



## **Information Resources Exchange Group Agenda**

*Wednesday, March 13, 2019*

### **10:00 am Welcome/IREG Business**

*10:10 am* Supporting GIS-T at Engineering & Public Works by Kiersten Gauntt, Burlington County, NJ

*10:40 am* GIS Use in Camden County & Camden County's Asset Management System for Transportation by Andrew Levecchia, Camden County, NJ

*11:10 am* How Delaware County is Using AGOL for Planning, Julie DeIMuto, Amanda Taylor, Delaware County, PA

*11:40 am* Bucks County Maps and Data Portal by Christian Regosch, Bucks County, PA

### **12:10 pm Lunch/ Network**

### **12:50 pm Member Roundtable**

*1:00 pm* Using GIS to Identify High Risk Pedestrian Crash Areas by Daryl Krasnuk, Hudson County, NJ

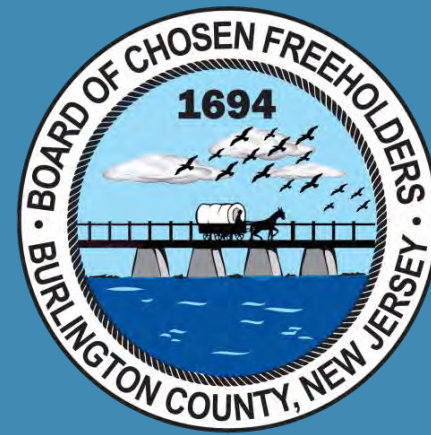
*1:30 pm* Coordinating Infrastructure Project Mapping at Middlesex County by Brian Kehoe, Helene Abode Maroun and Amy Fread, Middlesex County, NJ

*2:00 pm* Alternative Methods for Bicycle Planning in Mercer County by Matt Lawson, Mercer County, NJ

### **2:30 pm MAGTUG announcement/Coffee Break**

*2:40 pm* Increasing Tidal Flooding Situational Awareness in Cape May County, NJ Using ESRI Solutions for Flood by Calen Daugherty, Civil Solutions

*3:10 pm* Monmouth County Cultural and Heritage Virtual Tours, Monmouth County, Joe Barris



# SUPPORTING GIS-T AT ENGINEERING & PUBLIC WORKS

**Traffic Engineering**



**Traffic Operations Center**

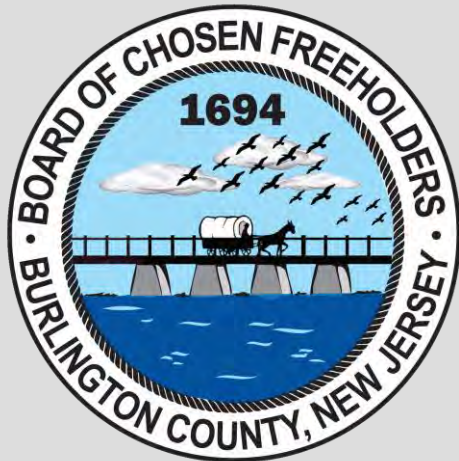
Kiersten Gauntt GISP

GIS Specialist II

Burlington County, NJ

# DVRPC TRANSPORTATION GRANT

- Grant funding to do transportation specific GIS
- Covers part of Kiersten's salary
- Time Cards and Bi-Annually Reports



# TRANSPORTATION GIS AT BURL CO

- Guiderail Inventory\*
- Bike
- Road Overlay
- Curve Inventory\*
- Pavement Management System\*
- Centerline Roads
- Bridges, Pipes, Culverts
- TOC Mapping
- Sidewalk Inventory\*
- County Owned Signs
- Safe Routes to School
- General Map Creation

\* DVRPC Funded/Contracted Projects



# ENGINEERING INTRANET WEBMAP

- Merrilee Torres built in ArcGIS online!
- Very useful to the engineers, they are able view all the GIS data that is pertinent to their work (and not pester me all the time...shhhh)
- Has all of the data that is in this presentation!
- **THE THING IS A BEAST!**



# GUIDERAIL INVENTORY

- DVRPC Funded Project
  - Taylor Wiseman Taylor Consulting Firm Awarded Project
  - Field Crews inspected every guiderail segment in the county
  - Final Deliverable GIS Geodatabase with line segments representing guiderail and attribute data describe guiderail and conditions of segments
    - Hard drive of Photos
    - Warranted Points point layer and MicroStation Drawings
- Guiderail Mapbook
  - 470 Page Mapbook
    - Set scale for each segment/s of guiderail
    - Aerial Imagery with Roads



# BIKE MAPPING

- Bike Map created by cartographer Steve Spindler with collaboration of the County
- Data used was from DVRPC Bike Feasibility Study, Existing Bike Routes, Existing County Data
- Steve partnering with other bicyclist in NJ to create more roads that are suitable for biking
- Maps are super popular!!!
- <http://www.burlingtonbikemap.com/>



# ROAD OVERLAY

- 10-13 roads(mileage dependence) per year are selected based on the conditions and the last time that the road was paved
- State funded project
- GIS layer created from centerlines of the segments that are being paved
- Maps created showing the following features so the engineers and field workers are aware of the structures:
  - Bridges, Culverts, Pipes
  - Storm Inlets
  - Outfalls
  - Manholes
- Additional Maps are created showing the segments of overlay with parcels for moratorium purposes



# CENTERLINE ROADS

- Roads in the county are collected via Trimble GPS unit, and Terrasync software, with the aid of ArcPad on another Trimble GPS Unit
  - All jurisdiction of roads are collected
  - New roads are constantly being added
    - Land Development, Public Safety, Aerial Photography, Co workers help with gathering information
  - Many attributes are collected in the field about the road
- Roads are very important for 911 purposes
  - Address range collection is needed for Next Gen 911
  - Naming Conventions of roads ( ie N Main St, Main St, Main St N)
- County Road Map
  - 2008 and 2011 road map of the entire county was done in collaboration with cartographer Steve Spindler.
  - 2019 hoping to do a new map



