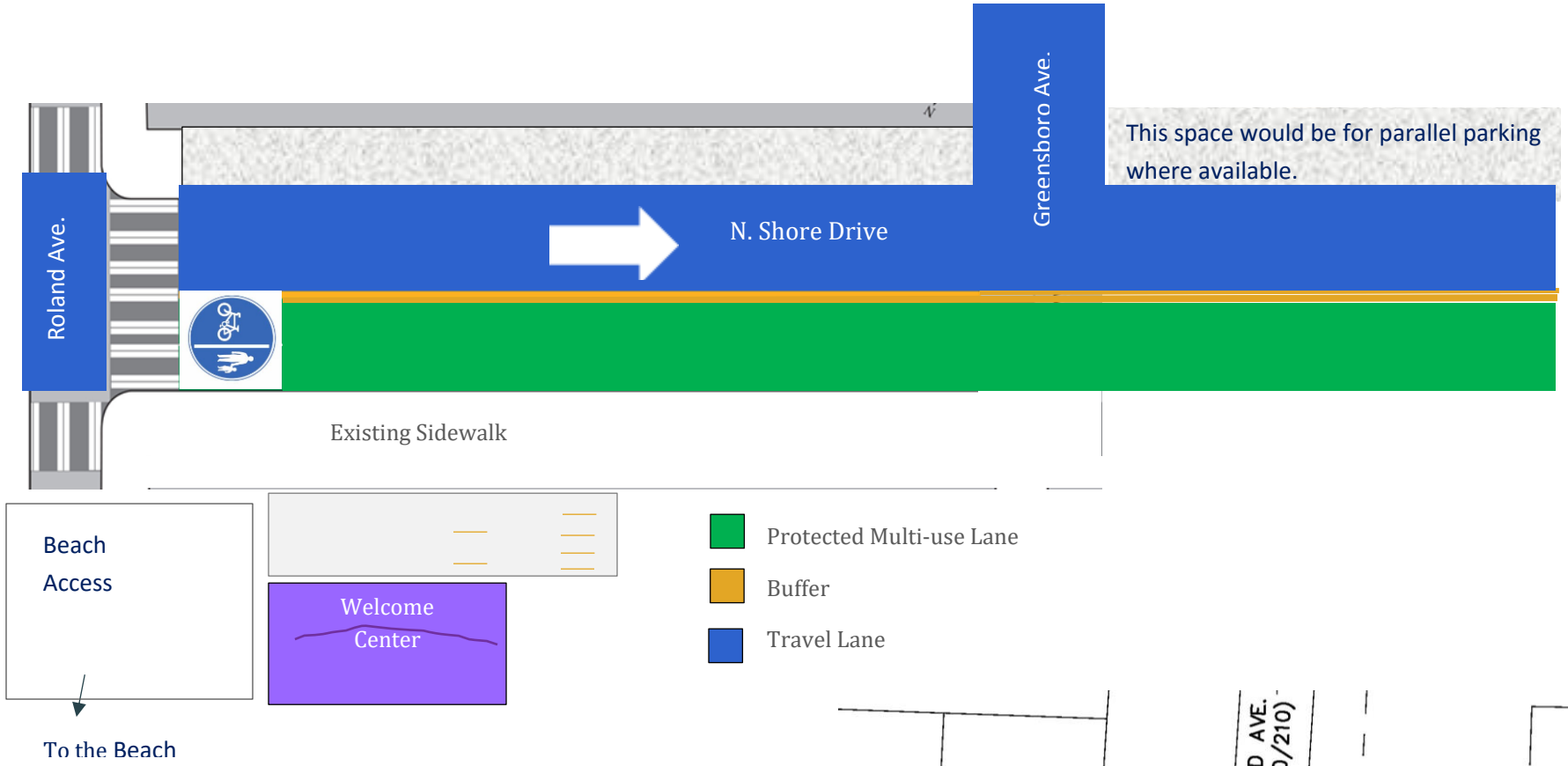


For the short term, painted lines, and bollards or plant boxes could act as a buffer, and accommodate this plan on a trial basis. (See Demonstration Pilot on the following pages). If the Town decides to implement the One Way Lanes on Shore Drive, they could eventually pave the gravel areas on the side of the road, and designate parking areas. This would improve the haphazard parking that occurs, and eliminate obstructing the sidewalk that often occurs in the CBD. The proposed area for the One Way infrastructure can be seen in Map 3.

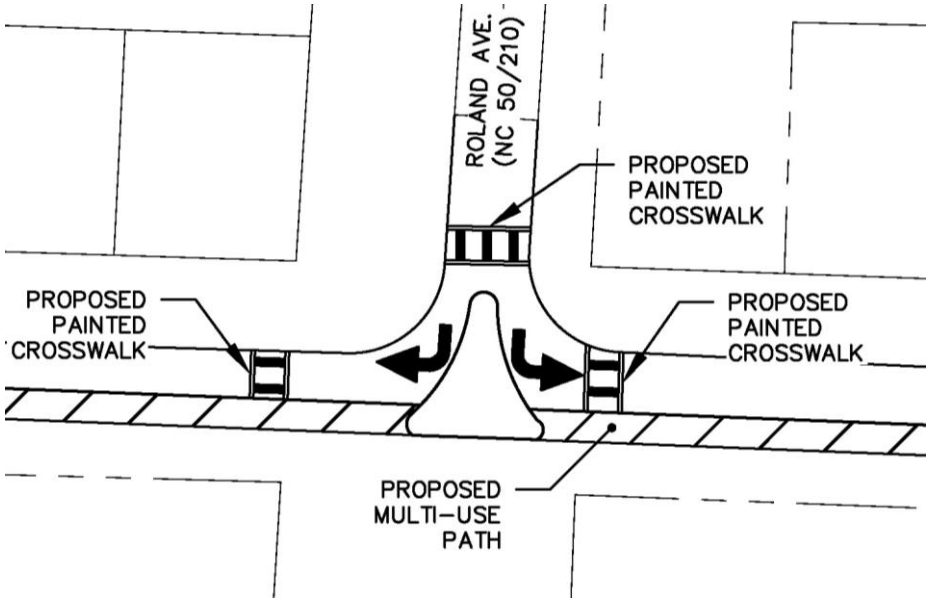
Currently, as shown below, there are two travel lanes, some sidewalk, and gravel areas used for parallel parking, where available.

Existing Cross section





The blue section above refers to the one lane of traffic, and the green section would be the multi-use lane. As pictured at right, Roland Avenue would become One Way at North Topsail Drive. The right lane would turn on South Shore Drive, and the Left lane would turn on North Shore Drive. Many towns have created a low cost pilot project to demonstrate the feasibility of the One Way Lanes, which is described on the following pages. After the Town evaluates this scenario, and the public has time to comment on its effectiveness, a decision can be reached. If the One Way Lanes are approved, and accepted by NCDOT, the paint and bollards shown in the following examples, would be replaced by more permanent structures.



Pilot Demonstration Project

Many towns and cities have hosted a pilot project to demonstrate how multi-use lanes will work. These pilots typically stimulate a great deal of interest and participation. Temporary cones or even bollards can be placed in the area representing the buffered zone as pictured below. This provides designated lanes. Some municipalities paint the multi-use lane the color green, or stencil the bicycle and walking templates, to make it more obvious. The two travel lanes mentioned previously, would be replaced with one travel lane, and the remaining lane would be converted for bikes and pedestrians travel.

Better Naito was a pilot project in Portland, which converted a traffic lane into protected bicycle and pedestrian infrastructure. Armed with bollards, the leaders divided the highway, and asked participants to come and try it out. They stenciled markings on the pavement to designate bike and pedestrian lanes. One person was the traffic counter. This project was a Green Lane Project, which is a ***PeopleForBikes*** program helping cities build better bike lanes.

Source: Mike Vogel
http:// bikeportland.org /2015/05/22/
betternaito-demo-kicks-off-two-week-trial-
multi-use-path-west-waterfront-park-143467

Another One Way Lane Pilot Project

Source: https://www.ioby.org/project/arapahoe-street-protected-bike-lane

Rendering future Arapahoe Street, Source: Alta Planning + Design

This pop-up protected bike lane on Arapahoe Street in Denver was a demonstration project so residents could experience and evaluate how a bicycle lane would work when separated from traffic. With Denver's large population, the bikeway project used crowdfunding (an online effort) to raise money, and actually lead a successful campaign which raised $36,000 for a protected bike lane. As depicted in the upper photo, potted plants and trees were temporarily placed in the median to separate bicyclists from the moving motorists. This scenario could be used in Surf City, to give the residents (including motorists, cyclists and pedestrians) a chance to experience the one lane traffic trial and comment on how it works, and its usefulness.

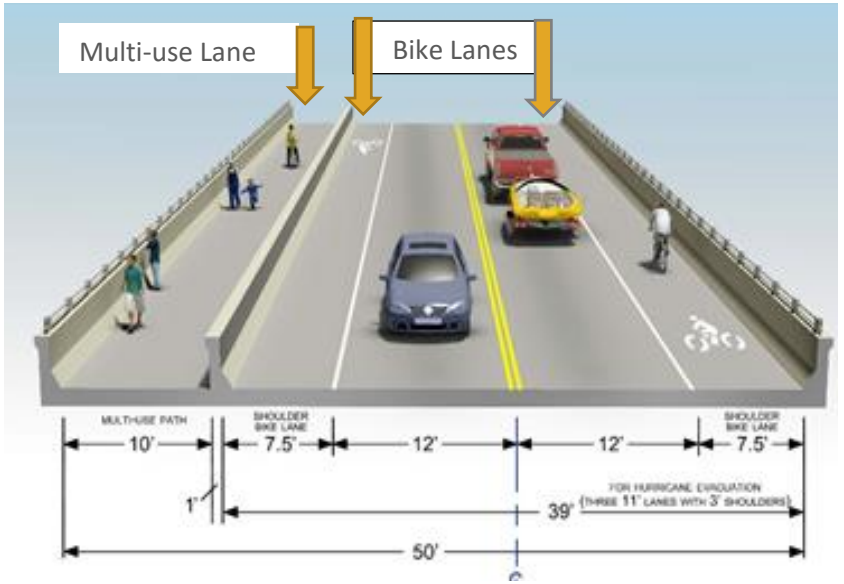
The picture below is a rendering of the same future street, with a hatched buffer lane, which has protective bollards (which are visual barriers usually made of steel which provides segment separation) and are placed periodically so the motorists are better separated from the bicyclists. (Rendering by: Alta Planning +Design)

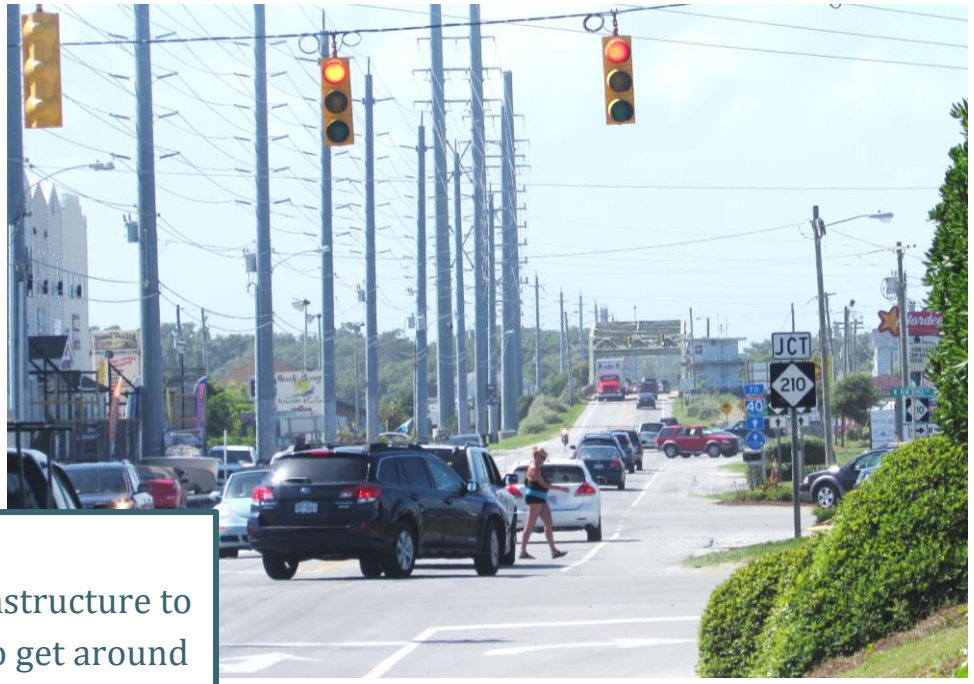
While Surf City's population is small in comparison, one idea to raise funds is when large events are held, such as a marathon or cycling event, to collect a sum which could be designated for the bike lane/ one-way street project. As outside funds are accumulated, the Town could match monies collected. Existing sidewalks could even be used to accommodate park benches, kiosks, food stands, changing rooms, bike parking, or landscaping with potted plants or trees to beautify the area.

Shown at left, the green area is a cycle track which keeps bicyclists in one area, and pedestrians use the sidewalk. In Surf City, we recommend using a Multi-use path instead of a separate sidewalk, as space is a little more limited. These examples could be used in the short-term, to see how the citizens and tourists adapt, and the Town could ask them to fill out a questionnaire by hand, or online survey where motorists, pedestrians and cyclists would each have the opportunity to provide comments on their experience, and vote on whether or not to make it permanent.

Corridor 4 – The New Topsail Bridge

The current swing bridge is slated to be replaced, with construction starting in 2017. Higher traffic volumes have demanded a bridge that does not open for boat traffic, and the new bridge is proposed to include a 10' multi-use path, as well as two 7'6" bike lanes. The bike lanes can be adapted to roadways to accommodate three traffic lanes should emergency evacuation be needed. To improve mobility in the Town, two roundabouts have been designed, one on each end of the bridge, to alleviate traffic congestion. This Comprehensive Bicycle and Pedestrian Plan will provide planning and opinions for infrastructure so the pedestrians and bicyclists crossing the bridge will have safe passage in both directions. A multi-use path along one side of Roland Avenue, has been planned as part of the bridge plan, and will be implemented by NCDOT at the time of the bridge construction.





Our Challenge:
How can we improve the infrastructure to make it safer for these folks to get around Town on a busy holiday weekend?

Corridor 5 - Off-road Multi-use Paths near the Community Center

A Public Workshop Forum was held on April 2nd, 2014 to involve citizens in the decision making process for future bicycle and pedestrian access. The workshop resulted in several recommendations for future access. Many of the ideas were suggested by several participants. In particular, the consensus of participants requested improved pedestrian access throughout the CBD area. The Town is often reminded of the patchwork of sidewalk that exists and improvement of the pedestrian access within the CBD would greatly improve the safety and enjoyment of both drivers and pedestrians, and promote healthy lifestyles and walkability.

Another area where the consensus desired improvement was the area surrounding the Surf City Community Center, located north of JH Batts Rd. The existing Community Center consists of an approx. 13,000 square foot Community Center building, two tennis courts, baseball field, softball field, and soccer/football field. The site contains existing footpaths that have been utilized by citizens over the course of time, but they are not maintained as part of the Town's pedestrian system. The participants of the workshop expressed a desire to improve the paths in order to provide a more comprehensive pedestrian system in the area. A unique opportunity exists in this area due to the current and future development of land north of the Community Center, namely the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC, pictured at right) and Tortuga Lane. Several of the workshop participants stated that they would like to see bicycle and pedestrian infrastructure such as multi-use lanes to provide access between the Community Center and the sea turtle hospital, which could also continue northwards to NC 210 in order to provide access to a significant portion of the Town. The Town has plans to add a new road, to be known as Caretta Dr., which will start at the roundabout on Tortuga Lane and head north to NC 210 adjacent to the recently constructed Walmart near the intersection of NC 50 and NC 210. An off road multi-use path loop in this area could be accomplished in the short term period of 5 years or less.

The Town of Surf City believes that creating off-road paths will endeavor to support the family-friendly community that sets Surf City apart from some other area beaches. The survey results revealed that the Town wholeheartedly supported off-road infrastructure, and many believed that the Town should make funding for implementation of the Bicycle and Pedestrian plan a priority. While some initiatives are needed immediately to protect the Town's citizens and tourists by providing safe passage, others such as the paths mentioned above, will promote the family-friendly environment, which Surf City has been known for. A Map of the Community Center proposed trails can be found in **Section 8- Map 5**. Survey results can be viewed in the office of the Town Planning Director, Todd Rademacher.

If the Town so desires, the multi-use path could continue on the back roads of Surf City as well, so if a family wanted to take an extended ride, they could continue on less trafficked roads. There are ample shoulders on many of the roads near the Community Park with level land, and very few hazards, or culverts. Paths in this area would not require extensive construction.

The area below details the Surf City Community Center, and the adjacent Karen Beasley Sea Turtle Rescue & Rehabilitation Center. The existing trails, which are currently footpaths in this area, could provide opportunities for an off-road multi-use path, which could be used by pedestrians and level B and C Bicyclists, which include children riding with adults, and active senior citizens with bicycles or tricycles, who prefer not to ride with the traffic. Because the area is already foot-trodden and level, creating paths would not be too difficult, and could be considered for the Short Term.

A common theme relayed in the surveys and at the Public Workshop was that intermediate bicyclists and less advanced cyclists, who are the majority in Surf City, and those riding with children would prefer an area to ride that is off-road. Forty-five percent of respondents answered that they do not ride because there are no paths that are away from the traffic, and 38% suggested they did not feel safe riding in the Town. As Surf City desires to appeal to bike riders and pedestrians of all ages and capabilities, establishing an off-road path, would take the bicyclist(s) away from higher traffic areas, and would be especially helpful for the large number of less experienced riders who ride mostly for recreation and exercise. By providing paths of this nature near areas of interest such as the Community Center connecting to the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC), families with children would have access to these adjacent areas of interest. Examples of trails materials can be seen on the following page. The road to the KBSTRRC has not yet been paved, yet this non-profit received over 60,000 visitors the first year after opening, and was recently named by the North Carolina Travel Industry Association's 'Visitors Attraction of the Year.' It would be cost-effective as well as advantageous to construct a multi-use path at the same time the road is paved in this area. (Source: http://www.visitpender.com/Blog/118111/Sea-Turtle-Hospital-named-NC-Visitors-Attraction-of-the-Year)

The top two images are from the ***Asheville Mountain Magic*** brochure, and show surface materials such as packed crushed gravel, that could be utilized for a multi-use trail near the Community Center and KBSTRRC.

The area aforementioned, the unpaved Tortuga Lane which is off Charlie Medlin Rd. would benefit from a multi-use path. This main entrance for the new Karen Beasley Sea Turtle Rescue and Rehabilitation Center, a site which has hundreds of visitors each week. This area is slated for future development and will be accessed by residents and visitors. There is significant shoulder on JH Batts Road and Conch St. to Driftwood Dr. to accommodate an off-road path, which could continue to Little Kinston Rd., and there are relatively few obstacles that inhibit accomplishing this. Establishing an off-road path would take the bicyclists away from the higher traffic areas which would be especially helpful for less experienced, **'B'** and **'C'** -type riders, and provide access to these family-friendly amenities.

An off-road multi-use path could also be established is near the Soundside Park. There is a pedestrian boardwalk, but no bike path, and there is ample room to create one. The proposed multi-use path on Roland Ave. will help pedestrians and bicyclists access this area from the new bridge.

Roundabout

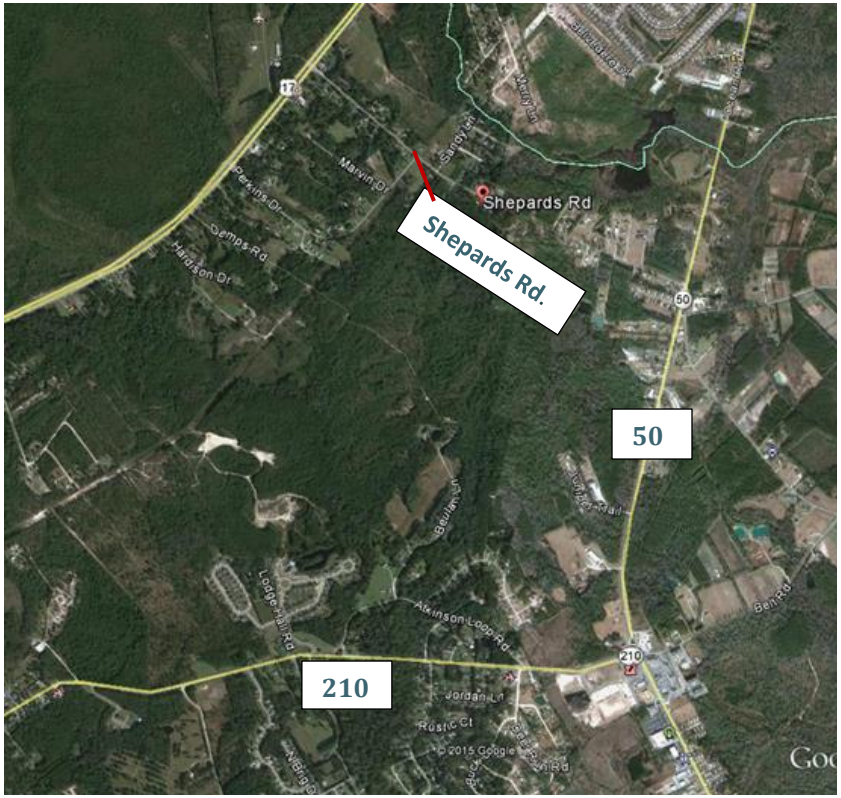
Karen Beasley Sea Turtle RRC

Surf City Community Center

The community desires additional walking and handicapped access to areas of interest, so they can observe the natural coastal ecosystems. A walking track in this area pictured, could connect paths to establish a viable path network which could improve safety for disabled users and improve usability. A phase could be added at a later date which would include a path around the lake behind the Community Center. For details, and connection to NC 210, See Map 5.

Corridor 6: Future Planning and Development

One area of Surf City which remains rather undeveloped is the stretch of Highway 50 toward Shepards Rd. The Comprehensive Transportation Plan for the Topsail Area dated February 2011 mentions how traffic is expected to be over capacity by 2030. As a new school is proposed in the vicinity of Shepards Rd., it will be important to not only widen the roadways, but link the Greenway to this area by multi-use path. Several Steering Committee members also recommended a multi-use path to continue down Shepards Rd., and turn on NC 50, to connect the loop of the Greenway with the Town which would provide non-motorized transportation assets away from NC 210. **Map 1** will also explain how the area which has phased in future development for Turtle Creek could also provide access to the Greenway, and create a desired loop which will eventually connect to Onslow County. As development increases, the Town should "think big" and visualize potential needs. The current narrow roadways in this area may be slated for widening, which would be the most cost-effective time to add a multi-use path, to complete the non-motorized transportation loop.



Volunteers in Jacksonville, NC Adopt-A-Trail and volunteer to keep it free of debris. (Source: City of Jacksonville, NC)

III. Short and Long-Term Opportunities

Recent Economic Indicators for Improved Infrastructure

Pedestrian Infrastructure

Recent economic studies show that increases in bicycle and pedestrian infrastructure have boosted the tourism and economy in many communities, which is of particular interest to the Town of Surf City that relies on tourism as its main source of income.

The term 'Walkability' refers to how easy it is to get around a town or city by walking, and if the built environment is 'friendly' to those who live, shop, visit, or spend time in that area. The footpaths, sidewalks, and pedestrian right of ways, accessibility and safety all influence the 'walkability' score. The following are two reports on Walkability that are particularly interesting. The first is a ***'White Paper: Evaluating the Economic Benefits of Non-motorized Transportation'*** which analyzes direct, indirect and economic Impacts due to health savings and environmental benefits and reported that 'investments in walking and bicycling are playing an increased role in establishing balanced transportation systems and supporting vibrant communities.' For more information on this report, follow this link: www.pedbikeinfo.org/cms/downloads/NTPP_Economic_Benefits_White_Paper.pdf. The second is a report called, ***'Walking the Walk'*** (Joe Cortright, Impresa, Inc., August 2009) which discusses how 'walkability' raises home values in the U.S. This report is used in Urban Planning, and explains the connection between consumers and how they typically like to be within a short walking distance to town, shopping and conveniences, and how this 'walkability' positively effects home values.

The link to this report can be found here: www.reconnectingamerica.org/assets/Uploads/2009WalkingTheWalkCEOsforCities.pdf.

Bicycle Infrastructure

Recent improvements in bicycle infrastructure in the Outer Banks of North Carolina have had quite an impact on tourism revenues. A case study entitled ***'Pathways to Prosperity: The Economic Impact of Investments in Bicycle Facilities'*** was done in July 2004. Some of the findings indicated that many bicyclists are in the high income category (between $50,000 and $100,000), are well educated, and likely travel to places with defined bike paths. This high income group spends money on restaurants, lodging, and retail establishments, and are drawn to the areas with improved infrastructure. It also describes how families like off-road infrastructure, and tend to navigate toward towns that can accommodate them for vacations. The report also covers the environmental, health and fitness benefits, and social benefits, that are accomplished through exercise. The full report can be found here: http://www.ncdot.gov/bikeped/download/bikeped_research_eiafulltechreport.pdf

Section 5: Facility Standards and Guidelines

Both national and state guidelines are available with proven standards to make Bicycle and Pedestrian facilities safe. The resources listed below have been useful and are referenced in this Comprehensive Plan. The guidelines are not a substitute for a more thorough evaluation by a landscape architect or engineer as suggested upon implementation, with approval from NCDOT, for creating a pedestrian and bicycle-friendly, safe, accessible community.

National Bicycle Facility Design Resources

AASHTO Guide for the Development of Bicycle Facilities

- This guide developed by the American Association of State and Highway and Transportation Officials provides national guidelines, standards, designs and approaches recommended for development of integrated modes of transportation.

Federal Highway Administration's Pedestrian and Bicycle Information Center and Manual on Uniform Traffic Control Devices (MUTCD)

- The purpose of the system is to provide the most applicable information for identifying safety and mobility needs and improving conditions for bicyclists within the public right-of-way

The National Associate of City Transportation Officials' (NACTO) 2012 Urban Bikeway Design Guide

- Newest publication of nationally recognized bikeway design standards, and offers guidance on current state of the practice designs (used in U.S. and internationally)

The National Association of City Transportation Officials' (NACTO) 2012 Urban Bikeway Design Guide

- Nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs (all of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US)

National Pedestrian Facility Design Resources

Federal Highway Administration PEDSAFE

- This interactive system utilizes tools to suggest solutions for pedestrian and safety accessibility problems

AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities

- This guide focuses on pedestrian mobility and gives strategies for accommodating pedestrians on public rights-of-way.

Public Rights-of-Way Accessibility Guidelines (PROWAG) and the ADA Standards to Accessible Design (2010 Standards)

- These standards and guidelines for the construction of accessible facilities are an important part of any sidewalk and bicycle facility project

North Carolina Department of Transportation's Design Resources

Complete Streets Planning and Design Guidelines 2012

- This guide promotes multi-modal transportation that encourages safety, efficiency and functionality while encouraging non-vehicular travel. Link: http://www.completestreetsnc.org/

NCDOT Design Toolbox

- Provides an update to NCDOT Complete Streets that takes the best practices, resources and information available nationally, and applies them to the North Carolina rules and standards.

Traditional Neighborhood Development Guidelines (TND) (2000)

It should be noted that National standards are often revised and can result in discrepancies in the report, and that cost estimates vary by time and from state to state, and at the time of project implementation should be provided and verified by a qualified engineer or landscape architect based on the actual project timeline.

I. General Bike/Pedestrian Planning and Design Guidelines and Considerations

In recent years, the Town has required new development to install sidewalk along the frontage of lots in an attempt to avoid a similar situation as the CBD area, where the gaps in the sidewalk prevents pedestrians from using a fully functioning pedestrian system. Some developments decided to install sidewalk on their own accord, whereas others chose not to, resulting in an inconsistent sidewalk system. The Town put the sidewalk requirement into place several years ago which has aided in providing a more complete sidewalk system.

The Manual on Uniform Traffic Control Devices (MUTCD) standard governs the design for control devices within NCDOT right-of-ways. All development within these areas must meet the MUTCD standard. Roads not maintained by NCDOT are not required to meet the MUTCD standard, but it is recommended that the standard should still be applied in these situations.

II. Typical Cross-Sections and Bicycle and Pedestrian Design Considerations

Sidewalks

Description

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the town, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks.

Discussion

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Where applicable, parking lane curbing and sidewalk improvements can be added to enhance the area. The One Lane conversion being considered for N. Shore and S. Shore Dr. in the CBD could provide extra curbing from existing which could accommodate park benches, shade trees, potted plants, and/or a bicycle parking rack. These enhancements could be used throughout the CBD for beautification and enjoyment, and would especially be an applicable amenity for the Welcome Center area at the Town's main beach access. See visualization next page.

Sidewalks Continued

STREET CLASSIFICATION	PARKING LANE ENHANCEMENT ZONE	FURNISHING/ GREEN ZONE	PEDESTRIAN	FRONTAGE THROUGH ZONE	TOTAL SIDEWALK AREA
Local Streets	7 feet	4 - 8 feet	5 - 6 feet	N/A	9 - 12 feet
Commercial Areas	8 - 10 feet	6 - 8 feet	6 - 12 feet	2 - 8 feet	14- 28 feet
Arterials and Collectors	8 - 10 feet	6 - 8 feet	4 - 12 feet	2 - 4 feet	12 -24 feet

Six feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably

Total sidewalk area excludes parking dimensions

Recommended dimensions shown here are based on the NCDOT Complete Streets Planning and Design Guidelines. Exact dimensions should be selected in response to local context and expected/desired pedestrian volumes.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant.

Additional References

USADOT. (2010). ADA Standards for Accessible Design. United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Marked Crosswalks

A marked crosswalk signals to motorists that they must yield for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer, especially on multi-lane roadways.

At mid-block locations, crosswalks can be marked where there is a demand. Some mid-block pedestrian crosswalks exist related to traffic crash analysis, or by observing repeated pedestrian behaviors which indicate a crossing is needed for desired access. These crosswalks are often determined by measuring pedestrian delays, pedestrian safety, and crossing opportunities. If few crossing opportunities between vehicles exist which causes individuals to run across the road after a significant crossing delay, a crosswalk may be necessary. If traffic volume is seasonal, such as in the Town of Surf City, a push button application to allow pedestrians to cross, may be the best solution, such as the newly installed crosswalk at Fun Center Drive near the Shoppes at the Promenade and Walmart intersection on Hwy 210. Typical signage for a crossing is pictured here. In some instances, countdown signals aide in crossing by informing the pedestrian the number of seconds remaining to cross the street. For better nighttime visualization, in-road flashing LED lights are sometimes added to crosswalks to alert motorists that a pedestrian is in the vicinity of the crosswalk, which automatically shut off after a set period of time. These are sometimes used on raised crosswalks in areas that are not well lit. The area and visibility can be assessed to decide if lighting is necessary in each instance.

Located at the new crosswalk in Surf City, this pedestrian signal head has instructions explaining the symbols, and a push button actuator which is placed at a level to be easily accessed by someone in a wheelchair.

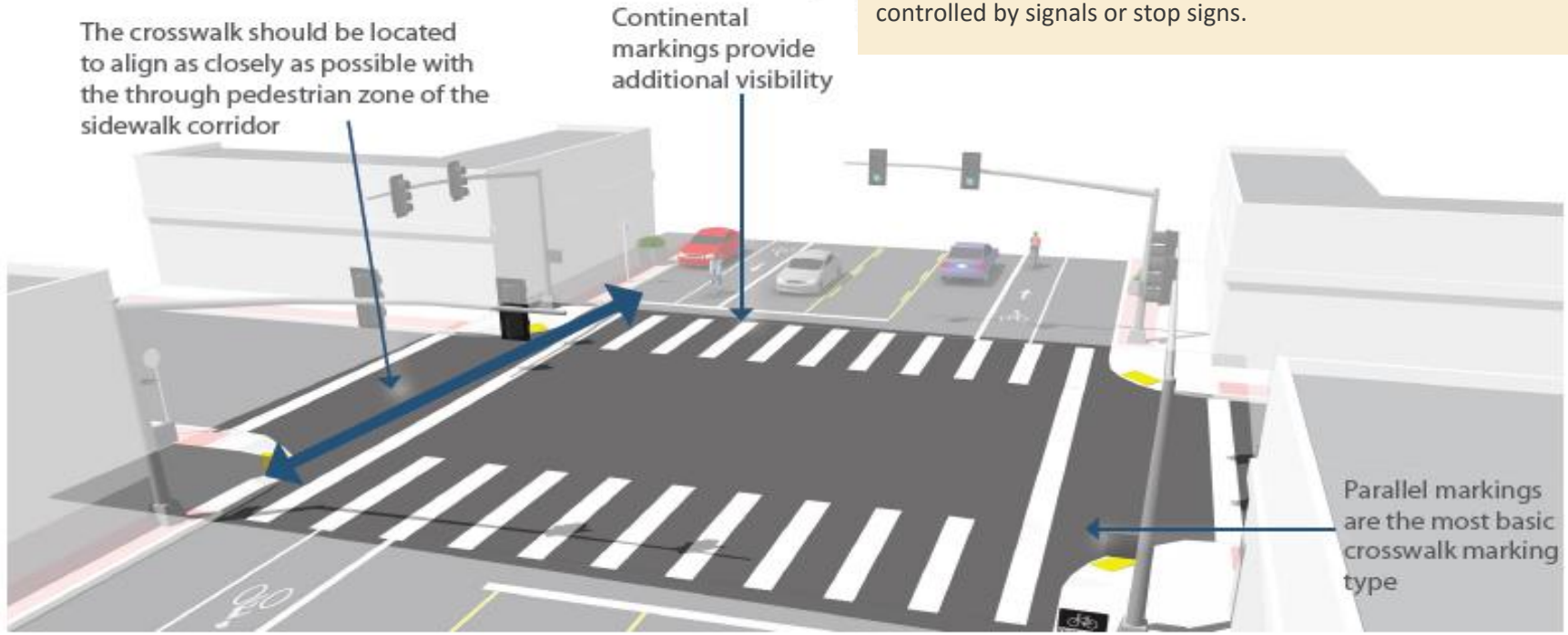
Guidance

At signalized intersections, all crosswalks should be marked. At unsignalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across
- At an offset intersection, to show pedestrians the shortest route across traffic.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Discussion

Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.



Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability compared to conventional paint.

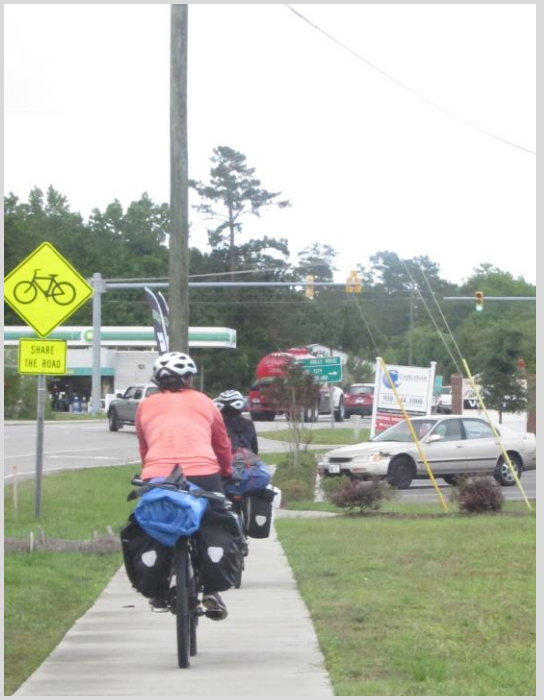
Additional References

FHWA. (2009). Manual on Uniform Traffic Control Devices. (3B.18)

FHWA. (2005). Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.

FHWA. (2010). Crosswalk Marking Field

As shown here, progress is taking place in Surf City, as the new crosswalk and sidewalk infrastructure provides a safe haven for pedestrians. The push button is available to enable pedestrians or cyclists to cross safely. The bright "Share the Road signage" cautions drivers to be aware of and look for bicyclists. These cyclists chose to not ride on the crowded roadway. Converting this sidewalk to a multi-use path may make more sense in the future.

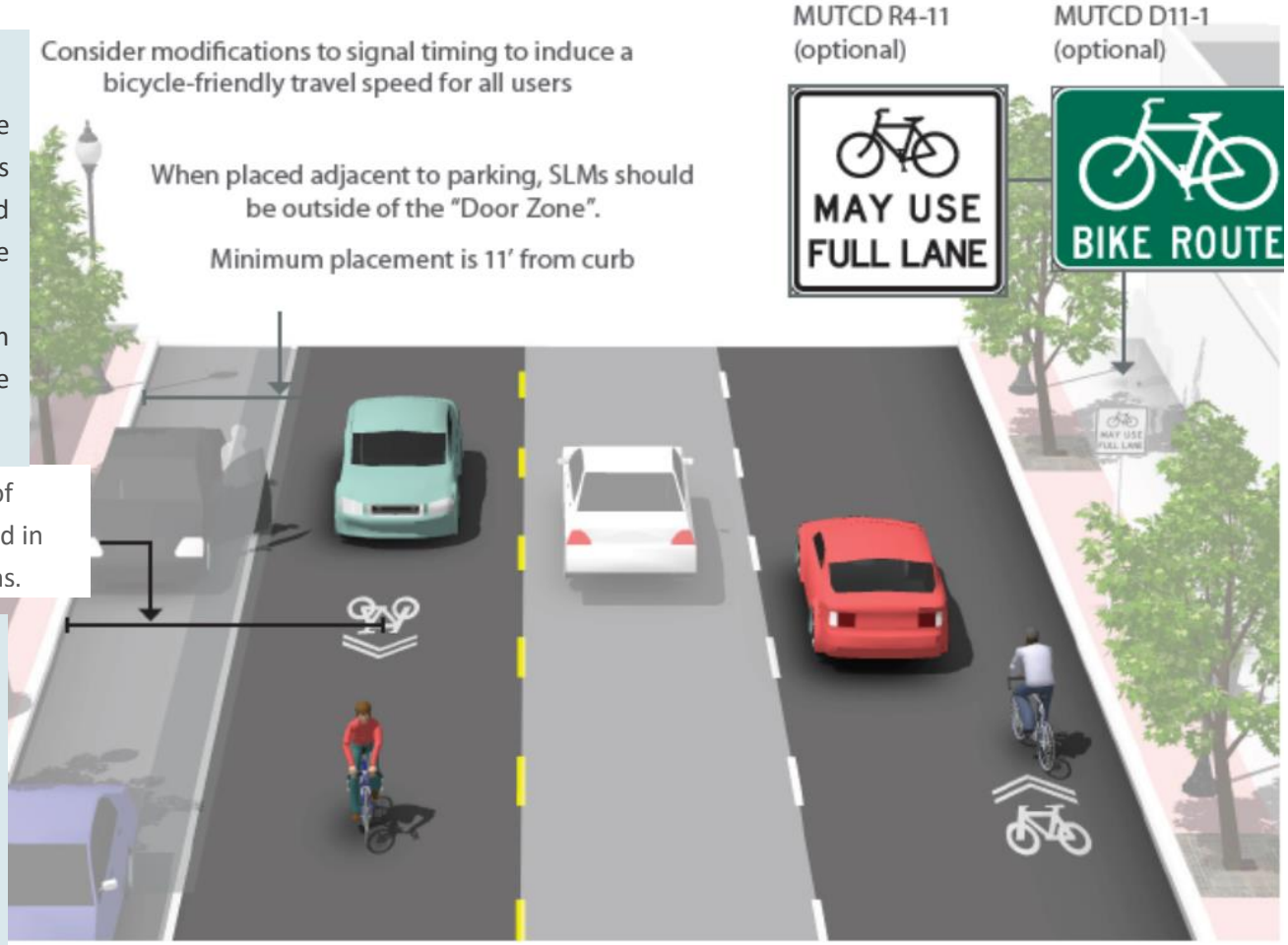


Another example of Push-button actuated crosswalk, with pedestrian safety crossing. Photo: Courtesy of Alta Planning

Marked Shared Roadway

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane, and should be placed outside the door zone of parked cars.
In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles.



Guidance –

Minimum placement of SLM marking centerline is 11' from edge of curb where on-street parking is present, and 4' from edge with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

Discussion

Bike lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated bike lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07)

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.

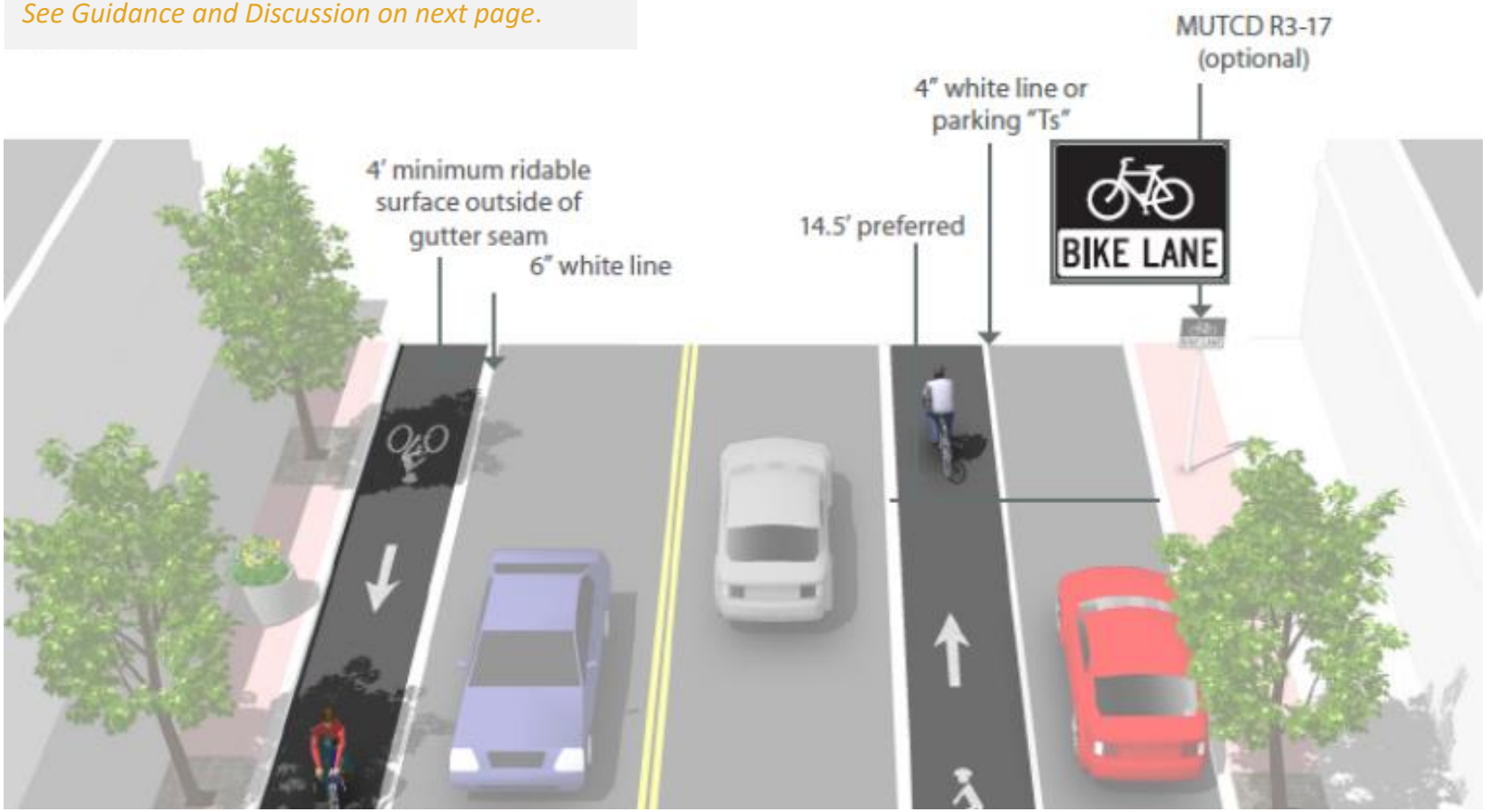
Bicycle Lanes

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway, than if they are expected to share a lane with vehicles. Currently in Surf City, paved shoulders with bike markings currently exist on S. Topsail Dr. to N. New River Dr., however the trails and markings are in need of maintenance.

See Guidance and Discussion on next page.



Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual on Uniform Traffic Control Devices.
NACTO. (2012). Urban Bikeway Design Guide.
NCDOT. (2000). Traditional Neighborhood Development (TND) Guidelines.
NCDOT. (1994). Bicycle Facilities Planning and Design Guidelines.

Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane (12 foot minimum)
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.

Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane.

Buffered Bike Lanes and Cycle Tracks

Buffered bike lanes are a safety initiative designed to create a greater space between bicyclists and motorists, and help protect them from car doors that swing out, and also drivers. Studies have found that buffered lanes encourage more bicyclists to drive with the traffic. Safety education, as shown on the following page, which depicts the rules when riding in buffered bike lanes, encourages cyclists to stay to the left side of the lane, or the farthest away from car doors. Depicted at left, the parking spaces to the right of the lane are buffered, and the bicycle lane is also buffered from motor vehicles. Buffered bike lanes are proposed on Topsail Drive.

Guidance

This educational poster describes the reasoning behind buffered bike lanes. It not only protects the bicyclists from drivers, it explains where the cyclist should ride in the lane to protect himself from door openings of parked cars.

Cycle Tracks

Description

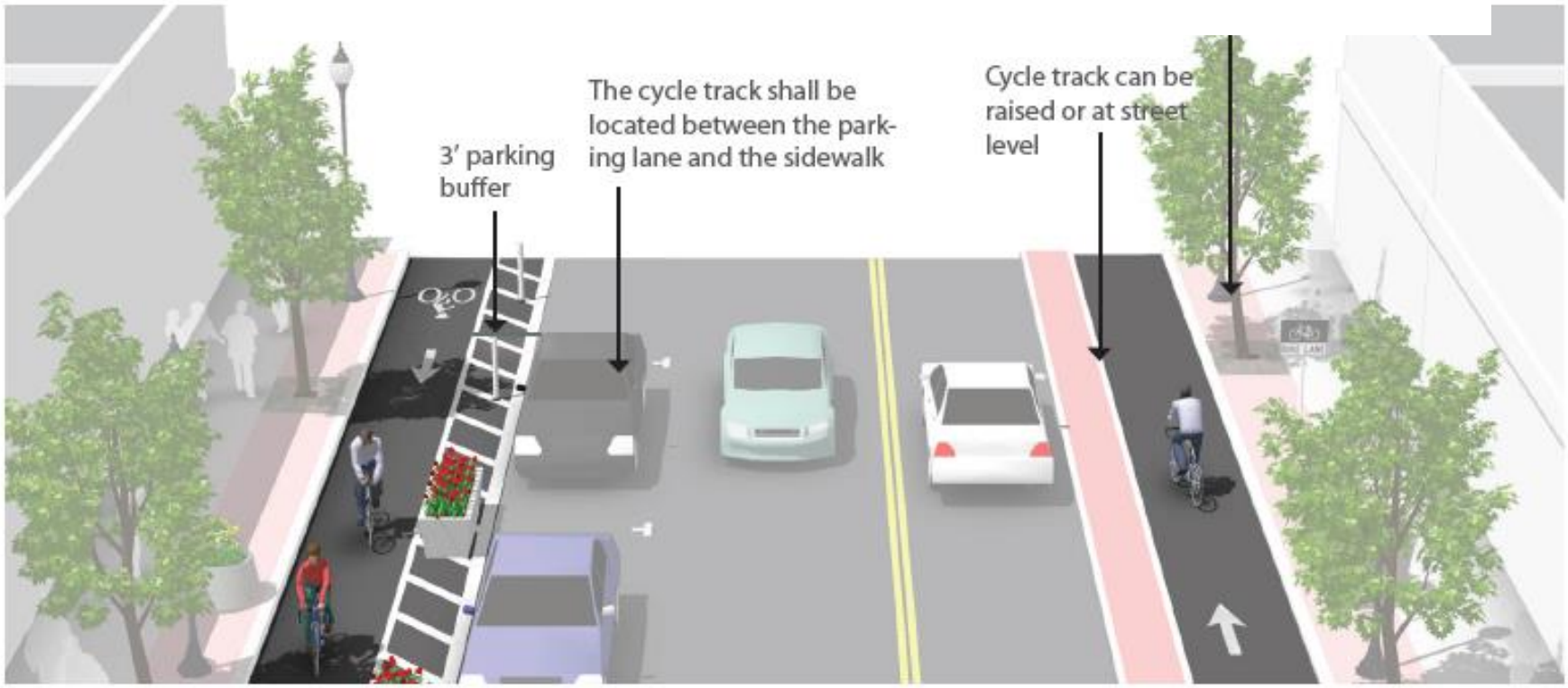
A cycle track is an exclusive bike facility that combines the user experience of a separated trail with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.

Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and "Yield to Bikes" signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

If possible, separate cycle track and pedestrian zone with a furnishing area.



Guidance

Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One Way Cycle Tracks

- 7 foot recommended minimum to allow passing.
- 5 foot minimum width in constrained locations

Two Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations.

Materials and Maintenance

In cities with winter climates, barrier separated and raised cycle tracks may require special equipment for snow removal.

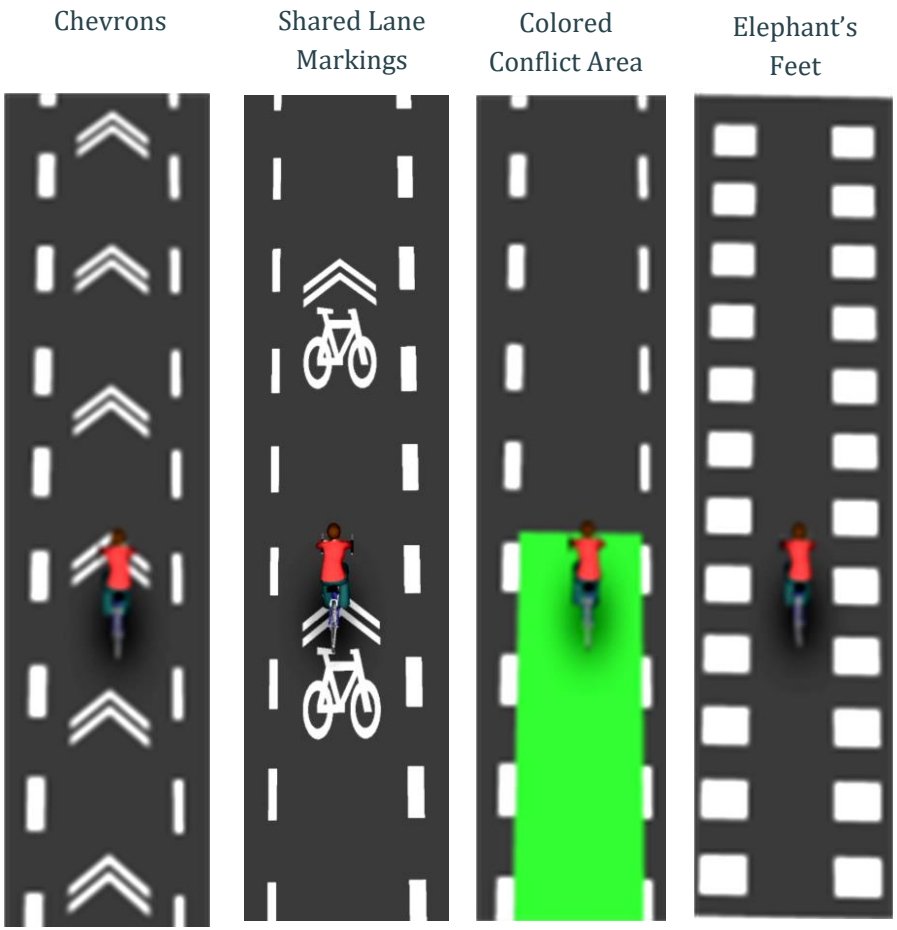
Additional References

NACTO. (2012). Urban Bikeway Design Guide.

Intersection Crossing Markings

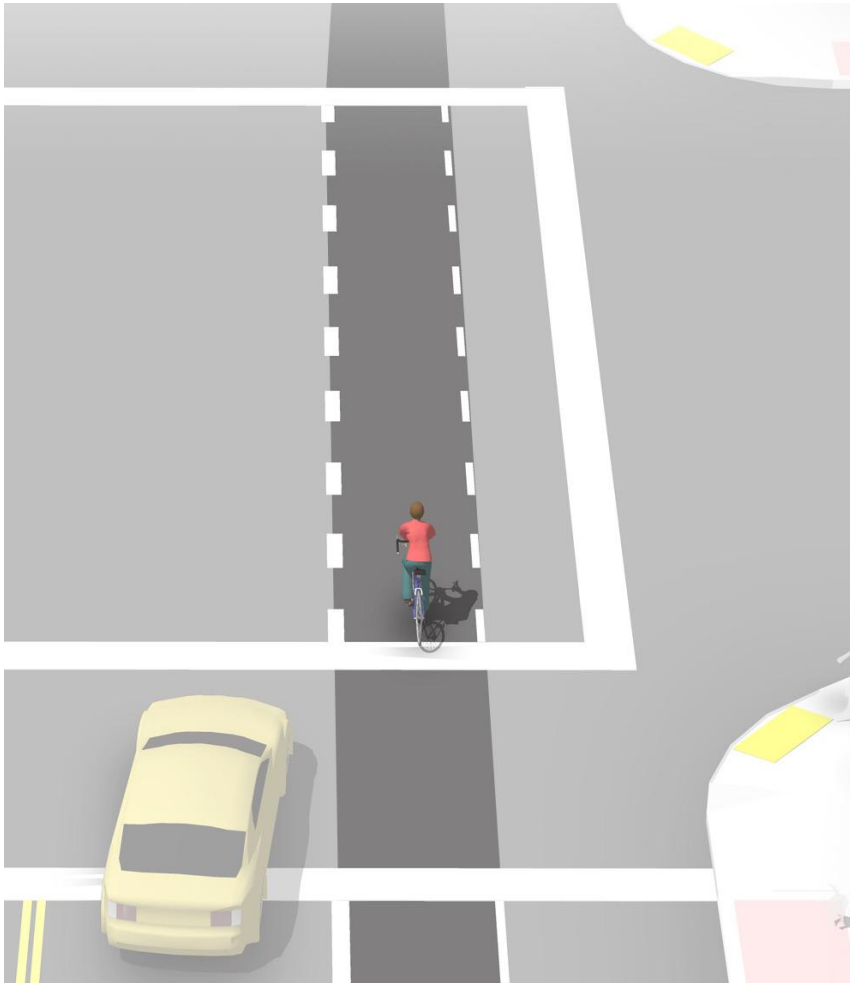
Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



Guidance

- See MUTCD Section 3B.08: "dotted line extensions"
- Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- Chevrons, shared lane markings, or colored bike lanes may be used to increase visibility within conflict areas or across entire intersections. Elephant's Feet markings are common in Canada, and in use in Chicago, IL.



Discussion

Additional markings such as chevrons, shared lane markings, or colored bike lanes in conflict areas are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities. FHWA. (2009). Manual on Uniform Traffic Control Devices. (3A.06) NACTO. (2012). Urban Bikeway Design Guide.

Unsignalized Marked Crossings

Description

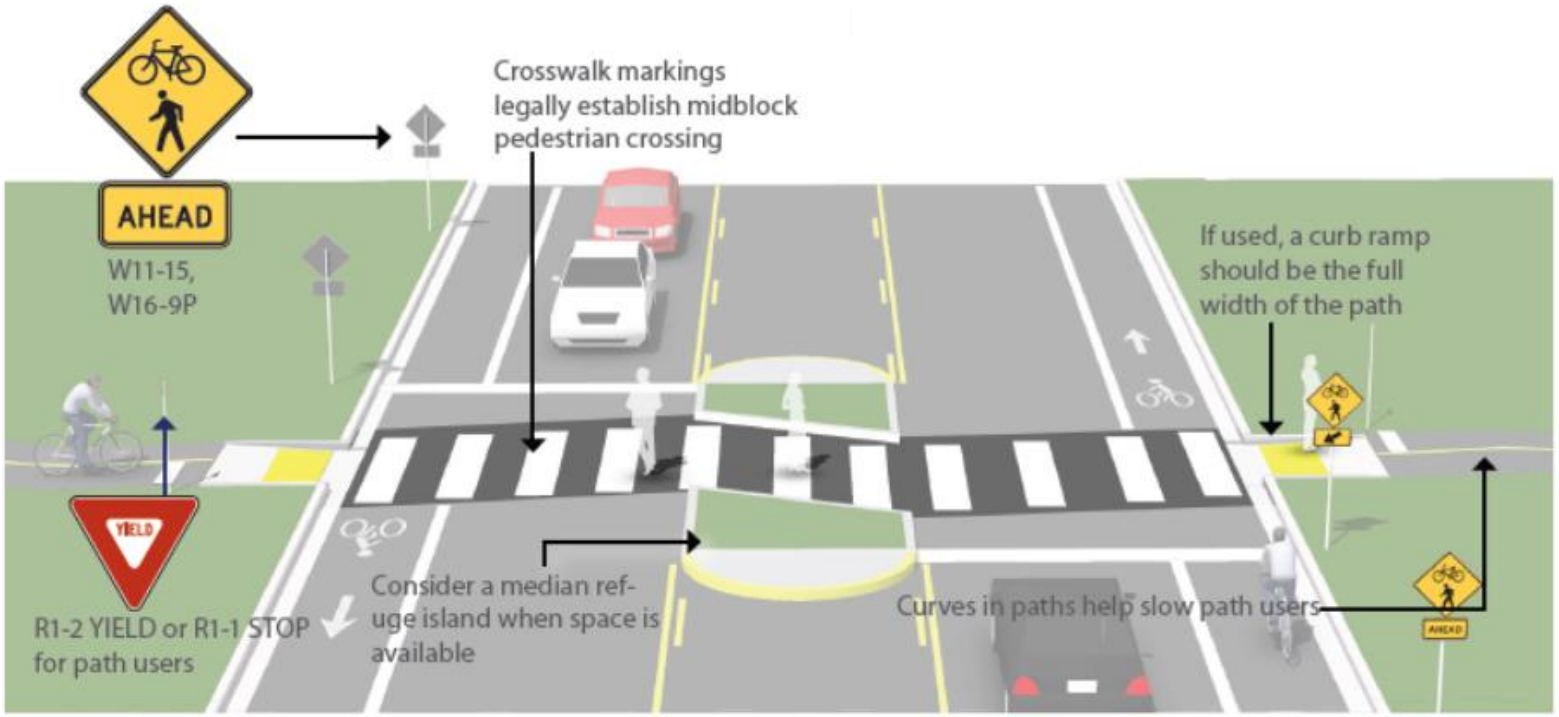
An unsignalized marked crossing typically consists of a marked crossing area, signage, and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.

Guidance

- Refer to the FHWA report, “Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations” for specific volume and speed ranges where a marked crosswalk alone may be sufficient.
- Where the speed limit exceeds 40 miles per hour, marked crosswalks alone should not be used at unsignalized locations.
- Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices.

Unsignalized Marked Crossings - continued



Discussion

Marked crosswalks alone will not make crossings safer, nor will marked crosswalks necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g. raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions, etc.) as needed to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding which treatment to use. Town streets and NCDOT roads have different requirements. Traffic counts should be considered in all instances for using unsignalized marked crossings.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Active Warning Beacons

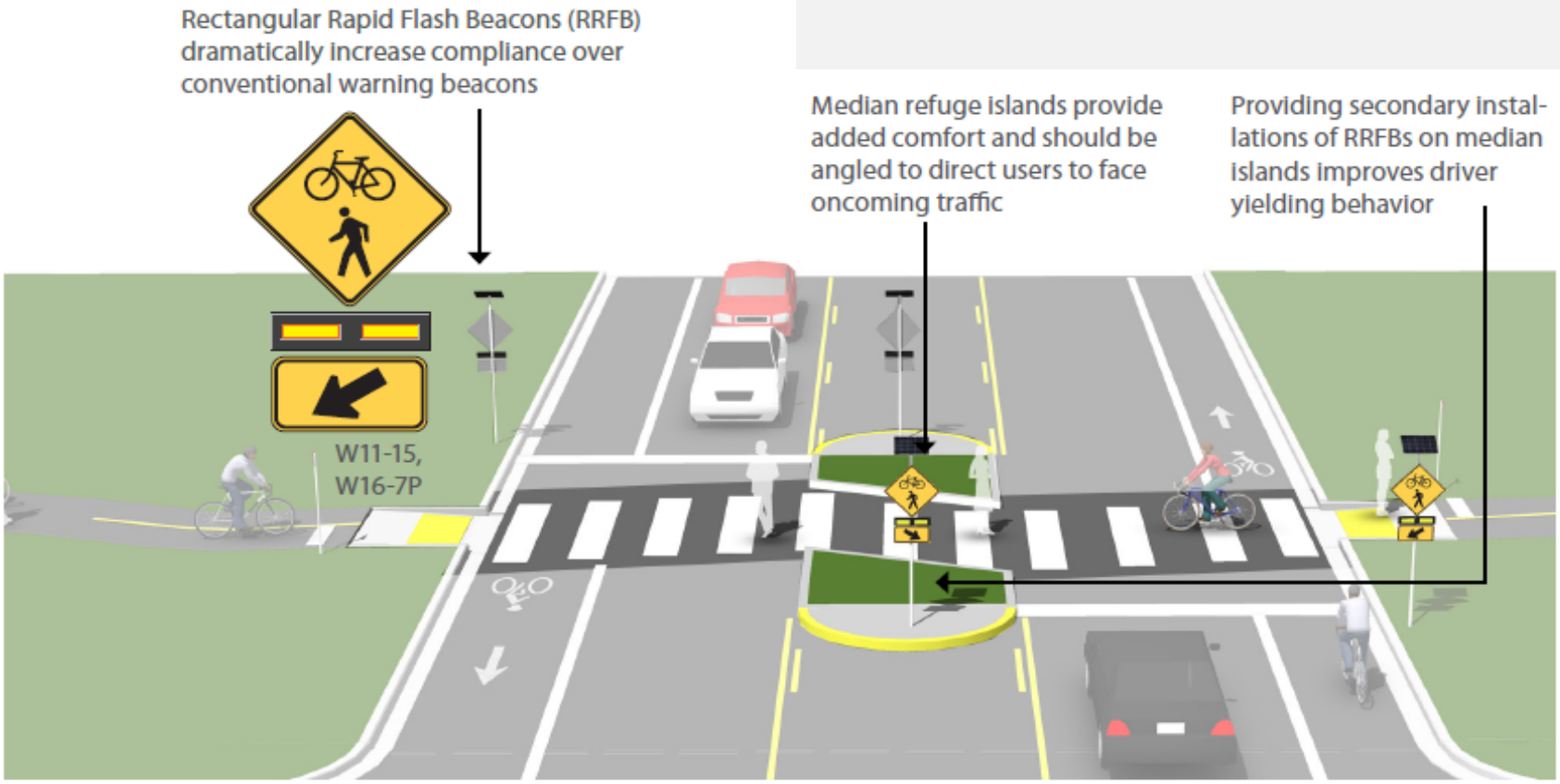
Description

Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

These enhancements include pathway user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.

Guidance

- Guidance for Unsignalized Marked Crossings applies.
- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or with passive detection, after the user clears the crosswalk.



Discussion

Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.
A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88 percent. Additional studies of long term installations show little to no decrease in yielding behavior over time.

Materials and Maintenance

Depending on power supply, maintenance of active warning beacons can be minimal. If solar power is used, signals should run for years without issue.

Additional References

NACTO. (2012). Urban Bikeway Design Guide.

FHWA. (2009). Manual on Uniform Traffic Control Devices.

FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11) NCDOT. (2012). Complete Streets Planning and Design Guidelines.

Multi-Use Trails

Description

Shared use paths can provide a desirable facility, particularly for recreation, and for users of all skill levels preferring separation from traffic. Multi-use paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5’ minimum) can be provided for pedestrian use.

Clearance

- Lateral Clearance: A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3’) is required by the MUTCD for the installation of signage or other furnishings.
- Overhead clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Discussion

The *AASHTO Guide for the Development of Bicycle Facilities* generally recommends against the development of shared use paths along roadways. Also known as "sidepaths", these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Additional References

Flink, C. (1993). Greenways: A Guide to Planning Design and Development.

Sight Distances

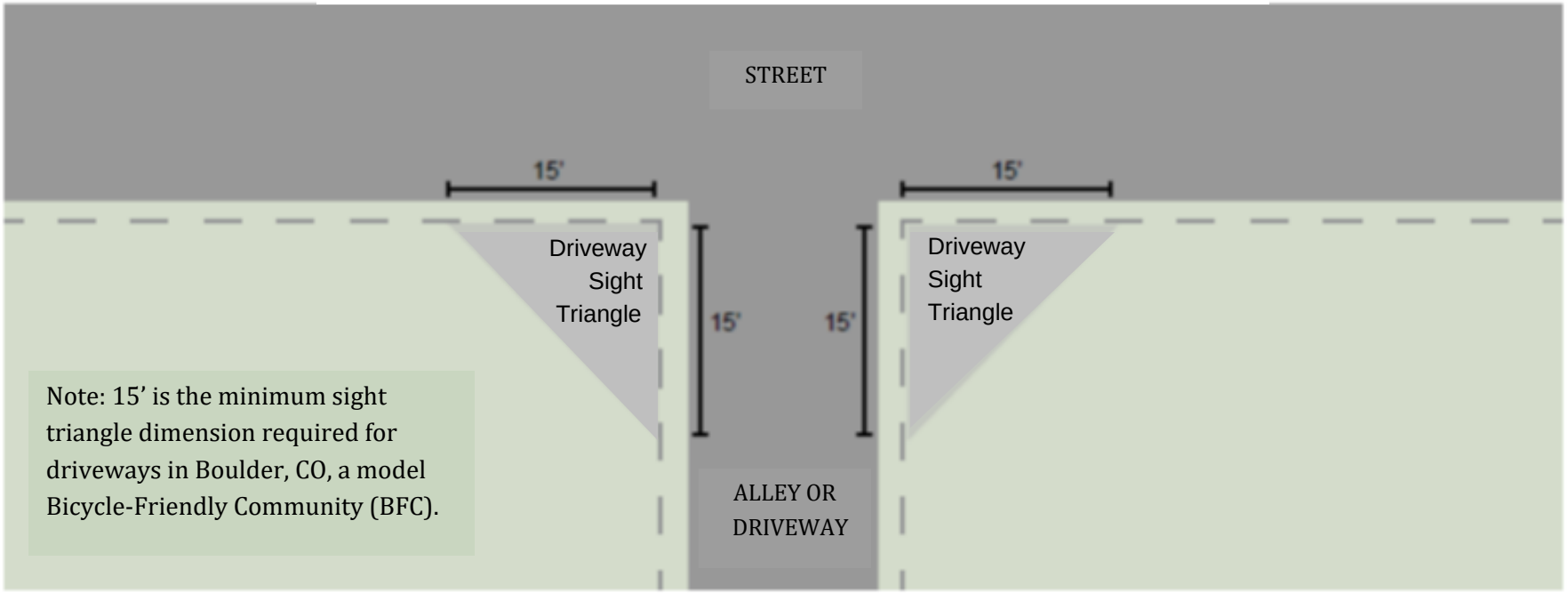
Description

Specified areas along intersection approaches, called sight triangles, should be free of obstructions that block a driver's view of potentially conflicting vehicles (including bicycles) or pedestrians entering the traveled way. The determination of sight triangles at intersections varies by the target speed of the thoroughfares, type of traffic control at the intersection and type of vehicle movement.

Guidance

- If the sight triangle is obstructed, every effort should be made to eliminate or move the obstruction or mitigate the obstruction (for example, install curb extensions to improve visibility of crossing pedestrians or trim vegetation).
- Shrubs must be kept low, and trees and large shrubs under-trimmed sufficiently to permit clear sight in the area between 2 feet and 8 feet above roadway elevations.
- Driver's eye level: 3.75'

Driveway Sight Distance [see following page for *Street Intersection* Sight Distance]



Discussion

Development standards for City of Boulder, CO (Revised City Code) may serve as a model for sight triangle guidance specific to driveways, roadways, and bicycle facilities. See the following page for a case study.

Materials and Maintenance

The AASHTO Guide for the Development of Bicycle Facilities (2012), section 7.2.4, recommends the following: "Adopt local ordinances to require adjacent landowners to control vegetation and/or allow road authorities to control vegetation that originates from private property." However, no specific sight triangle dimensions are provided.

Additional References

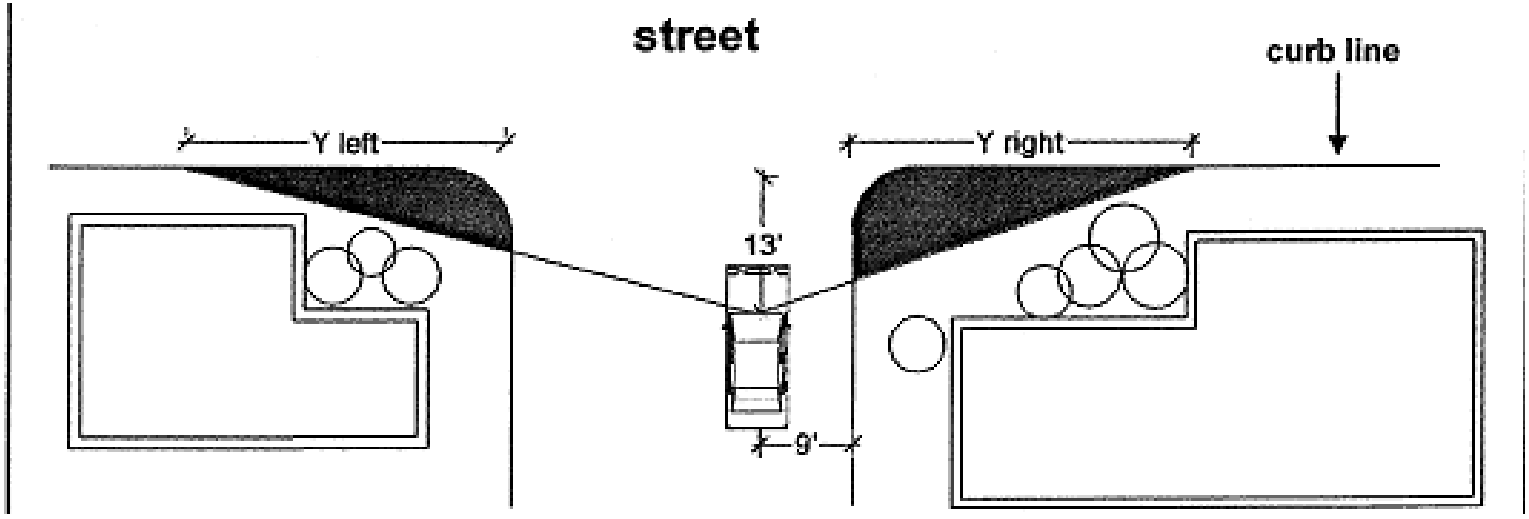
Designing Walkable Urban Thoroughfares: A Context Sensitive Approach Institute of Transportation Engineers (ITE)

Guidelines for Planting within Highway Right-of-Way

NCDOT Roadside Environmental Unit Landscape Design & Development

Site Distance Case Study for Street Intersections: City of Boulder, CO

The following development standards for City of Boulder, CO (Revised City Code) may serve as a model for guidance on sight triangles. The shaded area in the diagram below is required to be kept free of all structures, fences, landscaping and other materials. The size of the sight triangle is based on the size of the road and speed limit, as shown in the table below. See full development standards online: http://www.colocode.com/boulder2/



Lane Usage	Additional Facilities	Speed Limit	Y Distance (Left)	Y Distance (Right)
2 lanes	None	25 mph	155 feet	105 feet
		30/35 mph	210 feet	145 feet
	Bike lane or on-street parking	25 mph	110 feet	85 feet
		30/35 mph	150 feet	115 feet
	Bike lane and on-street parking	25 mph	90 feet	75 feet
		30/35 mph	125 feet	100 feet
3 or 4 lanes	None	25 mph	155 feet	80 feet
		30/35 mph	210 feet	110 feet
		40/45 mph	265 feet	135 feet
	Bike lane or on-street parking	25 mph	110 feet	65 feet
		30/35 mph	150 feet	90 feet
		40/45 mph	195 feet	115 feet
	Bike lane and on-street parking	25 mph	90 feet	60 feet
		30/35 mph	125 feet	80 feet
		40/45 mph	160 feet	100 feet
5 or more lanes	None	25 mph	155 feet	60 feet
		30/35 mph	210 feet	85 feet
		40/45 mph	265 feet	110 feet
	Bike lane or on-street parking	25 mph	110 feet	55 feet
		30/35 mph	150 feet	75 feet
		40/45 mph	195 feet	95 feet
	Bike lane and on-street parking	25 mph	90 feet	50 feet
		30/35 mph	125 feet	65 feet
		40/45 mph	160 feet	85 feet

Sight triangles derived from the size of the road and speed limit in the Boulder, Co case study were designed to ensure that drivers can see bicyclists and pedestrians when they are entering from a street.

Boardwalks

Description

Boardwalks are typically required when crossing wetlands or other poorly drained areas. They are usually constructed of wooden planks or recycled material planks that form the top layer of the boardwalk. Recycled material has gained popularity in recent years since it lasts much longer than wood, especially in wet conditions. A number of low-impact support systems are also available that reduce the disturbance within wetland areas to the greatet extent possible.

Guidance

- Boardwalk width should be a minimum of 10 feet when no rail is used. A 12 foot width is preferred in areas with average anticipated use and whenever rails are used.
- When the height of a boardwalk exceeds 30", railings are required.
- If access by vehicles is desired, boardwalks should be designed to structurally support the weight of a small truck or a light-weight vehicle.

Discussion

In general, building in wetlands is subject to regulations and should be avoided.

The foundation normally consists of wooden posts or auger piers (screw anchors). Screw anchors provide greater support and last much longer.

Materials and Maintenance

Decking should be either non-toxic treated wood or recycled plastic. Cable rails are attractive and more visually transparent but may require maintenance to tighten the cables if the trail has snow storage requirements.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities.

FHWA. (2001). Wetland Trail Design and Construction.

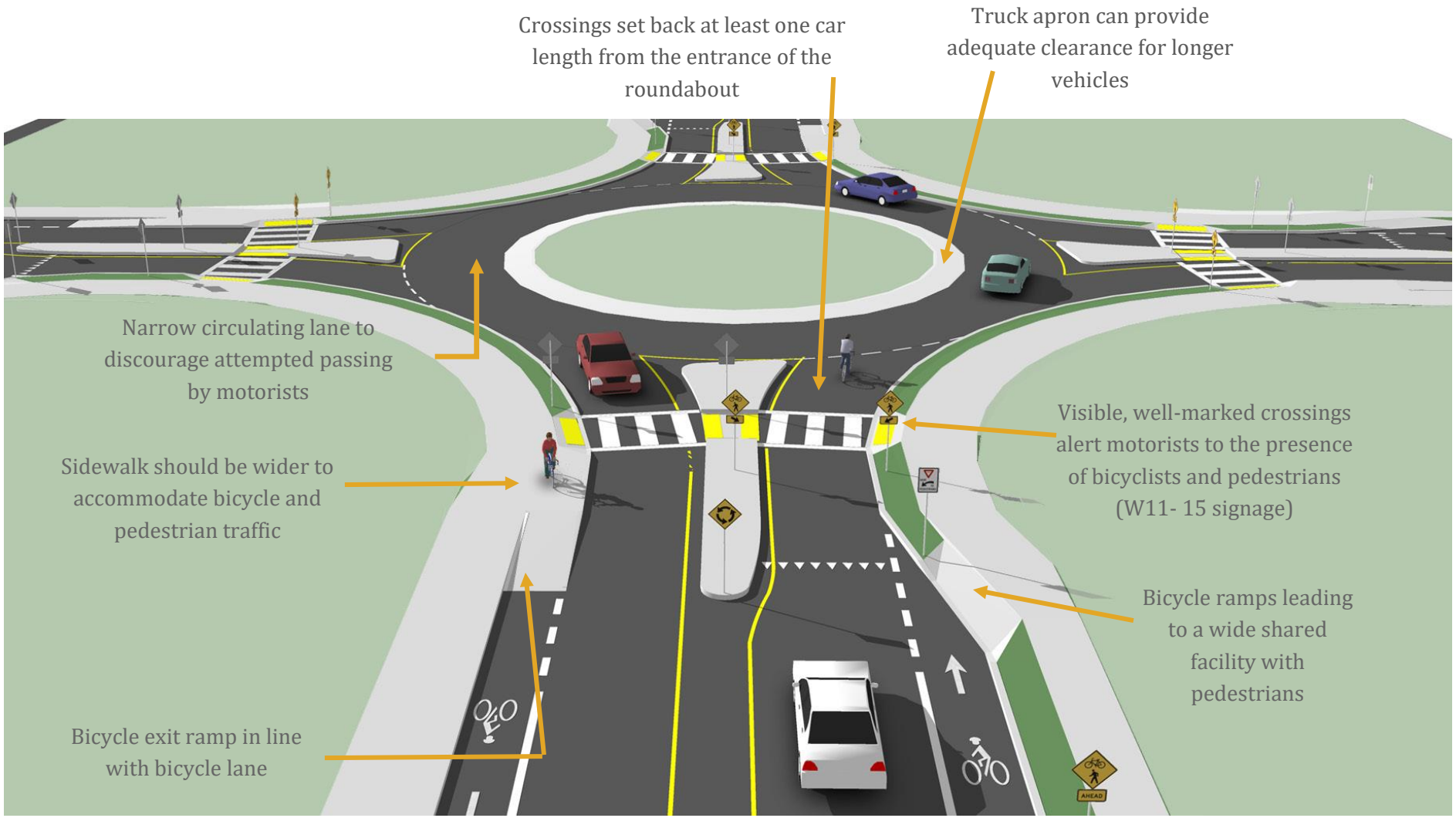
Bicyclists at Single Lane Roundabouts

Description

In single lane roundabouts it is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

Guidelines

- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to "take the lane."
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.



Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

Materials and Maintenance

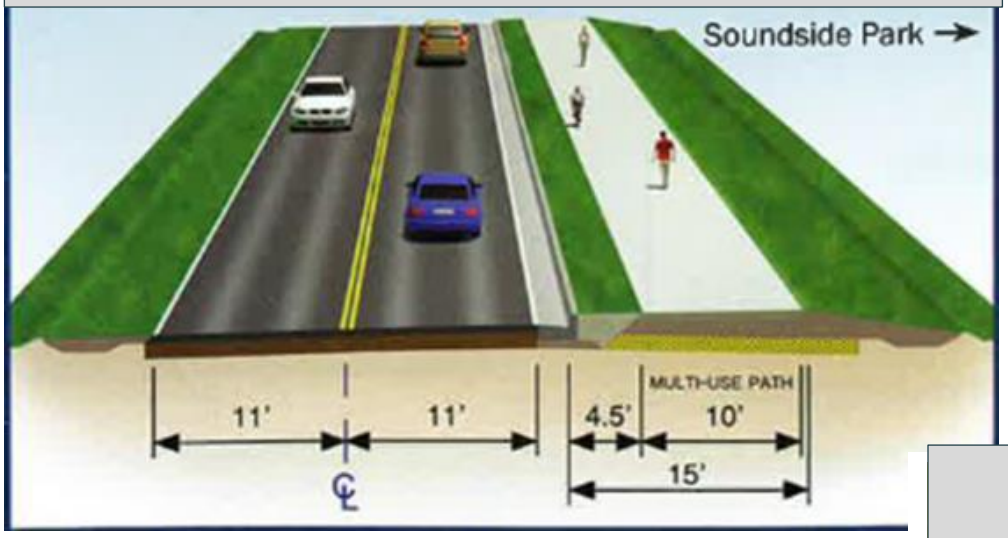
Signage and striping require routine maintenance.

Additional References

AASHTO. (2012). Guide for the Development of Bicycle Facilities.
FHWA. (2000). Roundabouts: An Informational Guide
FHWA. (2010). Roundabouts: An Informational Guide, Second Edition. NCHRP 672

Roland Ave – Multi-use Path

Roland Ave. Typical Section – Source: NCDOT



As part of the Topsail Bridge Replacement, the Federal Highway Administration has agreed to fund a Multi-use path on Roland Ave, on the same side of the road as Soundside Park, and has agreed to repaving and restriping Roland Avenue as part of the project. Since the new roundabout will change the movement of traffic in the area, the improvements pictured on the right will enable pedestrian and bicyclists to be able to reach the Central Business District, and also visit the Park. Traffic in this area of Roland Avenue will not be as congested, since it will no longer be the main entrance into Town, which allows for the pedestrian and bicycle infrastructure, shown at left.

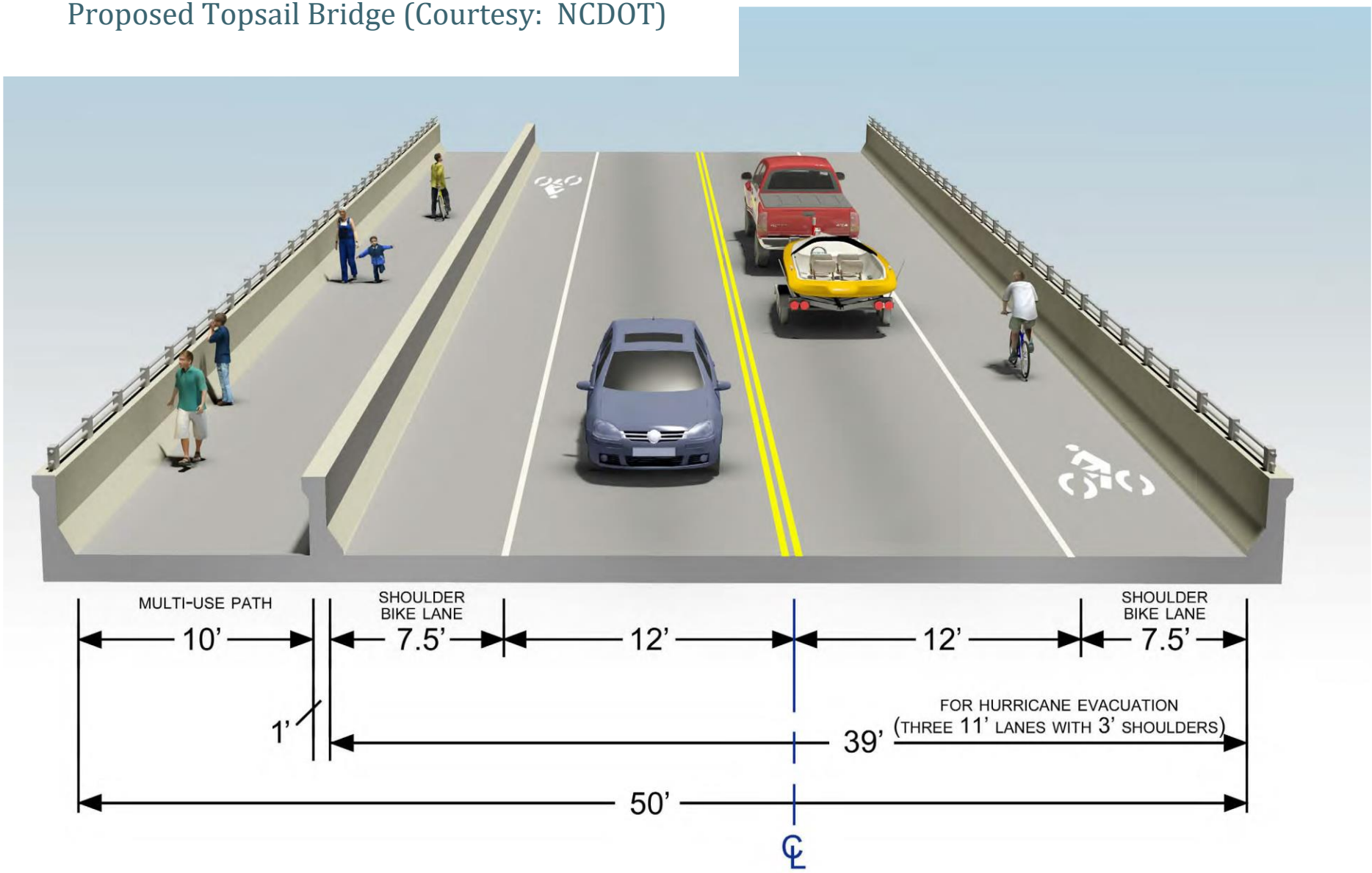
Island Roundabout

This rendering from NCDOT depicts the island side roundabout, which is referred to as a 3-legged roundabout where NC 210 and NC 50 enter Surf City after crossing the new Topsail Bridge. The new 3-legged roundabout promotes safety, enhanced traffic mobility, as there is no light for stopping vehicles. As you can see, the roundabout can be accessed either from Topsail Dr., by going around the roundabout, or New River Dr. by turning to the right. The traffic pattern in front of the IGA on Topsail Dr. will end at the IGA, and motorists, bicyclists and pedestrians will have to access New River Dr. to get over the bridge to the mainland. The raised refuge islands shown in the picture are safe areas for the bicyclists and pedestrians to use when maneuvering across the highway. This plan is currently being reviewed to see if a boardwalk going under the bridge would be a safer alternative than crossing multiple lanes of traffic. The proposed roundabouts at each end of the bridge will endeavor to keep traffic flowing smoothly, as vehicles will not have to wait for the present Swing Bridge to open for boats.

Mainland Roundabout

As the Topsail Bridge design was considered, a roundabout on the Mainland side was suggested to tie-in the intersection where Little Kinston Rd., and Atkinson Point Rd. connect. The Steering Committee concluded that a roundabout such as pictured at left would improve traffic safety and mobility, while at the same time providing a gateway approach for the bridge entering the Island. The roundabout design slows traffic, but increases mobility as motorists will yield to traffic in the roundabout, but there is no stoppage, like a traditional four-legged intersection. Median refuge islands in the center of the roadway direct vehicles on traffic flow, and allow safe passage for pedestrians or cyclists who are crossing the road in that area. The new Topsail Bridge is expected to significantly ease the traffic congestion that now accumulates in this area when the current swing bridge is open for boat passage, which occurs hourly, or as commercial boats require passage.

Proposed Topsail Bridge (Courtesy: NCDOT)



The alternative that was selected for the proposed Topsail Bridge replacement includes a 50 foot area, including a 10 foot multi-use path which is separated from traffic by a barrier wall. The dedicated bike lanes and sidewalks originally proposed were replaced with wider shoulders, to allow a 39 foot road width between the barriers. During an emergency or hurricane evacuation, this area could be converted into three lanes, or allow for two lanes leaving the island, and one emergency response lane accessing the island.

TOPSAIL ISLAND BRIDGE REPLACEMENT: ISLAND-SIDE ROUNDABOUT

Comments from Alta Planning + Design 4/16/2015

These suggestions were discussed thoroughly and incorporated where possible. In order to keep the traffic flowing in the Roundabout, some alternate suggestions have replaced the RRFB crossings, including additional crosswalks at Roland and New River Drive. Future observations of traffic and pedestrian counts will help track the need for updates in the future.

A). Bicyclists and pedestrians should be provided with a safe way to cross S. Topsail Dr. (NC50) after they cross the bridge. People walking and bicycling are likely to take the shortest path to the beach, which would include crossing NC 50 along the NE side of Kinston Ave. A high visibility crossing with RRFBs, a median island, and signage for bike/ped crossing is recommended. A boardwalk under the bridge connecting to the multi-use trail on Roland Ave. is also recommended.

B). As shown in current drawings, the bicycle lane on the south side of the bridge disappears into the roundabout. Bicyclists using that lane should be provided with a facility that connects them to the beach. Our recommendation includes upgrading the proposed sidewalk on the SW perimeter of the roundabout to a multi-use path. This path should then connect to the crossing noted above, and to the existing sidewalk and bicycle lanes on NC 50 south, after Kinston Ave.

C). At the bridge-side leg of the roundabout, the preferred alternative is for the multi-use trail on the bridge to switch back and underneath the bridge, connecting to Kinston Ave., thereby eliminated the need for this 4-stage bike/ped crossing. However, if that cannot be accomplished, a high-visibility crossing with RRFBs at the median island, signed for bike and ped crossing would be recommended. NOTE: RRFBs are currently being tested for application within roundabout crossing in Davidson, NC.

D). Bicyclists and pedestrians should be provided with a safe way to cross N. New River Dr (NC 210) after they cross the bridge. People walking and bicycling are likely to take the shortest path to the beach, which would include crossing NC 210 along the SW side of Roland Ave. Consider a high visibility crossing with RRFBs, a median island, and signage for bike/ped crossing.

E). The proposed multi-use path along Roland Ave. (north of NC 210) should be extended across NC 210 (see comment above), and should continue to the beach between New River Dr., and Shore Dr. This would connect the beach and the park with a dedicated bicycle and pedestrian facility, and would provide people walking and bicycling across the bridge with a dedicated facility to and from the beach on Roland Ave.

Multi-use Paths

Multi-use paths are by far the most versatile pedestrian system that can be provided, particularly since they are typically constructed wide enough to accommodate pedestrians and bicyclists on the same path, which can ultimately save space in narrow areas. Sidewalks are not designed to accommodate bicyclists, so multi-use paths are an efficient method to provide access to both bicyclists and pedestrians alike. Multi-use paths are typically 10 feet wide, with divider lines along the center to allow for travel in each direction. If space allows, 12-foot wide paths are preferred. If space is limited, the path may be 8 feet wide.