# GPS CENTERLINE DATA DICTIONARY & ATTRIBUTE TABLE

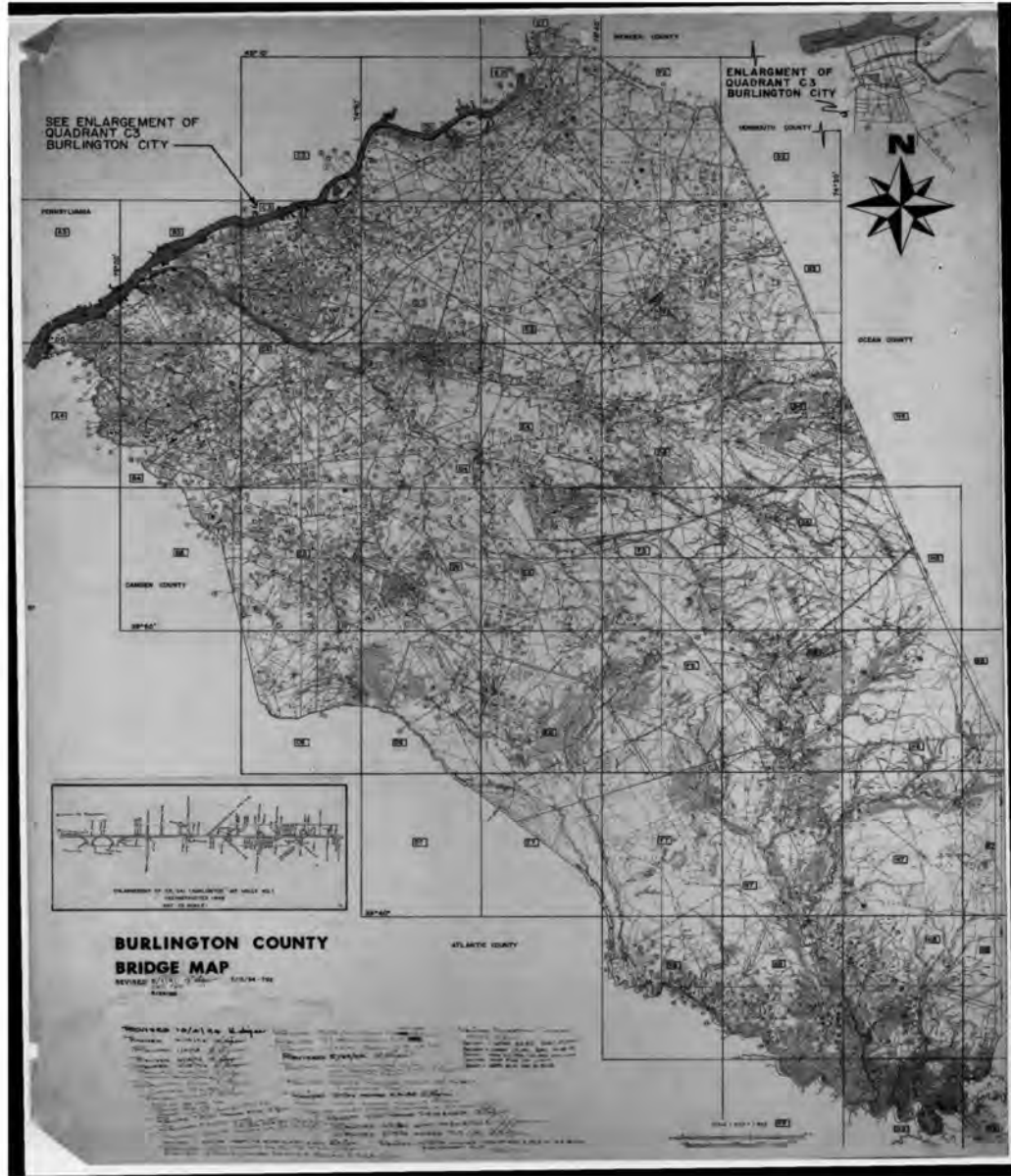
- Pre\_DIR- Pre- direction N,W,S,E
  - Pre\_Type- North,West, South, East
  - Street Name- Proper Name on Street sign ie: N Spring Garden St
  - Name- Segmented just Name part ie: Spring Garden
  - Street\_Type- Segmented just ending of road name ie: RD,AV, ST, BLVD,...
  - Suffix- End Direction N,W, S, E ie: Spring Gardent St N
  - Alter\_Name- Another name the road can be referenced by ie: RTE 616 is Bridgeboro Rd
  - County\_Route- Number of the County road ie: 537,541,616, ...
  - Type- Road, Jug Handle, Ramp
  - Jurisdiction- Local, Private, Military, 500,600,700 Series, Interstate, State, Emergency
  - From\_Stop- None, Light, Stop Sign, Yield
  - To\_Stop- None, Light, Stop Sign, Yield
  - Lanes- Number of lanes associated with the centerline
  - Shoulder- Yes/ No
  - Ditch- Yes/No
  - Direction- Two Way/ One Way
  - Posted Speed- Speed limit that is posted on the road ie:35MPH, if there is know speed limit posted  
25MPH is given or Unknown
  - Dominate\_Landuse- Residential, Rural, Military, Commercial, Industrial
  - Surface\_Material- Bituminous, Dirt, Concrete, Chip Seal
  - Striping- None, Solid, Broken
  - Date- Collection Date
  - Modified- Data edits are made
  - Segement\_Id- Sequential Number assigned to segement
  - Source- If roads were not GPSed by BC, we have roads that were given to us by the JBMDL
  - Method- Most roads say GPS, but roads given to us say Digitize
  - Functional\_Classification- NA, (Urban/Rural) Local,Collector, Principal Arterial, Minor Arterial
- \*Listed just pertinent fields, not GIS generated fields



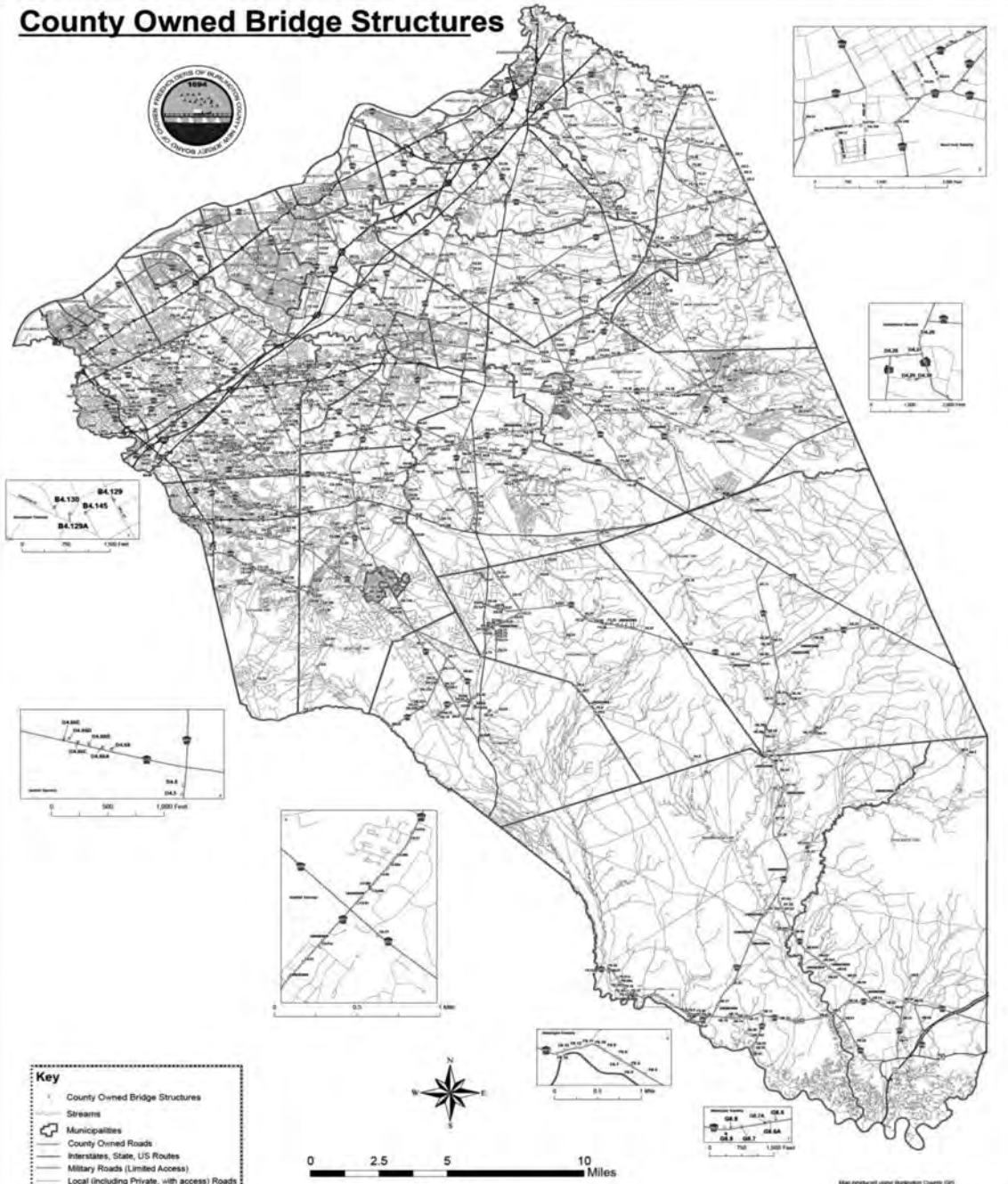
# BRIDGES, PIPES, CULVERTS

- 1114 structures have been collected via Trimble GPS Units
- County has a hand drawn map that was the base for the project
- Using Geofence the map was made digital and the starting point for field work
- File cards with information about the structure was the basis for the attribute table
- Many summers, many interns, many cans of bug spray were devoted to this project
- Some structures were not found, a shapefile with their approximate location and details as to why they were not found was created





# County Owned Bridge Structures



\* Colored maps are available by ordering a 1/4 in. map (map scale 1:100,000)

Map produced using Burlington County GIS  
Geographic Information System Data  
Roads and Structures Layer Area (L) by a County GIS Operator  
Boundaries and Other Data  
Map has been produced for the County government  
Structures layer includes are structures that  
Burlington County Bridge Structures have the only  
and are not visible on other maps  
Produced May 15, 2011





# TRAFFIC OPERATIONS (TOC) MAPPING

- Traffic Signals, Traffic Cameras, VMS Boards, Fiber Optic Lines/Markers, Rumble Strips
  - 509 Traffic Signals
  - 106 Traffic Cameras
  - 4 VMS Boards built 3 in the process of being built
  - 73 Fiber Optic Routes
  - 503 Fiber Optic Markers
  - 179 Miles of Rumble Strips
- Structures have been GPSed or digitized, with attributes that were pertinent to the traffic engineers



# COUNTY OWNED SIGNS

- Over 20,000 signs have been collected

Originally signs were being collected by county employees using Trimble Geo XH, Ranger handheld

- 10,000 signs collected
- Signs housed in File Geodatabase
- Data dictionary file that compiled the attribute table was designed by a Traffic Engineer and myself
- County contracted the job to a consulting firm that obtained GPS locations using video logging
- Final Deliverable
  - Hard drive with all the videos
  - Ipads with SignCad app created for data collection
  - (Garmin units to attach to Ipads to help with accuracy)
  - SignCad software has the option to export data into a GIS format

Purpose of project was for inventory and retroreflectivity scoring



## PROJECTS TO MENTION...

- Pavement Management System- GIS based asset system, generated for county by a consulting firm
  - Data collected via driving a GPS/Video logged base truck that used ground penetrating radar to score cracks in roadway
  - Final deliverable was a GIS line segments of scoring
  - Tables of justification of scoring and what type of overlay paving is needed
  - DVRPC funded project
- Curve Inventory-GIS bases asset system, generated for county by a consulting firm
  - Data collected via driving a GPS/Video logged base truck and the use of GPS software machine that calculates speeds of curves
  - Checking speed advisory signs to see if the speed limit is outdated
  - Final deliverable was a GIS data and reports of speed recommendations and sign placements
  - DVRPC funded project

## PROJECTS TO MENTION...

- Sidewalk Inventory

- Create a seamless, standardized regional GIS dataset of pedestrian facilities
- Final deliverable will be sidewalk centerlines, curb ramps, crosswalks
- DVRPC project, county input appreciated

- Safe Routes to School

- County created drop off zones for easier drop/ pick up at children for schools
- This included new signage and crosswalks
- GPSing of new signs that were created for schools and digitizing in all crosswalks throughout the county
- Funded with Cross County Connections grants

# QUESTIONS???

Kiersten Gaunt GISP

GIS Specialist II

Burlington County Public Works/ Information Technology Depts.

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**DVRPC - IREG**

March 13, 2019



# GIS-BASED ASSET MANAGEMENT

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Camden County



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# Signs

The image displays a GIS application interface. On the left, a pop-up window titled "Pop-up" shows a list of "All\_Signs (2)" with "JAYA PRAKASH NAVEEN ANNE" selected. Below this, a detailed view for "All\_Signs - JAYA PRAKASH NAVEEN ANNE" lists various attributes:

POSTUID3	
L_ROAD	PARK BLVD RT. 628
GPSDATE	7/11/2013
SIGNDIR	SE
POSTTYPE	U-CHANNEL
INVDATA	11/2/2013
PLCMNT	RIGHT
MUTCD	R3-8R
SIGNCOND	PASS
REFLECT	PASS
X	336514.810086
Y	398272.086883
INSTALLD	<Null>
SHT_TYPE	
SIGNBTYPE	
OFFSET	0
LIFEEXPCT	0
NOSIGNS	0
BDT	
UID	7938
IMG_LINK	<a href="http://apps-1/DocumentLinks/SignPhotos/13071">http://apps-1/DocumentLinks/SignPhotos/13071</a>

The background is an aerial view of a road intersection labeled "Park Blvd". A yellow arrow points from the "IMG\_LINK" field in the pop-up window to an inset photograph of a sign. The sign is a white rectangular sign with a black border, featuring a black arrow pointing up and a black arrow pointing right, with the word "ONLY" written below. To the right of the sign is a smaller white sign with black text that reads "NO TURN ON RED". The sign is mounted on a black post in a grassy area.