Another benefit to multi-use paths is their improved safety, particularly when compared to bicycle lanes that are directly adjacent to roads. Since designated bicycle lanes are typically constructed of 2 to 6-foot wide shoulders of the road, bicyclists are forced to ride very close to the passing motor vehicles, which in many areas are travelling 45 miles per hour and in some cases as much as 60 miles per hour. While experienced road bikers typically do not have an issue in these situations, more novice bike riders may be more apprehensive about using a bicycle lane. Less advanced riders, or families wishing to use a bicycle lane may choose not to allow their children to ride on a bicycle lane due to possible danger. Multi-use paths typically allow for some space, such as a buffered hatched area between the road and the multi-use path, or in some cases a landscaped strip, which provides pedestrians with a safe avenue of travel. Some areas may have space constraints where a grassed landscape strip is infeasible; in these situations, it is often recommended to install a raised curb along the border of the existing road and new multi-use path, or install bollards for separation, which provides a physical barrier between the pedestrian and motorist.

www.nps.gov Riding bikes on Multi-use Path at Sandy Hook, a small beach town in New Jersey.

www.pismobeach.org This photo from Pismo Beach in San Luis Obispo County in California.

Far left, a family rides at Sandy Hook. Left: this multi-use path is separated with landscaping and bollards and the more permanent divider is formed with brick pavers. The trees have drainage and provide shade for users of the path.

Section 6: Ancillary Facilities and Programs

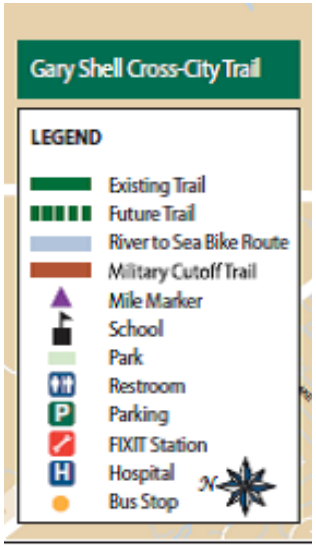
I. Mapping and/or Signing Projects

Bicycle brochures or maps are often provided in order to find out where someone can walk or ride a bike safely, or promote alternative non-vehicular transportation options. They also can direct individuals to recreational opportunities, beach accesses, or places of interest. By developing a brochure that maps the trails and their interconnectivity and also includes safety measures and precautions, the Town could educate visitors and seasonal renters to help them get around the town safely. As new biking infrastructure is added, signage will help residents and visitors find the routes. Examples of signage can be found here http://www.mutcd.fhwa.dot.gov/htm/2009/part9/fig9b_04_2_longdesc.htm

Figure 9B-4. Guide Signs and Plaques for Bicycle Facilities (Sheet 2 of 2)

Another way to depict the bike and pedestrian infrastructure is by providing the information on the Town's website, so those with computers, or smart phones, can easily connect to find the available trails, bike parking facilities, and pedestrian assets.

The City of Wilmington provides a ***weblink*** to their trails which also notes where new trails are being constructed, and how they will connect to the East Coast Greenway and River-to-the-Sea Bike Route. (http://www.wilmingtonnc.gov/community_services/gary_shell_cross_city_trail.aspx) The weblink also enables you to download a printable map of the Cross-City Trail, and shows where parking and bike FIX-IT stations are available. The Legend for the Gary Shell Cross City Trail is shown at right and depicts many places of interest.



II. Spot Improvements Programs

As is the case with any infrastructure, the bicycle and pedestrian system will need to be maintained in order to adequately maintain its function. The Town should set aside funding on a yearly basis in order to correct any deficiencies.

One of the subjects most frequently commented on in the public surveys was that the current multi-use paths are not maintained. The citizens and visitors who responded to the survey indicated that debris, broken glass, small stones, gravel, sand, vegetation, and obstacles like trashcans and vehicles prevent them from biking or walking on the paths. Others suggested that these areas be swept or cleaned on a weekly or bi-weekly basis. Pictured below is a motorized sweeper 'Tennant Green Machines 636,' which is just one example of a lightweight narrow sweeping device that can be used for sidewalks and bike lanes. Blowers could also be used to accomplish cleaning on a narrow path. A few respondents mentioned that perhaps some organizations would volunteer to maintain the paths, nevertheless it would need to be done on a regular basis.

III. Bike Parking and Wayfinding

Once bicycle and pedestrian assets are established, wayfinding signs are recommended so that multi-use paths can easily be found. Some Steering Committee members suggested applying trail markings on multi-use paths going to different locations. Such as 'flip flops' on the paths heading to the beach, a shopping bag going to the CBD, or a sign stating how far it is to the bridge or the Community Center. An example of wayfinding is in these photos from Arlington, VA, a League of American Bicyclists' bicycle-friendly city. Source: http://www.bikearlington.com

These photos demonstrate how multi-use path signage can help bicyclists find their way, and depict how areas for bike parking can be provided at busy access spots. The bike parking below includes a FIX-IT station which will be discussed in more detail on the following page. Park benches, shade trees, and drinking fountains near the trail are other amenities to consider. For more information on bike parking and wayfinding: http://mutcd.fhwa.dot.gov/htm/2009/part9/fig9b_04_1_longdesc.htm

Bike Conveniences -Bike Repair Stations

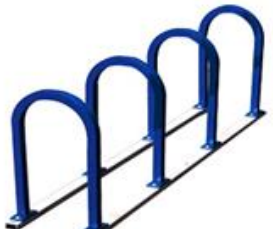
As shown here, a FIX-IT Station is a public accessible self-service stand for bikes and they are becoming more popular in bike-friendly towns and cities. They are usually provided in well-lit areas, so bicyclists can do their own bike repairs. The stand holds the bike to make it easier to work on, and usually consists of an air pump for bike tires, and provides the rider with tools such as Allen wrenches, or hex keys, screwdrivers, and tire levers needed for basic repairs and adjustments. This will help the bicyclists be able to fix his/her bike and be able to keep riding. In Dorchester, MA the town raised money online to purchase a bike FIX-IT station, by asking for individual contributions. There are quick and easy bike maintenance instructional videos available online.

Photo Source: www.bikearlington.com

Parking Extras

Once bicycle parking assets such as racks are in place, there are a couple of ways to make others aware of them. ***RackSpotter*** is a free, crowdsourced tool, which can be accessed by the web or downloaded as an app for smartphones, which identifies bike parking locations in different areas. People in the community inventory the bicycle racks, and use either a map or GPS on their phone to pinpoint a location. A Town can also add bike parking information on the Town's website, to make it biker-friendly, and enable someone to know if they will have parking options when they reach their destination. Some communities are also using crowdsourcing initiative to collect funds for particular bicycle assets, which are desired, but not a priority in the Town, which enables the fund to collect monies which accumulate until the asset can be purchased.

Currently, the Town is lacking in bike parking facilities. If the Town moves forward with plans to incorporate additional multi-use paths and infrastructure in this plan, there will be a need for an increase in bike parking. Minimal parking for bikes at the Community Center, and a few bike racks in the CBD near shopping, currently exist. Bike rentals are also available. With additional paths, parking would also be essential, especially in the CBD and beach accesses. While traditionally, bike parking racks were made of galvanized steel, some are now made of recycled materials. Some examples of bike racks are found here, but typically, as long as bikes can be secured to them by bike locks, and they cannot be moved, the bikes will not have safety issues. Survey respondents mentioned the lack of bike parking and requested them at beach accesses, observation areas, and especially outside grocery stores and eating establishments.



At Right, a make your own FIX-IT Station made from kegs at Sierra Nevada, Asheville. N.C.

An inexpensive alternative for bike parking are racks constructed from wood as shown here. It can be handmade, like this one at the Community Center. The wood could be paid for by the Town, and the project could be undertaken by City employees in the offseason months, or suggested for scouts or other volunteer groups and constructed as a community effort. Bikes were present at the Community Center, but only a few bicycle racks exist here.

Pictured below (left): Example of recently added bike parking infrastructure at McDonald's near the intersection of NC 210 and NC 50. As you can see, it is in use.

Below (Right) – No bicycle racks are currently at the beach access near the Welcome Center, which obviously could use one, as a bicycle is parked under the shelter on the boardwalk, on the opposite end as the flag.

IV. Sidewalk Maintenance Programs and Accessibility

Once the sidewalk network, or multi-use paths, are connected all over town, initiatives should be put into place to keep them free of debris, sand, and have periodic safety checks to ensure that cracks are fixed, drainage is working, and accessible slopes are well-designed with crossing areas to accommodate ramps for wheelchair users, and that all these areas are kept in good repair. A scheduled maintenance check should be done at least quarterly to check for areas of concern. If pedestrian-actuated traffic controls, such as a push button device for crosswalks, are utilized for crossing the street, they should be mounted at the appropriate height to permit wheelchair users to reach the buttons, and be located as close to the ramp as possible. The best possible device should be one that does not require excessive force to use the mechanism. It is also important that signals to alert drivers of crossings are properly placed, so that there are not obstacles which would cause a visual impairment to those in a wheelchair. The crossing device must also be timed correctly to allow safe crossing. All of these concerns should be given due consideration at the time of construction, with scheduled maintenance check times

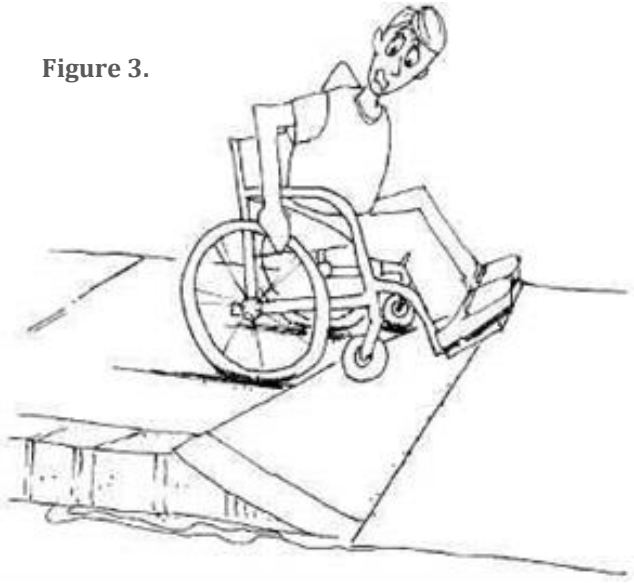
Figure 1.

Figure 2.

Roadway designs along with sidewalk designs should prioritize the needs of pedestrians and those with wheelchairs. Often, the roadways being paved over and over change the slope, and make it difficult for someone in a wheelchair to maneuver. **Figure 1.** is too steep; **Figure 2.** is at a gradual, slower grade, and is safer and easier to maneuver.

Source: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/chap4b.cfm

Figure 3.



A severely changing slope can be a problem for wheelchairs, as shown in **Figure 3.** Above. This drawing from the Federal Highway Administration bicycle/ pedestrian publication depicts a too steep slope. Before handicapped ramps are installed, the current federal highway codes should be reviewed and complied with.

V. Traffic Calming Devices – Chicanes, Chokers or Rumble Strips

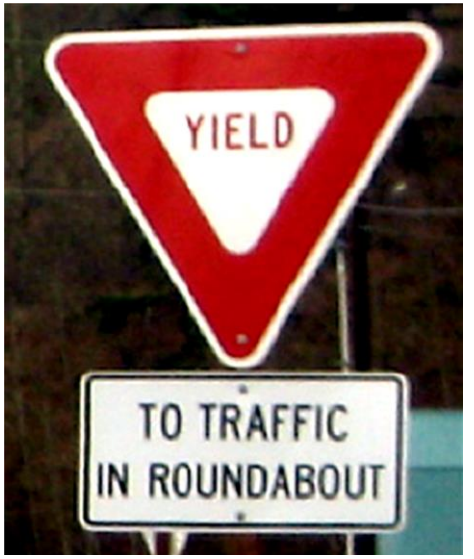
As many survey respondents mentioned that the speed of motorists is a safety problem in Surf City, this plan will cover a few traffic calming methods which could be considered. Traditionally, non-physical measures, such as reducing the Town's speed would be used to slow down traffic, but more recently, traffic calming devices, which physically change the road, such as speed humps, or road narrowing, are being utilized with the intention of slowing down or reducing motorized vehicular traffic speed, in an effort to improve safety for bicyclists and pedestrians. Typically ***reducing the speed*** to 15-25 miles per hour, and ***signs*** which heighten awareness of pedestrians and bicyclists in a busy, Central Business District, or residential high traffic area, will be enough to prevent accidents, however, this traffic management strategy requires ***enforcement***. Some counties are using ***speed cameras*** to issue citations, which not only causes speed reductions and awareness, but is generating a lot of income for the Town/County. In Montgomery County, Maryland a highly trafficked area, the safe speed traffic camera program earned over $16 million in revenue, last year alone. Other calming devices include ***roundabouts***, or ***traffic circles***, landscape strips which use planters or other ***removable barriers, one way roads***, ***chicanes*** *or* ***chokers***, ***speed humps, or rumble strips.*** Chicanes or chokers are built into the street, which alternate narrow and wide sections which form a serpentine, rather than straight pattern, and allow space as pictured below. An inexpensive way to slow down vehicles is to paint narrowed lanes, including center turn lanes, or bicycle and parking lanes. ***Rumble strips*** are grooves in the roadway, which alert inattentive drivers by causing a vibration and sound when the vehicle tires cross over the rumble strips, coercing drivers to comply with speed. The Town of Surf City has recently engaged the *WatchforMeNC* safety campaign, and is working to educate the public. http://watchformenc.org/campaign-materials/

Chicanes or chokers Source: www.saferoutesinfo.org/program-tools/how-can-you-design-environments-slow-down-traffic

Traffic Calming Initiatives

Roundabouts

Roundabouts often take the place of traffic signals in intersections and encourage mobilization as the traffic maneuvers counterclockwise around the circle. The traffic in the circle has the right-of-way, and an entering motorist must yield to those already in the circle. Slow speeds used in these circular intersections promote safety and numerous studies indicate that significantly less accidents occur (about a 35% reduction in total crashes and 76 percent reduction in injuries)[2] than in a typical intersection. Safe crossing areas are usually provided for pedestrians, which sometimes include an island, where they can safely stand until the traffic stops. Education is important, so motorists, bicyclists and pedestrians all know who has the right-of-way. As two roundabouts are being planned for the new Topsail Bridge Replacement Project, residents and visitors will need to learn how to maneuver them. Another area where a roundabout is being considered for the intersection of NC 210 and NC 50. ([2]https://www.fhwa.dot.gov/research/deployment/roundabouts.cfm)



Proposed Island Side Roundabout in Surf City; bridge construction is estimated to begin in 2017 with completion expected in 2020.

Speed Reduction Strategies

According to 'Health Resources in Action' motor vehicle crashes are the leading cause of unintentional injury deaths in the United States, and vehicle speed is the major cause. Communities work to develop strategies to slow down traffic to ensure safe speeds. Reducing the speed limit, and signage to make motorists aware of pedestrians and bicyclists is one way to prevent collisions. Communities striving to make streets safer for pedestrians and bicyclists often design designated paths or sidewalks to separate them from the motorists. Traditionally, police officers were present to control speed, but as they cannot be present at all times, and maintaining speed enforcement is quite costly, automated techniques are considered to be a more cost efficient approach. Radar speed signs that display the vehicle speed as the motorist approaches, is one effort that is used to make drivers aware of their speed, and are commonly used in school zones. Safe speed cameras are widely used in high traffic areas to measure the speed in slow zones, and record the motorist's license plate if their speed is in excess of the posted speed limit, and some generate automated tickets. This automated method encourages reduced speed, and has been effective in reducing the number of traffic fatalities, crashes, and injuries. Red light cameras are also used for traffic enforcement. Raised speed humps, or speed bumps are sometimes used as a physical apparatus to decrease speed, and restrict aggressive drivers. Raised pedestrian crossings, median islands, and increased lighting are often utilized to make motorists more aware of pedestrians and provide a safe refuge area when crossing the street, and are commonly used in un-signalized intersections.

In areas that have high volumes of speed over the speed limit, raised pedestrian refuge areas, such as a median and signs with a rapid flashing beacon are sometimes used, such as this one recently installed in St. Petersburg, Florida, at a popular crossing designation.

Photo Credit: Michael Frederick, City of St. Petersburg, FL

Traffic Circles

Traffic Circles, which are typically landscaped raised islands placed at intersections, help to lower the driver's speed, and make intersections safer. The newly implemented traffic circle located near the McDonald's, CVS, and Walmart in Surf City was planned to help make this intersection a safer area, and also helps in slowing down traffic, as it prevents high speed cut-through traffic from the intersection of NC 50 and NC 210.

VI. Transit Interface

The Town currently does not have a bus system, and likely will not for the foreseeable future due to the lack of a large and consistent population to provide for the demand of such a transportation system. The closest Greyhound Bus line stops to Surf City are at the Camp Lejeune, or in Wilmington in the Ogden area. Public transportation from Wilmington, NC is available about 30 minutes from Surf City at its' most northeastern point. (Blue Cay Rd, and Rt. 40 near Castle Hayne, NC).

VII. Safety Education Programs

As previously mentioned the Town has acquired a 'Watch for ME-NC' grant, from NCDOT. The value of this safety initiative including its literature and training programs will be realized as both children and adults become more aware of bicycle and pedestrian rules, and will also educate motorists to put safety first, and keep an eye out for those trying to cross the street. The program encourages the whole community to be involved, and will train police officers, who will then work with the schools and parks and recreation departments to convey the importance of this important safety initiative which we are hoping will reduce the number of accidents and fatalities in the Town.

VIII. School Safety and Bicycle and Pedestrian Safety Programs

There are currently no elementary or middle schools directly in Surf City, however, the Alston W. Burke Campus of Cape Fear Community College recently opened, with classes starting in 2015. The school, which may require speed limit signage, crossing notifications, or caution signs, especially since it is on a road curve with poor visibility at the entrance. The school is located at 615 on NC 210, near Colbert Lane, and is in close proximity to the proposed greenway project. Ideally, the greenway planning would include a path to the new Cape Fear Community College, and safety programs should be incorporated to discuss this option with the college students, as the greenway becomes a reality.

Planning is also underway for a future elementary school, in the vicinity of Shepards Rd, which is also in close proximity to the proposed greenway through the Duke Energy utility easement. The NCDOT *Safe Routes to School Program* is federally funded and "facilitates the planning, development and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption and air pollution in the vicinity of schools….provide a safe physical environment for bicycling and walking." The school can look into this program: http://www.ncdot.gov/download/programs/srts/srts.pdf By improving infrastructure to include crosswalks, multi-use paths, painted buffer zones, cycle, greater separation between bicyclists and automobiles, off-road paths and greenways, the Town will be increasing safety. In addition, brochures could also be printed to explain the rules, courtesies and right of ways, and additional signage and wayfinding could direct visitors how to safely get around town by walking or biking.

Ensuring that everyone knows the bike and pedestrian laws is crucial to promote safety. Safety initiatives can include organizing a bike rodeo program: http://www.saferoutesinfo.org/program-tools/organizers-guide-bicycle-rodeos, or http://www.bike.cornell.edu/pdfs/Bike_Rodeo_404.2.pdf. Or, expanding the *WatchforMeNC* program to enforce safety education by getting the Surf City Police Department working with Parks and Recreation Department to implement bicycle safety programs, regarding bicycle laws, such as described here: http://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW_RG_NC_Web.pdf ofrwww.ncdot.gov/bikeped/lawspolicies/

Signage

Below are examples of signage for school speed zones, and crossings, which could be considered if the necessity arises. LED flashing lights are now replacing older traditional lighting which requires more expensive wiring. The beacons are designed to reduce the traffic speed, and can be operational from a password protected website, or text message, and turned on at different times of day, when schools are releasing students or buses. Pictured at left the recently opened Alston W. Burke Campus of Cape Fear Community College on NC 210 in Surf City.

IX. Enforcement, Encouragement Promotion

Developing new infrastructure, such as crosswalks and 'No Parking' areas, and lowering speed limits is one way to insure safety, but in order to correct current behaviors enforcement and education are required. If people continue to park in the crosswalks without consequence, their behaviors will not change. The Town will be undergoing many changes in the next five years, as it grows and develops, enforcement and education of safety considerations will be critical for success. It is important to engage the Town of Surf City Police Department in the Town's decisions, and plan for additional training of officers, as they will be instrumental in enforcement. Some towns such as Wrightsville Beach employ an outside ticketing agency, if they do not have the manpower to keep up with traffic violations. Good communication between the police department and the Town will help to weigh in on these decisions. Town police offers may wish to expand the *WatchforMeNC* program to include bicycle rules and safety programs. For those who are out of the area, and may be visiting, events can be posted on social media, or the Town's website which can encourage visitors to attend. The described program could review the bicycle laws, right-of-ways and protocol. Links for law guidance may be found here: https://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW_RG_NC_Web.pdf and http://www.ncdot.gov/bikeped/lawspolicies/

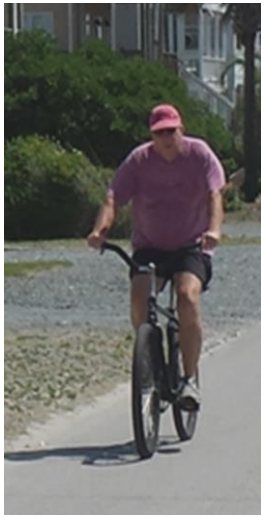
Once the new bicycle infrastructure is in place, encouragement and enforcement programs can begin to get the community active. As a new greenway, a temporary demonstration or trial for One-Way Lanes, or, a new multi-use trail is opened up, a "Kick-Off" or Ribbon Cutting Event can be held. To make these events as well attended as possible, they should be promoted. These events could also be announced on the local radio station. A kiosk could potentially be put outside the Welcome Center which has a brochure on bicycle and pedestrian assets, which could include wayfinding, how to get to places of interest in Town. Posters for programs like "Watch-for-Me-NC" can be displayed at points of interest. By encouraging others to use transportation assets that reduce energy use, we are not only keeping the Town healthier, but are reducing carbon emissions and helping the environment as well. At right bottom, a bike crossing lane is adjacent to the crosswalk to keep the bikes separated from pedestrians, which may serve the Town well near the Welcome Center across from the multi-use lane on Roland Avenue.

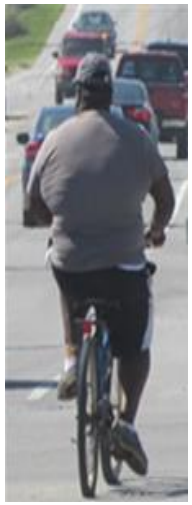
The next photos show Surf City's townspeople and visitors getting exercise and working towards healthy lifestyles. By improving the infrastructure assets and safety measures recommended in this plan, it will also reduce injuries and accidents and encourage exercise by commuting without vehicles.

Avoid this

By Implementing This.

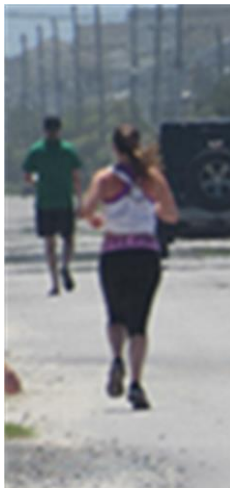
SAFETY FIRST





HEALTHY LIFESTYLES

BIKE



WALK

Recommendations and Plan Guidance

Photo Credit: www.walkbikenc.com/wp-content/uploads/2014/12/Designtoolbox.pdf

Section 7. Project Development and Recommendations

I. Overview of Recommendations and Plan Guidance – The Plan is approved, now what?

Timeline – The Timeline dates may change as the Plan advances, but is offered as a guide to set goals, and look to future considerations.

Sections 7 and 8

Sections 7 and 8 provide written recommendations and guidance with maps that convey planned, proposed and existing infrastructure. Steps to develop a Greenway plan are also listed in Section 7. It is suggested that the Town of Surf City use the recommendations in the Outline to determine next steps in moving the plan forward. The Recommendations Chart by Phase breaks the plan into Immediate, Short Term and Long Term Recommendations, items can be checked off as they are accomplished. As an example, the Recommendations by Phase suggests that maintenance of bike lanes and multi-use paths begin. The first column describes where this can be found in the plan. Appendix E. gives a guide to how maintenance can be accomplished. The task will be to develop a maintenance plan, assign responsibilities for how it will be accomplished, when it will start, how often the maintenance will occur.

Section 9

As Funding will play a big part in what gets accomplished, it is recommended that the Town pay particular attention to the Section 9 - Funding Recommendations. The federal, state and local government funding sources, along with private and non-profit funding strategies and deadlines are listed in this section. As funding is acquired, the plan can move forward. All applications for funding should be submitting as one of the first steps of the Plan. The Town must also work cohesively to strategize fundraising and budgeting efforts. Keeping the public aware of different stages of the plan will also help to reach out to volunteers who may want to join a committee, work on crowdfunding for a particular item, promote safety, or help with maintenance items.

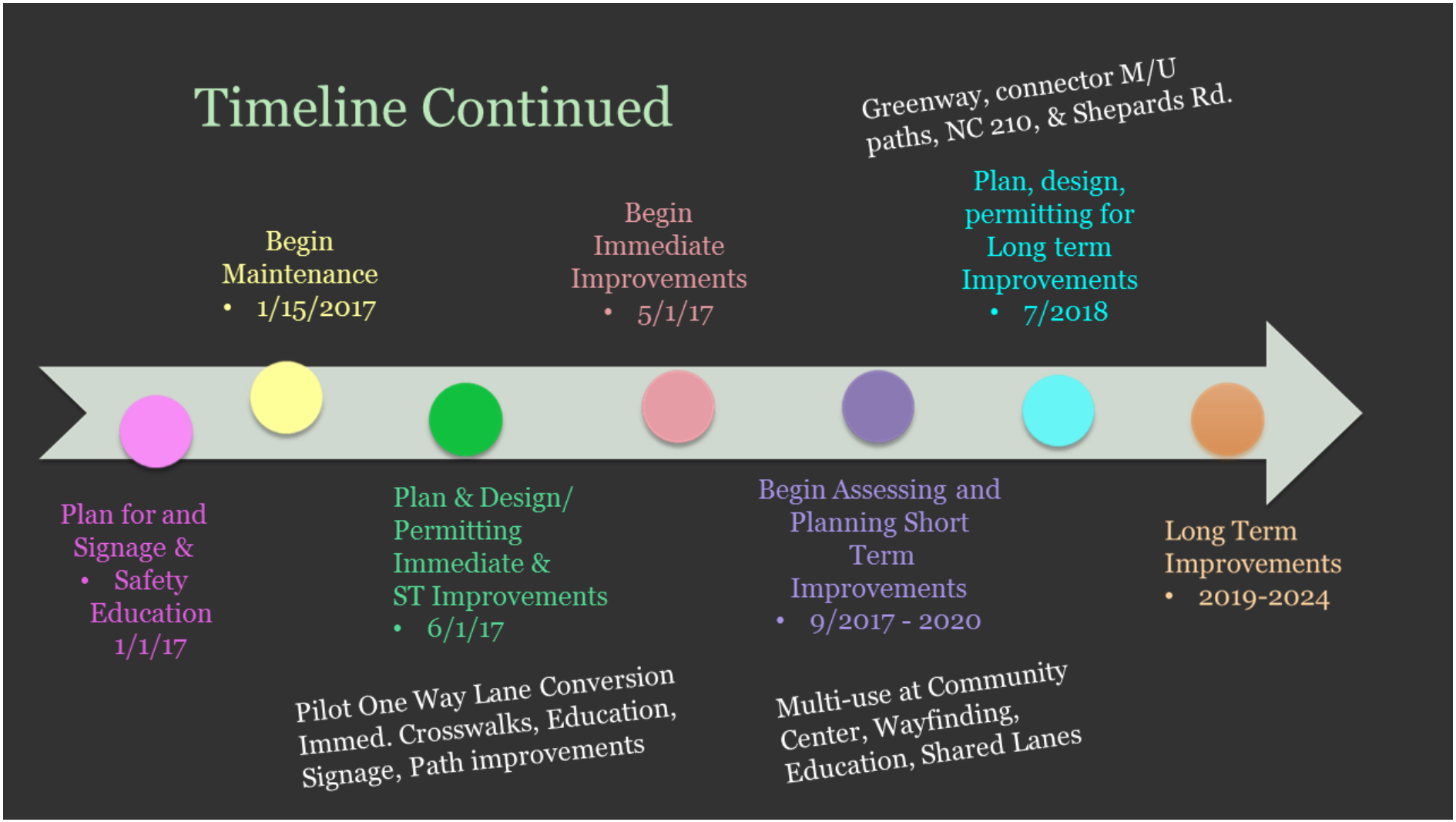
Section 10

Section 10 includes Guidance on Plan Implementation. After a committee is established to help with the plan, charting assignments and progress is recommended. At the end of Chapter 10 a chart is depicted that may be used as an example (or edited) to assign each task to a responsible party (lead) with possibly other partners. Decide who is going to work on what task, assign deadlines, and record progress.

Appendices

The appendices of the plan can be very useful in moving the plan forward. It details useful information describing where the Town has encountered bike and pedestrian crashes, describes predicted transportation deficiencies, provides cost opinions of infrastructure and signage, and gives useful suggestions on trail maintenance, kiosks, bike racks, lighting and bike share programs. It also conveys helpful information on the greenway transmission right of way zones and restrictions.


Timeline for Bike Ped Plan
Review of Final Draft
• 10/14/15
NCDOT Review 2/19/16
NCDOT Approval
• 9/30/15
Acquire Easements
• Ongoing
Meet with Duke Energy RE: Greenway
• By 1/1/17
Acceptance of Plan 11/1/15
Plan Revisions 4/15/16
Form Bike/Ped Committee to work on Funding Applications
• 10/1/16
Apply for Funding All Available Sources or ASAP w/ Deadline Considerations by
• 10-1/16 – 5/31/17
Plan for Multi-use and Bike Lane Maintenance 11/1/16
Note: Funds are required for advancement of plan, dates are estimated based on acquisition of funds.


Timeline Continued
Greenway, connector M/U paths, NC 210, & Shepards Rd.
Plan, design, permitting for Long term Improvements
• 7/2018
Begin Immediate Improvements
• 5/1/17
Begin Maintenance
• 1/15/2017
Plan for and Signage &
• Safety Education
1/1/17
Plan & Design/ Permitting Immediate & ST Improvements
• 6/1/17
Pilot One Way Lane Conversion Immed. Crosswalks, Education, Signage, Path improvements
Begin Assessing and Planning Short Term Improvements
• 9/2017 - 2020
Multi-use at Community Center, Wayfinding, Education, Shared Lanes
Long Term Improvements
• 2019-2024

II. Potential Projects, Preferred Treatments Program Initiatives

Acquiring Easements

As new developments are considered in the vicinity of the Town of Surf City, the Town should require developers to take the Bicycle and Pedestrian Plan into consideration, and if possible require the developers to set aside land for recreation. By providing easements to planned greenways, and adding pedestrian assets, the Town can aide mobilization by connecting to non-vehicular transportation assets in the Town. If this process is included in the planning, it will help to provide pedestrian and bicycle connectivity. One area in Town which has not had much development is west of Route 50 near Shepards Road, however, with the new school planned, and as developable land near the Central Business District becomes less available, areas need to be designated for recreational purposes. This less travelled area away from traffic could potentially add a multi-use loop from the greenway.

III. Guidelines for Improvements

A. Sidewalks (See Map 1 – Overall Proposed Plan)

Recommendation	Location	Description	Time	Details
Sidewalks	Infill Downtown/ CBD	Completion of all sidewalks in CBD	**ST**	Continue to connect sidewalks in the CBD for interconnectivity, add ADA curb ramps.
	Existing Sidewalk Plan	Complete Sidewalk Plan	**LT**	Complete Sidewalk Plan adjust for Bike/Ped Plan modifications (consider multi-use path in place of sidewalk.)

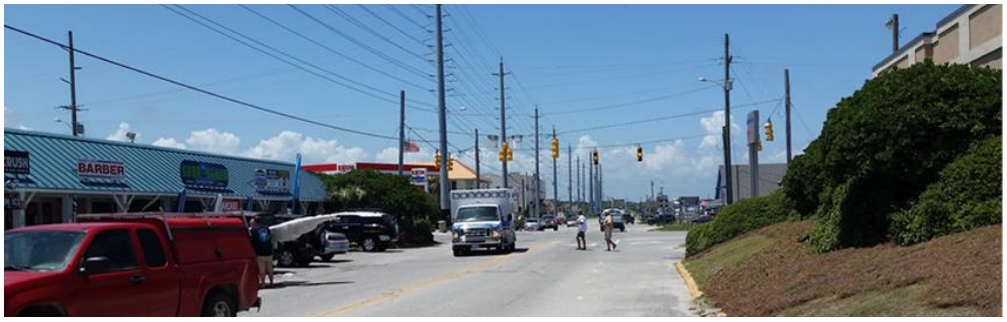
It is recommended that the Town continue to work towards connectivity of all the Sidewalks in the Central Business District according to their *Sidewalk Infrastructure Expansion Plan of 2008*. As funding becomes available, the Town of Surf City has been completing each phase outlined in this 2008 plan, and has made considerable progress since 2014. As new sidewalks are considered, the Comprehensive Bicycle and Pedestrian Master Plan should be taken into account to see if a multi-use path would better serve the area being contemplated. In some instances, a decision to replace the proposed sidewalk with a multi-use path instead of a separate sidewalk on the preconceived plan, may conserve resources instead of adding a sidewalk and a separate bike lane.

The following table shows the approximate existing, funded, and proposed footage and miles designated for sidewalk, bicycle lanes and multi-use paths currently in the Town of Surf City. To measure progress, this data can be compared with future development. The 'Funded' measurements include infrastructure that is planned as part of the Topsail Bridge Replacement project.

Infrastructure		Feet	Miles
Sidewalk			
	Existing	91,914	**17.4**
	Funded	2,157	**0.4**
	Proposed	107,272	**20.3**
Bike			
	Existing	38,358	**7.3**
	Funded	4,469	**0.8**
	Proposed	17,053	**3.2**
Multi-use Path			
	Existing	0	**0.0**
	Funded	5,366	**1.0**
	Proposed	58,691	**11.1**

B. Crosswalks (See Map 6 – Crosswalks)

In the Public Attitude survey, residents were polled to see where they thought that crosswalks should be a priority. The majority felt that a crosswalk on ***Roland Ave. crossing over to the IGA supermarket (pictured below)*** at Topsail Drive is the most needed location. As the infrastructure in this area will be changing with the new bridge, this need may change, but currently it is one of the most highly trafficked areas where it is very difficult to cross in the summer months when the traffic backs up from the opening of the Swing Bridge. Because of the difficulty crossing in this area, a push button actuated crosswalk with lighting is recommended. (See Design Considerations.) The 'Priorities' noted in the chart on the following page were derived from the surveys, which asked the public where they felt it was most necessary to have a crosswalk.



The intersection of Roland Ave. near Topsail Drive was determined by those surveyed to be the number 1 priority for a crosswalk. Since traffic will be redistributed with the relocation of the Topsail Bridge, this crosswalk may be removed after the bridge is constructed. Similarly, NC 210 and NC 50 is a highly trafficked intersection. The crosswalks suggested at this intersection may be temporary, as a roundabout is listed in the future STI Plan.

Crosswalks	At Island Roundabout, and Mainland Roundabout	Included with bridge	**ST/LT**
Crosswalk with signal	Roland Ave. and S. Topsail Ave. across from IGA Supermarket **(Priority #1)**	Short Term	**ST/LT**
Painted Crosswalk	2, Main Entrance to beach access across Roland Ave. @ Shore Drive **(#2)**	Immediate, Signalized if warranted	I
Crosswalk with signal	N. Shore Dr. and S. Shore Dr. near Welcome Center access **(#2)**	Short Term	**ST**
Crosswalk	JH Batts	At time of Multi-use Path Construction- Tortuga	**LT**
Crosswalk with signal	NC 210 and NC 50 (Food Lion, Walmart, Promenade) **(#3)**	ST, if pedestrian traffic demands	**ST/LT**
Crosswalk with signal	Harris Teeter Shopping Center, across NC 210	If pedestrian traffic demands	**LT**
Crosswalk signage	32 Beach Accesses (2 painted Crosswalk lines)	If warranted	**ST**
Crosswalk with signal	Handicapped Beach Access (at 9th Street, at Kinston Avenue)	Immediate, Signalized if warranted	I

According to those surveyed, the second most needed Crosswalk is at ***S. Shore Drive and Roland Ave.***, near the Beach access and Welcome Center. A designated crossing area would help to get pedestrians safely across the intersection, and also guide them to one crossing area, instead of multiple crossings as pictured below. Recommendations for curbing and sight triangle improvements at this crucial intersection, could improve safety, as well as beautification. This area is also where we have recommended a One Way Lane Conversion, which would have one way road traffic, and a multi-use path for bicyclists and pedestrians. The Short Term improvements recommend a trial of One Way Lanes, which, if approved, could be made permanent. None of the crosswalks recommended are at mid-block, all are at street intersections.

This location in the center of Town at Roland Ave., and South Shore Drive was observed to be one of the busiest pedestrian and bicycling areas.

Inserted crosswalk

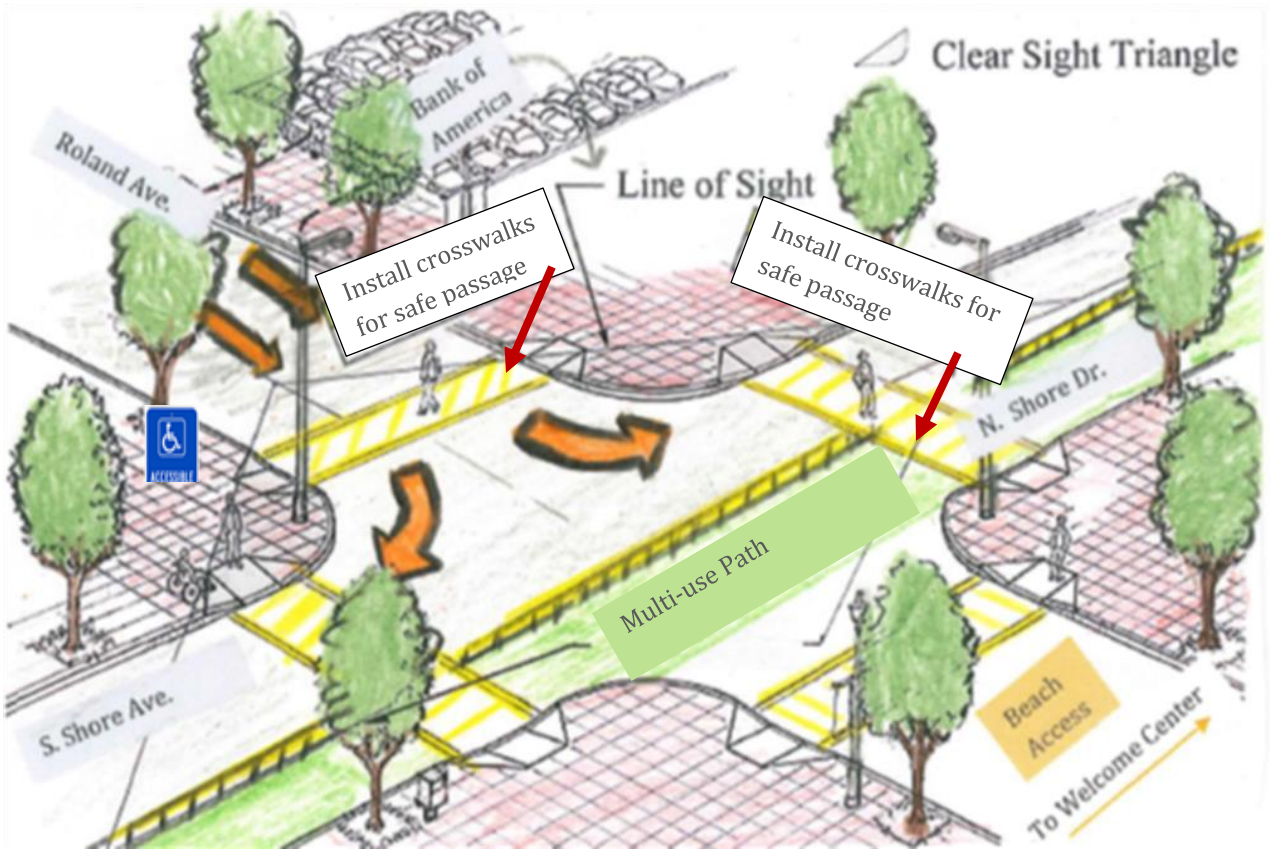
A major prohibitor of pedestrian and bicycle access to sidewalks are vehicles parked in non-designated spaces, such as this popular spot near the Welcome Center at Roland Ave. beach access, an area pictured many times in this report. By implementing 'No Parking' signage, and painting a crossing section as pictured, this problem could easily be remedied; however, enforcement (usually by ticketing citations and significant fines) is usually recommended, and necessary, to make it work. While a painted crosswalk may be sufficient, high visibility crosswalks made of a long lasting epoxy material embedded with reflective glass beads are also available at a higher cost, but require less maintenance over time.

While some of the recommendations need to wait for funding and approval, others can be immediately taken care of easily at a low cost. The main goals of a crosswalk are fundamentally simple, it alerts drivers to expect crossing pedestrians, and directs pedestrians to a safe crossing area. Stripes make a crosswalk highly visible to oncoming motorists, and increase pedestrian safety by reserving that spot, and not allowing parked vehicles. This section at the Welcome Center beach access across Roland Ave. on the beach side of Shore Drive would help to eliminate vehicular parking. (According to the UNC HSRC study referenced in Appendix D, average costs range between $770 for a striped crosswalk to $2,600 for a high visibility crosswalk.) No crosswalks in this area currently exist.

a. Crosswalk Signage

As pictured here, a vehicle is impeding pedestrians on the sidewalk at the beach access near the Welcome Center. This truck is parked in the same vicinity as the previous picture. It is recommended that a ladder type crosswalk be painted here, with "DO NOT BLOCK SIDEWALK ACCESS" signage, or signage indicating a fine for parking in this area, with plans for enforcement.

b. Clear Sight Triangles and Safety Considerations



Drawing was derived from this Source: www.ite.org/CSS/online DWUT10.html

Because the Welcome Center in Surf City has high volume of people crossing the street, the Town may want to consider adding curbs, to increase sight distance triangles. This type of crosswalk in a high priority transit area, without a crossing signal, helps the motorists know where the pedestrians are supposed to cross, and leads the pedestrians to a safe crossing avenue. As shown here, the ADA compliant crosswalk aprons allow a safe passage and make it easy for those in wheelchairs to maneuver. All four crosswalks may not be necessary, but at least one handicapped accessible crosswalk from the multi-use path on Roland Ave. should be considered. By counting the number of pedestrian and bicycle crossings, it would help to establish the need for signalized crosswalks in this busy area, and lead pedestrians to cross in a few spots, instead of haphazardly crossing in multiple places. Shade trees for rest and beautification may also be considered. The One Way traffic lanes beginning at Roland Ave, and going north and south, with a multi-use path for bicycles and walking as depicted above is one of the recommendations in this plan.

According to NCDOT, 'North Carolina's law states that pedestrians have the right of way at all intersections and driveways; however, they must act responsibly, using pedestrian signals where they are available.' The law also states that a pedestrian must yield the right of way to all vehicles when he or she is not in a marked or unmarked crosswalk. At the intersection of Roland Ave. and Shore Drive, there is a pedestrian crossing sign but no marked crosswalk. As mentioned previously, this intersection needs improvements, and Curb radius reductions pictured here (B. and C.) could be used to improve the current intersection (A.).