# Curves

The screenshot displays a GIS application interface. On the left, an aerial view shows a road labeled 'N Park Dr' with a cyan curve highlighted. In the center, two overlapping windows show 'Safe Curve Speed Analysis Report' for Curve 04000628\_MP1.46-1.61. On the right, a 'Pop-up' window lists attributes for the selected feature, with a red arrow pointing to the 'Hotlink' field containing the file path: `Y:\GIS_DATA\Asset Management\Curve Inventory\Camden PDFs 1-8-19\04000628_MP1.46-1.61.pdf`.

Camden\_Curves X

Field: Add Delete Calculate Selection: Zoom To Switch Clear Delete Copy Highlighted: Unselect Reselect Zoom To Switch Clear Delete

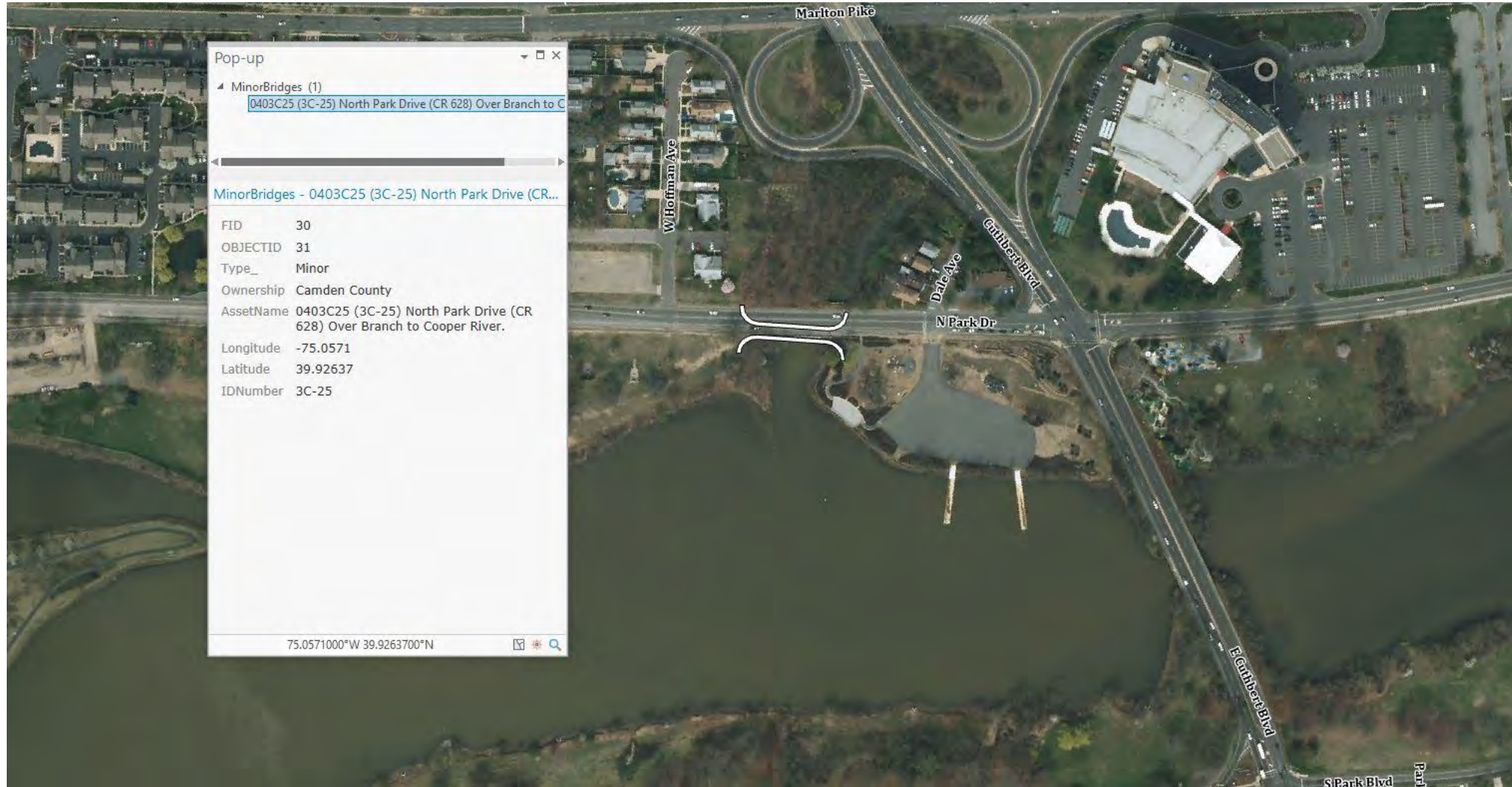
Field	GPS_FIT	AVERAGE_SP	DIFFERENTI	CURVE_SIGN	CURVE_SI_1	CURVE_SI_2	ADVISORY_S	SPEED_SIGN	CHEVRON_SI	CHEVRON_SP	CHEVRON_RE	Hotlink
JRVE_GRAD	98.6%	19.582349	N/A	W1-2	none	55 mph	none	W1-8	120 ft	none	The Recommended...	Y:\GIS_DATA\Asset...
	98.8%	19.582349	N/A	W1-2	none	55 mph	none	W1-8	120 ft	none	The Recommended...	Y:\GIS_DATA\Asset...
	98.5%	19.582349	N/A	W1-2	none	45 mph	none	W1-8	120 ft	none	The Recommended...	Y:\GIS_DATA\Asset...
	97.5%	19.582349	N/A	W1-2	none	45 mph	none	W1-8	120 ft	none	The Recommended...	Y:\GIS_DATA\Asset...

4 of 968 selected

Filters: 100%



# Bridges



# Outfalls

The screenshot shows a GIS application interface. On the left, a pop-up window displays the following metadata for the selected outfall:

Camden_Co_remainder_outfalls - gc	
OBJECTID_1	301
OBJECTID	0
NAME	gc
DATEINSPEC	9/21/2005
TIMERAIN	>48 Hours
QUANRAIN	>0.1 Inches
OUTDISC	Stream or River
OUTBRIDGE	No
PIPESHP	Circular
PIPEMAT	Concrete
PIPECOND	Good
HEADWALL	No Headwall
SUSPENDED	No
STRUCTPROT	None
OUTCOVER	None
PIPEFLOW	No
DEPTHFLOW	0
FLOWAPP	Clear
OUTEROS	None

Below the metadata, a list of attributes is shown:

Camden_Co_remainder_outfalls - gc	
COMMENTS	
PICIDS	6307
PIPEDIAM	24
PIPEWDIAM	24
PIPESUSPEN	0
FLOWODOR	Normal
ENABLED	0
ANCILLARYR	0
SML_OUTFAL	927
HUC_14_ID	02040202110060
ASSET_ID	c
FLOATABLES	Y
COUNTY	34007
MUNICIPALI	57660
__OBJECTI	0
__CHGCODE	0
OUTFALLID	3400757660927c
X	-75.0565129684496
Y	39.9251627617448

The map on the right shows an aerial view of a pond area with several blue circular markers representing outfalls. The markers are located near the pond's edge. The map includes labels for roads: W Hoffman Ave, Dale Ave, N Park Dr, E Garfield Blvd, S Park Dr, Harding Ave, and King Ave. The coordinates at the bottom of the map are 75.0565130°W 39.9251628°N.



# Outfalls

The image displays a GIS interface with a pop-up window for an outfall. The pop-up window contains the following information:

**Camden\_Co\_remainder\_outfalls - gc**

OBJECTID_1	301
OBJECTID	0
NAME	gc
DATEINSPEC	9/21/2005
TIMERAIN	>48 Hours
QUANRAIN	>0.1 Inches
OUTDISC	Stream or River
OUTBRIDGE	No
PIPESHP	Circular
PEPMAT	Concrete
PIPECOND	Good
HEADWALL	No Headwall
SUSPENDED	No
STRUCTPROT	None
OUTCOVER	None
PIPEFLOW	No
DEPTHFLOW	0
FLOWAPP	Clear
OUTEROS	None

**Camden\_Co\_remainder\_outfalls - gc**

COMMENTS

PICIDS	6307
PIPEHDIAM	24
PIPEWDIAM	24
PIPESUSPEN	0
FLOWODOR	Normal
ENABLED	0
ANCILLARYR	0
SML_OUTFAL	927
HUC_14_ID	02040202110060
ASSET_ID	c
FLOATABLES	Y
COUNTY	34007
MUNICIPALI	57660
__OBJECTI	0
__CHGCODE	0
OUTFALLID	3400757660927c
X	-75.0565129684496
Y	39.9251627617448

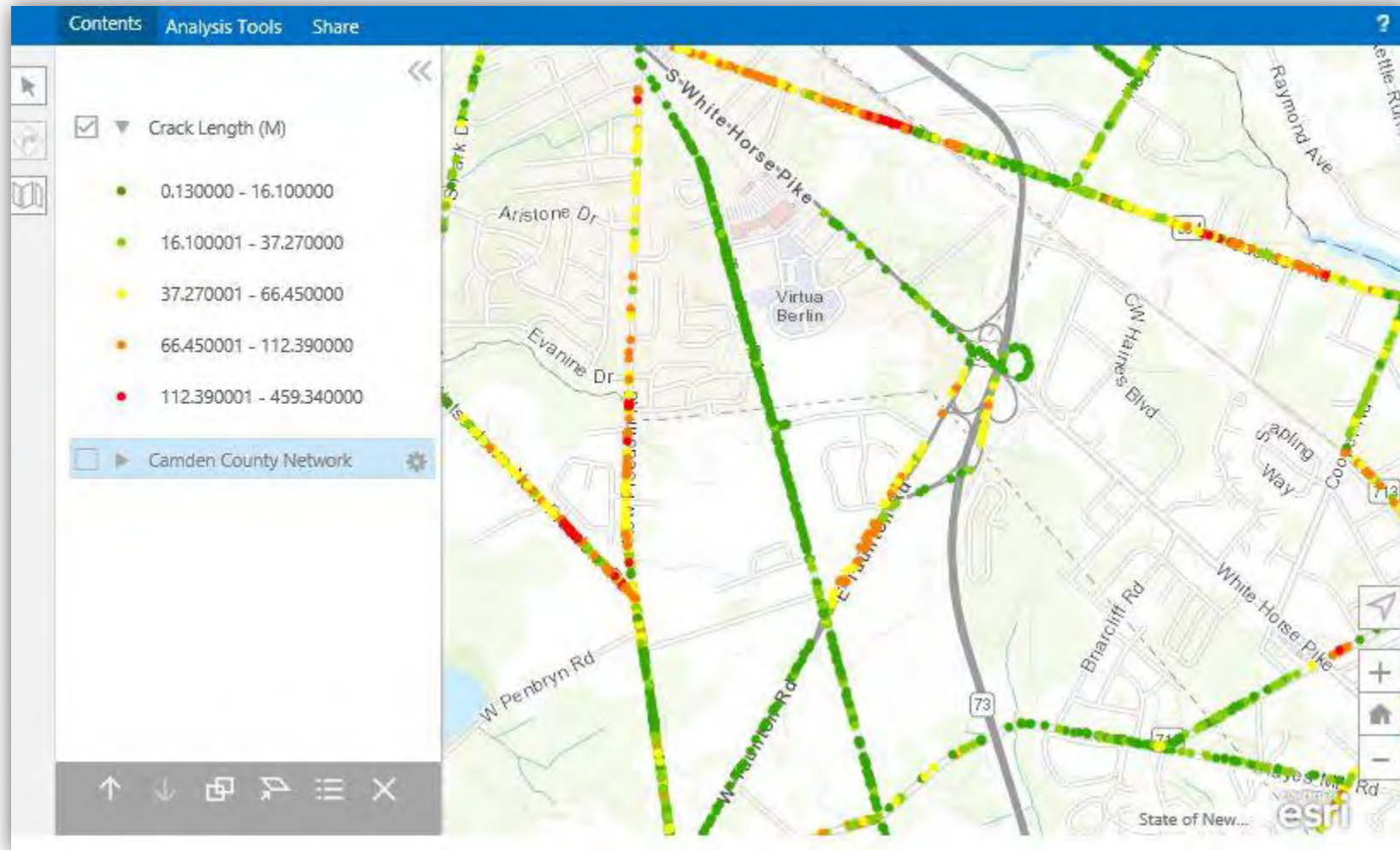
75.0565130°W 39.9251628°N

75.0565130°W 39.9251628°N

The background shows an aerial view of a residential area with streets labeled 'W Hoffman Ave', 'Herald Ave', and 'King Ave'. Two blue circular markers are visible on the map. Two photographs are overlaid on the right side of the map:

- The top photograph shows a concrete pipe opening completely blocked by a dense pile of dry sticks and branches.
- The bottom photograph shows a concrete pipe opening in a grassy area, partially covered with fallen brown leaves.