Photo A. Current intersection

c. Curb Radius Reduction Considerations

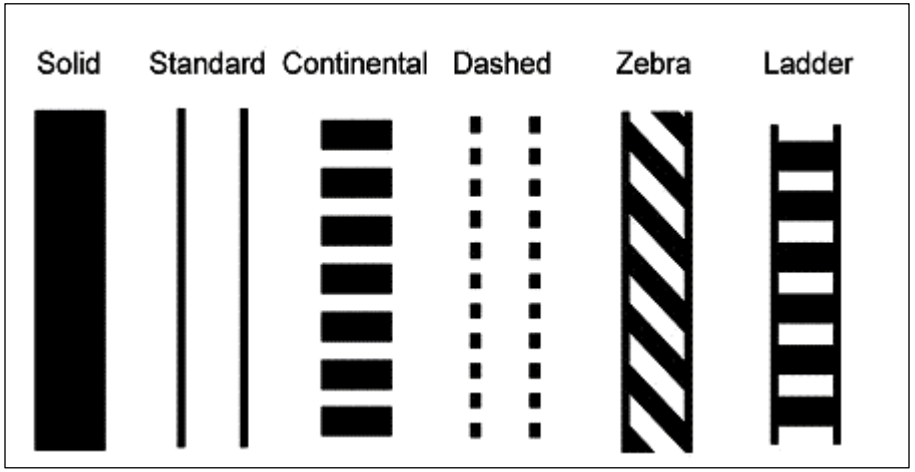
Another design consideration which slows traffic is a curb radius reduction, which helps to improve the sight distance and safety. By limited the turning radius to create a tighter turn, it will reduce speeds, and shorten the crossing distance for pedestrians. Another feature of this infrastructure, is that it can help to improve the sight distance between pedestrians and motorists, while at the same time enhancing the area. The raised curbs shown here can also be filled with plants and low vegetation to beautify the area, while at the same time providing better site distance. The curb radius reductions shown here are examples that could be used for the intersection of Roland Ave. and Shore Drive, which would provide an inviting entrance to the main hub of the town. One picture shows regular crosswalks, and one shows upgraded materials such as stone and brick. Photo B. and C. Sources: NC Design Toolbox Page 6-25

Photo B. Curb Consideration

Photo C. Curb Radius Reduction

d. Crosswalk Design and Handicapped Access Points

At some point in time, the Town may consider putting lines across the street to every beach access. The Standard two lines shown below may be enough to help direct pedestrians across the traffic. Other crosswalk marking patterns are shown below, as examples of the most common. (REF: www.fhwa.dot.gov.) For crosswalk guidance, see the *Design Considerations* given earlier in this report. We recommend that the Ladder Crosswalk be utilized as the Town standard; however, markings must be approved by NCDOT or Federal Highway, if not a Town road.



Crosswalk A is a traditional parallel line crosswalk.

Crosswalk B is high-visibility crosswalk with a ladder design.

The 2009 MUTCD allows for two basic types pictured here, either two parallel lines, or a ladder design, which may be horizontal, continental, or diagonal markings.

(See 2009 MUTCD, page 384.)

Handicapped Beach Access Locations are at 9th Street, Kinston Avenue, and Roland Ave. As Roland Ave. has previously been discussed, the two other locations should definitely have crosswalks to be accessible to those with special needs, who may be in wheelchairs. Handicapped access points, should be slated for 'Immediate' Improvements, while the other beach access points, may be short or long term, as determined by the Town.

Additional crosswalk recommendations are at the intersection of NC 210 with access from the Harris Teeter Shopping Center, if traffic demands, and potentially at JH Batts Dr., at the time of the multi-use path construction on Tortuga Lane. Once the multi-use path is established, the crosswalk would help to access the other side of NC 210. Traffic in that area gets heavy in the summer months, as vacationers enter Surf City on weekends, as pictured at right.

C. Multi-Use Paths and Buffered Bike Lanes

Multi-Use Paths	Tortuga Lane	Paved path at time of road paving	**ST**
	Alongside Roland Ave. (Accomplished with Bridge construction.)	Path from Soundside Park to beach	**ST/LT**
	Caretta Drive (future road)	Path from Tortuga to Harris Teeter Center	**LT**
	Community Center Footpath	Convert footpath to permanent path	**ST**
	Connect Cape Fear Community College and Greenway	At time of Greenway construction	**LT**
	Connect Proposed School, Shepard Rd. and Greenway	At time of school construction	**LT**
	NC 210 (US 17 to NC 50)	Coordinate with Widening of NC 210	**LT**
	NC 50 (from intersection of NC 210 and NC 50, south to new Topsail Bridge)	Paved path on east side of NC 50	**LT**
	NC 50 from NC 210 (Roland Ave.) North towards Shepards Rd.	As funds allow	**LT**
	Atkinson Loop Rd.	As funds allow	**LT**
Buffered Bike Lanes	Topsail Drive North (Roland Ave. to Shell Road)	Lanes with Divided Lines 3' from Traffic	**ST/LT**

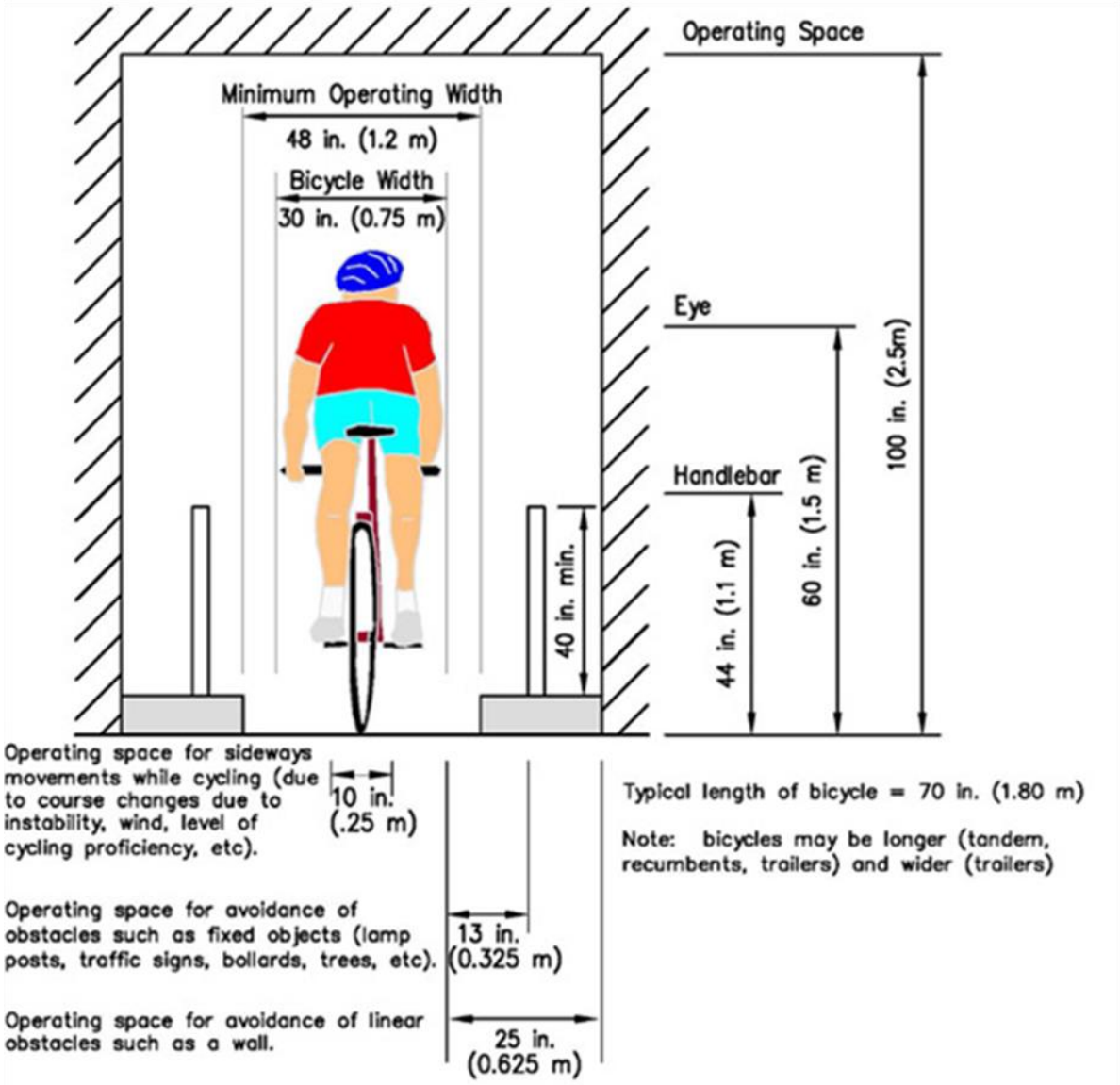
Guidance

The multi-use paths are discussed in detail in the *Design Considerations* section. Converting the footpaths into multi-use path at the Community Center would not be too difficult as the land is flat and accessible, (see photos next page). Since it is already well-traveled, with ample space around the park, it would not require a significant amount of excavating, and is thereby recommended for the 'Short Term.' The adjacent path through to the Turtle Hospital and continuing on Tortuga Lane is recommended for completion at the time that Tortuga Lane is paved. As this gravel road is highly trafficked (according to the KBSTRRC, over 60,000 visitors the first year), it is expected that paving this road will become a priority for the Town. Once the entire loop is completed, this will be an area for enjoyment for all the families in the area, and can be connected to the improvements on Caretta Drive, which will eventually extend to the Harris Teeter Shopping Center, and provide a long off-road loop away from NC 210. NC 210 improvements are being considered in the STI Plan for the years 2017 through 2027, as confirmed by Division 3 NCDOT Engineers. The scope is to widen NC 210 to a 3-lane section & construct 2 roundabouts; one at the intersection of NC 210 and NC 50, and the other at NC 210 and Watts Landing Road. It is recommended to also plan for an off road multi-use path adjacent to the expanded lanes on one side of the Highway, with sidewalk adjacent to the highway on the opposite side, which could coincide with the planned improvements. Further recommendations include connecting the Cape Fear Community College and the proposed school near Shepard Road to the Greenway with a multi-use path. (See Maps 7 and 8.) As mentioned on Pg. 74, it is recommended that NCDOT continue the path on Roland Ave. from Soundside Park, all the way to the beach, to provide a dedicated facility for bicyclists and walkers to access the beach from the bridge, which should be accomplished concurrently with the Bridge construction. Buffered bike lanes that are separated from traffic are recommended for North Topsail Drive, beginning at Roland Ave. and continuing to Shell Road connecting to N. New River Drive.

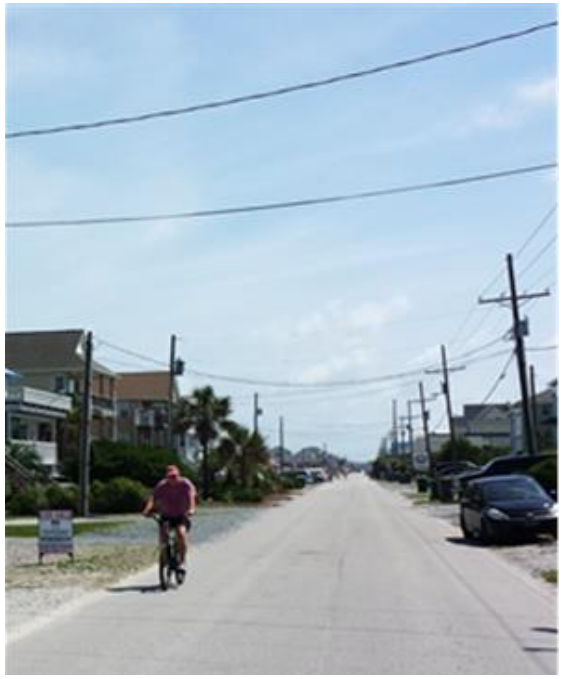
Shown below, the current footpaths at the Community Center could be easily converted to a family-friendly off-road multi-use trail. Eventually this multi-use path could connect to the proposed Greenway which would potentially run alongside the Duke Energy electric lines.

A footpath around the Community Center Park leads to this sidewalk which goes to the ball fields.

The short term recommendations for this plan include multi-use paths around the Community Center and leading to the Karen Beasley Sea Turtle Rescue & Rehabilitation Center pictured at left. The other recommendations for multi-use paths were indicated for the long-term as they will connect to infrastructure which is not yet in place including: the proposed greenway, the New Topsail Bridge, the proposed school, or are on a road slated for future construction or expansion. It should be noted that the public voiced their opinion that off-road infrastructure was highly desirable in the Town, as the majority of bicyclists did not want to ride alongside traffic. Pedestrians, also desired a longer pathway. Once the areas named above are connected to the Greenway, it will create a network of family friendly off-road routes which can be enjoyed by pedestrians and bicyclists.



Source: http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa12018/



Federal Highway standards suggest a clearance of 48" for bike lanes, not including a buffered area. Because space is limited in our Town, it is suggested to extend the shoulder about 6-8" to accommodate a buffered area between lanes. Maintenance of roadways is recommended on a regular basis. (See Maintenance suggestions for maintenance activities in Appendix E.) The extra 6-8" could provide space for a buffered area in between the vehicle and bicycle lane. (See *Buffered Lanes* in *Design Considerations*.) The buffered lanes are recommended on North Topsail from Roland Ave. to Shell Rd, where it merges onto N. New River Dr.

a. Bike lane and Multi-use Path Maintenance -

As mentioned many times in the survey existing multi-use lanes and bike lanes require maintenance: removal of sand and debris, pruning of vegetation, and refreshing the paint on lines, as well as painting bike and pedestrian stencil symbols or words. In order to accommodate both pedestrians and bicyclists, while also considering costs, the most feasible recommendation is essentially widening the existing sidewalk to 8-10' wide. Further recommendations: paved residential driveways that cross the trail should have a white stripe to delineate the trail. Sight triangles should be maintained at driveways and intersections, as noted in the *Design Considerations*. On S. Shore Drive, the existing bike lane is in need of maintenance. One problem is that there are steep slopes on some of the existing residential driveways, which should be improved.

D. One Way Conversion **(See Map 3 – Central Business District)**

One Way lanes are being considered for the area below. Beginning at Roland Ave, the proposed One Way Lane would go South on S. Shore Drive to High Point Ave. Also from Roland Ave., cars would proceed North on North Shore Drive to New Bern Ave. (see Map 3). The proposed multi-use path for pedestrians and bicyclists is on the ocean side of Shore Drive. The beach accesses may create conflict areas with cars entering and existing, such as Durham Ave. and Charlotte Ave. Clearly delineating the multi-use path across these beach access areas will help reduce conflict. Paved residential driveways that cross the path should have white stripes that also delineate the trail. As shown in the picture below, no path is currently delineated in this area. If one exists, it is covered with gravel and debris, and cannot be seen. The road is currently two-way, but the centerline cannot be seen, which presents a problem, especially with many visitors in the area. Paving gravel areas and delineating parking spaces would aide in controlling haphazard parking, and would help maintain sight triangles at driveways and intersections.

Traffic in this photo happens to be only going in one direction with bicyclists and pedestrians on the ocean side of the road, which is similar to the proposed One Way scenario explained here.

One Way Conversion	Convert two traffic lanes into One traffic lane with one multi-use Bike and Pedestrian Lane From Roland Ave left on N. Shore Dr. to New Bern Ave., and from Roland Ave. Right on S. Shore to High Point Ave.	Short Term - temporary to see if it works Long Term actual structures	**ST** LT	Temporary Pilot Demonstration Permanent infrastructure w/ signage

While most Steering Committee members felt that converting two lanes of traffic into One Lane for motorists and one lane for bicyclists and pedestrians might make sense for the area described as North Shore Drive from Roland to New Bern Ave., and S. Shore Drive from Roland Ave. to High Point Ave. to increase safety, they agreed that a trial or pilot demonstration for this area would be the best idea to determine the feasibility. By getting comments and reviews from the public including motorists, pedestrians and cyclists, it would be determined if the One Way Conversion would enhance mobility and be an improvement for the Town.

As shown below on S. Shore Drive, the truck is driving in the middle of the road to avoid the pedestrians unloading their car. Fortunately, there is no vehicle coming in the other direction. In summer months the amount of vehicular traffic and number of pedestrians and bicyclists on this road increases dramatically. The One Way Lane scenario, with a multi-use path for bicyclists and pedestrians would help to allow more space, and make it safe to commute about town.

Demonstration Pilot Projects were described in the *Design Considerations*, and Surf City could use those models to schedule a Walk-and-Ride-About-Town (or similar named project) which could last from 2 weeks to a month to see how it works. Temporarily, the existing traffic lanes could be painted, with bollards or planters being used to separate traffic. If the Town decides to implement the One Way lanes, they may consider refiguring the existing roadway. By eliminating the grassy/gravel area in between the sidewalk and the road, a buffered separation area could be created. The One Way Lanes may create room for designated parking spaces would also help to eliminate haphazard parking in both directions.

It is suggested to pave gravel areas and designate parking spaces where available, allowing for sight distance on perpendicular roads. Scheduling these improvements with NCDOT when the road resurfacing will take place, would be the most opportune time. Extra sidewalk areas could be used for park benches, bike parking, or cardio exercise stations, which are provided on some trails. *As an example: see Waite Park, Minnesota's Healthy Living Trail, follow this link: http://www.ci.waitepark.mn.us/index.asp?Type=B_BASIC&SEC=%7B29F1954A-D2EA-4DBB-B772-AD5C60124D29%7D&DE=%7BC9069AC8-F2BE-44E9-BCA4-9BCBCA41DEE0%7D

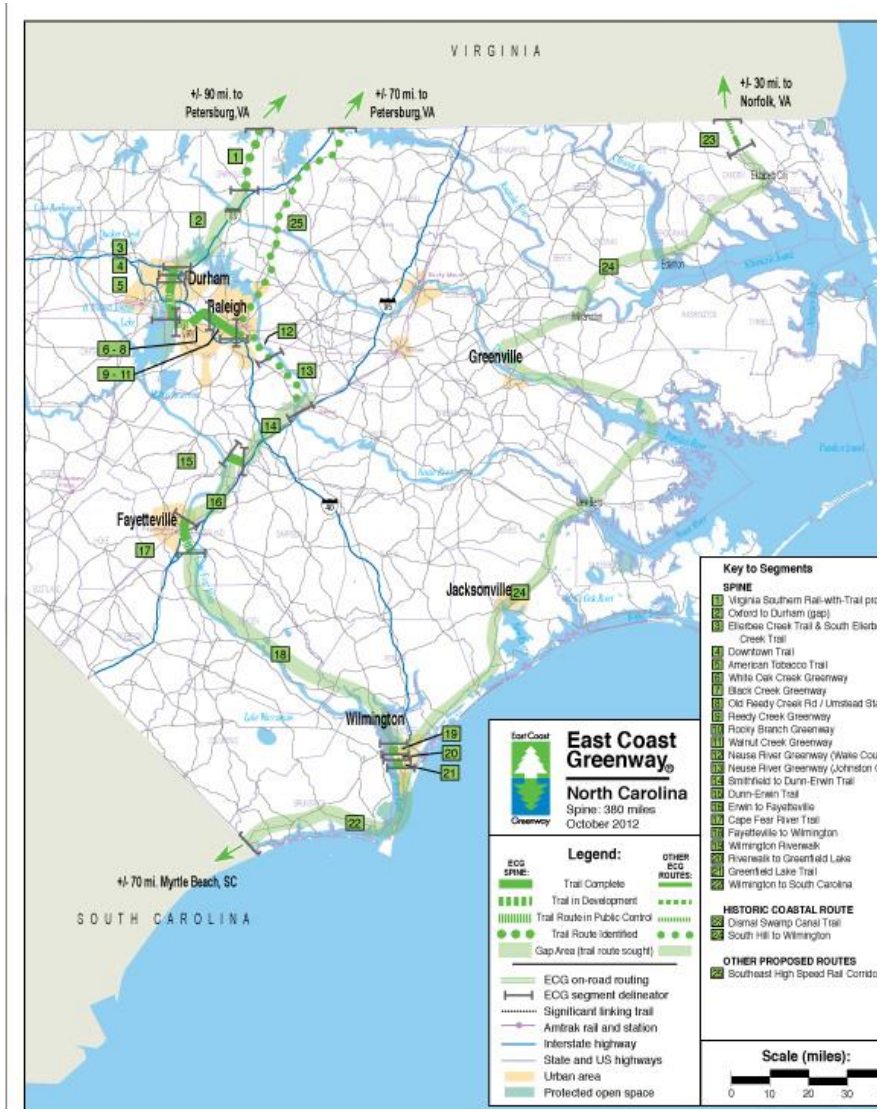
E. Greenway **(See Map 7 Greenway)**

The proposed Greenway is envisioned to be developed alongside the Duke Energy power line easement which runs semi-parallel to Hwy 17, in the vicinity of Electric Lane off of NC 210, about 3/10 of a mile from the Harris Teeter Shopping Center. This resource could provide an approx. 4 mile conservation area for the greenway, and enhance the Town by creating a recreational greenspace which would eventually connect from Onslow to Pender County. While the greenway is still in the organizational stages, efforts have been made to contact Duke Energy to discover how to accomplish this goal. Duke Energy has also committed funds for protecting, improving and restoring waterways in the Carolinas, and is working to promote environmental education and conservation, which will have a lasting impact on the region's waterways. Plans are underway, to partner with Pender County to complete a grant application through the Duke Energy Water Resources Fund (Oct., 2015). This fund has grant cycles published online, which municipalities can apply for. The greenway is envisioned to help provide an off-road avenue for recreation while at the same time providing an environmental conservation educational outreach allowing students, citizens and tourists of Surf City and its surrounding areas, to enjoy the natural surroundings, flora and fauna of the East Coast, some of which are specific only to our area.

Greenway	Duke Powerline -Vicinity of Electric Lane from Hwy 210 to NC50	Short Term to Long Term depending on funds	**ST/LT**
	Connect to Pender County	Long Term	**LT**

Pictured below are the electric lines as they currently appear.

Jacksonville, NC Greenway / https://jacksonvillenc.gov/index.aspx?NID=210



Steps to Develop a Greenway Plan

- Establish Mission Statement
- Coordinate with other interested groups and parties to form a Steering Committee
- Meet with Key Individuals and Key Utility Affiliates
- Complete Paperwork with Duke Energy
- Procure Funds
- Design and Plan the Course
- Meet with Landowners – Acquire easements
- Conduct Environmental, Historical, Engineering Assessments
- Identify needed Facilities and Infrastructure
- Establish Cost Estimates
- Consider Possible Connectors (Mountains to Sea Trail, East Coast Greenway, Holly Ridge Greenway)
- Create a Master Plan – See Electric Transmission Right of Way Requirements from Duke Energy (Appendix C)
- Develop a Timeline
- Implement the Plan

F. Pedestrian Assets - Walking Tracks

To increase mobility for pedestrians, besides the multi-use paths and greenways already recommended, other pathways that may be desired are a footpath area around the pond at the Community Center, or a loop around Soundside Park. These two areas are places of scenic beauty, and can be enjoyed as is, but future considerations may include improving these two areas by extended the walking areas with a flat surface which includes ramps for accessibility and ease of use by people using wheelchairs, strollers, walkers, crutches, etc. Pictured here, views from Soundside Park.

G. Future Planning & Parking Capacity

"If you build it, they will come." The following events are often held in Surf City which invite walkers, bikers and runners to the Town. Increasing safer pedestrian and biking infrastructure and bike parking facilities will encourage mobilization without driving.

Walkers, runners and bicycling enthusiasts as well as those ready to take a 'Dolphin Dip,' flock to Surf City for events. One such event which took place in October 2015 is the Two Town Half Marathon, a partnership with the Town of Topsail Beach and the Town of Surf City. Parking at these events is always limited. The Town Planning Department should look at undeveloped properties to see if purchasing them for parking would make economic sense, so they would have parking available for event participants. Looking into parking areas on the other side of the proposed bridge would also be encouraged, with shuttle service available for events such as Fourth of July celebration, marathons, and bike tour event parking.

In this comprehensive plan, one goal is to increase infrastructure for walking and biking, which provides alternatives for mobilization without driving. Once infrastructure and bike parking is in place, more residents and visitors will be able to walk and bike to these events.

Dolphin Dip New Years' Day

One popular annual event which draws a massive contingency is the Dolphin Dip held on New Year's Day, when many families brave the chilly weather by daring to take a dip in the sometimes icy ocean. Because the event is held in the off-season on New Year's Day, parking can usually be accommodated. Because the event draws many folks from surrounding areas (some estimated 4,000 people), and the new bridge will eventually replace some of the parking previously available near Crabby Mike's that is normally utilized for this event, acquiring land for parking assets is highly recommended. Note: Some photos in this report have been used from The Town of Surf City Facebook and web site pages. Photo credits: Alan Libby and others

Future Plannin3: The area beside the Welcome Center at the Roland Avenue Beach access has endless possibilities, if motorized parking was removed from that area, it could be converted to a boardwalk which includes changing or dressing areas, and a bathhouse, or showers, such as shown on the next pages from Hilton Head, S.C. This area would allow pedestrians to walk freely, and bicyclists to reach the beach without having to watch for cars backing up. A side area might have bike parking, and benches for sitting, with possible shade trees.

While this recommendation was not included in the cost considerations for this plan, perhaps the Town can determine what would make the most sense for this area, to determine if walking and biking assets in this area would help those trying to reach the beach, and ask residents how important beautification amenities are, to help determine if the Town's main entrance should be enhanced. It is included here as a consideration for pedestrian and bicycling assets such as a boardwalk, bicycle racks, shade trees, seating, or even a fountain to cool off. (See next page)

Image: Hilton Head Island, S.C. The rooms to the left are for changing clothes. The boardwalk provides a large area for both pedestrians and cyclists to enjoy with seats for resting and both shade and palm trees.

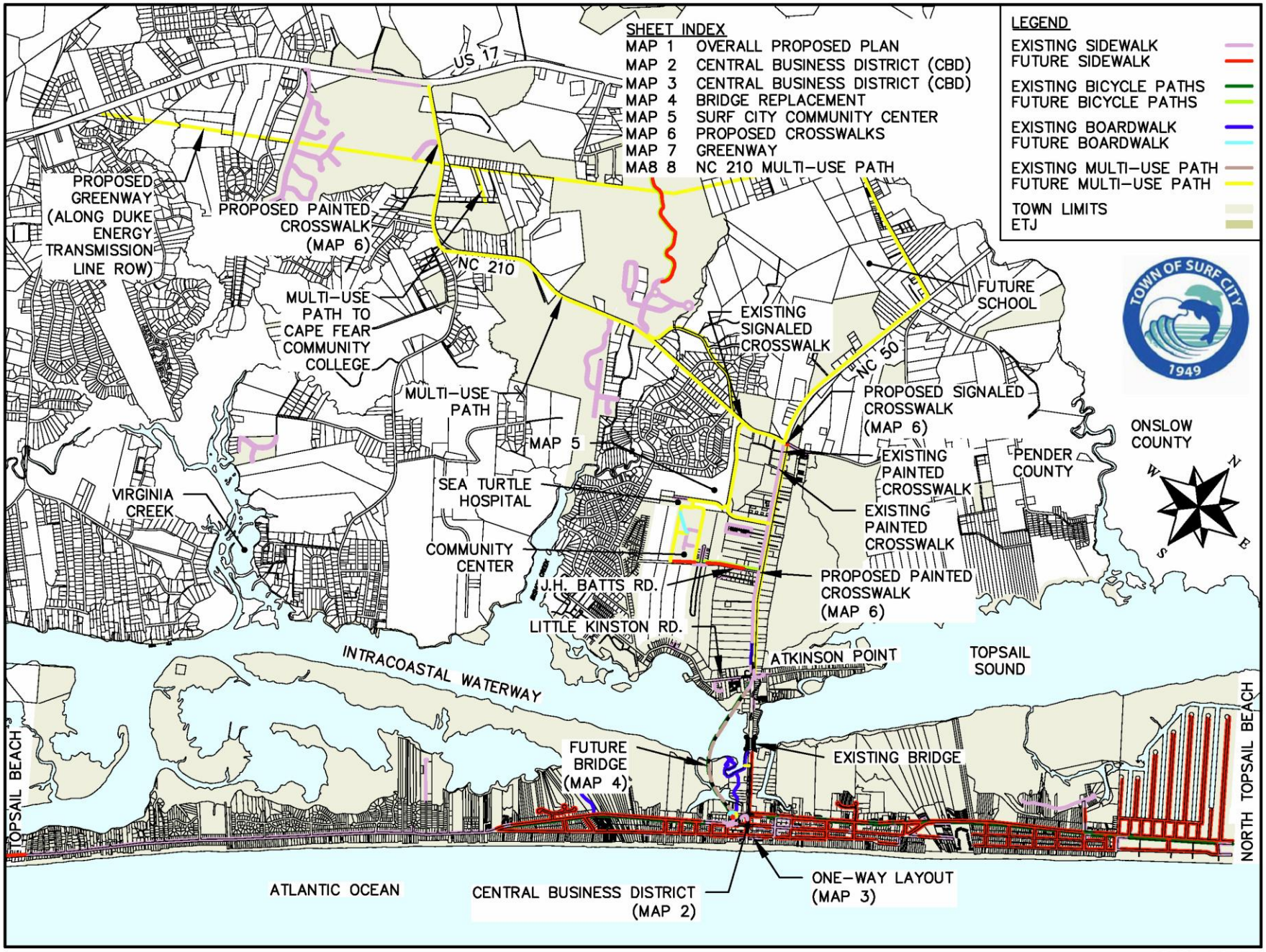
Hilton Head Island, SC

Another option that some Towns are providing are interactive fountains, with sidewalks and seats around it, like the one in City of Rockville, Maryland Town Center shown here, which is adjacent to an amphitheater where local musicians perform on week-ends.

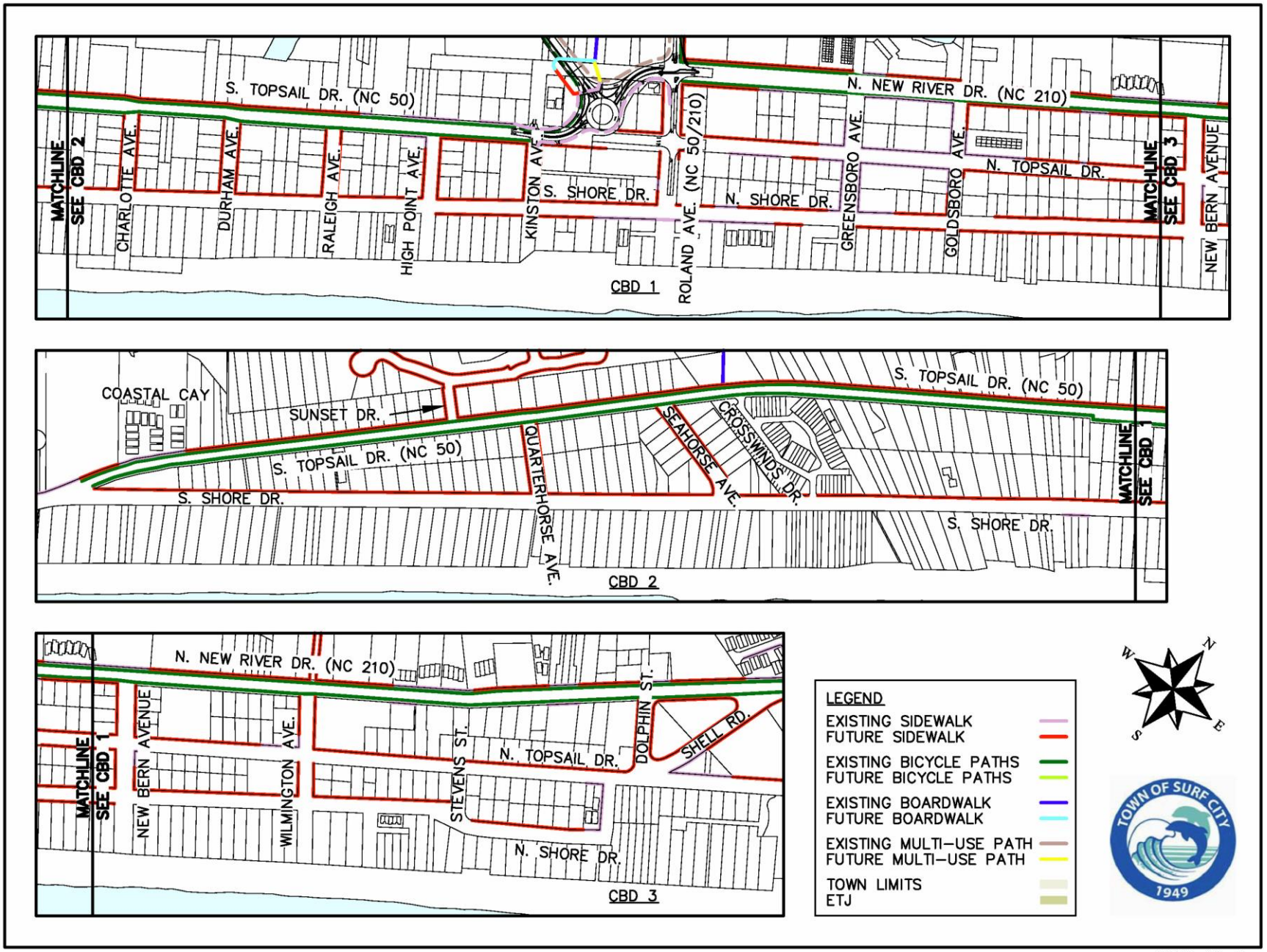
Source: Fountains by Water-Works https://www.pinterest.com/pin/567312884283440388/

These ideas are not included in the cost estimates and are provided more to stimulate a creative outlook on the possibilities available.

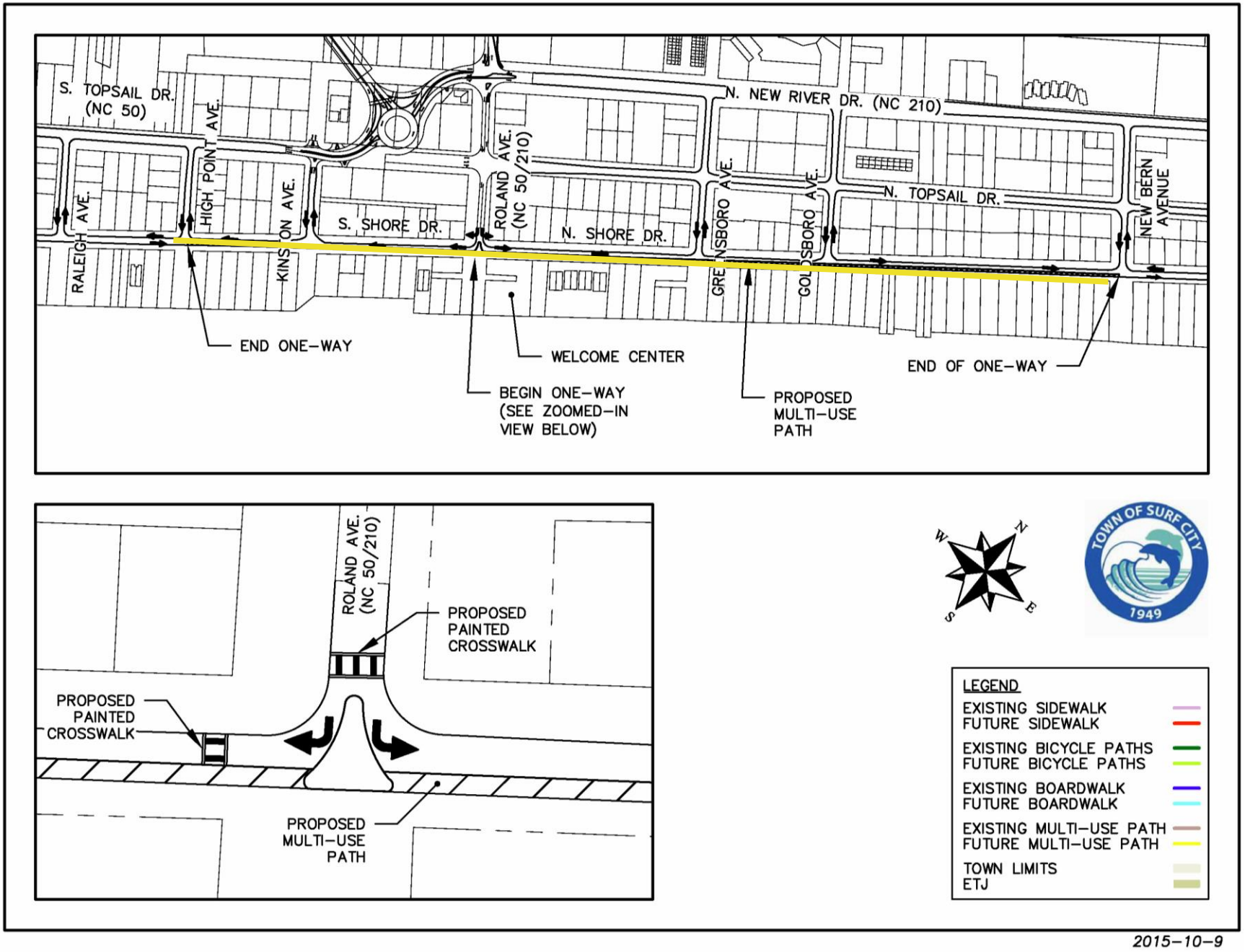
MAP 1 – OVERALL PROPOSED PLAN



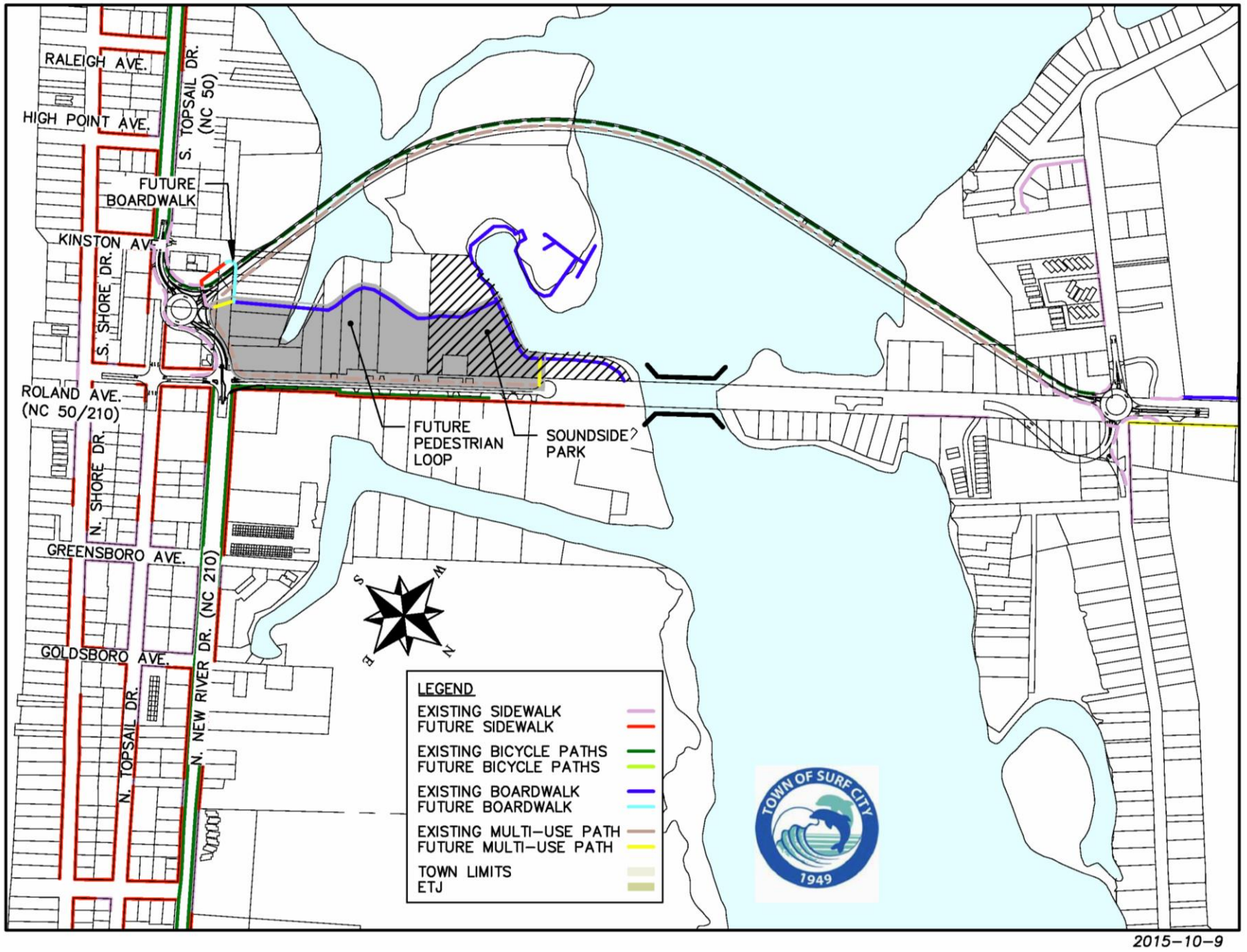
MAP 2 – CENTRAL BUSINESS DISTRICT (CBD)



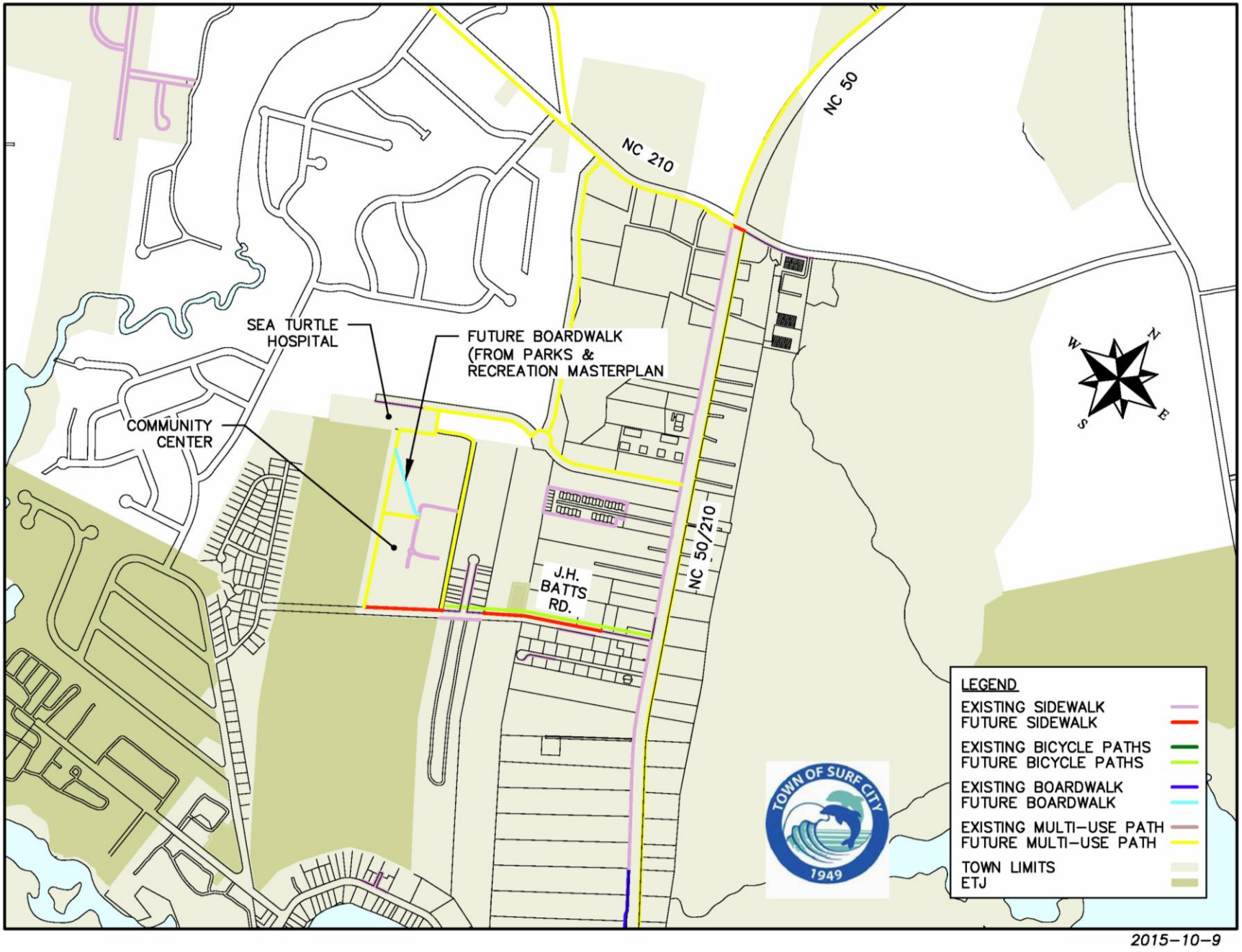
MAP 3 – CENTRAL BUSINESS DISTRICT (CBD)