# Pavement





# Inlets



<b>ID #</b>	
<b>Municipality</b>	
<b>Location</b>	
<b>Type</b>	
<b>Year</b>	
<b>Condition</b>	
<b>X</b>	
<b>Y</b>	



# Manholes



<b>ID #</b>	
<b>Municipality</b>	
<b>Location</b>	
<b>Type</b>	
<b>Year</b>	
<b>Condition</b>	
<b>X</b>	
<b>Y</b>	



# Data Development

- 2004 Parcel Layer
- 2004 Outfall Data
- 2015 Sign Inventory and Retro-Reflectivity compliance
- 2016 NJDOT COMBIS – Bridges
- 2016 County Microfiche conversion – Right of Way
- 2019 Curve Inventory
- 2019 Signal Timing Inventory
- 2019 Pavement Management
- 2019 Inlets and Manholes
- DVRPC GIS Annual Contract



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# System Progression



<b>Road Name &amp; Limits</b>	Park Blvd (CR 628) from Cuthbert Blvd (CR 636) west to curve
<b>Mile Marker(s)</b>	
<b>R.O.W.</b>	75'
<b>Pavement Management</b>	
<b>Manholes</b>	
<b>Outfalls</b>	ID #3400757660927c – Concrete Pipe – No Headwall
<b>Inlets</b>	
<b>Signs &amp; Retro-Reflectivity</b>	All PASS
<b>Curves</b>	The Recommended Advisory Speed for this pass is at or above the posted speed limit
<b>Bridges</b>	Minor 0403C25 (3C-25) over Branch to Cooper River
<b>Traffic Signals</b>	641/636 - Associated files on Server

# Any Questions?



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## **Andrew Levecchia**

Director, Division of Planning

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## **Kamille Preto**

GIS Analyst

[Kamille.Preto@Camdencounty.com](mailto:Kamille.Preto@Camdencounty.com)

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### Featured Maps



Delaware County Planning Commission Agenda



Delaware County's Media Offices and Transportation



Downtown Upper Darby Vision Plan



Steps toward Walkability: DelCo Sidewalk Inventory

The mission of Delaware County Planning Department (DCPD) is to promote the sound development and redevelopment of the County through the application of contemporary planning principles and smart growth concepts, while maintaining and enhancing the cultural, economic, and environmental livability of the County.

March 13, 2019

# How Delaware County is using AGOL for Planning Information Regional Exchange Group at DVRPC



Delaware County is currently operating ArcGIS for Server Enterprise Standard and is in the middle of upgrading from 10.2 to 10.6

### 3 Departments currently utilize GIS in the County:

Board of Assessments' GIS Department for parcel maintenance and hosting of Public Parcel Viewer

Delaware County Emergency Services for emergency management operations

Planning Department's GIS and Information Services Section for dataset maintenance and support of County planning initiatives





Resources – \$\$\$ & staff

Skills – some departments are using simple tools repeatedly and do not have the skills to do more in-depth mapping

No Centralized GIS – not all departments talk to each other and there is no designated coordinator or support person. Planning Department tries to help other Departments with mapping needs.

No Geospatial Strategic Plan – in absence of a plan to follow the Planning Department has to take the lead in implementing new GIS technology to keep current



**GIS Obstacles and Issues**

## Staff of 2 GIS Professionals

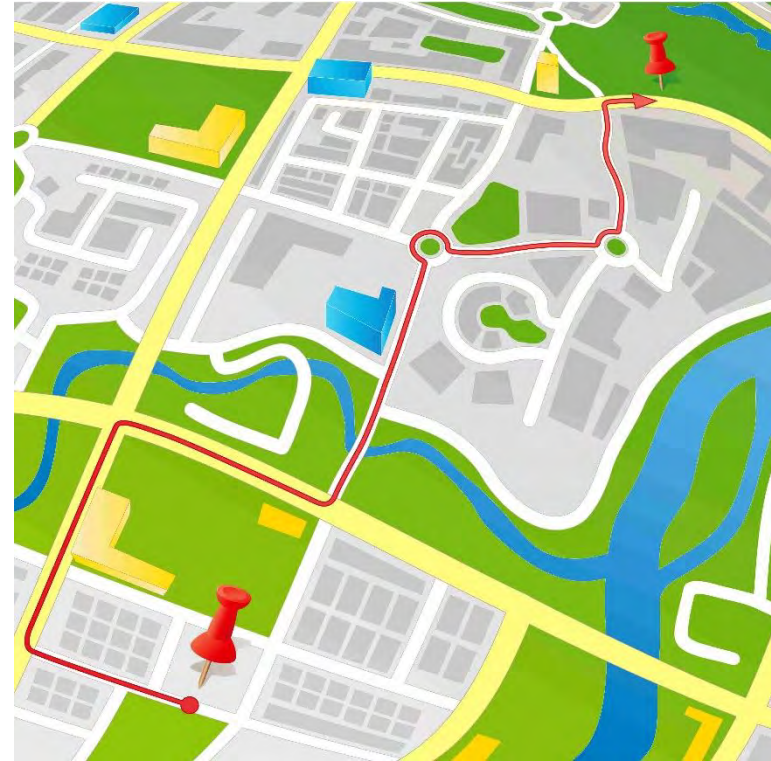
Maintaining data and creating maps for projects, DCPD staff, County staff and the public

Implementing ArcGIS Online for our planning projects

Supporting our planners in becoming skilled in utilizing the ArcGIS Online platform

Using Collector in the field  
How to create Story Maps  
Utilizing the Living Atlas

## Mapping our own path...



## County/Municipal Planning

Interactive application for Newtown Public Questionnaire for new zoning ordinance and a story map showing results

Downtown Awakenings Story Map

Transportation Improvements Inventory application and crowdsourcing map

Steps towards Walkability: Sidewalk Inventory

Downtown Awakenings Story Map

## Health and Human Services Applications

Web Application of Homeless Services & Drug and Alcohol Locator

Survey 123 Application for the Point-In-Time Count of Homeless

## Subdivision/Land Development

Historic proposed development plans application

Monthly County Planning Commission Agenda

Countywide Zoning Application

## Collector Projects:

Trail Collection

County Signage in Parks

Transportation Improvements

# Projects in ArcGIS Online

# <http://dataportal-bucksgis.opendata.arcgis.com>

**BucksCounty.org**  
The Official Site of Bucks County, Pennsylvania

Sign In

## Bucks County Data Portal

Provided by the Commissioners of Bucks County and the Bucks County Planning Commission

Jump to

- County Initiatives
- Interactive Maps
- Documents
- Find and Explore Data

This is the Bucks County GIS public platform for exploring the data of Bucks County and other data that may be important to the residents, business community and visitors of the county.

### County Initiatives

- Church
- Clock Tower
- Aerial View of Town
- Sunset



# USING GIS TO IDENTIFY HIGH RISK PEDESTRIAN CRASH AREAS

Daryl Krasnuk – Hudson County Division of Planning



March 13th, 2019  
DVRPC, Philadelphia

# PRESENTATION OVERVIEW

1 Study Background

2 Description of Analysis

3 Results from Analysis

4 Additional Steps

5 Questions



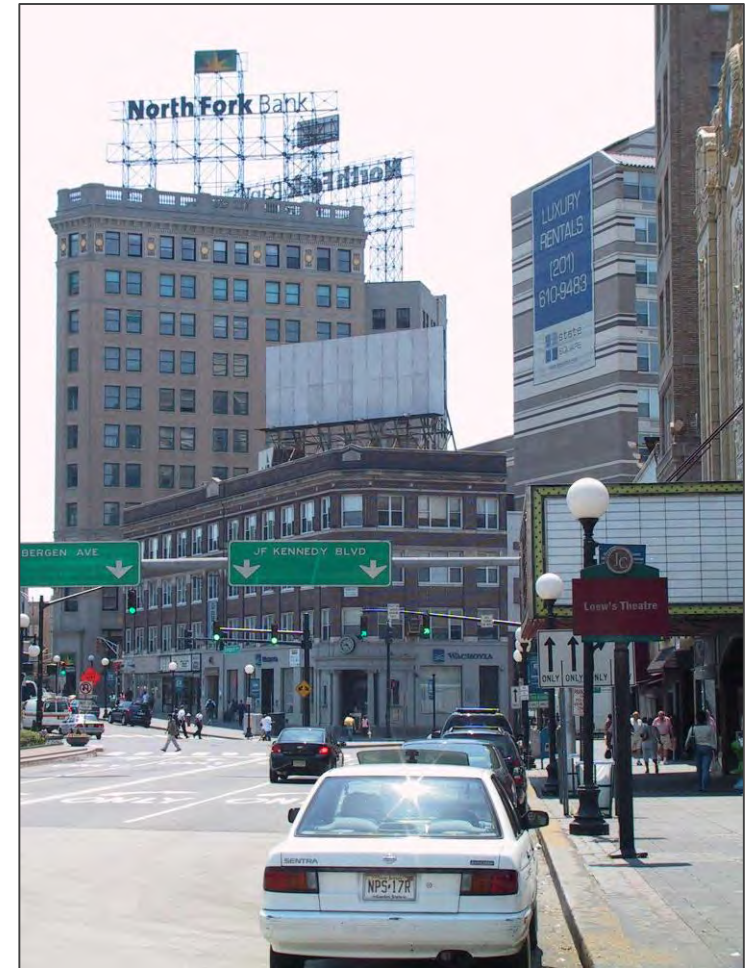
# HUDSON COUNTY – AN URBAN ENVIRONMENT

## Population density

- Hudson County has the 6<sup>th</sup> highest population density in the US
- Approx. 14,700 people per sq. mile
- Density continues to increase
  - Hudson County is the fastest growing county in NJ
  - Infrastructure capacity struggling to meet demand

## Commuting

- 42% of county residents use public transportation to get to work (state average is about 11%)
- 9% of workers walk or bike to work
- Nearly 25% of residents do not own a vehicle
- Hudson County serves as a regional connection to/from NYC
- Congested roads and extensive public transportation network
  - This creates opportunities and challenges in terms of circulation
  - High volumes of pedestrian and vehicular traffic create safety conflicts