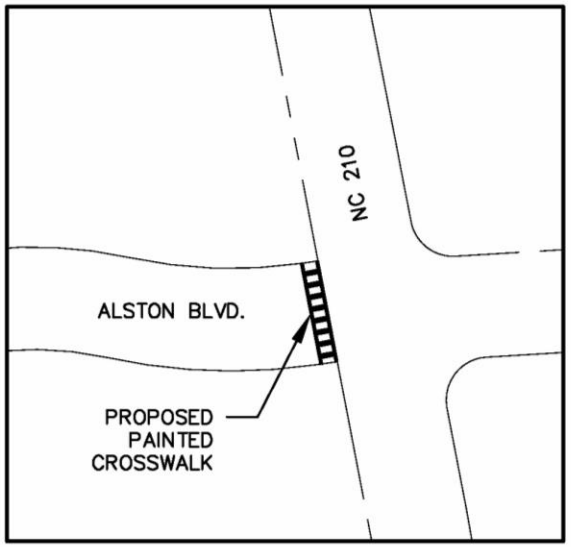
MAP 4 – BRIDGE REPLACEMENT



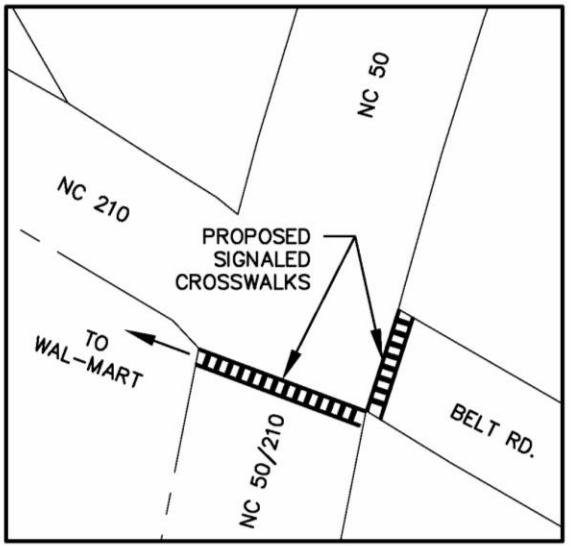
MAP 5 – SURF CITY COMMUNITY CENTER



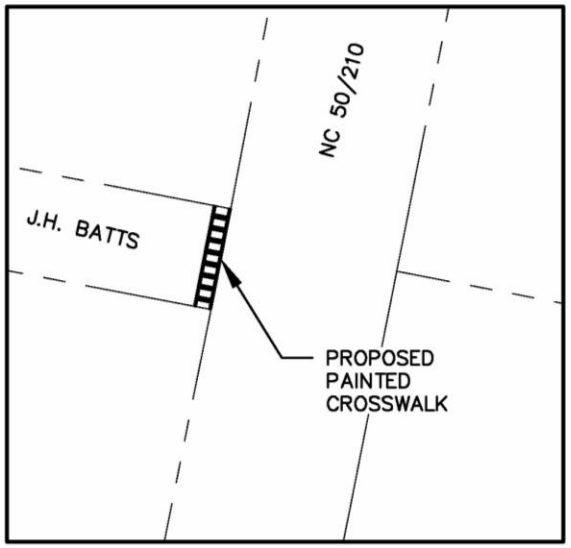
MAP 6 – CROSSWALKS



HARRIS TEETER CROSSWALK



NC 50/210 (MAINLAND) CROSSWALK



J.H. BATTS CROSSWALK

LEGEND

EXISTING SIDEWALK
FUTURE SIDEWALK

EXISTING BICYCLE PATHS
FUTURE BICYCLE PATHS

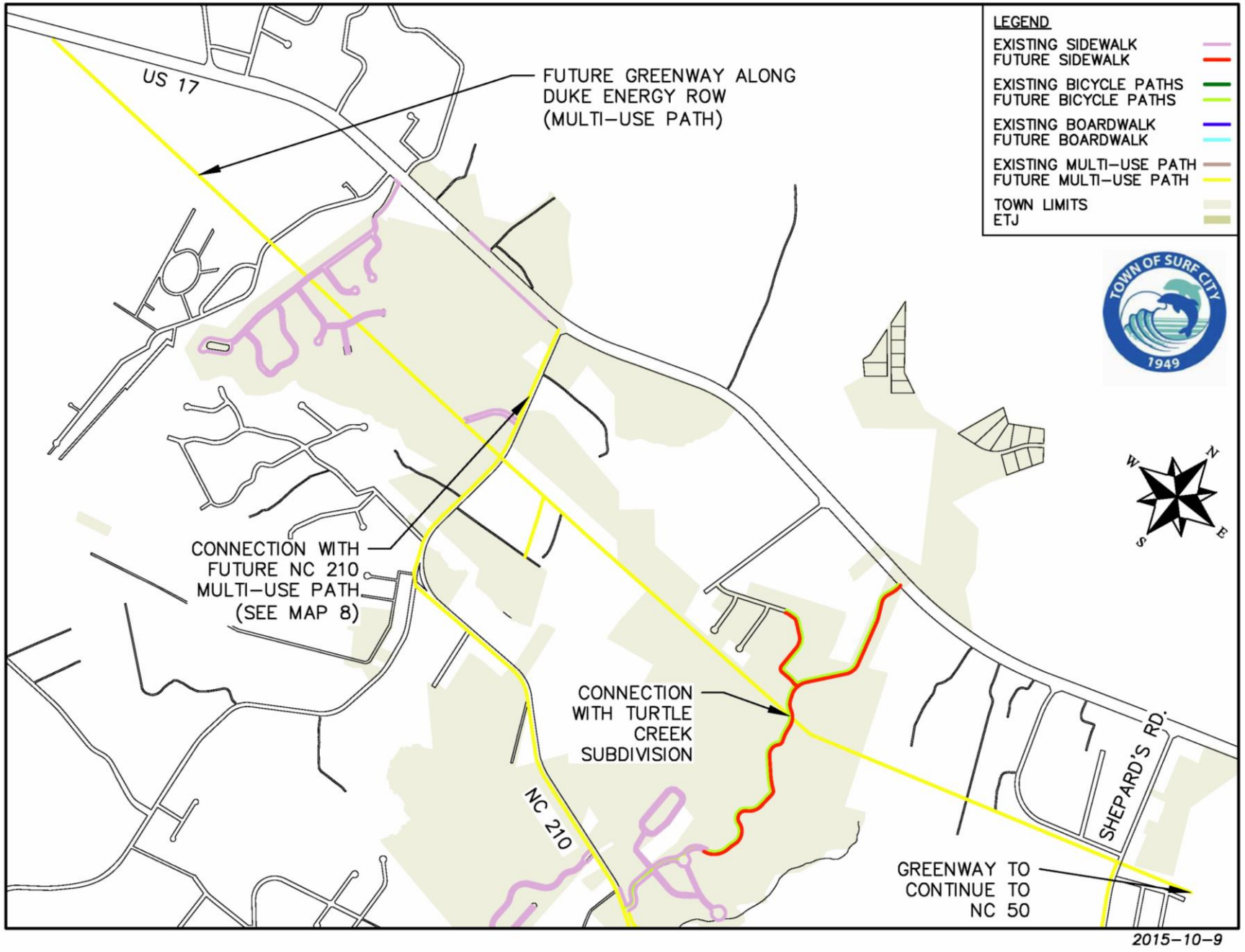
EXISTING BOARDWALK
FUTURE BOARDWALK

EXISTING MULTI–USE PATH
FUTURE MULTI–USE PATH

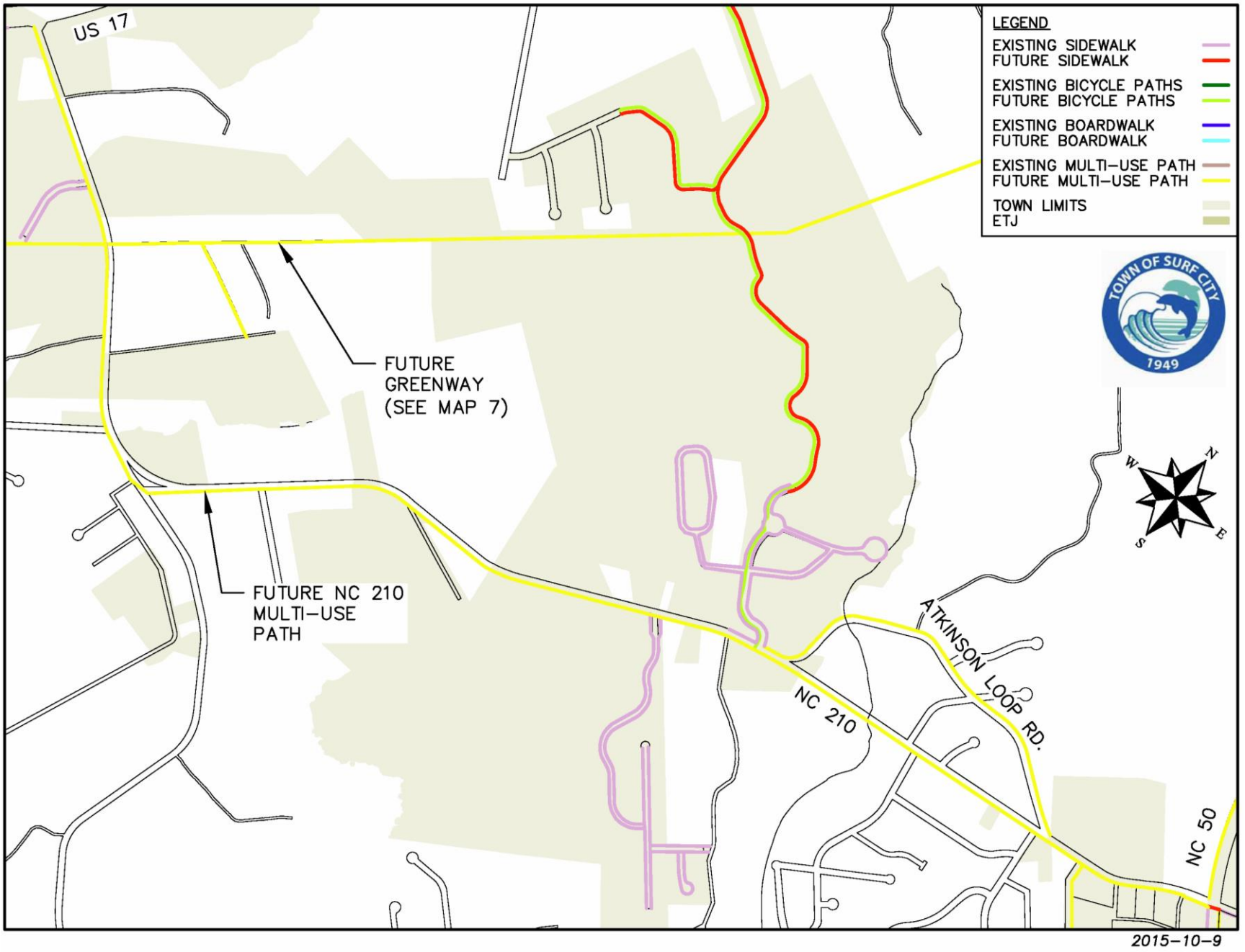
TOWN LIMITS
ETJ

2015–10–9

MAP 7 – GREENWAY



MAP 8 – NC 210 MULTI–USE PATH



Section 9: Funding Recommendations

I. OVERVIEW

When considering possible funding sources for bicycle and pedestrian projects, it is important to remember that not all construction activities or programs will be accomplished with a single funding source. It will be necessary to consider several sources of funding that together will support full project completion. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. This appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors. Note that this reflects the funding available at the time of writing. Funding amounts, cycles, and the programs themselves may change over time.

II. FEDERAL FUNDING SOURCES

Federal funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations. Federal funding typically requires a local match of five percent to 50 percent, but there are sometimes exceptions. The following is a list of possible Federal funding sources that could be used to support construction of pedestrian and bicycle improvements.

MOVING AHEAD FOR PROGRESS IN THE TWENTY-FIRST CENTURY

The largest source of federal funding for pedestrian and bicycle projects is the USDOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, *Moving Ahead for Progress in the 21st Century* is the Fixing America's Surface Transportation Act (FAST Act) was signed on December 4, 2015.

This act, with a similar structure to MAP-21, but with higher local matches required for projects. Therefore, it is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance.

Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all of these programs, are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system. For more information, visit: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Photo Source: Bicycle +Pedestrian Toolbox/ Alta Greenways

Transportation Alternatives

Transportation Alternatives (TA) is a funding source under the FAST ACT that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SRTS), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEALU did.

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a two percent set-aside of total MAP- 21 allocations. Note that state DOT's may elect to transfer up to 50 percent of TA funds to other highway programs, so the amount listed on the website represents the maximum potential funding. Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Each state's governor is given the opportunity to "opt out" of the Recreational Trails Program. However, as of the writing of this plan, only Florida and Kansas have "opted out" of the RTP. For all other states, dedicated funds for recreational trails continue to be provided as a subset of TA. The FAST ACT replaced MAP-21. For the complete list of eligible activities, visit: http:// fhwa.dot.gov/fastact/

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of pedestrian improvements are eligible, including trails, sidewalks, crosswalks, pedestrian signals, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50 percent of each state's STP funds are allocated by population to the MPOs; the remaining 50 percent may be spent in any area of the state. The Fixing America's Surface Transportation (FAST) Act reauthorized Federal surface transportation programs for FY 2016 through 2020. FHWA will post FAST Act implementation information under http://www.fhwa.dot.gov/fastact/ as it is developed.

- Pedestrian and bicycle infrastructure projects remain broadly eligible across Federal-aid highway and transit programs.
- U.S. Department of Transportation (USDOT), States, MPOs, and cities should continue to promote and adopt design criteria and standards that provide for the safe and adequate accommodation of pedestrians, bicyclists, and motorized users.

Highway Safety Improvement Program The FAST Act doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. It preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds.

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no non-attainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible. Communities located in attainment areas who do not receive CMAQ funding apportionments may apply for CMAQ funding to implement projects that will reduce travel by automobile. *The FAST Act replaced MAP 21*

For more information:
http://smartgrowthamerica.org/documents/Complete-Streets-FAST-Act-One-Pager.pdf

Federal Transit Administration Enhanced Mobility of Seniors and Individuals with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. *For more information:*

https://www.fta.dot.gov/funding/grants/5310-enhanced-mobility-seniors-disabled-fact-sheet

Photo source: Bicycle + Pedestrian Toolbox/ Alta Greenways

Safe Routes to School (SRTS) Program

SRTS enables and encourages children to walk and bike to school. The program helps make walking and bicycling to school a safe and more appealing method of transportation for children. SRTS facilitates the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.

The *North Carolina Safe Routes to School Program* is supported by federal funds through SAFETEA-LU and FAST Act legislation. Please note that all SRTS projects "shall be treated as projects on a Federal-aid system under chapter 1 of title 23, United States Code." Although no local match is required and all SRTS projects are 100% federally funded under the SAFETEA-LU, agencies are encouraged to leverage other funding sources that may be available to them, including grant awards, local, state, or other federal funding. SRTS funds can be used for proposed projects that are within 2 miles of a school public or private, K-8, in a municipality or in the county jurisdiction. In response to the Strategic Transportation Investments law of June 2013, proposed SRTS projects will be considered as part of the Bicycle and Pedestrian project input with Strategic Prioritization Office for funding consideration. Most of the types of eligible SRTS projects include sidewalks or a shared-use path. However, intersection improvements (i.e. signalization, marking/upgrading crosswalks, etc.), on street bicycle facilities (bike lanes, wide paved shoulders, etc.) or off-street shared-use paths are also eligible for SRTS funds. http://saferoutespartnership.org/healthy-communities/policy-change/federal/FAST-act-background-resources

For a more inclusive list, please visit the FHWA SRTS program at: Or; contact DBPT/NCDOT at 919.707.2604.

OTHER FEDERAL FUNDING SOURCES

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities (PSC) is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide."

The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health"). The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts. PSC 2015 Priorities include: using PSC agency resources to advance Ladders of Opportunity for every American and every community; helping communities adapt to a changing climate, while mitigating future disaster losses; and supporting implementation of community-based development priorities.

For more information: http://www.sustainablecommunities.gov/

http://www2.epa.gov/smart-growth/hud-dot-epa-partnership-

Resource for Rural Communities:
http://www.sustainablecommunities.gov/sites/sustainablecommunities.gov/files/docs/federal_resources_rural.pdf

Federal Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are $250,000. The local match may be provided with in-kind services or cash. For more information: http://www.ncparks.gov/About/grants/lwcf_main.php

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. *Annual application deadline is August 1st*. For more information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507- 5691

National Scenic Byways Discretionary Grant Program

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.

Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction.

For more information: http://www.bywaysonline.org/grants/

Federal Lands Transportation Program (FLTP)

The FLTP funds projects that improve access within federal lands (including national forests, national parks, national wildlife refuges, national recreation areas, and other Federal public lands) on federally owned and maintained transportation facilities. $300 million per fiscal year has been allocated to the program for 2013 and 2014. *The 2016 to 2020 legislation is called the FAST Act.*

For more information: http://www.fhwa.dot.gov/federalaid/projects.pdf

Photo Source:

Bicycle + Pedestrian Toolbox

Energy Efficiency and Conservation Block Grants

The Department of Energy's ***Energy Efficiency and Conservation Block Grants*** (EECBG) may be used to reduce energy consumptions and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future.

For more information: http://www1.eere.energy.gov/wip/eecbg.html

TIGER Discretionary Grants

The U.S. Department of Transportation's (DOT) Transportation Investment Generating Economic Recovery (TIGER) discretionary grants are intended to fund capital investments in surface transportation infrastructure. The grant program focuses on "capital projects that generate economic development and improve access to reliable, safe, and affordable transportation for disconnected both urban and rural, while emphasizing improved connection to employment, education, services and other opportunities, workforce development, or community revitalization." Infrastructure improvement projects such as recreational trails and greenways with an emphasis on multi-modal transit qualify for this grant. *Pre-Application deadlines are typically in May, with final application deadlines in June.*

For more information: http://www.dot.gov/tiger

Economic Development Administration

Under Economic Development Administration's (EDA) Public Works and Economic Adjustment Assistance programs, grant applications are accepted for construction, non-construction, technical assistance, and revolving loan fund projects. "Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities." *Application deadlines are typically in March and June.*

For more information: http://www.eda.gov/funding-opportunities/files/2015-EDAP-FFO-Fact-Sheet.pdf

Historic Preservation Fund Grants

The State, Tribal, and Local Plans & Grants (STLPG) division manages several grant programs to assist with a variety of historic preservation and community projects focused on heritage preservation. For more information on the different grant programs visit: http://www.nps.gov/preservation-grants/

Environmental Contamination Cleanup Funding Sources

EPA's Brownfields Program provides direct funding for brownfields assessment, cleanup, revolving loans, and environmental job training. EPA's Brownfields Program collaborates with other EPA programs, other federal partners, and state agencies to identify and leverage more resources for brownfields activities. Technical assistance relating to brownfields financing is an additional service provided.

For more information:
http://epa.gov/brownfields/grant_info/index.htm

National Coastal Wetlands Conservation Grant Program

Under the National Coastal Wetlands Conservation Grant Program, U.S. Fish and Wildlife Service will provide over $21 million to 25 projects in 13 coastal and Great Lakes states with the aim to protect, restore or enhance more than 11,000 acres of coastal wetlands and adjacent upland habitats. "The Service awards grants of up to $1 million to states based on a national competition, which enables states to determine and address their highest conservation priorities in coastal areas. Since 1992, the Service has awarded over $357 million in grants under the program."

For more information: http://www.fws.gov/coastal/CoastalGrants/

National Fish and Wildlife Foundation: Five Star & Urban Waters Restoration Grant Program

The Five Star & Urban Waters Restoration Grant Program seeks to develop community capacity to sustain local natural resources for future generations by providing modest financial assistance to diverse local partnerships for wetland, riparian, forest and coastal habitat restoration, urban wildlife conservation, stormwater management as well as outreach, education and stewardship. Projects should focus on water quality, watersheds and the habitats they support. NFWF may use a mix of public and private funding sources to support any grant made through this program. *Request for proposals application are typically due in late January, or early February.*

For more information:
http://www.nfwf.org/fivestar/Pages/home.aspx#.VS_eq_nF-Bw

Environmental Solutions for Communities Grant Program

The National Fish and Wildlife Foundation (NFWF) and Wells Fargo seek to promote sustainable communities through Environmental Solutions for one or more of the following:

- Support innovative, cost-effective programs that enhance stewardship on private agricultural lands to enhance water quality and quantity and/or improve wildlife habitat for species of concern, while maintaining or increasing agricultural productivity.
- Support community-based conservation projects that protect and restore local habitats and natural areas, enhance water quality, promote urban forestry, educate and train community leaders on sustainable practices, promote related job creation and training, and engage diverse partners and volunteers.
- Support visible and accessible demonstration projects that showcase innovative, cost-effective and environmentally-friendly approaches to improve environmental conditions within urban communities by 'greening' traditional infrastructure and public projects such as storm water management and flood control, public park enhancements, and renovations to public facilities.
- Support projects that increase the resiliency of the Nation's coastal communities and ecosystems by restoring coastal habitats, living resources, and water quality to enhance livelihoods and quality of life in these communities.

In North Carolina, strong preference will be given to projects located in the regions of Charlotte, Raleigh, or Winston-Salem.

For more information:
http://www.nfwf.org/environmentalsolutions/Pages/2015rfp.aspx#.VS-8SPnF-Bw

III. STATE FUNDING SOURCES

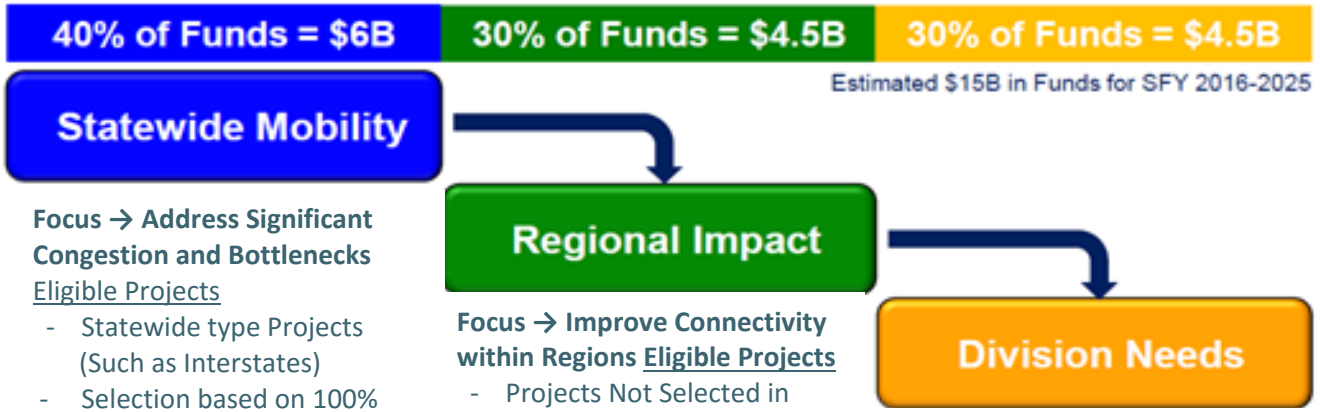
There are multiple sources for state funding of bicycle and pedestrian transportation projects. However, beginning July 1, 2015, state transportation funds cannot be used to match federally-funded transportation projects, according to a law passed by the North Carolina Legislature.

North Carolina Department of Transportation (NCDOT) Strategic Transportation Investments (STI)

The NCDOT's State Transportation Improvement Program is based on the Strategic Transportation Investments Bill, signed into law in 2013. The Strategic Transportation Investments (STI) Initiative introduces the Strategic Mobility Formula, a new way to fund and prioritize transportation projects.

The new Strategic Transportation Investments Initiative is scheduled to be fully implemented by July 1, 2015. Projects scheduled for construction before then will proceed as scheduled under the current Equity Formula. Projects slated for construction after that time will be ranked and programed according to the new formula. The new Strategic mobility formula assigns projects for all modes into one of three categories: 1) Statewide Mobility, 2) Regional Impact, and 3) Division Needs.

How the STI Works *(Source: NCDOT Bicycle and Pedestrian Prioritization, June 2015)*



Focus → Address Significant Congestion and Bottlenecks
Eligible Projects
- Statewide type Projects (Such as Interstates)
- Selection based on 100% Data
- Projects Programmed prior to Local Input Ranking

Focus → Improve Connectivity within Regions Eligible Projects
- Projects Not Selected in Statewide Mobility Category
- Regional Projects
- Selection based on 70% Data & 30% Local Input
- Funding based on population within Region

Focus →Address Local Needs
Eligible Projects
- Projects Not Selected In Statewide or Regional Categories
- Division Projects
- Selection based on 50% Data and 50% Local Input
- Funding based on equal share for each Division = ˜$34 M per yr.

All independent bicycle and pedestrian projects are placed in the "Division Needs" category, and are ranked based on 50% data (safety, access, demand, connectivity, and cost effectiveness) and 50% local input, with a breakdown as follows:

Safety 15%

- Definition: Projects that are in close proximity to destinations that draw or generate high volumes of users.
- How it's measured: Crash history, posted speed limits, and estimated safety benefit
- Calculation:
  - Bicycle/pedestrian crashes along the corridor within last five years: 40% weight
  - Posted speed limits, with higher points for higher limits: 40% weight
  - Project safety benefit, measured by each specific improvement: 20% weight

Access 10%

- Definition: Projects that are in close proximity to destinations that draw or generate high volumes of users
- How it's measured: Type of and distance to destination

Demand 10%

- Definition: Projects serving large resident or employee user groups
- How its measured: # of households and employees per square mile within 1 ½ mile bicycle or ½ mile pedestrian facility + factor for unoccupied housing units (second homes)

Connectivity 10%

- Definition: Measure impact of project on reliability and quality of network
- How it's measured: Creates score per each SIT based on degree of bike/ped separation from roadway and connectivity to similar or better project type

Cost Effectiveness 5%

- Definition: Ratio of calculated user benefit divided by NCDOT project cost
- How it is measured: (Safety + Demand + Access + Connectivity) Estimated Project Cost to NCDOT

Local Input 50%

- Definition: Input from MPO/RPOs and NCDOT Divisions, which comes in the form of points assigned to projects.
- How it is measured: Base points + points for population size. A given project is more likely to get funded if it is assigned base points from both the MPO/RPO and the Division, making the need for communicating the importance of projects to these groups critical. Further, projects that have a local match will score higher.

Additional bicycle and pedestrian project requirements:

- Federal funding typically requires a 20% non-federal match
- State law prohibits state match for bicycle and pedestrian projects (except for Powell Bill)
- Limited number of project submittals per MPO/RPO/Division
- Minimum project cost requirement is $100,000
- Bike/Ped projects typically include: bicycle lanes, multi-use path/greenway, paved shoulders, sidewalks, pedestrian signals, SRTS infrastructure projects, and other streetscape/multi-site improvements (such as median refuge, signage, etc.)

These rankings largely determine which projects will be included in NCDOT's State Transportation Improvement Program (STI). The STI is a federally mandated transportation planning document that details transportation planning improvements prioritized by the stakeholders for inclusion in NCDOT's Work Program over the next 10 years. "More than 900 non-highway construction projects were prioritized for years 2015-2020, totaling an estimated $9 billion. NCDOT will only have an estimated $1.5 billion to spend during this time period." The STIP is updated every 2 years. The STIP contains funding information for various transportation divisions of NCDOT, including, highways, rail, bicycle and pedestrian, public transportation and aviation.

For more information on STI: https://connect.ncdot.gov/projects/planning/Pages?State-Transportation-Improvement-Program.aspx

Duke Energy Water Resources Fund – This fund can be utilized to help with the Greenway in Surf City.

Duke Energy is investing $10 million in a fund for projects that benefit waterways in the Carolinas. The fund includes a $1.5 million designation for projects in the Dan River Basin Region (north of Greensboro and Winston-Salem). The fund supports science-based, research-supported projects and programs that provide direct benefit to at least one of the following focus areas:

- Improve water quality, quantity and conservation;
- Enhance fish and wildlife habitats;
- Expand public use and access to waterways; and
- Increase citizens' awareness about their roles in protecting these resources.

For more information: http://www.duke-energy.com/community/foundation/water-resources-fund.asp

Clean Water Management Trust Fund

The Clean Water Management Trust Fund is available to any state agency, local government, or non-profit whose primary purpose is the conservation, preservation, and restoration of North Carolina's environmental and natural resources. Grant assistance is provided to conservation projects that:

- Enhance or restore degraded waters;
- Protect unpolluted waters, and/or
- Contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits;
- Provide buffers around military bases to protect the military mission;
- Acquire land that represents the ecological diversity of North Carolina; and
- A+qw2zaZWx3zddcquire land that contributes to the development of a balanced State program of historic properties.

The application deadline is typically in February. For more information: http://www.cwmtf.net/#appmain.htm

Incidental Projects

Bicycle and Pedestrian accommodations such as; bike lanes, wide paved shoulders, sidewalks, intersection improvements, bicycle and pedestrian safe bridge design, etc. are frequently included as "incidental" features of larger highway/roadway projects. This is increasingly common with the adoption of NCDOT's "Complete Streets" Policy.

In addition, bicycle safe drainage grates and handicapped accessible sidewalk ramps are now a standard feature of all NCDOT highway construction. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds, and usually with a local match. On-road bicycle accommodations, if warranted, typically do not require a local match.

"Incidental Projects" are often constructed as part of a larger transportation project, when they are justified by local plans that show these improvements as part of a larger, multi-modal transportation system. Having a local bicycle or pedestrian plan is important, because it allows NCDOT to identify where bike and pedestrian improvements are needed, and can be included as part of highway or street improvement project. It also helps local government identify what their priorities are and how they might be able to pay for these projects. Under "Complete Streets" local governments may be responsible for a portion of the costs for bicycle and pedestrian projects.

For more information: http://www.ncdot.gov/bikeped/funding/process

SPOT Safety Program

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues. The program is funded with state funds and currently receives approximately $9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is $250,000.

The Spot Safety Program targets hazardous locations for expedited low cost safety improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest.

For more information:
https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

Photos left: Bicycle + Pedestrian Toolbox/Alta Greenways

Powell Bill Funds

Annually, State Street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds (which is 10.4% of the net amount after refunds) shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. The statutes also provide that funds be disbursed to qualified municipalities on or before October 1st and January 1st, thereby allowing sufficient time after the end of the fiscal year for verification of information and to determine the proper allocations and preparation of disbursements. Powell bill documents are due between July 1st and July 21st of each year, with additional documentation due shortly thereafter.

More information: https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx

Highway Hazard Elimination Program

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90 percent federal funds and 10 percent state funds. The cost of Hazard Elimination Program projects typically ranges between $400,000 and $1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STI). For more information: https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

Governor's Highway Safety Program

The Governor's Highway Safety Program (GHSP) funds safety improvement projects on state highways throughout North Carolina. All funding is performance-based. Substantial progress in reducing crashes, injuries, and fatalities is required as a condition of continued funding. This funding source is considered to be "seed money" to get programs started. The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends. State Highway Applicants must use the web-based grant system to submit applications.

For more information: http://www.ncdot.org/programs/ghsp/

Eat Smart, Move More North Carolina Community Grants

The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to support their efforts to develop community-based interventions that encourage, promote, and facilitate physical activity. The current focus of the funds is for projects addressing youth physical activity. Funds have been used to construct trails and conduct educational programs.

For more information:
http://www.eatsmartmovemorenc.com/Funding/Funding.html

The North Carolina Division of Parks and Recreation – Recreational Trails and Adopt-a-Trail Grants

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking, and horseback riding to river trails and off-highway vehicle trails. *"The Adopt-a-Trail Grant Program"* (AAT) awards $108,000 annually to government agencies, nonprofit organizations and private trail groups for trail projects. The Recreational Trails Program (RTP) is a $1.3

Million grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. Grant applicants must be able to contribute 20% of the project cost or in-kind contributions. *Both grant applications are typically due in January or February*. For more information:
http://www.ncparks.gov/About/trails_grants.php

NC Parks and Recreation Trust Fund (PARTF)

The Parks and Recreation Trust Fund (PARTF) provide dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the general public. Counties, incorporated municipalities, and public authorities, as defined by G.S. 159-7, are eligible applicants. A local government can request a maximum of $500,000 with each application. An applicant must match the grant dollar-for-dollar, 50 percent of the total cost of the project, and may contribute more than 50 percent. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match. *Grant applications are typically due in February*. For more information:

http://www.ncparks.gov/About/grants/partf_main.php

Community Development Block Grant Funds

Community Development Block Grant (CDBG) funds are available to local municipal or county governments that qualify for projects to enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low and moderate income. State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the State of North Carolina. Some urban counties and cities in North Carolina receive CDBG funding directly from HUD. Each year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. These community improvement projects are administered by the Division of Community Assistance and the Commerce Finance Center under eight grant categories. Two categories might be of support to pedestrian and bicycle projects in 'entitlement communities': Infrastructure and Community Revitalization.

More information:
http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Clean Water Management Trust Fund (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection, eligible for application by a state agency, local government, or non-profit. At the end of each year, a minimum of $30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies, and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. *Deadlines are typically in February*.

For more information: http://www.cwmtf.net/#appmain.htm

Safe Routes to School (SRTS) Program

For details on the FAST Act, and Safe Routes to School Program; See *Federal Funding Sources* above for more information.

Urban and Community Forestry Grant

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between $1,000 and $15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c) (3) organizations, and other tax-exempt organizations. First time municipal applicant and municipalities seeking Tree City USA status are given priority for funding. *Grant applications are due by March 31 at 5:00 pm and recipients are notified by mid-July each year.*

For more about Tree City USA status, including application instructions, visit: http://ncforestservice.gov/Urban/urban_grant_overview.htm

IV. LOCAL GOVERNMENT FUNDING SOURCES

Municipalities often plan for the funding of pedestrian and bicycle facilities or improvements through development of **Capital Improvement Projects (CIP)** or occasionally, through their annual **Operating Budgets**. In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing pedestrian and bicycle projects are also described below. However, many will require specific local action as a means of establishing a program, if not already in place.

Capital Reserve Fund

Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants, and donations for the specified use.

Capital Project Ordinances

Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

Local Improvement District (LID)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks, or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

Municipal Service District

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the town-wide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

Tax Increment Financing

Project Development financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it.

Other Local Funding Options

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Installment purchase financing
- In-lieu-of fees
- Partnerships

V. PRIVATE AND NON-PROFIT FUNDING SOURCES

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

Novozymes North America

Novozymes North America is a company leading in several industries: biofuels, detergent, food, feed and bioagriculture. Out of its Franklinton, NC location, the company operates the largest multi-purpose enzyme manufacturing facility in the USA. Each year, Novozymes invests nearly 14 percent of its global revenue in research and development.

Union Bank

A community bank serving the north central North Carolina region with a location in Youngsville. Union Bank strives to make the communities it serves better by providing strong financial and customer service. With its strong commitment to the communities it serves, Union Bank is involved in a variety of different local projects.

Wake Electric Membership Corp

Wake Electric is an electric utility company that provides reliable, safe and affordable energy and related services to approximately 39,000 consumers in parts of several counties in north central North Carolina, including Franklin County. Wake Electric operates as a non-profit cooperative business and aims to consistently meet the needs of its consumers through an emphasis on great services and quality of life.

Land for Tomorrow Campaign

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals, and community groups committed to securing support from the public and General Assembly for protecting land, water, and historic places.

The campaign was successful in 2013 in asking the North Carolina General Assembly to continue to support conservation efforts in the state. The state budget bill includes about $50 million in funds for key conservation efforts in North Carolina. Land for Tomorrow works to enable North Carolina to reach a goal of ensuring that working farms and forests, sanctuaries for wildlife, land bordering streams, parks, and greenways, land that helps strengthen communities and promotes job growth, and historic downtowns and neighborhoods will be there to enhance the quality of life for generations to come.

For more information: http://www.land4tomorrow.org/

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To ensure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

Projects considered for funding typically are innovative and aim to create meaningful, transformative change. Project examples include: service demonstrations; gathering and monitoring of health-related statistics; public education; training and fellowship programs; policy analysis; health services research; technical assistance; communications activities; and evaluations.

For more specific information about what types of projects are funded and how to apply, visit http://www.rwjf.org/en/how-wework/grants/what- we-fund.html

North Carolina Community Foundation

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for non-profit organizations and institutions throughout the state. Based in Raleigh, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide.

For more information: http://nccommunityfoundation.org/

Walmart State Giving Program

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/economic opportunity, health and wellness, and environmental sustainability. Both programmatic and infrastructure projects are eligible for funding. State Giving Program provides grants to 501(c) (3) organizations, ranging from $25,000 to $250,000. *The program grant application deadline is May 1st*.

Online resource: http://foundation.walmart.com/apply-for-grants/state-giving

Rite Aid Foundation Grants

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis to communities in which Rite Aid operates. The Rite Aid Foundation which focuses on three core areas for charitable giving: children's health and well-being; special community health and wellness needs; and Ride Aid's own community of associates during times of special need.

Online resource: https://www.riteaid.com/about-us/rite-aid-foundation

Z. Smith Reynolds Foundation

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The Foundation focuses its grant making on five focus areas: Community Economic Development; Environment; Public Education; Social Justice and Equity; and Strengthening Democracy. *Deadline to apply is typically in August.*

For more information: www.zsr.org

Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. There are numerous different initiatives and grant programs, yet the ones most relevant to increased recreational opportunities and trails are the Revitalizing Neighborhoods and Environment Programs. Starting in 2013, a new 10-year, $50 billion goal to be a catalyst for climate change was launched. This initiative aims to spark the "innovation economy and advance a transition to a low-carbon future."

For more information: www.bankofamerica.com/foundation

Duke Energy Foundation

Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business "sponsor"
- A clear business reason for making the contribution

The grant program has several investment priorities: Education; Environment; Economic and Workforce Development; and Community Impact and Cultural Enrichment. Related to this project, the Foundation would support programs that support conservation, training, and research around environmental and energy efficiency initiatives.

For more information: http://www.duke-energy.com/ community/ foundation.asp

The Community Transformation Grant

Centers for Disease Control and Prevention (CDC) developed this program to improve the health and wellness of Americans. The program supports community initiatives that prevent chronic diseases such as cancer, diabetes, and heart disease. Some partnering organizations that have received funding include: schools; transportation experts; businesses; and faith-based organizations.

For more information:
http://www.cdc.gov/nccdphp/dch/programs/communitytransformation/

American Greenways Eastman Kodak Awards

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design, and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying, or political activities.

For more information: http://www.rlch.org/funding/kodak-american-greenways-grants

National Trails Fund

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a $200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $588,000 to 192 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects - including volunteer recruitment and support.

For more information: http://www.americanhiking.org/national-trails-fund/

The Conservation Alliance

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. Grants are typically about $35,000 each. Since its inception in 1989, The Conservation Alliance has contributed $4,775,059 to environmental groups across the nation, saving over 34 million acres of wild lands.

The Conservation Alliance Funding Criteria:

• The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation.
• The Alliance does not look for mainstream education or scientific research projects, but rather for active campaigns.
• All projects should be quantifiable, with specific goals, objectives, and action plans and should include a measure for evaluating success.
• The project should have a good chance for closure or significant measurable results over a fairly short term (within four years).

For more information: http://www.conservationalliance.com/grants

National Fish and Wildlife Foundation (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, non-profit, tax exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants, and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation provides grants through more than 70 diverse conservation grant programs. A few of the most relevant programs for bicycle and pedestrian projects include Acres for America, Conservation Partners Program, and Environmental Solutions for Communities. Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

For more information:
http://www.nfwf.org/whatwedo/grants/Pages/home.aspx

The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL).

Founded in 1972, the TPL is the only national non-profit working exclusively to protect land for human enjoyment and well-being. TPL helps acquire land and transfer it to public agencies, land trusts, or other groups that have intentions to conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

For more information: http://www.tpl.org

Blue Cross Blue Shield of North Carolina Foundation (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. Healthy Places grant concentrates on increased physical activity and active play through support of improved build environment such as sidewalks, and safe places to bike. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the non-profit, provide an audit.

For more information: http://www.bcbsncfoundation.org/

Alliance for Biking & Walking: Advocacy Advance Grants

Bicycle and pedestrian advocacy organizations play the most important role in improving and increasing biking and walking in local communities. Rapid Response Grants enable state and local bicycle and pedestrian advocacy organizations to develop, transform, and provide innovative strategies in their communities. Since 2011, Rapid Response grant recipients have won $100 million in public funding for biking and walking. The Advocacy Advance Partnership with the League of American Bicyclists also provides necessary technical assistance, coaching, and training to supplement the grants.

For more information, visit www.peoplepoweredmovement.org

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

Private Individual Donations

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

Fundraising/Campaign Drives

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

Volunteer Work

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

VI. INNOVATIVE FUNDING OPTIONS

Crowdsourcing "is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers."

For some success stories and ideas for innovative fundraising techniques: http://www.americantrails.org/resources/funding/TipsFund.html

TRAIL PARTNERSHIP CASE STUDIES IN THE CAROLINAS

Wilmington/New Hanover County & Blue Cross Blue Shield (BCBS)

BCBSNC and their ***GO NC! Program*** donated funds to complete the final phase of the 15-mile Gary Shell Cross-City Trail from Wade Park to the drawbridge at Wrightsville Beach. In addition to completing the trail, other enhancements include mile markers along the 15-mile trail and five bicycle fix-it stations along the trail. This partnership came about during development of the WMPO's Wilmington/New Hanover County Comprehensive Greenway Plan in 2012.

Project contact: Amy Beatty, Superintendent, City of Wilmington Recreation & Downtown Services, 302 Willard Street, Wilmington, NC 28401; Phone: 910. 341.7855.

The Mary Black Foundation, Spartanburg, SC

The Mary Black Foundation Rail Trail was a collaboration between the Mary Black Foundation, Palmetto Conservation Foundation, City of Spartanburg, Partners for Active Living, SPATS, and local citizens. It extends from downtown Spartanburg at Henry Street, between Union and Pine Streets, and continues 2 miles to Country Club Road. Since its inception there has been buzz about redeveloping the Rail Trail corridor. The commuter and recreational trail brings together all walks of life, and connects neighborhoods, businesses, restaurants, a school, a bike shop, the YMCA, a grocery store, and a skate park. As the Hub City Connector segment of the Palmetto Trail through Spartanburg County, the Rail Trail is an outdoor transportation spine for Spartanburg from which other projects are expected to spin off. One great example is the first phase of B-cycle bicycle-sharing program located at the Henry Street trailhead. Project contact: Lisa Bollinger, Spartanburg Area Transportation Study, 366 North Church Street, Suite 700, Spartanburg, SC 29303; Phone: 864-596-3570. Funding Resources B-21 SUMMER 2014 DRAFT SOUTH

Mary Black Foundation Trail
www.traillink.com/trail/mary-black-rail-trail.aspx.

Swamp Rabbit Trail and Greenville Health System, Greenville, SC

The Greenville Health System Swamp Rabbit Trail is a shared-use-path that runs along the Reedy River through Greenville County, connecting parks, schools, and local businesses. The GHS Swamp Rabbit has become very popular among residents and visitors for recreational and transportation purposes. The Greenville Heath System has become a private sponsor because of the health benefits offered by the trail as well as the branding opportunity achieved by having its name and logo on the trail's signs. The GHS Swamp Rabbit Trail continues to increase in size and popularity, with communities in neighboring counties making plans to extend the trail into their towns. Project contact: Ty Houck, Director of Greenways, Natural and Historic Resources, Greenville County Parks, Recreation and Tourism. 4806 Old Spartanburg Road, Taylors, SC 29687. Phone: 864-676-2180 ext. 141.

Swamp Rabbit Trail Greenville, SC
Source:
http://www.10best.com/awards/travel/best-urban-trail/swamp-rabbit-trail-greenville-s-c/

Section 10. Guidance on Plan Implementation

The following guidelines will help to move the plan forward

Adopting the Plan

- Review of the Plan by the Steering Committee (10-14-15)
- Finalization and sealing of the Plan (11-19-15)
- Review and approval of the Plan by NCDOT (2-19-2016)

Edits and Revisions (Cavanaugh) (4/10/2016)

- Re-review by NCDOT and edits by Cavanaugh (9-15-2016)
- Review of the Plan by the Planning Board
- Acceptance of the Plan by Town Council

Implementation and Development- Note, for each numbered item below establish who is responsible for this task.

This plan has laid out Recommendation tables to help with Implementation, which you can find at the beginning of the Recommendations Section. It is important to utilize these tables, and the Short term and long term goals identified at the beginning of the Plan. Long term goals offer suggestions for Performance Monitoring on Page 3, to measure success. These tools will be critical in implementation of the plan.

1. Agree on priorities starting with **Immediate Recommendations**, then **Short Term**, and plan for **Long Term** Recommendations.
2. Create a committee with 5-7 members to work under the direction of the Town Planning Director to identify funding strategies, work on funding applications, and prioritize implementation improvements for advancement of the Plan. Sub-committees may be useful on certain sections.
    a. Make sure the Committee knows their responsibilities
    b. Devise recommendations to the Town Planner for each phase of the plan (I), **(ST) (ST/LT) (LT)**
    c. Require new developments to allow for required bike parking in all new commercial and multi-family residential developments.
3. Require new development to set aside land for greenways and pedestrians and multi-use paths, explore growth opportunities to implement the plan, phase in with Development and school planning
4. Implementation of policies that support pedestrian and bicycle development
5. Apply for funding from all State, Local, and Private Sources, including innovative funding options, based on deadlines noted
   Note: Be creative in discovering how the funds may be applied. For instance, the Duke Water Resources Fund, may be used to acquire easements and informational kiosks/placards for the Greenway development.

6. Develop an inventory of plan parcels recommended for acquisition
7. Work on wayfinding signs, signage for crossings and safety education
8. Establish goals and dates for:
    - Bike Racks and wayfinding implementation
    - Try ***crowdfunding*** for wish list items such as: Fix-It Stations, water fountains, shade trees
    - Decide if speed limit reduction should be implemented
    - Education Programs
    - Schedule the One Way Lane Conversion Pilot Study, run the trial and ask for comments and suggestions

9. Coordinate with Mountains to Sea, East Coast Greenway, local municipalities, RPO's and NCDOT to improve development and resources
10. Work cohesively with Cyclists groups, MPO, and Town leadership to promote Surf City infrastructure development, to obtain funding and support, to encourage use, and educate others
11. Develop a more detailed timeline for advancement of plan – Assign responsibilities with deadlines

12. Obtain calendar for road improvements which may already be scheduled - Communication/coordination with Highway Division 3 and their three year resurfacing schedule. Specifically, the 2017-2019 plan can be found at this link: https://connect.ncdot.gov/resources/Asset-Management/HMIP-Plans/Pages/FY2017-2019_HMIP_Plans.aspx

13. Acquire environmental and engineering designs and permits, work on obtaining greenway right-of-ways, and acquire necessary easements

14. Advance the plan as funding is acquired
    - Plan ahead – Establish a plan for development so as funding becomes available, next steps will be ready for implementation
15. Schedule regular maintenance. Plan for maintenance on Town calendar, discuss how and when it will take place, and who is responsible for maintenance.
16. Act on safety education programs and initiatives; as each segment opens, invite the public and educate them on safety measures and rules

17. Future school – Communication with the Region 8 'Active Routes to School' Coordinator should begin now to plan for infrastructure. **http://www.ncdot.gov/download/programs/srts/srts.pdf** Action Step – Maintain communication with the coordinator to facilitate connection with the proposed greenway, and work together to apply for funding programs.
18. Communicate with the townspeople on social media and website to ask for assistance, announce new infrastructure plans and openings, and set up a funding instrument for donations.

Guidance continued

1. ***Immediate Improvements, (I)*** should begin project development now
2. ***Short term (ST) -*** Plan ahead for interconnection

   Infrastructure affecting and leading to the proposed bridge should coordinate with the timing of the bridge project so that bicyclists and pedestrians will have somewhere to go when they cross the bridge. By working closely with NCDOT, the plan can work cohesively providing signage and connection to the new infrastructure.
3. ***Long term (LT) -*** While some parts of the plan are not included in the ***Immediate*** or ***Short Term*** Recommendations***,*** the planning for implementation should begin soon, so that easements and funding can be acquired in advance, as we are planning and working toward the ***Long Term*** goal.

Other helpful links:

- **Complete Streets Policy**

  http://www.completestreetsnc.org
- **NCDOT Pedestrian Policy Guidelines**

  http://www.ncdot.gov/bikeped/download/bikeped_Ped_Policy.pdf
- **NCDOT Bicycle Policy –**

  http://www.ncdot.gov/bikeped/download/bikeped_laws_bicycle_policy.pdf
- **NCDOT Greenway Policy**

  http://www.ncdot.gov/_templates/download/external.html?pdf=http%3A//www.ncdot.gov/bikeped/dowload/bikeped_laws_GreenwayAdmin_Action.pdf
- **NCDOT Board of Transportation Resolution for bicycling and Walking –**

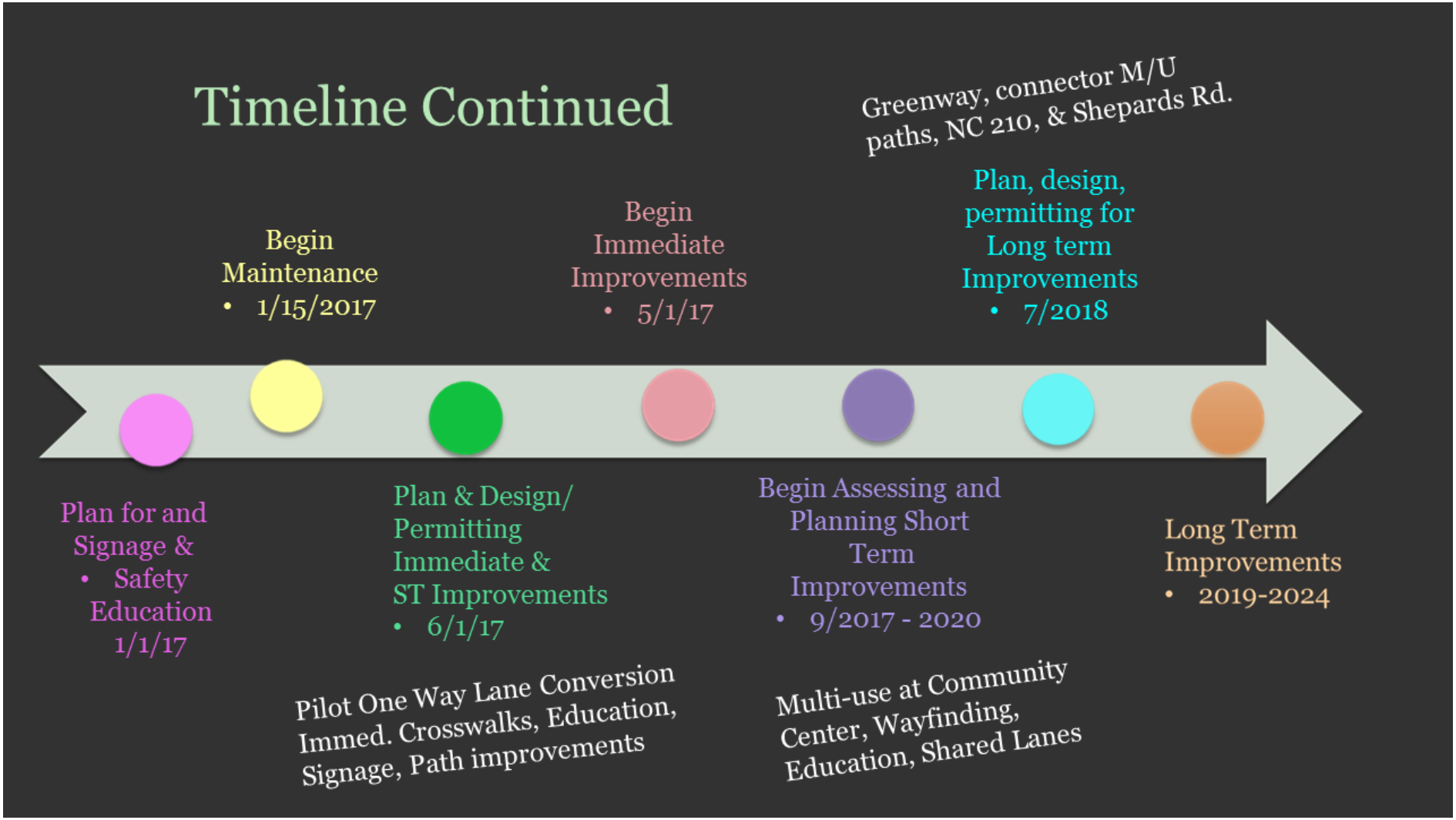
  http://www.ncdot.gov/bikeped/download/bikeped_laws_BOT_Mainstreaming_Resolution.pdf
- **Walk Bike NC Design Toolbox**

  http://www.walkbikenc.com/wp-content/uploads/2014/12/designtoolbox.pdf

It is further recommended that each task described above, be put in a chart format. The task should be assigned a responsible agency/ (a lead person and/or partners) to indicate who is responsible for this phase, the deadlines or phase of improvement, indicate where more information can be found in the plan, indicate phase (ST, LT, Immediate) and note efforts accomplished.

Task	Responsible Agency	Phase	Expected Start	Completion	Section of Plan	Notes/Efforts/ Implementation


Timeline for Bike Ped Plan
Review of Final Draft
• 10/14/15
NCDOT Review 2/19/16
NCDOT Approval
• 9/30/15
Acquire Easements
• Ongoing
Meet with Duke Energy RE: Greenway
• By 1/1/17
Acceptance of Plan 11/1/15
Plan Revisions 4/15/16
Form Bike/Ped Committee to work on Funding Applications
• 10/1/16
Apply for Funding All Available Sources or ASAP w/ Deadline Considerations by
• 10-1/16 – 5/31/17
Plan for Multi-use and Bike Lane Maintenance 11/1/16
Note: Funds are required for advancement of plan, dates are estimated based on acquisition of funds.


Timeline Continued
Greenway, connector M/U paths, NC 210, & Shepards Rd.
Plan, design, permitting for Long term Improvements
• 7/2018
Begin Immediate Improvements
• 5/1/17
Begin Maintenance
• 1/15/2017
Plan for and Signage & Safety Education
• 1/1/17
Plan & Design/ Permitting Immediate & ST Improvements
• 6/1/17
Pilot One Way Lane Conversion Immed. Crosswalks, Education, Signage, Path improvements
Begin Assessing and Planning Short Term Improvements
• 9/2017 - 2020
Multi-use at Community Center, Wayfinding, Education, Shared Lanes
Long Term Improvements
• 2019-2024

Recommendations for Town of Surf City Comprehensive Bicycle and Pedestrian Plan Outline

Map ID	Recommendation	Location Start/End Point	Description/ Improvement	Immed. (I) Short Term (ST) Long Term (LT)	Details	Qty	Cost per unit	Project Cost Range
2	**Sidewalks**	Infill Downtown/ CBD	Completion of all sidewalks in CBD		Continue to connect sidewalks in the CBD (interconnectivity)		Per Existing Plan	
App		Existing Sidewalk Plan	Complete Sidewalk Plan	LT	Complete Sidewalk Plan adjust for Bike/Ped Plan modifications.	18.7 miles	$150,000 - $170,000/mile	$2,805,000 - $3,179,000
5	**Multi-Use Paths**	Tortuga Lane	Paved path at time of road paving	ST	Coordinate with road paving	0.4 miles	$220,000/mile	$ 55,000.00
5		Caretta Drive	Path from Tortuga to Harris Teeter Center	LT	In planning stages only - Road does not exist Total 8,031'	0.4 miles	$220,000/mile	$ 55,000.00
5		Community Center Footpath	Convert footpath to permanent path	ST	Footpath at this time	0.8 miles	$100,000/mile	$ 80,000.00
		Connect Cape Fear Community College and Greenway	At time of Greenway construction	LT	Add to Greenway Plan	0.2 miles	$220,000/mile	$ 4,400.00
		Connect Proposed School, Shepard Rd. and Greenway	At time of school construction	LT	Add to Greenway Plan	0.2 miles	$220,000/mile	$ 4,400.00
8		NC 210 (US 17 to NC 50)	Coordinate with Widening of NC 210	LT	Coordinate with road widening project	2.8 miles	$220,000/mile	$ 616,000.00
1, 5		NC 50 (from intersection of NC 210 and NC 50, south to new bridge)	Paved path on east side of NC 50	LT	On opposite side of road from existing boardwalk and sidewalk	1.2 miles	$220,000/mile	$ 264,000.00
		MC 50 from NC 210 (Roland Ave.) North towards Shepards Rd.	As funds allow	LT	Add to Side of Roadway	1.8 miles	$133,170/mile	$ 239,706.00
8		Atkinson Loop Rd.	As funds allow	LT	Alternate to riding on NC 210	0.7 miles	$133,170/mile	$ 93,219.00
4	**Buffered Bike Lanes**	Topsail Drive North	Lanes with Divided Lines 3' from Traffic	ST/LT	This need mentioned often in survey	4.8 miles	$111,320/mile	$ 400,000-$575,000
5	**Bike Lane**	JH Batts	Add bike lane alongside sidewalk	ST/LT	This will help with interconnection to Community Center area	0.3 miles	$133,170/mile	$39,951.00
7	**Bike Lane**	Turtle Creek Subdivision	To help with off-road interconnection	ST/LT	Alternate route to Greenway	1.7 miles	$133,170/mile	$226,389.00
	Crosswalks						Bridge Project	$ -
3	Crosswalks with signal	Across Roland Ave near IGA **(Priority #1)**	Short Term (Prior to Bridge Construction)	I/ST		1	$2,540	$ 2,540.00
3	Crosswalk with signal	Roland Ave at Welcome Center **(Priority #2)**	Short Term	I	Beach side of Road, adjacent to N. & S. Shore Drive	1	$2,540	$ 2,540.00
3	Crosswalks with signal	N. Shore and S. Shore Dr. Near Welcome Center & access **(#2)**	Short Term	ST	Crossing N. Shore and S. Shore Drive alongside Roland Ave.	2	$2,540	$ 5,080.00
NP	Crosswalks with signal and curb ramps	Handicapped Beach Access (9th Street and Kinston Ave.)	Immediate, signalized if warranted	I	Provide crosswalks ADA compliant for handicapped individuals	2	$2,540	$ 5,080.00
6	Crosswalk with signal	NC 210 and NC 50 Intersection	Two crosswalks with RRFB or a Roundabout	ST	Cost listed is for a Roundabout* (see Below)	1		
6	Crosswalk without signal	JH Batts	At time of Multi-use Path Construction	ST		1	$350	$ 350.00
6	Crosswalk with signal	Harris Teeter Shopping Center, across NC 210	As pedestrian Traffic demands	ST		1	$2,540	$ 2,540.00
4	Crosswalk at roundabouts	At Island Roundabouts and Mainland Roundabout	Included with bridge	ST/LT		2	Bridge Project	$ -
NP	Two painted crosswalk lines and signage	All Beach Accesses (32)	Long Term, unsignalized until warranted	ST/LT		32	$340/each	$ 10,880.00
7, 8	**Greenway**	Duke Powerline -Vicinity of Electric Lane from NC 210 to NC 50		ST/LT	21,233' 4.02 miles	4 miles	$220,000/mile	$ 884,400.00
		Connect to Greenway- Pender County Schools		LT	possible shared cost project		not estimated	
3	**One Way Conversion**	Convert two lanes into One traffic lane and a Bike and Pedestrian Lane						
3		From High Point Ave. to New Bern Ave.	Temporary (Pilot Demonstration/Trial)	I	Using paint & bollards, or planters for separation	0.6 miles	$2,000/mile	$ 1,200.00
			Permanent - Long Term	ST/LT	Permanent Infrastructure with signage	0.6 miles	$12,000/mile	$45,000 - $50,000
	Signage/Markings	Wayfinding	Trail markers, mapping	ST	When infrastructure is added		Total	$ 50,000.00
	Education	Safety	(Workshops, Hand-outs, Annual training)	I	Kiosk near Welcome Center		Annually	$ 10,000.00
		Mapping	Brochures and Maps	I	Kiosk near Welcome Center			
APP I.		Trail Etiquette	Multi-media, (videos, website, posters)	I	Kiosk near Welcome Center			
APP L.	**Bike Parking**	Beach Accesses	Determine most crucial spots	I	IGA, CBD, Some Beach Accesses, Places of Interest	10	$155 - $850	$1,550 - $8,500
		Destinations and Points of Interest	Poll residents to determine needs/desires	I		7 to 14	$155 - $850	$3,500 - $7,000
		CBD	Poll residents to determine needs/desires	ST		7 to 14	$155 - $850	$3,500 - $7000
4	**Pedestrian Boardwalk**	Under New Topsail Bridge	Included in Project?	ST	Same time as bridge construction so infrastrut. will be in place	200 feet	$2M per mile	$75,000 - $100,000
5		Across Community Center Pond	To be considered	LT		600 feet	$450,000 - $500,000/mile	$45,000 - $50,000
APP K.	**Lighting**	Low level on boardwalk	Upon Construction	ST	Similar to short bollards with top light	6 each	$550-675 each	$3,300 - $4,500
APP K.		One-Way Conversion	Upon Construction	ST	Lights on lampost	30 each	$1,500-$1800	$45,000 - $54,000
APP K.		Walking Tracks Pedestrian Loop at Soundside Park	Upon Construction	LT	Similar to short bollards with top light	10 each	$550-675 each	$5,500 - $6,750
APP K.		Street Level on Crosswalks	Upon Construction	ST/LT	Estimated 12 lights per crosswalk - 6 each crosswalks	6 each	$900 each	$ 5,400.00
APP E.	**Maintenance**	Removal of Sand/Debris	Regular basis	I				
APP E.		Pruning of Vegetation	Regular basis	I	Annual Budget		$1,600/mile	$ 50,000.00
APP E.		Painting	Divider lines	ST				
	Walking Tracks	Soundside Park (Blue Crush Stone, covered w/ 2" asphalt)		LT		0.6 miles	$121,390/mile	$ 72,834.00
Pg 96	**Curb Radius Reductions near Welcome Center**	Improvements and Curbing for Clear Sight Triangles	Incl. low growing plants separating crosswalks	ST	Improvements on both sides of Roland Ave.			$ 60,000 - 75,000
1	**Shade trees near Roland Ave. Multi-use path**	For beautification and break from sun	Between Soundside Park and Welcome Center	ST		10	$350 - $500 each	$3,500 - $5,000
	Roundabout*	At Roland Ave (NC 210 and NC 50 intersection)	Raised with plants	ST/LT		1	each	$200,000 - $400,000
					Improvements and C+E64:E78urbing for Clear Sight Triangles			
APP L.	**Information Kiosk**	Outside Welcome Center	Weatherproof, freestanding, digital LED	ST/LT		1	each	$5,000 - $15,000
	Wish list items:							
APP L.	**Water fountain**	Near Greenway	When funds allow/ crowdfunding	ST/LT	Stone, Outdoor	1	$620 + plumbing	$1,200 - $2,700
APP L.	**Park Bench**	Along Roland Ave., and at least one on Greenway Trail	When funds allow /Crowdfunding/donation	ST/LT	Have public decide where most needed	12	$250-$500	$1,500 - $6,000
	Bike Fix-It Station	Locations: Greenway, Community Center, Mainland side of bridge	When funds allow/ crowdfunding	ST/LT	Holds Bike and provides tools for repairs	3	$900-1200 each	$2,700 -$3,600

* This consideration is for a crossing for bicyclists and pedestrians so they would not have to impede the traffic with a signalized crosswalk on Roland Ave.
More information on how ***Costs Estimates*** were determined can be found in Appendix D
NP - Not Pictured

TOTAL ESTIMATED PROJECT COSTS FOR RECOMMENDATIONS (Before Tunnel) **$6,487,159-$7,329,959**

APP J	**Tunnel**	Under New River Drive for Pedestrian and Bike Traffic (Or two crosswalks)*	This option provide as a consideration only if needed.	ST/LT				$3,000,000-6,000,000

(After Tunnel) **$9,487,159 - $13,329,959**

Recommendations for Town of Surf City

Map ID/ or Pg. No.	Recommendation	Location Start/End Point	Description/ Improvement	Immed. (I) Short Term (ST) Long Term (LT)	Details	Qty	Cost per unit	Project Cost Range
(I)	**IMMEDIATE RECOMMENDATIONS (Beginning now < 3 years)**							
6	**Education**	Safety	(Workshops, Hand-outs, Annual training)	I	Kiosk near Welcome Center			
6		Mapping	Brochures and Maps	I	Kiosk near Welcome Center		Annually	$ 10,000.00
APP I.		Trail Etiquette	Multi-media, (videos, website, posters)	I	Kiosk near Welcome Center			
APP L.	**Bike Parking**	Beach Accesses	Determine most crucial spots	I	IGA, CBD, Some Beach Accesses, Places of Interest	10	$155 - $850	$1,550 - $8,500
APP L.		Destinations and Points of Interest	Poll residents to determine needs/desires	I		7 to 14	$155 - $850	$3,500 - $7,000
APP E.	**Maintenance**	Removal of Sand/Debris	Regular basis	I				
APP E.		Pruning of Vegetation	Regular basis	I	Annual Budget		$1,600/mile	$ 50,000.00
	Crosswalks	At Island Roundabout and Mainland Roundabout	Included with Topsail Bridge construction					
3	Crosswalks with signal	Across Roland Ave near IGA **(Priority #1)**	Short Term (Prior to Topsail Bridge construction)	I/ST	RRFB - acuated warning beacons by pushing or sensor	1	$2,540	$ 2,540.00
3	Crosswalk with signal	Roland Ave at Welcome Center **(Priority #2)**	Short Term	I	Beach side of Road, adjacent to N. & S. Shore Drive	1	$2,540	$ 2,540.00
NP	Crosswalks with signal and curb ramps	Handicapped Beach Access (9th Street and Kinston Ave.)	Immediate, signalized if warranted	I	Provide crosswalks ADA compliant for handicapped individuals	2	$2,540	$ 5,080.00
3	**One Way Conversion**	Convert two lanes into One traffic lane and a Bike and Pedestrian Lane						
3	One Way Conversion - Temporary	From High Point Ave. to New Bern Ave.	Temporary (Pilot Demonstration/Trial)	I	Using paint & bollards, or planters for separation	0.6 miles	$12,000/mile	$ 1,200.00
		TOTAL IMMEDIATE RECOMMENDATIONS						**$76,410 - $86,860**
(ST)	**SHORT TERM RECOMMENDATIONS (3 to 5 years)**							
3	**Crosswalks with signal**	N. Shore and S. Shore Dr. Near Welcome Center & access **(#2)**	Short Term	ST	Crossing N. Shore and S. Shore Drive alongside Roland Ave.	2	$2,540	$ 5,080.00
6	Crosswalk with signal	NC 210 and NC 50 Intersection	Two crosswalks with RRFB or a Roundabout	ST	Cost listed is for a Roundabout * See Roundabout	1		$ -
6	Crosswalk without signal	JH Batts	At time of Multi-use Path Construction	ST		1	$350	$ 350.00
6	Crosswalk with signal	Harris Teeter Shopping Center, across NC 210	As pedestrian Traffic demands	ST		1	$2,540	$ 2,540.00
5	**Multi-Use Paths**	Tortuga Lane	Paved path at time of road paving	ST	Coordinate with road paving	0.4 miles	$220,000/mile	$ 55,000.00
5		Community Center Footpath	Convert footpath to permanent path	ST	Footpath at this time	0.8 miles	$100,000/mile	$ 80,000.00
APP L.	**Bike Parking**	CBD	Poll residents to determine needs/desires	ST		7 to 14	$155 - $850	$3,500 - $7000
4	**Pedestrian Boardwalk**	Under New Topsail Bridge	Included in Project?	ST	Same time as bridge construction so infrastrut. will be in place	200 feet	$2M per mile	$75,000 - $100,000
Pg. 76, 77	**Signage/Markings**	Wayfinding	Trail markers, mapping	ST	When infrastructure is added		Total	$ 50,000.00
APP N.	**Lighting**	Low level on boardwalk	Upon Construction	ST	Similar to short bollards with top light	6 each	$550-675 each	$3,300- $4,500
APP N.		One-Way Conversion	Upon Construction	ST	Lights on lampost	30 each	$1,500-$1800	$45,000-54,000
Pg. 96	**Curb Radius Reductions near Welcome Center**	Improvements and Curbing for Clear Sight Triangles	Incl. low growing plants separating crosswalks	ST	Improvements on both sides of Roland Ave.			$ 60,000 - 75,000
1, Pg. 77	**Shade trees near Roland Ave. Multi-use path**	For beautification and break from sun	Between Soundside Park and Welcome Center	ST		10	$350 - $500 each	$3,500 - $5,000
		TOTAL SHORT TERM RECOMMENDATIONS						**$ 383,270 - $438,470**
(ST/LT)	**SHORT TO LONG TERM RECOMMENDATIONS (as funding allows 3-7 years)**							
7, 8	**Greenway**	Duke Powerline -Vicinity of Electric Lane from NC 210 to NC 50		ST/LT	21,233' 4.02 miles	4 miles	$220,000/mile	$ 884,400.00
APP N.	**Lighting**	Street Level on Crosswalks	Upon Construction	ST/LT	Estimated 12 lights per crosswalk - 6 each crosswalks	6 crosswalks	900	$ 5,400.00
2	**Buffered Bike Lanes**	S. Topsail Drive (Roland Ave. to southern town limits)	Lanes with Divided Lines 3' from Traffic	ST/LT	This need mentioned often in survey	4.8 miles	$111,320/mile	$ 400,000-575,000
5	**Bike Lane**	JH Batts	Add Bike Lane alongside sidewalk	ST/LT	This will help with interconnection to Communicty Center	0.3	$133,170/mile	$39,951.00
7	**Bike Lane**	Turtle Creek Subdivision	Connect to Greenway	ST/LT	To help with offroad path interconnection	1.7	$133,170/mile	$226,389.00
3	**One Way Conversion**	From High Point to New Bern Ave.	Permanent - Long Term	ST/LT	Permanent Infrastructure with signage	0.6 miles	$45,000- $50,000	$45,000 - $50,000
4	**Crosswalk - at roundabouts**	At Island Roundabouts and Mainland Roundabout	Included with bridge	ST/LT		2	Bridge Project	$ -
Pg. 97	**Crosswalk - two painted lines and signage**	All Beach Accesses (32) (or Ladder style if adopted as standard by Town)	Short Term unsignalized until warranted	ST/LT		32	$340/each	$ 10,880.00
Pg. 74	**Multi-use Path**	Alongside Roland Ave. (Accomplished with Bridge construction.)	Path from Soundside Park to beach	ST/LT				
5	**Roundabout**	At Roland Ave (NC 210 and NC 50 intersection)	Raised with plants	ST/LT	Improvements and Curbing for Clear Sight Triangles	1	each	$200,000 - $400,000
APP M.	**Information Kiosk**	Outside Welcome Center	Weatherproof, freestanding, digital LED	ST/LT		1	each	$5,000-15,000
5	**Pedestrian Boardwalk**	Across Community Center Pond	To be considered	ST/LT		0.1 miles	$450,000 - $500,000/mile	$45,000 - $50,000
	Wish list items: Consider Crowdsourcing or Other Fundraising measures							
Pg. 77	**Water fountain**	Near Greenway	When funds allow/ crowdfunding	ST/LT	Stone, Outdoor	1	$620 + plumbing	$1,200- $2,700
Pg. 77	**Park Bench**	Along Roland Ave., and at least one on Greenway Trail	When funds allow /Crowdfunding/donation	ST/LT	Have public decide where most needed	12	$250-$500	$1,500 - $6,000
Pg. 78	**Bike Fix-It Station**	Locations: Greenway, Community Center, Mainland side of bridge	When funds allow/ crowdfunding	ST/LT	Holds Bike and provides tools for repairs	3	$900-1200 each	$2,700 -$3,600

	TOTAL ST/LT RRECOMMENDATIONS							**$ 1,867,420 - $ 2,269,320**
(LT)	**LONG TERM RECOMMENDATIONS - As funding allows 7-10+ years**							
2	**Sidewalks**	Existing Sidewalk Plan	Complete Sidewalk Plan	**Now - LT**	Complete Sidewalk Plan adjust for Bike/Ped Plan modifications.	18.7 miles	$150,000 - $170,000/mile	$2,805,000 - $3,179,000
5	**Multi-Use Paths**	Caretta Drive (future road)	Path from Tortuga to Harris Teeter Center	**LT**	In planning stages only - Road does not exist Total 8,031'	0.4 miles	$220,000/mile	$55,000.00
7		Connect Cape Fear Community College and Greenway	At time of Greenway construction	**LT**	At time of Greenway Construction	0.2 miles	$220,000/mile	$4,400.00
7		Connect Proposed School, Shepard Rd. and Greenway	At time of school construction	**LT**	As school is constructed, connect to Greenway	0.2 miles	$220,000/mile	$4,400.00
8		NC 210 (US 17 to NC 50)	Coordinate with Widening of NC 210	**LT**	Coordinate with road widening project NC 210	2.8 miles	$220,000/mile	$616,000.00
1, 5		NC 50 (from intersection of NC 210 and NC 50, south to new bridge)	Paved path on east side of NC 50	**LT**	On opposite side of road from existing boardwalk and sidewalk	1.2 miles	$220,000/mile	$264,000.00
7		NC 50 from NC 210 (Roland Ave.) North towards Shepards Rd.	As funds allow	**LT**	Add to Side of Roadway	1.8 miles	$133,170/mile	$239,706.00
8		Atkinson Loop Rd.	As funds allow	**LT**	Alternate to riding on NC 210	0.7 miles	$133,170/mile	$93,219.00
APP N.	**Lighting**	Walking Tracks Pedestrian Loop at Soundside Park	Upon Construction	**LT**	Similar to short bollards with top light	10 each	$550-675 each	$5,500 - $6,750
4	**Walking Tracks**	Soundside Park (Blue Crush Stone, covered w/ 2" asphalt)		**LT**		0.6 miles	$121,390/mile	$72,834
		TOTAL LONG TERM RECOMMENDATIONS (Includes exsiting Sidewalk Plan)						**$4,160,059 - $4,535,309.00**
			TOTAL ESTIMATED RANGE OF COSTS PER PLAN					**$6,487,159 - $7,329,959**
	Other possible costs							
7, 8	**Greenway**	Connect to Greenway- Pender County Schools		**LT**	**Possible shared cost project**		not estimated	depends on distance
	Mentioned in case future needs require							
APP. J	**Tunnel**	Under New River Dr. for Pedestrian and Bike Traffic (Or two RRFB crosswalks)*		**ST/LT**	**IF FUTURE NEEDS REQUIRE PASSAGE**			$3,000,000-6,000,000

If tunnel is considered TOTAL WITH TUNNEL **$9,487,159 - $13,329,959**

* This consideration is for a crossing for bicyclists and pedestrians so they would not have to impede the traffic with a signalized crosswalk on Roland Ave.

More information on how Costs Estimates were determined can be found in Appendix D

NP - Not Pictured

APPENDIX Index

RESOLUTION 2013 – 11-08

AUTHORIZING THE TOWN OF SURF CITY TO SUPPORT THE CREATION OF A TOWN of SURF CITY BICYCLE AND PEDESTRIAN PLAN ADVISORY COMMITTEE TO SECURE GRANT FUNDING FOR THE TOWN.

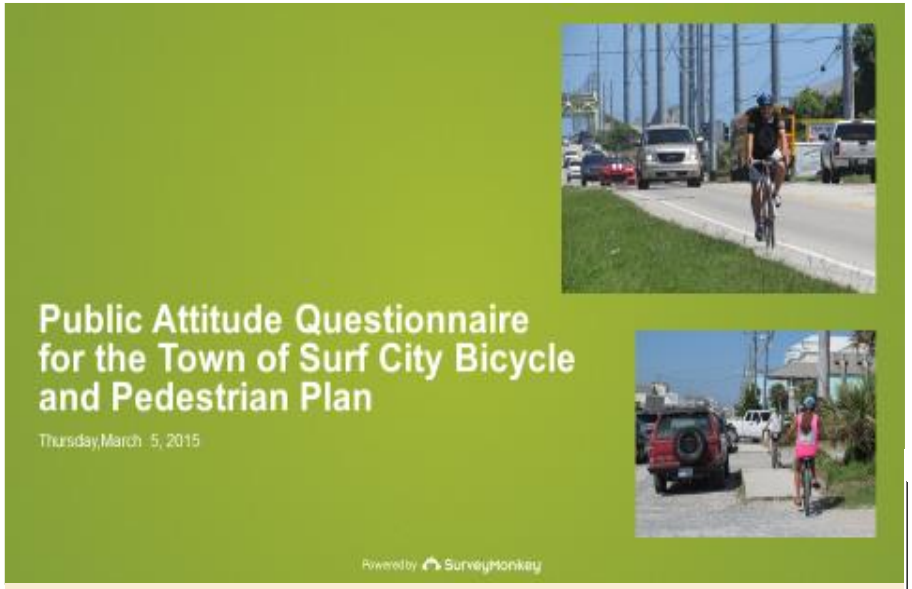
WHEREAS, The Town of Surf City supports the development of a bicycle and pedestrian infrastructure plan that will prepare long range plans for improvements, funding locally-sponsored projects and administering programs supporting the development and maintenance of the Town of Surf City's bikeways and walkways. The Town supports the creation of **The Bicycle and Pedestrian Plan Advisory Committee** will serve to advise the Town of Surf City's staff and Board of Directors about these plans and safety programs, as well as to provide a forum for the discussion and resolution of issues related to bicycle and pedestrian transportation, by promoting safety, increased physical activity and healthy lifestyles among its residents and visitors.

WHEREAS, **The Town of Surf City's Bicycle and Pedestrian Plan Advisory Committee,** (SCBPPAC) headed by Todd Rademacher, the Planning Director will work with the consulting engineer, Cavanaugh & Associates, P.A, and NCDOT Division of Bicycle and Pedestrian Transportation (DBPT) to secure the Comprehensive Bicycle and Pedestrian Planning Grant Initiative Funding to help with the construction of future bikeways and walkways; and also work with Pender County to inform them of our desire to include the development of bikeways, greenways and walking paths in the Town of Surf City to be considered as part of the local transportation prioritization policy.

At the October Town Council Meeting, we voted to support the hiring of Cavanaugh & Associates, P.A. to evaluate and add to the existing Parking and Transportation Master Plan they helped Surf City to develop in August of 2008, the Sidewalk Master Plan, the Parking and Transportation Master Plan by incorporating a long range planning document, (The Surf City Bicycle and Pedestrian Master Plan Development) that sets forth both long and short term goals and objectives for improving bicycle and pedestrian facilities, and identifies the priorities and suggestions for means of funding these projects. The plan will promote the connection of bicycling and walking paths throughout the Town, suggest areas that require improvements, including priorities and will be submitted to the NCDOT to become eligible for state and federal grant funding which will ensure a safer walking and bicycling environment. The SCBPPAC, named above will work with the consulting firm in these efforts, representing public support.

The Town of Surf City Bicycle and Pedestrian Plan Advisory Committee will open their meetings to businesses and residents to get public viewpoints and support for this project and request the citizens of Surf City to suggest desired connector routes, areas with dangerous impediments to walking and bicycling, and areas where crosswalks or signaling is needed or desired. Our hope is that all of these efforts will encourage more people to consider walking or riding a bike to work, school, shopping or recreation which will decrease the number of motor vehicles on the roads, and increase safety and well-being of our residents and visitors.

Appendix B. Survey Data



Two surveys were given to Town residents and visitors regarding Bicycle and Pedestrian Infrastructure. The first survey which was advertised on social media was available online and by hand and had 1,027 participants. This survey was also available at the Public Workshop. The results were presented to the Planning Board. The second survey 'Public Attitude Questionnaire' was also distributed through survey monkey, and had mostly resident questions. It had 647 respondents. Some of the commonalities are listed at left, and sample questions follow.

Survey results are physically available at the Office the Town of Surf City's Planning Director, Todd Rademacher.

Commonalities – Bicycle Infrastructure
Bicyclists Concerns (From survey)

NC 210 & Hwy 17 are perceived to be very dangerous
Current paths need maintenance and widening; much too narrow
Lots of support for the Power Line greenway as a multi-use path
Improvements near S Curve – too dangerous
Off-road multi-use paths helpful
Need connectivity to off-road trails
More Bicycle parking at shopping areas and the beach
Bike trails desired to connect to:

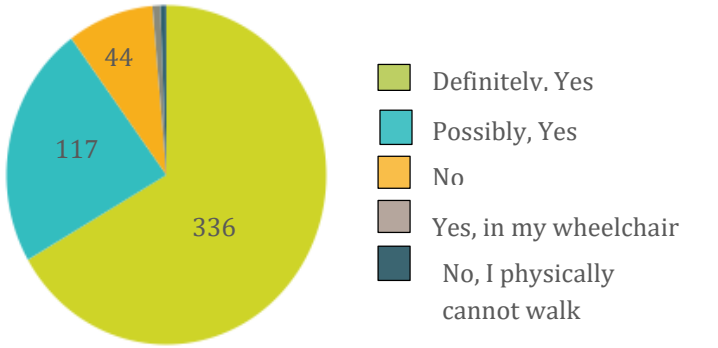
- Soundside Park
- Holly Ridge to Surf City
- Karen Beasley Sea Turtle RRC
- Cape Fear Community College
- New Greenway where electric lines are

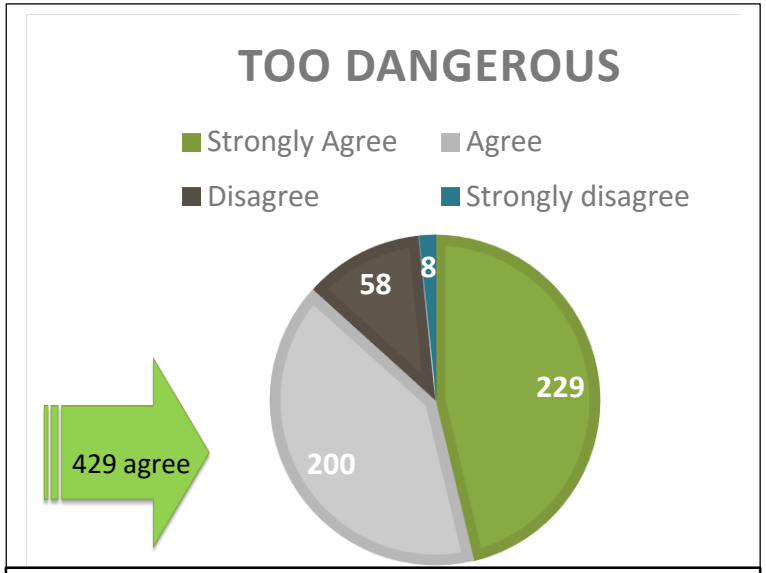
Increased "Share the Road" signage
Increased awareness and
Motor vehicle "Slow down" signs
More and better separation from cars

While the full survey results are lengthy and cannot be shown in this report, a sampling of questions are shown below and on the next few pages.

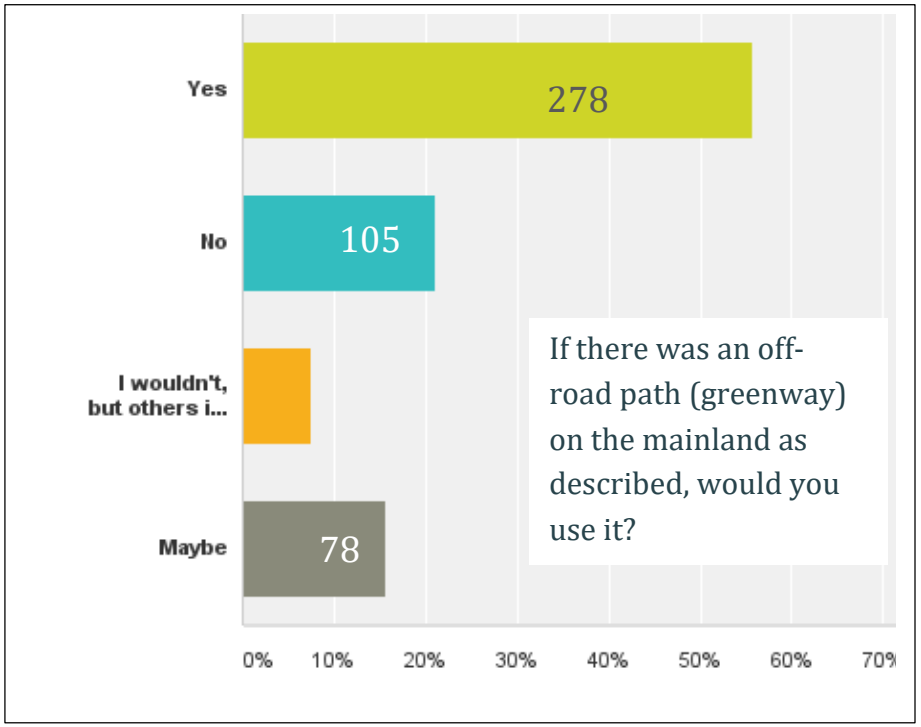
Q10 Do you think you would walk/jog more frequently if the sidewalks were connected, and if there was an off-road avenue to get to other locations?

Answered: 504 Skipped: 13

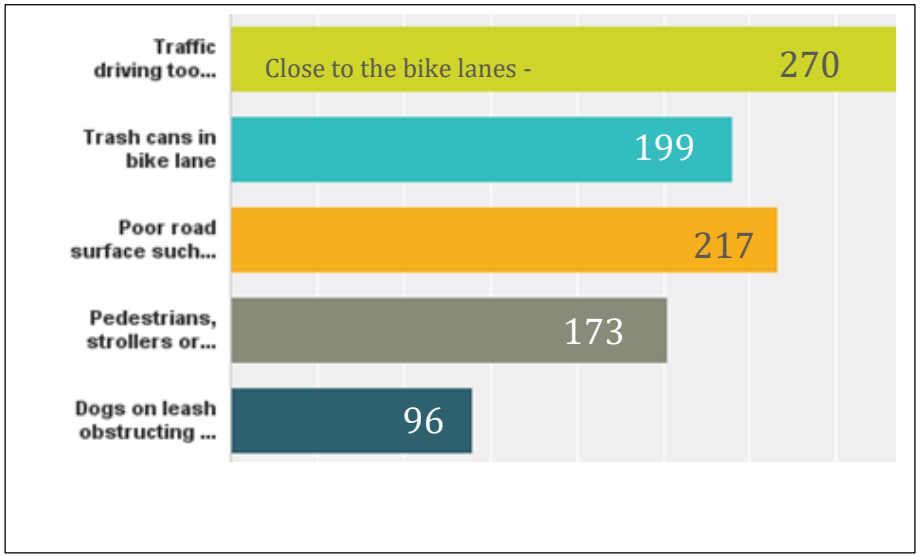


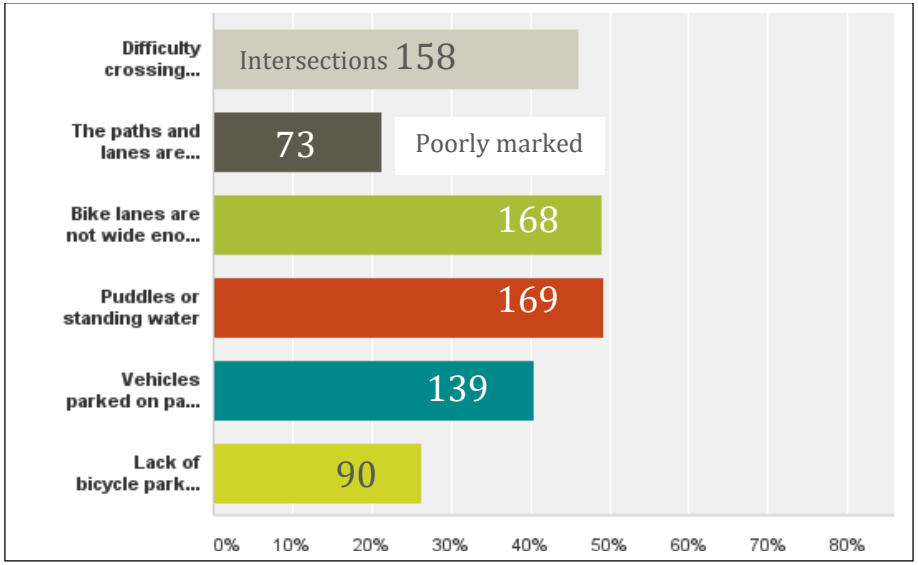


Do you agree that it is too dangerous for someone to ride their bike alongside the traffic on existing streets and roads?



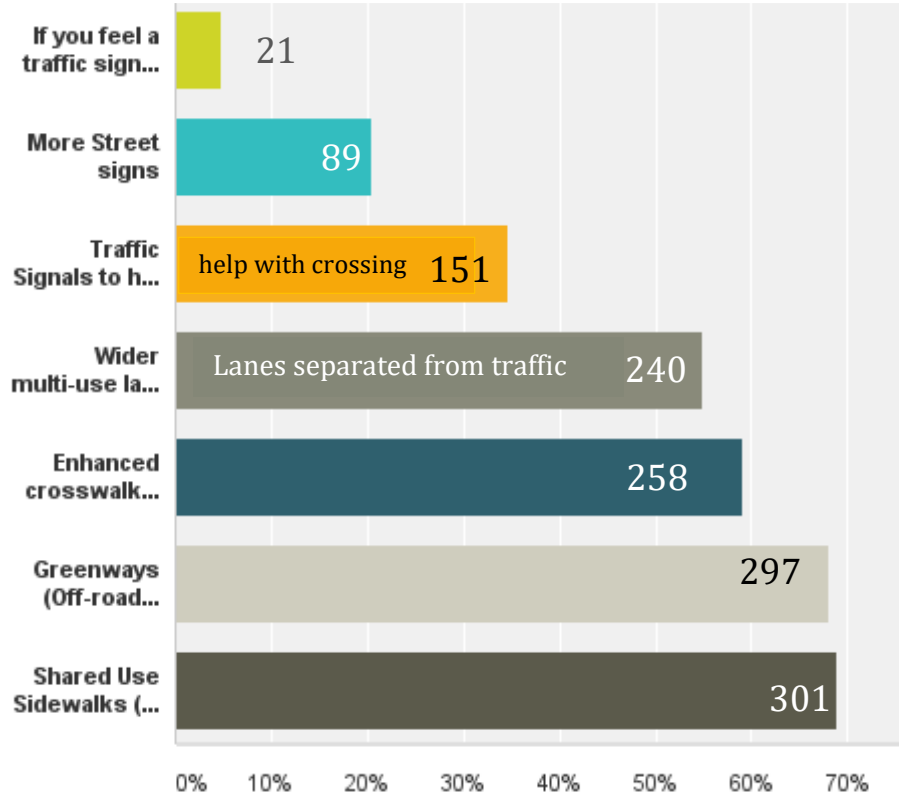
When asked if they encountered these problems on the bike paths, survey respondents answered:





Responses from the Public Attitude Survey

Which of these design features would you like to see implemented



Responses from the Surf City Bicycle/Pedestrian Survey

Please indicate if you would Agree/Disagree with these recommended changes to increase the ease of walking and bicycle

	Agree	Disagree	Total
Provide interconnecting sidewalks and trails	93.34% 561	6.66% 40	601
Provide wider sidewalks and paths on Shore Drive from rentals and residences to the Central Business District	82.14% 483	17.86% 105	588
Provide crosswalks at the busiest areas to make it safer	92.31% 552	7.69% 46	598
Provide multi-use paths from residences and neighborhoods to the business district	82.88% 489	17.12% 101	590
Provide paths on the side of the bridge before you get to the island so people could walk /bike to the beach.	87.27% 514	12.73% 75	589
Provide paths for areas of interest such as the Community Park and Sea Turtle Hospital and around the lake at the Community Park.	86.64% 506	13.36% 78	584
Provide a multi-use path (greenway) where the electric lines run through the town which is near Electric Lane on Hwy 210 just down form the Harris Teeter Shopping Center.	66.43% 374	33.57% 189	563

Electric Transmission Right of Way Requirements for Shared-Use Paths/Trails

This list of Duke Energy's transmission right of way requirements for the co-location of shared-use paths/trails has been developed as a guideline to answer the most frequently asked questions. This should not be considered a comprehensive list of all requirements or factors that may need to be addressed. You should contact the Asset Protection Right of Way Specialist if you have additional questions or concerns. This list of requirements and guidelines is subject to change at any time and without notice. Duke Energy reserves all rights conveyed to it by the right of way agreement applicable to the subject property. An engineering drawing, including topographic grade changes, location of Duke Energy structures and paths/trails must be approved by an Asset Protection Specialist.

Compliance with these Duke Energy Shared-Use Path/Trails requirements, or approval of any such plans by Duke Energy, does not guarantee that other applicable requirements imposed by any local, county, state, federal or other applicable regulatory agency have been satisfied.

Definition: For purposes of this document the term "trail(s)" shall be used to refer to Multi-Use Paths or Shared-Use Paths as defined by the American Association of State Highway and Transportation Officials (ASSHTO).

1. The trails must not exceed a total of 10 feet in width, regardless of the surface construction material.
2. A minimum separation of 25 feet is required between the trail and its associated easement, to any Duke Energy electrical facility. This includes, but is not limited to, poles, towers, guy anchor(s), equipment, etc. If the owner of the trail is not the current owner of the fee simple title to the lands underlying Duke Energy's easement, the trail owner shall obtain a legally sufficient easement from the current fee simple title owner and produce said easement to Duke Energy prior to commencing activities within the Duke Energy easement. In the event a private easement is not required, no portion of the trail or shoulder, or associated grading, shall be located within 25 feet of any electrical facility.
3. The owner of the trail shall be responsible for safety and liability associated with its construction or use thereof.
4. Bollards shall be installed per Duke Energy specifications, with Duke Energy locks, where the trailheads connect with roads/streets as to prevent vehicular traffic. Duke Energy may require reinforcement of the trail at specified access points along the corridor for Duke Energy heavy equipment crossings. These trail reinforcement areas shall consist of a 20-foot-long, 10-foot-wide paved area capable of supporting 80,000 pounds with pavement markings indicating "heavy equipment crossing."
5. Culverts shall be installed where the trails cross creeks, ditches, etc. These culverts shall be capable of supporting 80,000 pounds, and shall be a minimum of 20 feet wide. Signage must indicate the maximum load of the crossing at culvert approach.
6. No structures including, but not limited to, lights, signs, benches, exercise equipment, and irrigation systems shall be located within the Duke Energy easement.
7. Planting of vegetation shall adhere to the Right of Way (RW) Restrictions Guidelines for the specific Duke Energy territory. A copy of the RW Restrictions/Guidelines can be obtained from your Asset Protection Specialist.
8. Duke Energy reserves the right to close, without notice, all or a portion of the trail located within the transmission line easement, for any length of time, for construction, maintenance or emergency line operations.
9. Duke Energy will not be held responsible for any damages to the trails due to its operations or any liability based on the use of the trail. Prior to the installation of a shared-use trail, a "Trail Encroachment Agreement", which includes "hold harmless" language, shall be executed with Duke Energy. In addition, deed information of all property owners that the trail affects must be supplied to Duke Energy. Proof that the property owners have signed an easement agreement with the owner of the trail will be required, as applicable.
10. All other Duke Energy electric transmission right of way restrictions/guidelines shall apply to the installation of trails.

We hope this is useful information. If you have additional questions or plan any activity not mentioned above, please contact:

Duke Energy Representative _____ **Phone Number** _____

Form #XXXXX 06/13

Transmission Rights of Way Restrictions

This list of rights-of-way restrictions has been developed to answer the most frequently asked questions about property owner use of Duke Energy's electric transmission rights of way. This list does not cover all restrictions or all possible situations. You should contact the Asset Protection Specialist if you have additional concerns about the rights of way. This list of restrictions is subject to change at any time and without notice. Duke Energy reserves all rights conveyed to it by the right-of-way agreement applicable to the subject property. All activity within the rights of way shall be reviewed by an Asset Protection specialist to obtain prior written approval. Engineering plans may be required. Compliance with the Duke Energy Rights-of-Way Guidelines/Restrictions or approval of any plans by Duke Energy does not mean that the requirements of any local, county, state, or federal government or other applicable agency with governing authority have been satisfied.

1. Structures, buildings, manufactured/mobile homes, satellite systems, swimming pools (any associated equipment and decking), graves, billboards, dumpsters, signs, wells, deer stands, retaining walls, septic systems or tanks (whether above or below ground), debris of any type, flammable material, building material, wrecked or disabled vehicles and all other objects (whether above or below ground) which, in Duke Energy's opinion interferes with the electric transmission right of way, are not allowed within the right-of-way limits. Transformers, telephone/cable pedestals (and associated equipment), and fire hydrants are not allowed. Manholes, water valves, water meters, backflow preventers and irrigation heads are not permitted. Attachments to Duke Energy structures are prohibited.
2. Fences and gates shall not exceed 10 feet in height and shall be installed greater than 25 feet from poles, towers and guy anchors. Fences shall not parallel the centerline within the rights of way but may cross from one side to the other at any angle not less than 30 degrees with the centerline. If a fence crosses the rights of way, a gate (16 foot wide at each crossing) shall be installed by the property owner, per Duke Energy's specifications. The property owner is required to install a Duke Energy lock on the gate to ensure access. Duke Energy will supply a lock.
3. Grading (cuts or fill) shall be no closer than 25 feet from poles, towers, guys and anchors (except for parking areas, see paragraph 7) and the slope shall not exceed 4:1. Grading or filling near Duke Energy facilities, which will prevent free equipment access, or creates ground to conductor clearance violations, will not be permitted. Storage or stockpiling of dirt or any other material is prohibited. Sedimentation control, including re-vegetation, is required per state regulations.
4. Streets, roads, driveways, sewer/water lines, other utility lines or any underground facilities shall not parallel the centerline within the rights of way, but may cross, from one side to the other, at any angle not less than 30 degrees with the centerline. No portion of such facility or corresponding easement shall be located within 25 feet of Duke Energy's facilities. Roundabouts, cul-de-sacs, intersections (such as roads, driveways and alleyways) are not permitted.
5. Any drainage feature that allows water to pond, causes erosion, directs stormwater toward the rights of way, or limits access to or around Duke Energy facilities is prohibited.
6. Contact Duke Energy prior to the construction of lakes, ponds, retention, or detention facilities, etc.
7. Parking may be permitted within the rights of way, provided that:
    a. Prior to grading, concrete barriers shall be installed at a minimum of 9 feet from the Duke Energy facilities. During construction, grading shall be no closer than 10 feet to any Duke Energy facility.

b. After grading/paving activity is complete, a Duke Energy approved barrier, sufficient to withstand a 15-mph vehicular impact, shall be erected 9 feet from any Duke Energy facility.

c. Any access areas, entrances, or exits shall cross (from one side to the other) the rights of way at any angle not less than 30 degrees with the centerline, and shall not pass within 25 feet of any structure. Parking lot entrances/exits cannot create an intersection within the rights of way.

d. Lighting within the rights-of-way limits must be approved by Duke Energy before installing. Due to engineering design standards, lighting is not allowed in the "wire zone." Where lighting is approved (border zone), the total height may not exceed 15 feet in Area A and 12 feet in Area B. Contact your Asset Protection Specialist as the wire zone varies for the different voltage lines.

8. Duke Energy will not object to certain vegetation plantings as long as:

a. It does not interfere with the access to or the safe, reliable operation and maintenance of Duke Energy facilities.

b. With prior written approval, Duke Energy does not object to low growing shrubs and grasses within the wire zone. Tree species are not allowed within the wire zone. Trees that are approved in the border zone may not exceed, at maturity, 15 feet in Area A and 12 feet in Area B. See map on back of page for areas. Contact the Asset Protection specialist for wire zone/border zone definitions.

c. For compliant mature height species, refer to plants.ces.ncsu.edu for reference.

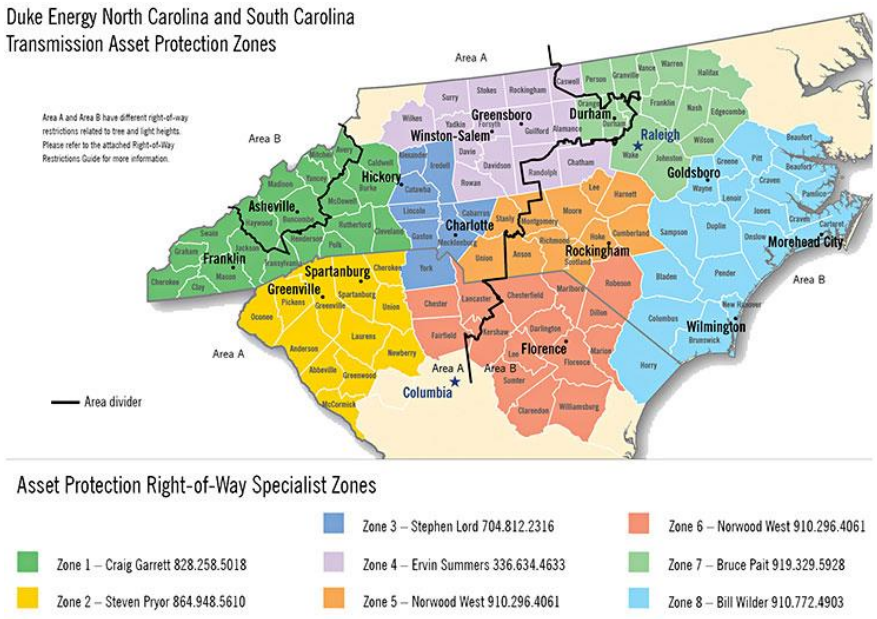
d. Engineering drawings must indicate the outer most conductor.

e. Vegetation that is not in compliance is subject to removal without notice.

f. Duke Energy may exercise the rights to cut “danger trees” outside the rights-of-way limits as required to properly maintain and operate the transmission line.

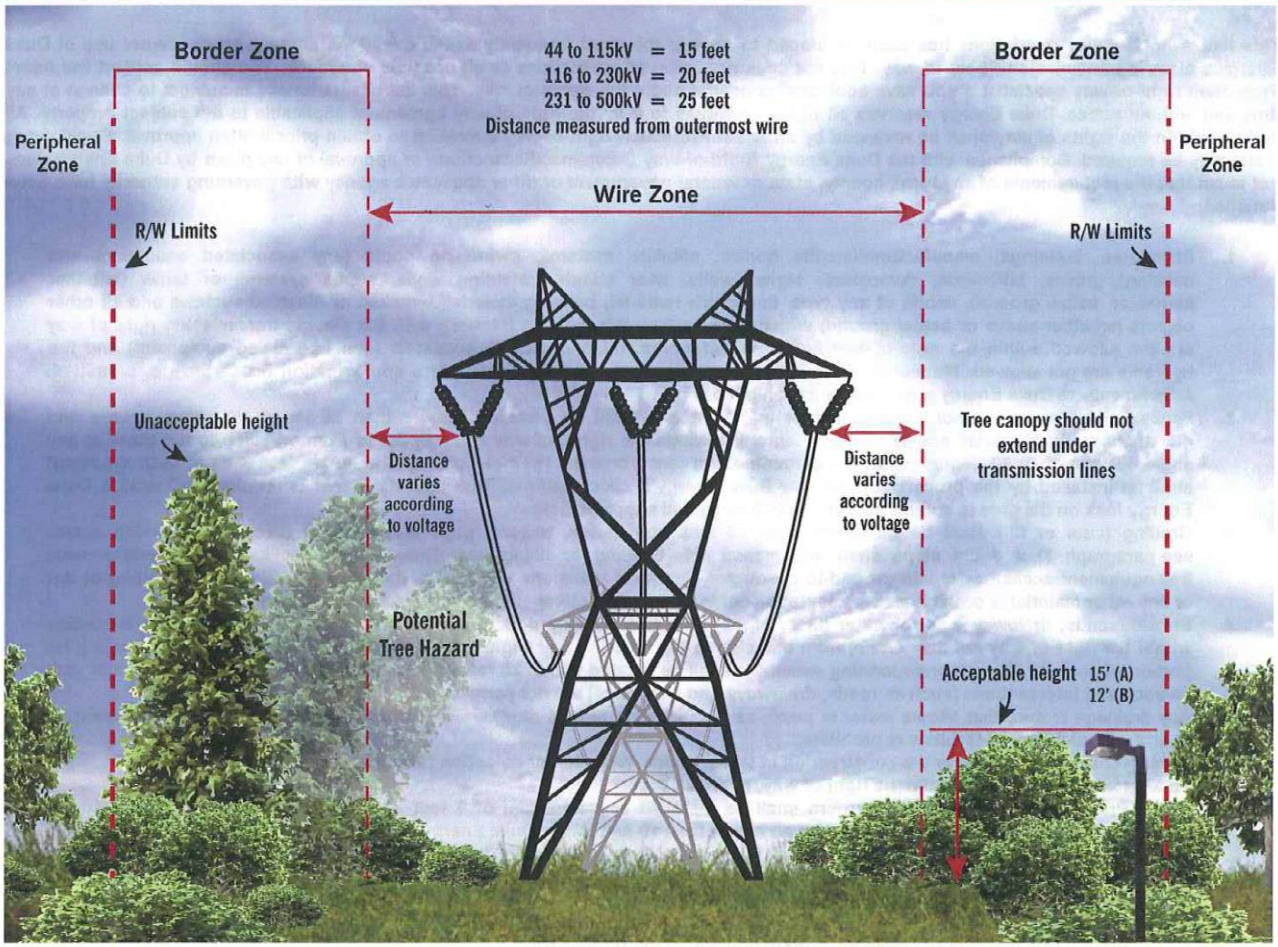
Source: www.duke-energy.com/safety/right-of-wa-management/transmission-restrictions.asp.

As shown below, Bill Wilder is the contact for the Surf City area (Zone 8)



DUKE ENERGY®

Transmission Right-of-way Zones - Carolinas



Wire Zone: Extends beyond the outermost conductor on both sides. (See diagram above.)

Permitted within the Wire Zone: Low-growing plants, shrubs and grasses.
Not permitted within the Wire Zone: Tree species of any kind.

Border Zone: Extends from the edge of the Wire Zone to the outside edge of the Right of Way.

Permitted within the Border Zone: Lighting structures and plantings within the Right of Way that do not exceed a vertical height of 15 feet in Area A and 12 feet in Area B. (See Asset Protection Map for location of geographic areas) For compliant mature height species, refer to **plants/ces.ncsu.edu/**.

Not permitted within the Border Zone: Any object that exceeds vertical height restrictions. These restrictions are based on flat ground elevations. If the ground elevations differ, no object at any time may exceed the outermost conductor's ground elevation.

Peripheral Zone: Outside the Right of Way and adjacent to Border Zones.

Permitted within the Peripheral Zone: Trees may be planted in the Peripheral Zone. Duke Energy recommends customers exercise caution selecting and planning trees in this zone.
Not permitted in the Peripheral Zone: Trees with canopies are subject to routine trimming and possible removal.

In all zones:

When an outage risk is identified, Duke Energy will attempt to notify the affected customer. However, the company may need to take immediate action if trees cannot be pruned to appropriate levels. This may include trees and shrubs that are within 20 feet of the power line at the maximum peak load or during weather conditions that create line sag and sway.

Written approvals by Duke Energy are required for all plans.

We hope this is useful information. If you have additional questions on line voltages or plan any activity not mentioned above, please contact the Asset Protection Specialist for your area. (See Map)

*Right of Way is intended to reference the easement rights granted to Duke Energy. Actual zone size may vary based upon the particular Right of Way.

Appendix D. Planning-Level/Per-Unit Cost Estimates for the Surf City Bicycle and Pedestrian Plan

ABOUT THESE ESTIMATES:

The following cost estimates are directly from the 2013 report, ***'Costs for Pedestrian and Bicyclist Infrastructure Improvements'*** (and its associated database). The research was conducted by the UNC Highway Safety Research Center (HSRC), and was prepared for the Federal Highway Administration. The report features general estimates and cost ranges for 77 pedestrian and bicycle facilities using more than 1,700 cost observations, and are presented with a median and average price, the minimum and maximum cost, and the number of sources. The full report can be found here, and can be referenced for text that describes the following tables in more detail: http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

SIDEWALKS:

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Sidewalk	Brick Sidewalk	$60	$60	$12	$160	Linear Foot	9 (9)
Sidewalk	Concrete Paved Shoulder	$6.10	$6.64	$2.79	$58	Square Foot	1 (11)
Sidewalk	Concrete Sidewalk	$27	$32	$2.09	$410	Linear Foot	46 (164)
Sidewalk	Concrete Sidewalk - Patterned	$38	$36	$11	$170	Linear Foot	4 (5)
Sidewalk	Concrete Sidewalk - Stamped	$45	$45	$4.66	$160	Linear Foot	12 (17)
Sidewalk	Concrete Sidewalk + Curb	$170	$150	$23	$230	Linear Foot	4 (7)
Sidewalk	Sidewalk Unspecified	$34	$45	$14	$150	Linear Foot	17 (24)
Sidewalk	Sidewalk Pavers	$70	$80	$54	$200	Linear Foot	3 (4)

BICYCLE LANES

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Bikeway	Bicycle Lane	$89,470	$133,170	$5,360	$536,680	Mile	6 (6)
Bikeway	Signed Bicycle Route	$27,240	$25,070	$5,360	$64,330	Mile	3 (6)
Bikeway	Signed Bicycle Route with Improvements	$241,230	$239,440	$42,890	$536,070	Mile	1 (6)

PATHS:

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Path	Boardwalk	$1,957,040	$2,219,470	$789,390	$4,288,520	Mile	5 (5)
Path	Multi-Use Trail - Paved	$261,000	$481,140	$64,710	$4,288,520	Mile	11 (42)
Path	Multi-Use Trail - Unpaved	$83,870	$121,390	$29,520	$412,720	Mile	3 (7)

CROSSWALKS:

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Crosswalk	High Visibility Crosswalk	$3,070	$2,540	$600	$5,710	Each	4(4)
Crosswalk	Striped Crosswalk	$340	$770	$110	$2,090	Each	8 (8)
Crosswalk	Striped Crosswalk	$5.87	$8.51	$1.03	$26	Linear Foot	12 (48)
Crosswalk	Striped Crosswalk	$6.32	$7.38	$1.06	$31	Square Foot	5 (15)

WAYFINDING SIGNS:

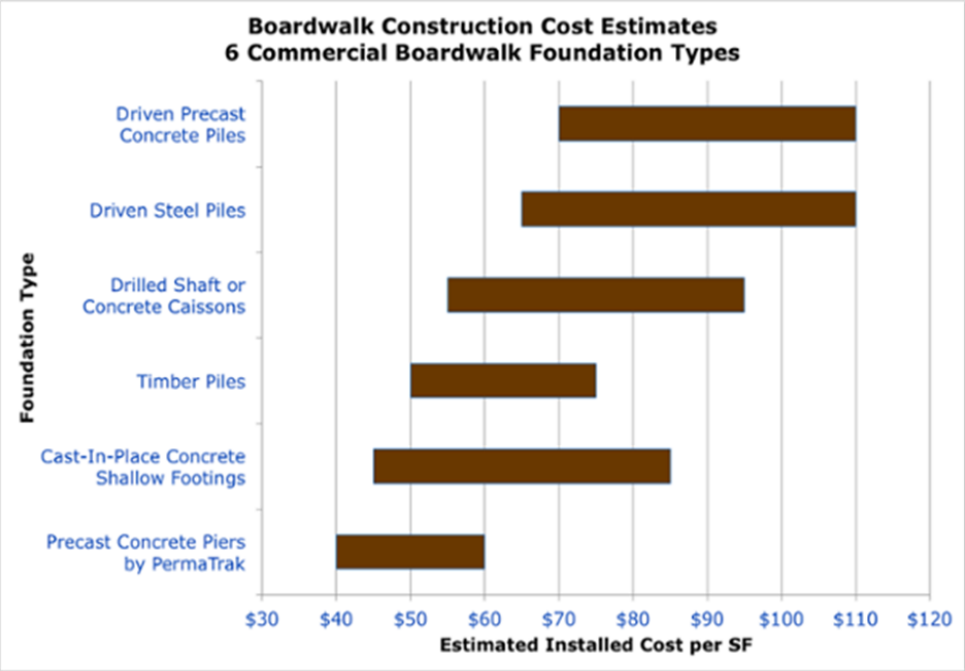
According to the ***'Costs for Pedestrian and Bicyclist Infrastructure Improvements'*** report, approximate signage costs (per unit) include the following:

"Bike Route" signage $160
"No turn on red" signage $220 for a metal sign or $3,200 for an electronic sign
In-pavement yield paddles $240
Trail regulation sign $160
Trail wayfinding/information sign range from $530 to $2,150.

Looking at local costs estimates sometimes helps to gauge a better understanding of projected costs.

Jacksonville Urban Area Metropolitan Planning Organization recently published their 2040 Long Range Transportation Plan, referred to as **JUMPO 2040 LRTP** of April 2015, Source: http://files.www.jumpo-nc.org/plans-documents/JUMPO2040LRTP_Final_Report.pdf, which lists costs per unit for transportation infrastructure.

Infrastructure	Description	Typical Size or Spacing	Estimated Cost/Unit	Target User
Striped Bike Lane	Exclusive Use area adjacent to outer most travel lane	Width 4' to 5'	$2,000/ mile	Advanced and Basic Cyclists
Sidewalk	Dedicated space for pedestrians, with buffer from roadway	Width 5'	$150,000/mile $175/each	ADA Compliant for Pedestrians
Paved Shoulder	Additional pavement adjacent to travel lane	Width 4'	$500,000/mile if 4'	Advanced Cyclists
Multi-use Path	Separated from traffic , open space greenway, or sidepath	width 10-14' pref.	$220,000/mile	All Cyclists and pedestrians
	separated from road			
Shared Lane Markings	Pavement markings on lanes to indicate shared space for bikes and motorists	Spaced 100-250 feet	$12,500 per mile ($175 each)	Advanced or Intermediate Cyclists
(Sharrows)				



Source: http://www.permatrak.com/news-events/bid/97419/Boardwalk-Construction-Estimates-How-Much-Does-a-Boardwalk-Cost

Source: How to Build a Walking Trail / Texas Department of Health

This example is provided as a cost estimate for a walking trail.

Gravel Coverage Formula

1. Convert trail surface area into square feet (length x width = square feet).
2. Square feet/324 = # of cubic yards needed to cover 1" deep.
3. Multiply cubic yards by depth of surface desired.
4. Multiply this figure by 1.25 = # tons surface material needed.

Example

How many tons of gravel is needed for 1/4 mile trail that is 6' wide and 4" deep?

1. 1320 ft. X 6 ft. = 7920 sq. Ft.
2. 7920/324 = 24.44 cubic yds. For 1" deep surface
3. 24.44 x 4" deep = 97.6 cubic yds.
4. 97.76 x 1.25 = 122.2 tons gravel needed

Asphalt

4" asphalt slab is acceptable on compacted topsoil as a base.
2" asphalt slab is acceptable on a 4-6" compacted gravel base.
Typical cost (including base preparation and surfacing)
Asphalt paving $22-26/ton.

Coverage

1 ton of asphalt 4" deep will pave a 6' wide trail 7.5 feet
1 ton asphalt 2" deep will pave a 6' wide trail 15 feet.

Comments

Asphalt is the most expensive surface available but also the longest lasting. It is a low maintenance surface that can be painted or otherwise marked if so desired. Asphalt does not need edging.

Appendix E. Trail Maintenance

The Gary Shell Cross-City Trail, a 15 mile multi-use trail for bicyclists and pedestrians is being constructed in Wilmington, NC. According to its Master Plan, the trail costs are estimated at nearly $8 million dollars, with over $6 million dollars, a combination of federal, state local and private funds expended or allocated to date. (Source: https://www.wilmingtonnc.gov/Portals/0/documents/Community%20Services/Parks,%20Recreation,%20and%20Downtown%20Services/Cross%20City%20Trail/2012-03-12_GSCCTMasterPlan_RevisedDraft.pdf). Where possible, the trail is 10' wide multi-purpose path which comfortably accommodates two-way directional, multi-modal traffic, and is designed to accommodate individuals with disabilities. The maintenance activities of this trail are described below, so that the Town of Surf City can get an idea of how the maintenance management is accomplished

Trail Maintenance Activities in nearby Wilmington, N.C. are provided as an example.

The Gary Shell Cross-City Trail is maintained by the Community Service's Parks, Landscaping and Athletics Facilities Division. One fulltime staff person from this Division is responsible for daily maintenance and inspection of the trail facility. Additional staff and seasonal help are made available as funding becomes available. It should be noted that in the event of a severe weather event such as a hurricane, post-storm maintenance is supplemented by the Wilmington's Public Services Department and if authorized, state and federal aid.

Maintenance activities include:

- Mowing
- Blowing natural debris such as leaves, acorns and twigs
- Trash pickup
- Weed control as needed by mechanical or chemical removal
- Edge/Trail shoulder vegetative maintenance
- Erosion repair
- Bridge and boardwalk repair
- Bituminous patching and striping replacement as needed
- Sign inventory and replacement
- Periodic trail sweeping and vacuuming
- Pet waste stations

Source: http://archive.luminanews.com/article.asp?aid=10519

They are working toward developing an ***"Adopt-A-Trail Program,"*** a community partnership where volunteer organizations and individuals would commit to helping with upkeep of their segment of the trail.

Another example of a Sustainable Maintenance Plan is on the following page.

Example: Trail Maintenance Plan

Some Towns and Cities supplement their plans by having other groups help to maintain the trails. An example of a Sustainable Trail Maintenance Plan using paid contractual workers and volunteer groups is below.

1. Town Maintenance Crews (Emergencies, Sign Installations, Work Orders)
2. Contractual Lawn Work (Scheduled Weeding, Edging, Pruning, Leaf Blowing)
3. Prison Labor (Bike Racks, weed abatement, trash pick-up)
4. Service Groups (Trash pick-up, shrub, tree, and flower planting, painting of wood structures)
5. Volunteers (Adopt-A Trail, trash pick-up once monthly, sweeping)

Monitoring the Trails

- Bike Riders and Pedestrians can monitor the trails and report if work needs to be done.
- Routine inspections can be done by service groups (Weekly, Bi-weekly, Monthly)
- Infrastructure inspections done by Town Semi-annually, or Annually
- Inventory to include the year trail or path is built, and its' condition, useful life, and renovation schedule

Appendix F. Crash Data

Reported Pedestrian and Pedalcyclist Crashes in Surf City, NC

For the Reporting Period of January 1, 2000 to July 27, 2015

NCDMV Crashid	*County*	*Road Classification*	*On Road*	*Miles*	*Dir*	*From Road*	*Toward Road*	*Crash Severity*	*Date of the Crash*	*Time of the Crash*	*Vehicle Style (Type)*
100120882	Pender	NC Route	NC 50 - S SHORE DR	0.011	S	ROSEMARY	KAREN DR	B-Injury (Evident)	6/19/2000	2:11 PM	Pedestrian
100653112	Pender	NC Route	NC 50 - ROLAND AVE	0.028	W	N TOPSAIL DR	NC 210	C-Injury (Possible)	6/28/2002	10:15 PM	Pedestrian
100720838	Pender	NC Route	NC 50	0.1	E	JH BATTS RD	LITTLE KINSTON RD	A-Injury (Disabling)	9/29/2002	12:10 AM	Pedestrian
101372723	Onslow	NC Route	NC 210 -N NEW RIVER DR	0.1	N	NINTH ST	STARFISH LN	Fatal (Killed)	8/28/2004	2:56 AM	Pedestrian
102311845	Pender	NC Route	N NEW RIVER DR	0.1	S	CRAVEN AVE	MECKLENBERG AVE	Fatal (Killed)	7/6/2007	5:26 PM	Pedestrian
103508222	Pender	Local Street	SEAHORSE	0		S TOPSAIL DR	S SHORE DR	B-Injury (Evident)	7/29/2012	8:00 AM	Pedalcycle
103740278	Pender	NC Route	NC 50	0.5	W	NC 210	VESTA CT	C-Injury (Possible)	4/3/2013	7:27 PM	Pedestrian
103787540	Onslow	Local Street	N NEW RIVER DR	0.006	S	FOURTH ST	E FIFTH ST	B-Injury (Evident)	6/28/2013	9:02 PM	Pedestrian
103790108	Onslow	Local Street	9TH STREET	0.2	W	9TH STREET		B-Injury (Evident)	6/29/2013	6:20 AM	Pedestrian
104010573	Pender	NC Route	NC 210 BUS	0.1	E	ELECTRIC LN	COLBERT LN	B-Injury (Evident)	3/19/2014	12:30 PM	Pedestrian
104071822	Pender	Local Street	ROLAND AVE	0		S TOPSAIL DR	N TOPSAIL DR	C-Injury (Possible)	6/1/2014	1:00 PM	Pedalcycle
104093723	Pender	Public Vehicular Area	PVA 420 FUN CENTER DR	0.01	S	NC 210		C-Injury (Possible)	7/2/2014	2:51 PM	Pedestrian
104096336	Pender	Public Vehicular Area	PVA 511 ROLAND AVE	0.006	S	ROLAND AVE		Property Damage Only	7/5/2014	7:00 PM	Pedestrian
104127479	Pender	Local Street	N NEW RIVER DR	0.014	N	PENDER AVE	NEPTUNE DR	A-Injury (Disabling)	8/15/2014	7:14 PM	Pedestrian
104426897	Pender	Local Street	W 9TH STREET	0.1	W	NC 210 BUS		B-Injury (Evident)	7/3/2015	5:00 PM	Pedestrian
104439044	Pender	NC Route	NC 210	0		WATTS LANDING RD	KING DR	C-Injury (Possible)	7/19/2015	7:36 AM	Pedalcycle

*These are only the accidents/injuries in the Town of Surf City, which does not include the surrounding area.

Last Updated: 7/27/2015

These figures were provided by the Traffic Safety Specialist at NC Department of Transportation- Transportation Mobility and Safety Division

Appendix G. – Traffic Counts

Ramey Kemp & Associates, Transportation Engineers, counted the motorized vehicles at the intersections pictured here on July 9, 2014, which was on a Wednesday (mid-week), and the hourly traffic count is shown on the following charts. Eight thousand nine hundred forty-two (8,942) vehicles crossed the intersection of NC 50 & Gateway Condo Drive, during this 13 hour period which is an average of 688 vehicles per hour. The mid-week traffic is substantially less than the weekend traffic counts, which you will see on the following charts.

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : NC 50 & Gateway Condo Dr_Fun Center Dr
Site Code : 00070914
Start Date : 7/9/2014
Page No : 2

Groups Printed- Vehicles

	NC 50 Southbound				Gateway Condo Drive Westbound				NC 50 Northbound				Fun Center Drive Eastbound						
Start Time	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Exclu. Total	Inclu. Total	Int. Total
03:00 PM	2	129	0	0	0	0	0	0	0	0	25	0	18	0	0	0	0	174	174
03:15 PM	4	161	0	2	2	0	0	0	0	0	20	0	18	0	0	0	2	205	207
03:30 PM	2	172	0	2	1	0	0	0	1	0	20	0	22	0	0	0	2	218	220
03:45 PM	6	137	0	0	2	5	0	0	3	0	11	0	26	0	0	0	0	190	190
Total	14	599	0	4	5	5	0	0	4	0	76	0	84	0	0	0	4	787	791
04:00 PM	3	123	0	0	0	0	0	0	1	0	22	0	12	0	0	0	0	161	161
04:15 PM	2	126	0	0	0	0	0	0	1	0	17	0	18	0	0	0	0	164	164
04:30 PM	4	160	0	0	0	0	0	0	2	0	26	0	20	0	0	0	0	212	212
04:45 PM	4	151	0	0	1	0	0	0	1	0	13	0	14	0	0	0	0	184	184
Total	13	560	0	0	1	0	0	0	5	0	78	0	64	0	0	0	0	721	721
05:00 PM	3	132	0	0	1	0	0	0	1	0	11	0	16	0	0	0	0	164	164
05:15 PM	5	153	0	0	1	0	0	0	3	0	19	0	27	0	0	0	0	208	208
05:30 PM	3	144	0	1	0	0	0	0	1	0	17	1	20	0	0	0	2	185	187
05:45 PM	2	121	0	0	0	0	0	0	2	0	10	0	12	0	0	0	0	147	147
Total	13	550	0	1	2	0	0	0	7	0	57	1	75	0	0	0	2	704	706
06:00 PM	3	134	0	0	1	0	0	0	0	0	11	0	13	0	0	0	0	162	162
06:15 PM	1	131	0	1	1	0	0	0	0	0	3	0	5	0	0	0	1	141	142
06:30 PM	3	145	0	0	1	0	0	0	0	0	5	0	9	0	0	0	0	163	163
06:45 PM	4	158	0	0	1	0	0	0	0	0	6	0	13	0	0	0	0	182	182
Total	11	568	0	1	4	0	0	0	0	0	25	0	40	0	0	0	1	648	649
07:00 PM	3	139	0	1	0	0	0	0	0	0	8	0	12	0	0	0	1	162	163
07:15 PM	5	119	0	0	0	0	0	0	1	0	14	0	7	0	0	0	0	146	146
07:30 PM	2	93	0	0	0	0	0	0	0	0	10	0	11	0	0	0	0	116	116
07:45 PM	4	115	0	0	0	0	0	0	0	0	23	0	21	0	0	0	0	163	163
Total	14	466	0	1	0	0	0	0	1	0	55	0	51	0	0	0	1	587	588
Grand Total	218	7007	0	28	34	5	0	1	44	0	791	1	807	0	0	6	36	8906	8942
Apprch %	3	97	0		87.2	12.8	0		5.3	0	94.7		100	0	0				
Total %	2.4	78.7	0		0.4	0.1	0		0.5	0	8.9		9.1	0	0		0.4	99.6	

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : NC 50 & Gateway Condo Dr_Fun Center Dr
Site Code : 00070914
Start Date : 7/9/2014
Page No : 1

Groups Printed- Vehicles

	NC 50 Southbound				Gateway Condo Drive Westbound				NC 50 Northbound				Fun Center Drive Eastbound						
Start Time	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	1	44	0	0	5	0	0	0	0	0	3	0	5	0	0	0	0	58	58
07:15 AM	0	64	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	69	69
07:30 AM	1	62	0	0	1	0	0	0	2	0	15	0	5	0	0	0	0	86	86
07:45 AM	1	107	0	0	1	0	0	0	0	0	9	0	9	0	0	0	0	127	127
Total	3	277	0	0	7	0	0	0	2	0	30	0	21	0	0	0	0	340	340
08:00 AM	0	68	0	1	0	0	0	0	0	0	15	0	15	0	0	0	1	98	99
08:15 AM	1	110	0	2	1	0	0	0	1	0	9	0	4	0	0	0	2	126	128
08:30 AM	0	114	0	0	0	0	0	0	0	0	11	0	13	0	0	0	0	138	138
08:45 AM	5	136	0	0	0	0	0	0	2	0	16	0	12	0	0	0	0	171	171
Total	6	428	0	3	1	0	0	0	3	0	51	0	44	0	0	0	3	533	536
09:00 AM	4	98	0	0	0	0	0	0	1	0	9	0	10	0	0	0	0	122	122
09:15 AM	12	117	0	0	0	0	0	0	1	0	13	0	9	0	0	0	0	152	152
09:30 AM	3	124	0	1	0	0	0	0	1	0	12	0	15	0	0	1	2	155	157
09:45 AM	6	135	0	0	2	0	0	0	3	0	15	0	15	0	0	0	0	176	176
Total	25	474	0	1	2	0	0	0	6	0	49	0	49	0	0	1	2	605	607
10:00 AM	10	145	0	0	0	0	0	0	0	0	17	0	18	0	0	0	0	190	190
10:15 AM	14	154	0	1	0	0	0	0	0	0	19	0	20	0	0	0	1	207	208
10:30 AM	3	168	0	0	0	0	0	0	0	0	19	0	14	0	0	0	0	204	204
10:45 AM	4	164	0	1	0	0	0	0	0	0	31	0	11	0	0	0	1	210	211
Total	31	631	0	2	0	0	0	0	0	0	86	0	63	0	0	0	2	811	813
11:00 AM	6	123	0	2	1	0	0	0	1	0	10	0	28	0	0	0	2	169	171
11:15 AM	5	183	0	1	1	0	0	0	0	0	20	0	15	0	0	0	1	224	225
11:30 AM	8	169	0	0	1	0	0	0	0	0	17	0	22	0	0	0	0	217	217
11:45 AM	10	163	0	1	0	0	0	0	2	0	13	0	14	0	0	1	2	202	204
Total	29	638	0	4	3	0	0	0	3	0	60	0	79	0	0	1	5	812	817
12:00 PM	7	152	0	2	0	0	0	0	1	0	18	0	36	0	0	2	4	214	218
12:15 PM	5	137	0	0	2	0	0	0	0	0	21	0	14	0	0	0	0	179	179
12:30 PM	2	162	0	0	0	0	0	0	2	0	17	0	19	0	0	1	1	202	203
12:45 PM	6	161	0	0	0	0	0	0	1	0	12	0	11	0	0	0	0	191	191
Total	20	612	0	2	2	0	0	0	4	0	68	0	80	0	0	3	5	786	791
01:00 PM	6	160	0	2	3	0	0	1	1	0	21	0	23	0	0	0	3	214	217
01:15 PM	1	183	0	1	1	0	0	0	1	0	18	0	14	0	0	1	2	218	220
01:30 PM	8	141	0	0	1	0	0	0	1	0	27	0	29	0	0	0	0	207	207
01:45 PM	5	157	0	0	0	0	0	0	1	0	19	0	24	0	0	0	0	206	206
Total	20	641	0	3	5	0	0	1	4	0	85	0	90	0	0	1	5	845	850
02:00 PM	5	134	0	0	0	0	0	0	2	0	20	0	22	0	0	0	0	183	183
02:15 PM	8	156	0	2	1	0	0	0	3	0	16	0	12	0	0	0	2	196	198
02:30 PM	3	124	0	2	0	0	0	0	0	0	15	0	19	0	0	0	2	161	163
02:45 PM	3	149	0	2	1	0	0	0	0	0	20	0	14	0	0	0	2	187	189
Total	19	563	0	6	2	0	0	0	5	0	71	0	67	0	0	0	6	727	733

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : NC 50 & Gateway Condo Dr_Fun Center Dr
Site Code : 00070914
Start Date : 7/9/2014
Page No : 1

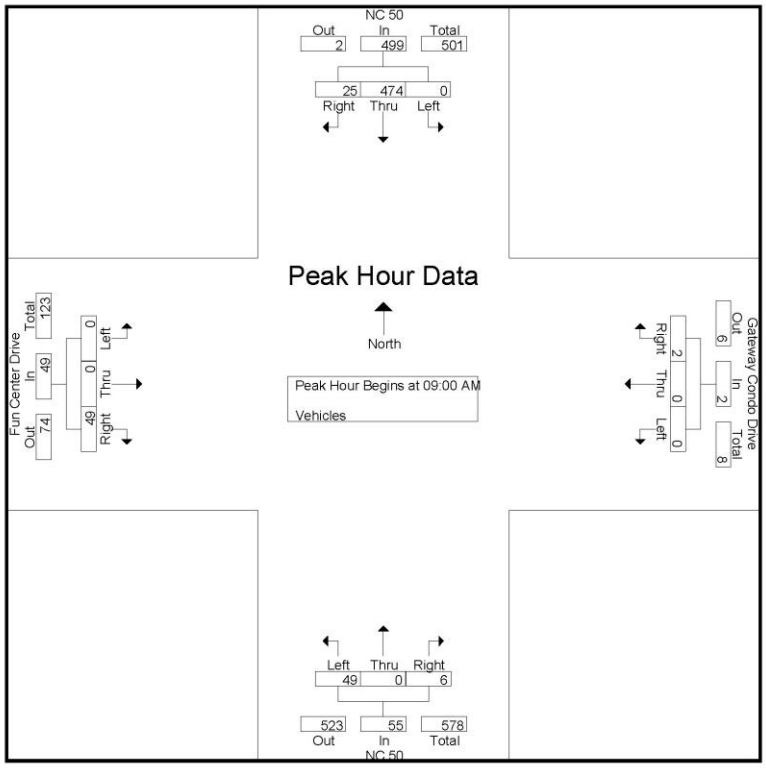
Groups Printed- Peds

	NC 50 Southbound				Gateway Condo Drive Westbound				NC 50 Northbound				Fun Center Drive Eastbound						
Start Time	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Right	Thru	Left	Trks	Exclu. Total	Inclu. Total	Int. Total
** BREAK**																			
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
** BREAK**																			
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
** BREAK**																			
02:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
02:30 PM	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	3
** BREAK**																			
Total	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	4	4
** BREAK**																			
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
** BREAK**																			
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
** BREAK**																			
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
** BREAK**																			
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
** BREAK**																			
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Grand Total	0	1	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	9	9
Apprch %	0	100	0		0	0	0		0	100	0		0	100	0				
Total %	0	11.1	0		0	0	0		0	44.4	0		0	44.4	0		0	100	

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : NC 50 & Gateway Condo Dr_Fun Center Dr
Site Code : 00070914
Start Date : 7/9/2014
Page No : 3

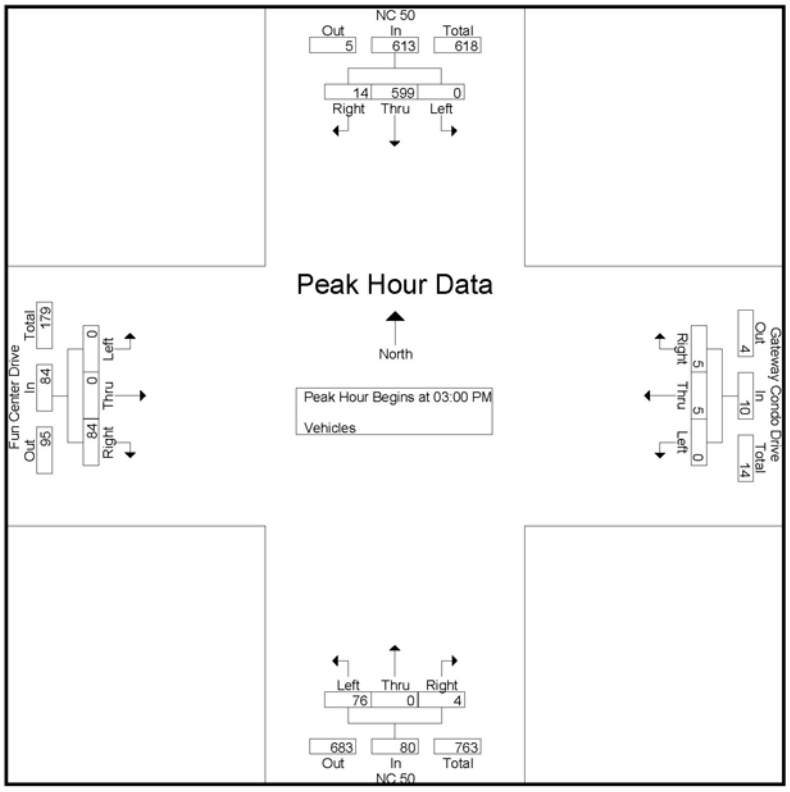
	NC 50 Southbound				Gateway Condo Drive Westbound				NC 50 Northbound				Fun Center Drive Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 09:00 AM																	
09:00 AM	4	98	0	102	0	0	0	0	1	0	9	10	10	0	0	10	122
09:15 AM	**12**	117	0	129	0	0	0	0	1	0	13	14	9	0	0	9	152
09:30 AM	3	124	0	127	0	0	0	0	1	0	12	13	**15**	0	0	**15**	155
09:45 AM	6	**135**	0	**141**	**2**	0	0	**2**	**3**	0	**15**	**18**	15	0	0	15	**176**
Total Volume	25	474	0	499	2	0	0	2	6	0	49	55	49	0	0	49	605
% App. Total	5	95	0		100	0	0		10.9	0	89.1		100	0	0		
PHF	.521	.878	.000	.885	.250	.000	.000	.250	.500	.000	.817	.764	.817	.000	.000	.817	.859



RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS
5808 Faringdon Place, Suite 100
Raleigh, NC 27609
PH: 919 872-5115

File Name : NC 50 & Gateway Condo Dr_Fun Center Dr
Site Code : 00070914
Start Date : 7/9/2014
Page No : 5

	NC 50 Southbound				Gateway Condo Drive Westbound				NC 50 Northbound				Fun Center Drive Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 07:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	2	129	0	131	0	0	0	0	0	0	**25**	**25**	18	0	0	18	174
03:15 PM	4	161	0	165	**2**	0	0	2	0	0	20	20	18	0	0	18	205
03:30 PM	2	**172**	0	**174**	1	0	0	1	1	0	20	21	22	0	0	22	**218**
03:45 PM	**6**	137	0	143	2	**5**	0	**7**	**3**	0	11	14	**26**	0	0	**26**	190
Total Volume	14	599	0	613	5	5	0	10	4	0	76	80	84	0	0	84	787
% App. Total	2.3	97.7	0		50	50	0		5	0	95		100	0	0		
PHF	.583	.871	.000	.881	.625	.250	.000	.357	.333	.000	.760	.800	.808	.000	.000	.808	.903



Appendix G. –Traffic Counts – Roland Ave. and Belt Rd.

The charts on the following pages are to provide insight to the traffic study in the Town of Surf City, reported by Quality Counts, LLC. They used instrumentation to determine how much traffic crossed the intersection of Roland Ave. and Belt Road (which we have described in this report as the intersection of Hwy 210 and Hwy 50,) from 1:00 p.m. to 7:00 p.m. on Friday, May 16th, 2014 and Saturday, May 17th, 2014. The traffic is counted at 15 minute intervals to determine the peak hour of traffic.

As you will see in ***Figure 4*** on the following page, the peak hour of traffic on Friday, 5-16-2014, was from 3:45 to 4:45 p.m., at which time 1,606 vehicles crossed the intersection. During the six hour period, there were a total of 8,765 vehicles crossings, which is an average of 1,461 per hour, with zero bicyclists or pedestrians counted during the entire six hours.

The same data was performed on Saturday, 5-17-2014, and traffic counts were taken from 12:00 p.m. to 6:00 p.m. The study found that the peak hour of traffic was from 3:15 to 4:15 p.m., which had 1,800 vehicles during that hour. During this six hour time period, 9,632 vehicles crossed the intersection, with only 4 pedestrians, and zero bicyclists counted. This calculates to an average of 1,605 vehicles per hour. Please note that these figures are prior to the peak tourist season which is typically considered to be from Memorial Day to Labor Day. ***See Figure 5.*** Because of the seasonally high traffic counts, a roundabout is being considered by NCDOT for this intersection.

A similar traffic study was done on the same dates for the intersection of Hwy 210, referred to as the Walmart Drive and Belt Rd, which is pinpointed on the map on this page. On Friday, 5-16-2014, the traffic counts indicated the same peak hour between 3:45 and 4:45 p.m. with 1,209 vehicles counted in that hour. In the six hour period, 6,527 crossed that intersection,

an average of 1,088 vehicles per hour. The study did not count any pedestrians or bicyclists during the six hours. A study was also done the following day, 5-16-2015 from 8:30 a.m. to 2:30 p.m. The peak hour was from 11:00 a.m.-12:00 p.m., with 1,398 vehicles reported, see ***Figure 6.*** A total of 7,445 people crossed this intersection during the six hour period period, which averages 1,241 per hour. Only 1 bicycle was reported in that timeframe. A similar study was done that same afternoon from 1:00 p.m - 7:00 p.m., which the peak hour between 3:45 and 4:45 p.m., with 1,209 vehicles in that hour. All the reports indicated steady traffic on both days.

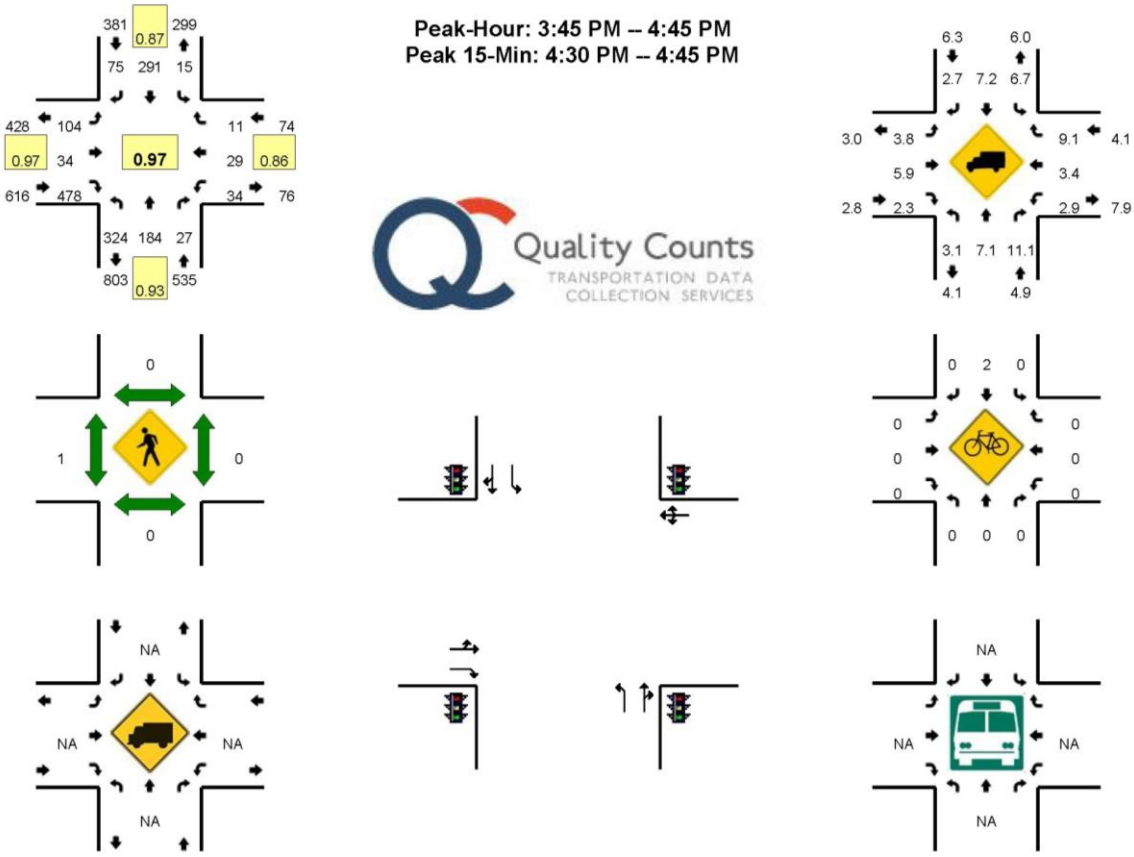
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Roland Ave -- Belt Rd
CITY/STATE: Surf City, NC

QC JOB #: 12601801
DATE: Fri, May 16 2014

Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:30 PM -- 4:45 PM



15-Min Count Period Beginning At	Roland Ave (Northbound)				Roland Ave (Southbound)				Belt Rd (Eastbound)				Belt Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
1:00 PM	79	33	6	0	1	40	18	0	19	10	90	0	8	6	2	0	312	1305
1:15 PM	92	46	6	0	2	48	13	0	15	8	93	0	11	8	3	0	345	1331
1:30 PM	73	35	3	0	3	50	15	0	16	8	78	1	7	3	1	0	293	1298
1:45 PM	71	59	10	0	5	62	19	0	14	10	71	0	6	8	1	0	336	1286
2:00 PM	58	25	6	0	2	86	8	0	23	4	74	0	8	7	2	0	303	1277
2:15 PM	109	58	2	0	1	52	19	0	24	8	104	0	10	7	3	0	397	1329
2:30 PM	89	51	6	0	6	54	15	0	12	7	86	0	6	3	2	0	337	1373
2:45 PM	88	47	7	0	6	61	15	0	21	6	126	0	9	6	2	0	394	1431
3:00 PM	84	29	9	0	2	65	10	0	28	9	93	0	9	7	1	0	346	1474
3:15 PM	108	56	9	0	5	60	23	0	23	7	105	0	10	10	3	0	419	1496
3:30 PM	89	49	8	0	5	65	22	0	22	10	86	0	10	8	4	0	378	1537
3:45 PM	71	44	6	0	3	88	20	0	27	8	122	0	7	11	2	0	409	1552
4:00 PM	81	36	4	0	6	68	22	0	30	3	110	0	11	5	2	0	378	1584
4:15 PM	83	55	7	0	5	64	16	0	25	15	119	0	6	7	5	0	407	1572
4:30 PM	89	49	10	0	1	71	17	0	22	8	127	0	10	6	2	0	412	1606
4:45 PM	98	36	6	0	7	58	12	0	17	7	114	0	10	9	1	0	375	1572
5:00 PM	98	50	12	0	6	66	21	0	25	7	99	0	5	14	4	0	407	1601
5:15 PM	97	43	2	0	6	57	22	0	26	13	99	0	8	7	5	0	385	1579
5:30 PM	84	50	7	0	5	68	14	0	27	9	110	0	4	5	2	0	385	1552
5:45 PM	90	44	5	0	6	50	14	0	27	13	110	0	5	9	1	0	374	1551
6:00 PM	75	34	5	0	4	76	14	0	26	5	107	0	2	6	2	0	356	1500
6:15 PM	70	45	9	0	6	56	7	0	26	7	104	0	8	8	1	0	347	1462
6:30 PM	52	43	7	0	2	67	19	0	20	8	104	0	10	5	5	0	342	1419
6:45 PM	62	35	8	0	5	76	13	0	20	10	85	0	10	3	1	0	328	1373

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	356	196	40	0	4	284	68	0	88	32	508	0	40	24	8	0	1648
Heavy Trucks	12	20	4		0	28	0		0	4	4		4	0	0		76
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

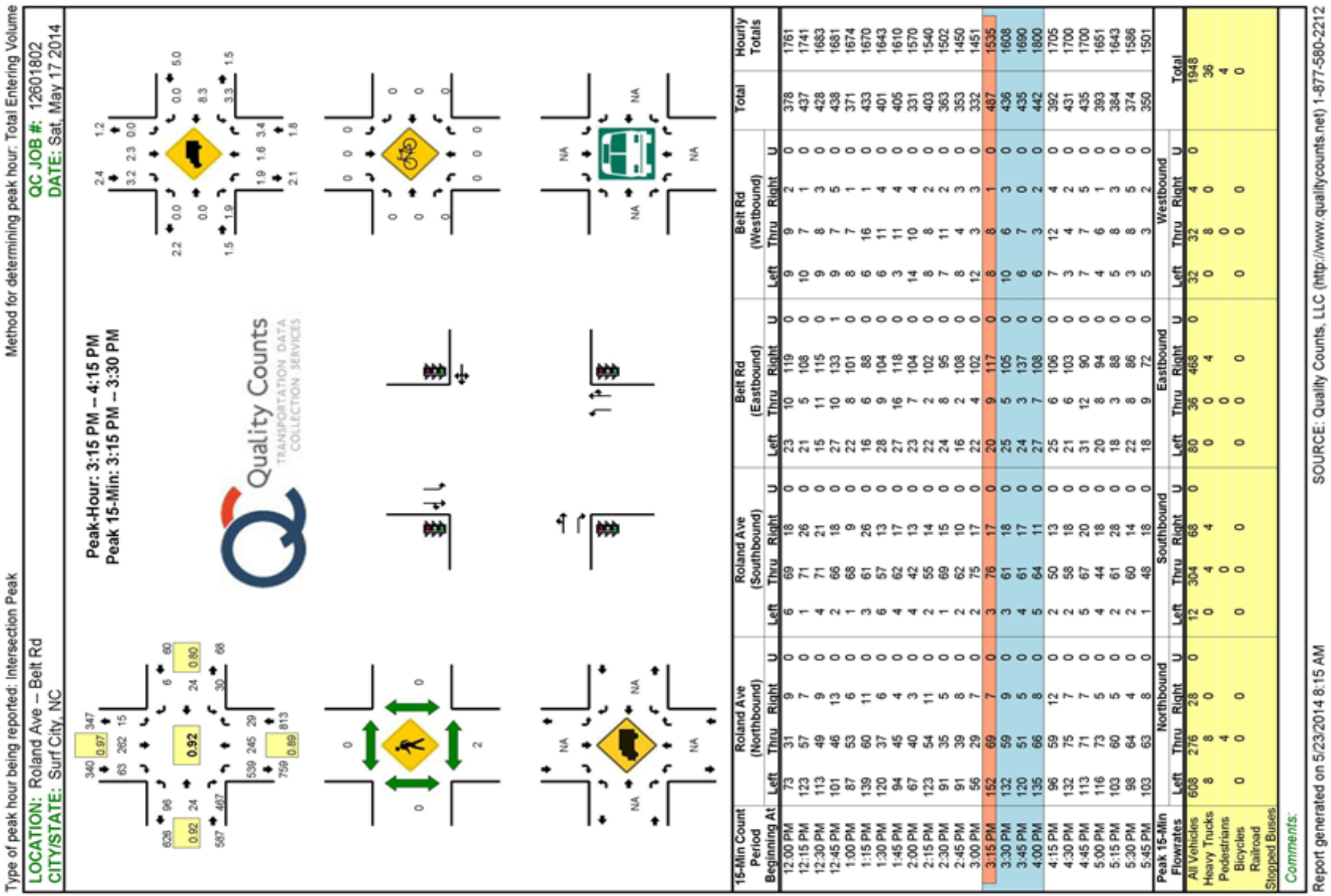
Comments:

Report generated on 5/23/2014 8:15 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Figure 4. Traffic Counts – Roland Ave. and Belt Rd.

Figure 5. Traffic Counts – Roland Ave. and Belt Rd.



15-Min Count Period Beginning At	Roland Ave (Northbound)				Roland Ave (Southbound)				Belt Rd (Eastbound)				Belt Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:00 PM	73	31	9	0	6	69	18	0	23	10	119	0	9	9	2	0	378	1761
12:15 PM	123	57	7	0	1	71	26	0	21	5	108	0	10	7	1	0	437	1741
12:30 PM	113	49	9	0	4	71	21	0	15	11	115	0	9	8	3	0	428	1683
12:45 PM	101	46	13	0	2	66	18	0	27	10	133	1	9	7	5	0	438	1681
1:00 PM	87	53	6	0	1	68	9	0	22	8	101	0	8	7	1	0	371	1674
1:15 PM	139	60	11	0	3	61	26	0	16	6	88	0	6	16	1	0	433	1670
1:30 PM	120	37	6	0	6	57	13	0	28	9	104	0	6	11	4	0	401	1643
1:45 PM	94	45	4	0	4	62	17	0	27	16	118	0	3	11	4	0	405	1610
2:00 PM	67	40	3	0	4	42	13	0	23	7	104	0	14	10	4	0	331	1570
2:15 PM	123	54	11	0	2	55	14	0	22	2	102	0	8	8	2	0	403	1540
2:30 PM	91	35	5	0	1	69	15	0	24	8	95	0	7	11	2	0	363	1502
2:45 PM	91	39	8	0	2	62	10	0	16	2	108	0	8	4	3	0	353	1450
3:00 PM	56	29	7	0	2	75	17	0	22	4	102	0	12	3	3	0	332	1451
3:15 PM	152	69	7	0	3	76	17	0	20	9	117	0	8	8	1	0	487	1535
3:30 PM	132	59	9	0	3	61	18	0	25	5	105	0	10	6	3	0	436	1608
3:45 PM	120	51	5	0	4	61	17	0	24	3	137	0	6	7	0	0	435	1690
4:00 PM	135	66	8	0	5	64	11	0	27	7	108	0	6	3	2	0	442	1800
4:15 PM	96	59	12	0	2	50	13	0	25	6	106	0	7	12	4	0	392	1705
4:30 PM	132	75	7	0	2	58	18	0	21	6	103	0	3	4	2	0	431	1700
4:45 PM	113	71	7	0	5	67	20	0	31	12	90	0	7	7	5	0	435	1700
5:00 PM	116	73	5	0	4	44	18	0	20	8	94	0	4	6	1	0	393	1651
5:15 PM	103	60	5	0	2	61	28	0	18	3	88	0	5	8	3	0	384	1643
5:30 PM	98	64	4	0	2	60	14	0	22	8	86	0	3	8	5	0	374	1586
5:45 PM	103	63	8	0	1	46	18	0	18	9	72	0	5	3	2	0	350	1501

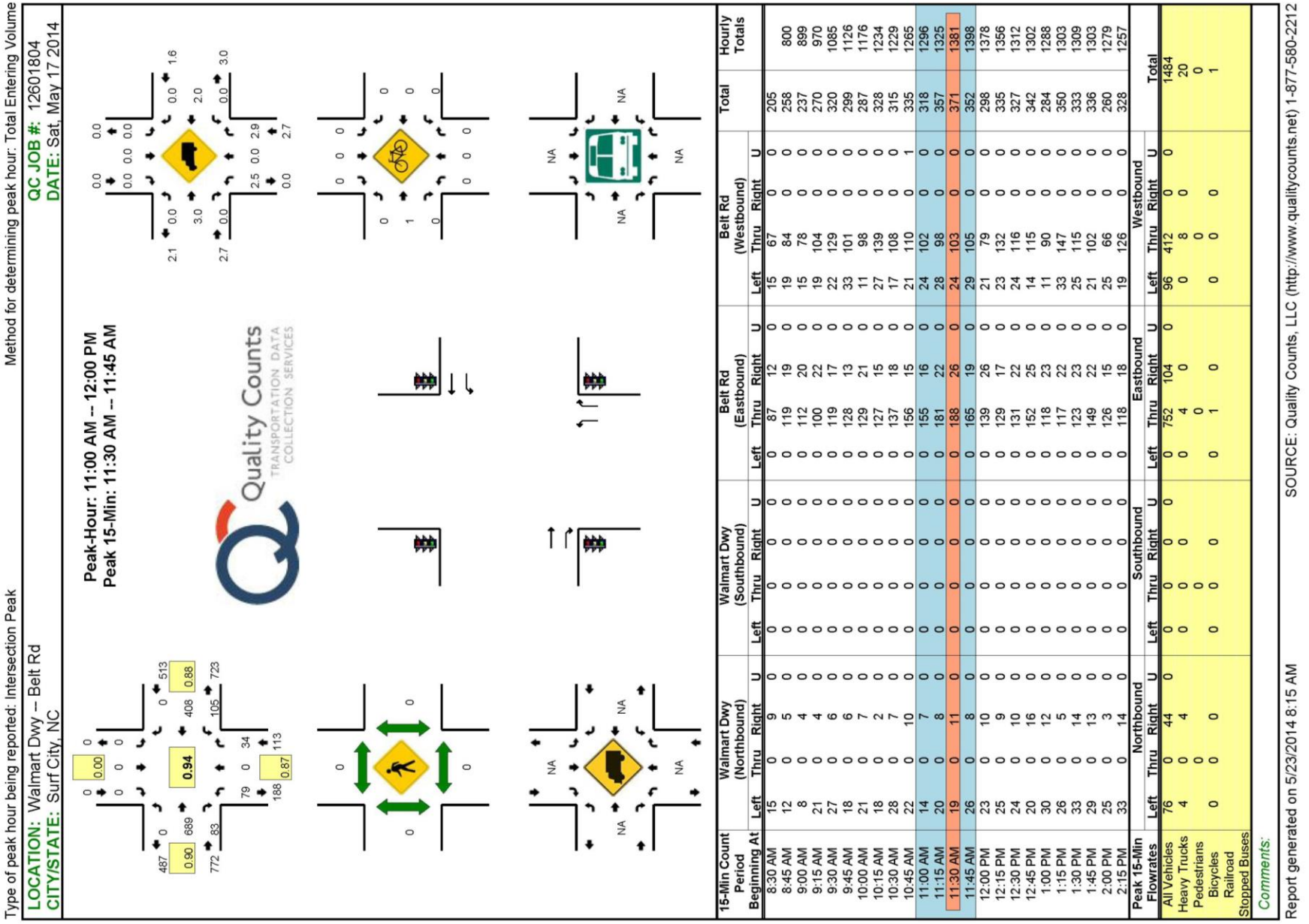
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	608	276	28	0	12	304	68	0	80	36	468	0	32	32	4	0	1948
Heavy Trucks	8	8	0		0	4	4		0	0	4		0	8	0		36
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/23/2014 8:15 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Figure 6. Traffic Counts –Walmart Driveway & Belt Rd.



Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: Walmart Dwy -- Belt Rd — QC JOB #: 12601804
CITY/STATE: Surf City, NC — DATE: Sat, May 17 2014

Peak-Hour: 11:00 AM -- 12:00 PM
Peak 15-Min: 11:30 AM -- 11:45 AM

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

15-Min Count Period Beginning At	Walmart Dwy (Northbound)				Walmart Dwy (Southbound)				Belt Rd (Eastbound)				Belt Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
8:30 AM	15	0	9	0	0	0	0	0	0	87	12	0	15	67	0	0	205	
8:45 AM	12	0	5	0	0	0	0	0	0	119	19	0	19	84	0	0	258	800
9:00 AM	8	0	4	0	0	0	0	0	0	112	20	0	15	78	0	0	237	899
9:15 AM	21	0	4	0	0	0	0	0	0	100	22	0	19	104	0	0	270	970
9:30 AM	27	0	6	0	0	0	0	0	0	119	17	0	22	129	0	0	320	1085
9:45 AM	18	0	6	0	0	0	0	0	0	128	13	0	33	101	0	0	299	1126
10:00 AM	21	0	7	0	0	0	0	0	0	129	21	0	11	98	0	0	287	1176
10:15 AM	18	0	2	0	0	0	0	0	0	127	15	0	27	139	0	0	328	1234
10:30 AM	28	0	7	0	0	0	0	0	0	137	18	0	17	108	0	0	315	1229
10:45 AM	22	0	10	0	0	0	0	0	0	156	15	0	21	110	0	1	335	1265
11:00 AM	14	0	7	0	0	0	0	0	0	155	16	0	24	102	0	0	318	1296
11:15 AM	20	0	8	0	0	0	0	0	0	181	22	0	28	98	0	0	357	1325
11:30 AM	19	0	11	0	0	0	0	0	0	188	26	0	24	103	0	0	371	1381
11:45 AM	26	0	8	0	0	0	0	0	0	165	19	0	29	105	0	0	352	1398
12:00 PM	23	0	10	0	0	0	0	0	0	139	26	0	21	79	0	0	298	1378
12:15 PM	25	0	9	0	0	0	0	0	0	129	17	0	23	132	0	0	335	1356
12:30 PM	24	0	10	0	0	0	0	0	0	131	22	0	24	116	0	0	327	1312
12:45 PM	20	0	16	0	0	0	0	0	0	152	25	0	14	115	0	0	342	1302
1:00 PM	30	0	12	0	0	0	0	0	0	118	23	0	11	90	0	0	284	1288
1:15 PM	26	0	5	0	0	0	0	0	0	117	22	0	33	147	0	0	350	1303
1:30 PM	33	0	14	0	0	0	0	0	0	123	23	0	25	115	0	0	333	1309
1:45 PM	29	0	13	0	0	0	0	0	0	149	22	0	21	102	0	0	336	1303
2:00 PM	25	0	3	0	0	0	0	0	0	126	15	0	25	66	0	0	260	1279
2:15 PM	33	0	14	0	0	0	0	0	0	118	18	0	19	126	0	0	328	1257

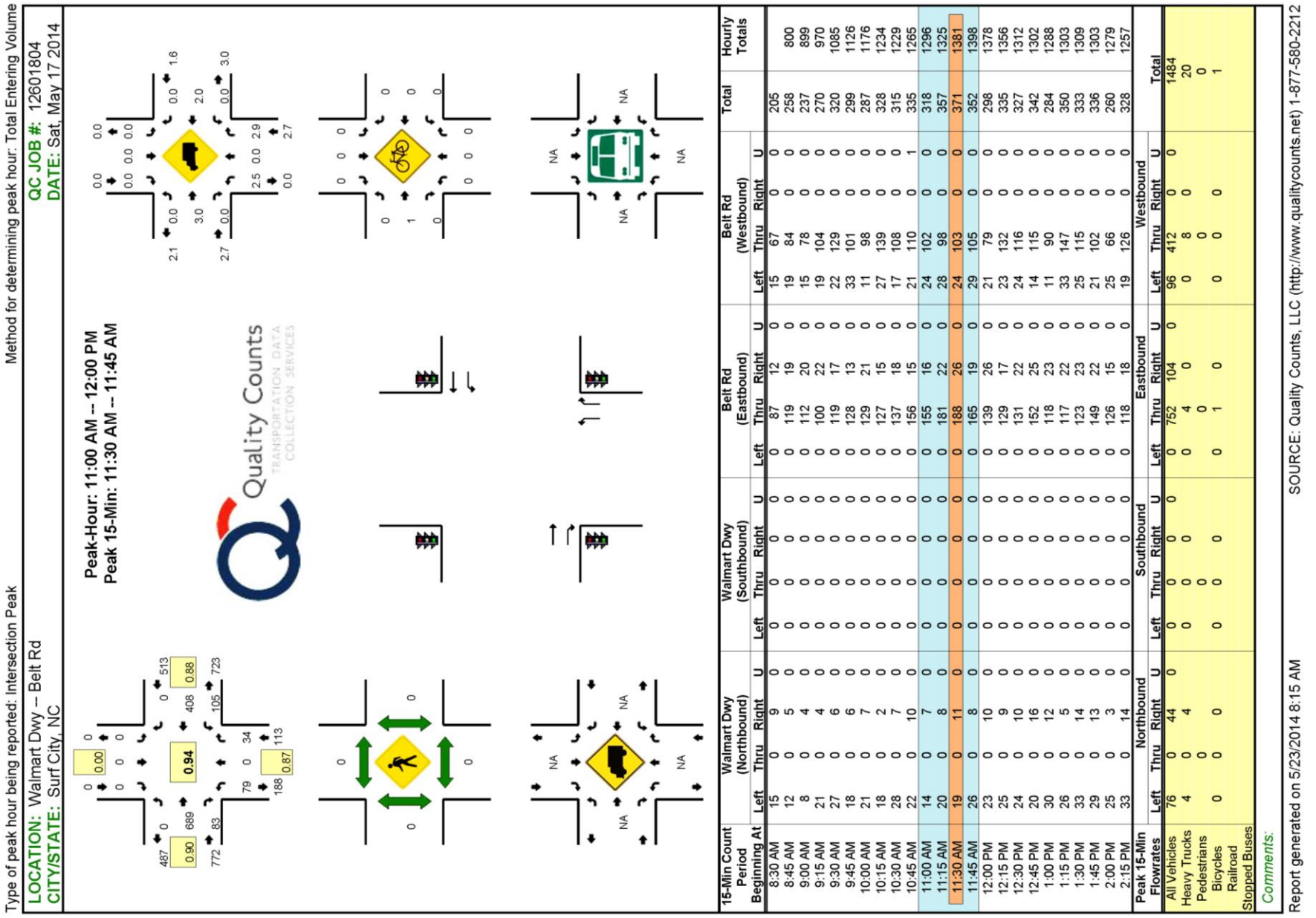
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	76	0	44	0	0	0	0	0	0	752	104	0	96	412	0	0	1484
Heavy Trucks	4	0	4		0	0	0		0	4	0		0	8	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/23/2014 8:15 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Figure 7. Traffic Counts –Walmart Driveway & Belt Rd.



Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Walmart Dwy -- Belt Rd
CITY/STATE: Surf City, NC

QC JOB #: 12601804
DATE: Sat, May 17 2014

Peak-Hour: 11:00 AM -- 12:00 PM
Peak 15-Min: 11:30 AM -- 11:45 AM

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

15-Min Count Period Beginning At	Walmart Dwy (Northbound)				Walmart Dwy (Southbound)				Belt Rd (Eastbound)				Belt Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
8:30 AM	15	0	9	0	0	0	0	0	0	87	12	0	15	67	0	0	205	
8:45 AM	12	0	5	0	0	0	0	0	0	119	19	0	19	84	0	0	258	800
9:00 AM	8	0	4	0	0	0	0	0	0	112	20	0	15	78	0	0	237	899
9:15 AM	21	0	4	0	0	0	0	0	0	100	22	0	19	104	0	0	270	970
9:30 AM	27	0	6	0	0	0	0	0	0	119	17	0	22	129	0	0	320	1085
9:45 AM	18	0	6	0	0	0	0	0	0	128	13	0	33	101	0	0	299	1126
10:00 AM	21	0	7	0	0	0	0	0	0	129	21	0	11	98	0	0	287	1176
10:15 AM	18	0	2	0	0	0	0	0	0	127	15	0	27	139	0	0	328	1234
10:30 AM	28	0	7	0	0	0	0	0	0	137	18	0	17	108	0	0	315	1229
10:45 AM	22	0	10	0	0	0	0	0	0	156	15	0	21	110	0	1	335	1265
11:00 AM	14	0	7	0	0	0	0	0	0	155	16	0	24	102	0	0	318	1296
11:15 AM	20	0	8	0	0	0	0	0	0	181	22	0	28	98	0	0	357	1325
11:30 AM	19	0	11	0	0	0	0	0	0	188	26	0	24	103	0	0	371	1381
11:45 AM	26	0	8	0	0	0	0	0	0	165	19	0	29	105	0	0	352	1398
12:00 PM	23	0	10	0	0	0	0	0	0	139	26	0	21	79	0	0	298	1378
12:15 PM	25	0	9	0	0	0	0	0	0	129	17	0	23	132	0	0	335	1356
12:30 PM	24	0	10	0	0	0	0	0	0	131	22	0	24	116	0	0	327	1312
12:45 PM	20	0	16	0	0	0	0	0	0	152	25	0	14	115	0	0	342	1302
1:00 PM	30	0	12	0	0	0	0	0	0	118	23	0	11	90	0	0	284	1288
1:15 PM	26	0	5	0	0	0	0	0	0	117	22	0	33	147	0	0	350	1303
1:30 PM	33	0	14	0	0	0	0	0	0	123	23	0	25	115	0	0	333	1309
1:45 PM	29	0	13	0	0	0	0	0	0	149	22	0	21	102	0	0	336	1303
2:00 PM	25	0	3	0	0	0	0	0	0	126	15	0	25	66	0	0	260	1279
2:15 PM	33	0	14	0	0	0	0	0	0	118	18	0	19	126	0	0	328	1257

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	76	0	44	0	0	0	0	0	0	752	104	0	96	412	0	0	1484
Heavy Trucks	4	0	4		0	0	0		0	4	0		0	8	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/23/2014 8:15 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Bike Share Stations

Appendix H. On Bike Share Information

This is provided for if and when the current bike shops determine they need additional facilities to meet the demand.

On Bike Share requires minimal infrastructure for installation. In fact, you can put bike stations anywhere you can put bike racks-no power or internet are required. Many systems are up and running with a full fleet of bikes and bike stations in a single day.

Bike Stations use custom designed commercial grade racks designed to withstand the most demanding environments. They are designed for surface mount locations, and are best secured into poured concrete. No power or internet is required for the racks, so they can be added anywhere you can install regular bike racks.

Bike racks are also made specifically for mounting our electronic key boxes using a special mounting plate on top of the rack that can hold one or two key boxes. The electronic key boxes are mounted to the plate using tamper-resistant hardware for added security. This design makes it fast and easy to mount the key boxes; but more importantly, this location makes accessing the key boxes convenient.

NOTE: This material is presented at an option, only if endorsed by local businesses, if such a time occurs that they cannot meet demand.

Automated Bike Share... Anywhere

On Bike Racks Feature:

- Hardened Steel Construction
- Powder Coated Black Finish
- Simple Surface Mounting
- Integrated Mounting Plate for Electronic Key Box

Bike Station features: the keys for the bikes are stored inside electronic Key Boxes which are mounted directly to our specially made bike racks. These weather-resistant Key Boxes use on-board electronics to secure and release the bike keys to program members. When members register to participate in the bike share system, they can either be assigned a individual PIN (access code) that they can use anytime to checkout and return bikes, or you can have members use their smartphone to request PINs each time they want to checkout and return bikes. Using the key box is easy, and it provides a high level of security as well as accountability. Here is how you use the Key

Here are some of the features of the On Bike Share electronic key box:

- Durable metal casing mounts directly onto bike rack
- Upload and download PINs and activity logs from key box using USB drive
- Weather resistant case provides all-season key access/Optional weather guard
- No subscription required
- No internet access required
- Runs on four replaceable 'AA' batteries that last up to 500 days of normal use
- No access cards to buy
- Program up to 800 codes per key box (4-6 digits)
- PC-based software runs on Windows® XP, Windows Vista®, Windows7,
- or Windows8 computer with Java installed, or on Mac OS X with Java installed; requires USB port

Basic Bike Share System Includes:

Custom Decaled Bicycles
- 7-speed Shimano internal gearing
- Simple Twist Shifter
- Plush comfort seat
- Integrated U-lock
- Rear Basket
- Puncture-Resistant Tires
- Fenders

On Bike Racks
- Commercial Grade Construction
- Powder Coated Finish
- Integrated Mounting Plate for Key Boxes
- Surface Mount Design

Electronic Key Boxes
- Weather-Sealed
- Commercial Grade Steel Case
- On-board Electronics
- Touch Key Pad
- Battery Powered

Management Software
- PC-based Software
- Create Key Box Access Codes
- Assign Access Codes to Members

APPENDIX I. Education, Rules and Etiquette

As new infrastructure is incorporated into the pedestrian and bicycle network, rules and education must be conveyed. Below is an example of the Rules and Etiquette provided for the Cross-City Trail in Wilmington, N.C. In additional to safety and education training, a similar approach would help to insure everyone understands the expectations. Source: http://www.uncw.edu/ba/services/documents/crosscitytrailrules.pdf

Cross-City Trail Rules and Etiquette

The Gary Shell Cross-City Trail is enjoyed by many different types of users. Whether you are bicycling, walking, jogging, skating, walking a dog or pushing a stroller, if all users follow the same set of rules, your experience on the trail will be safer and more enjoyable. Help make the trail safe and enjoyable for everyone by using the following guidelines:

YIELD TO PEDESTRIANS. Pedestrians have the right of way.

KEEP RIGHT. Always stay to the right side of the trail except when passing others.

PASS ON THE LEFT. Pass others traveling in the same direction on the left. Yield to slower and oncoming trail users, and remember that children and pets can be unpredictable.

ANNOUNCE YOURSELF BEFORE PASSING. Politely warn trail users as you approach from behind. Give a clear audible signal when passing like "Passing on your left". Give the person you are passing time to respond. Don't wear headphones on the trail so you can hear others passing you.

IF YOU STOP, PLEASE LEAVE THE TRAIL. Always allow other trail users room to pass on the left.

BE COURTEOUS. All trail users, including bicyclists, joggers, walkers, wheelchairs, strollers, rollerbladers and skaters, should be respectful of other users regardless of their mode, speed or level of skill.

BE PREDICTABLE. Travel in a consistent and predictable manner. Always look behind when changing position on the trail.

DON'T BLOCK THE TRAIL. When in a group or with your pets, use no more than half the trail so you don't block the flow of other users.

DON'T LITTER. Do your part to keep the park clean. Please pick up after yourself and pets. Bags are available at pet waste stations located throughout the park.

STOPPING. Move off of or to the side of the trail when you stop. Beware of others behind you, and make sure they know you are stopping.

The Town can decide what wording makes sense for the particular path. The General Rules below were derived from the Emerald Isle Bike Path Guidelines, and are given as an example of signage.

MULTI-USE PATH GUIDELINES FOR USE

MOTORIZED APPARATUS STRICTLY PROHIBITED!
EXCEPTION FOR HANDICAPPED ASSISTANCE ONLY!

Bicycling

- **Keep to the Right, Pass on the left only when safe**
- **'On your left' audible warning when passing**
- **Stop at all intersections**
- **Move off path if equipment complications or for a break**
- **Helmets are recommended for all**
  (Required for children under 16)
- **Yield to Pedestrians**
- **Bicycle front and rear lights are required for riding at night**

Walking/Running

- **Keep to the Right**
- **Don't walk or run more than 2 abreast**
- **Use caution when entering the path or changing direction**

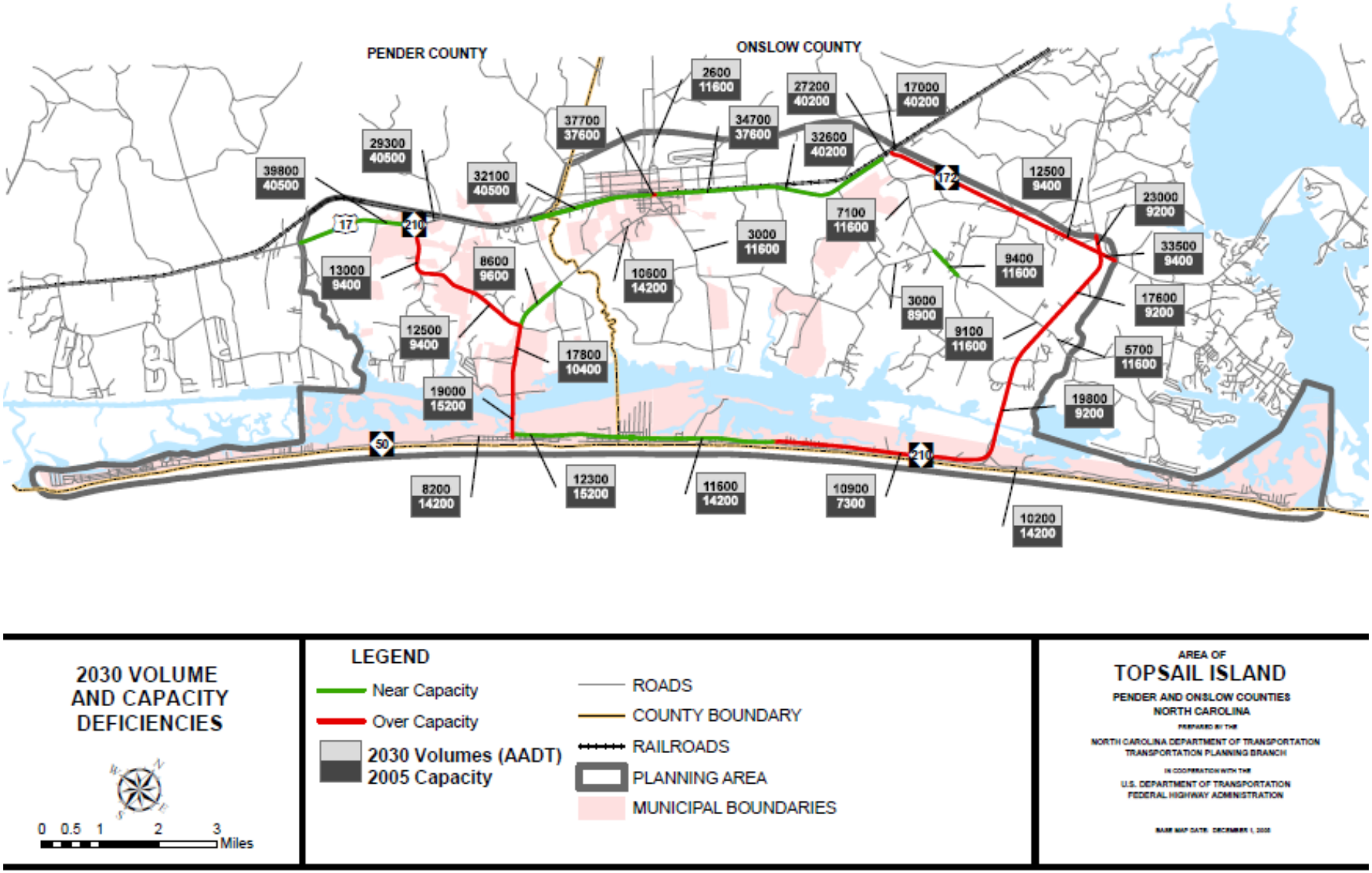
In-Line Skating or Skateboarding

- **Keep to the Right**
- **Single-file only**

Common Courtesy

- **No littering**
- **Keep your dog/pet on a leash, pick up after your dog**
- **Respect other path users**
- **Share the path**

APPENDIX J. Topsail Island Transportation Deficiencies 2007



In the 2007 Topsail Island Transportation Plan, Hwy 210 and Roland Ave. (far Left red lines) were already designated as Over Capacity, see Legend above.

Treatment: Pedestrian and Bicycle Bridges and Underpasses

Description/Purpose

Pedestrian and bicycle bridges and underpasses separate pedestrians and bicyclists from vehicular traffic and allow for safe, uninterrupted pedestrian and bicycle traffic flow. They are most appropriate for crossing a freeway or other high-speed, high-volume arterial street or rail-line.

Expected Effectiveness

The effectiveness depends largely on the likelihood that they will be used by pedestrians and bicyclists as an alternative to at-grade crossings. For bridges and underpasses that are used by a large proportion of pedestrians and bicyclists, studies have found that pedestrian-related crashes decreased by 91 percent.[24] However, other studies have determined that if the walking time to use an overpass is 50 percent longer than crossing the street at-grade, then the bridge or underpass will not be used and will be ineffective in reducing crashes.[25]

Costs

Costs range from $500,000 to $4 million, depending on required right-of-way acquisition and site characteristics (NCHRP Report 500, Volume 10, 2004).

Keys to Success

- Bridges are best suited in areas where the topography allows for a structure without ramps.
- Underpasses work best when they can be designed to feel open, well-lit, and safe.
- Both bridges and underpasses should be accessible to all pedestrians, including those in wheelchairs.

Key Factors to Consider

- Bridges and underpasses will not be used if a more direct route is available.
- These structures need to be located to minimize the travel required to access them. Fencing may be needed to channel pedestrians and bicyclists to the bridge or underpass.
- It may be difficult to obtain funds and meet ADA guidelines for ramps that require extensive right-of-way.
- Crime, vandalism, graffiti, lighting, and drainage issues may also cause problems

Evaluation Measures

- Number or percent of pedestrian and bicycle crashes and changes in probability of being involved in a crash once treatment is in use.

At this time, Roland Avenue in the CBD does not have the bicycle and pedestrian traffic to warrant a tunnel or overpass, but as more walkers and bikers travel to this area, their ability to cross the road here will require at least a signalized crosswalk, with future considerations of an overpass or tunnel for safety. The Town will have to weigh how many people are crossing, and how the mobilization of the traffic is affected in order to make a determination if another course of action is needed to provide a crossing that is not at grade. Source: http://guide.saferoutesinfo.org/engineering/pedestrian_and_bicycle_bridges_and_ tunnels.cfm

Appendix L. Options and Costs for Bike Parking Racks –
Alternately, Wooden Racks can be built by Volunteers

Individual bike docks are also available at about

$100 each.

Angled Stadium Rack are available for six to eight bikes

6 Bikes = $519.00

Wave Racks for 8-10 bikes
$187.85 +
shipping

Approx. $125

Post & Ring Rack

Wave Racks: $847.00 galvanized holds 15 bikes
Quantity and shipping discounts available on large orders
1-888-447-2401 x303 adam@theparkcatalog.com