JFK Blvd at Journal Square in Jersey City

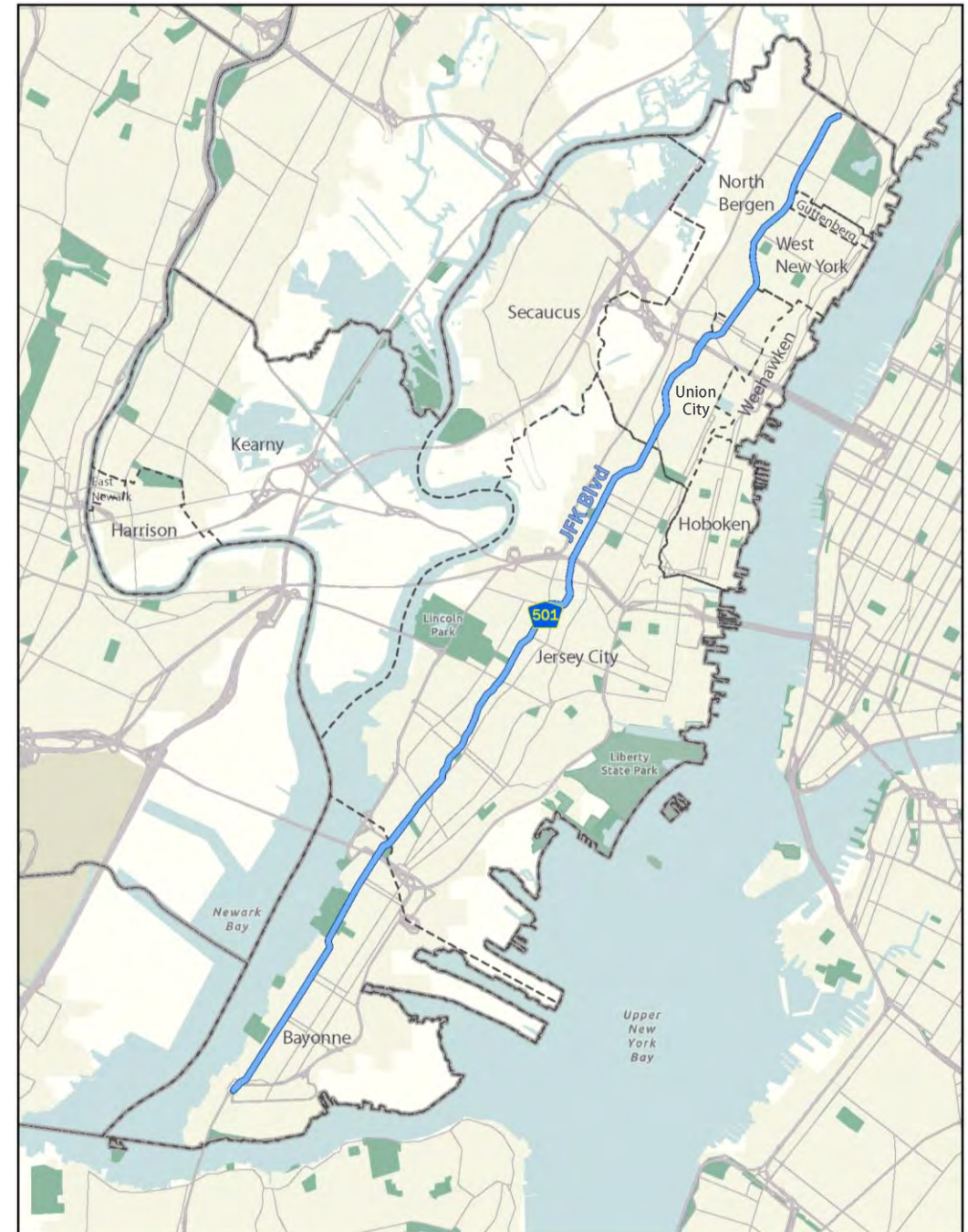


NJT and PATH trains passing through Harrison

# JFK BLVD

## Background

- Highly-traveled urban corridor
  - Average daily traffic counts range from 10,000 to 32,000
  - 13.7 miles long
  - Passes through 6 municipalities
  - Important regional connector
- Significant pedestrian activity
  - 44 schools on or near the boulevard
  - 3 college campuses located on JFK
  - Residential housing and retail in many locations along JFK
- Identified as the most dangerous road in Hudson County
  - Between 2014 and 2016:
    - 4,069 crashes
    - 1,107 injuries
    - 12 fatalities





# JFK BLVD SAFETY STUDY

## Elected officials request study for JFK Blvd

### After 2 teens die, freeholder wants end-to-end safety study for JFK Blvd

Freeholder Anthony Vainieri called on fellow board members to expand an ongoing study to boost safety for pedestrians and motorists

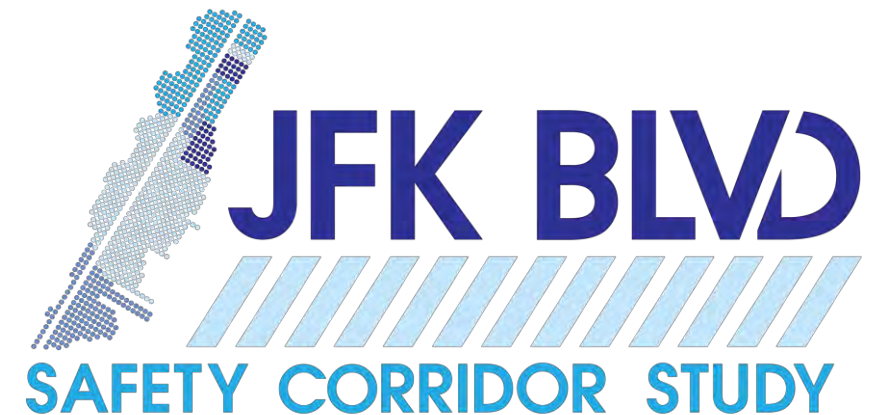
*nj.com – March 2016*

- HC Planning submitted a proposal to the North Jersey Transportation Planning Authority (NJTPA) Subregional Studies Program in 2017
  - \$240,000 federal grant awarded
  - \$60,000 in-kind match (completed through Division of Planning staff time)
- Study goal - Improve user safety through physical and policy based solutions
  - Objective: Identify and quantify several critical focus areas where crash conflicts are highest
  - Strategy: Utilize geospatial technology, public feedback and field observations
    - Apply a GIS based approach to identify and rank unsafe areas along JFK Blvd
    - Review prior studies in similar urban environments
    - Public engagement through events, surveys and meetings
    - Local stakeholder engagement through Technical Advisory Committees



Fatal crashes on JFK Blvd from 2016-2018

*Photo credits – NJ Advance Media*



# JFK BLVD GENERAL CONDITIONS

- Roadway
  - Typically 60 feet wide curb to curb in a 100 foot right-of-way
  - Two northbound travel lanes and two southbound travel lanes
  - Parking on both sides of the road for most of the corridor
  - Turning lanes are provided in selected high volume areas
    - Where additional pavement width is available
    - Or where on-street parking has been eliminated
- Traffic management
  - Over 200 signalized intersections
  - Speed limit is 25 mph throughout the entire road
    - Observed speed is generally much higher
- Land use
  - Large variation in land use over short distances
  - High density residential and commercial most common
    - High density residential - 46%
    - Commercial - 38%
    - Mixed urban or recreational - 8%
    - Other - 8%

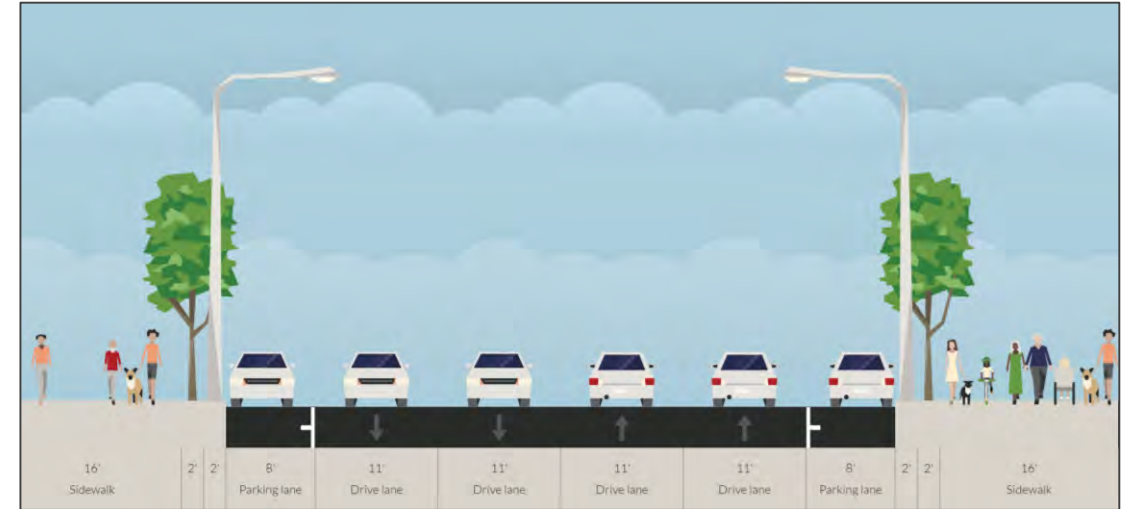


Image credit - Streetmix

JFK and 27<sup>th</sup> looking south



Photo credits - Google street view

JFK and 27<sup>th</sup> looking north





# VEHICLE-PEDESTRIAN CRASHES ON JFK BLVD

## Pedestrian crash data on JFK Blvd

- 10 years of data (2007-2016)
- Source: NJDOT
- Includes crash severity field

## Crash Data Summary

- Total of 618 vehicle-pedestrian accidents
  - No injury – 62
  - Pain - 407
  - Moderate injury – 109
  - Incapacitating injury – 23
  - Fatality - 17

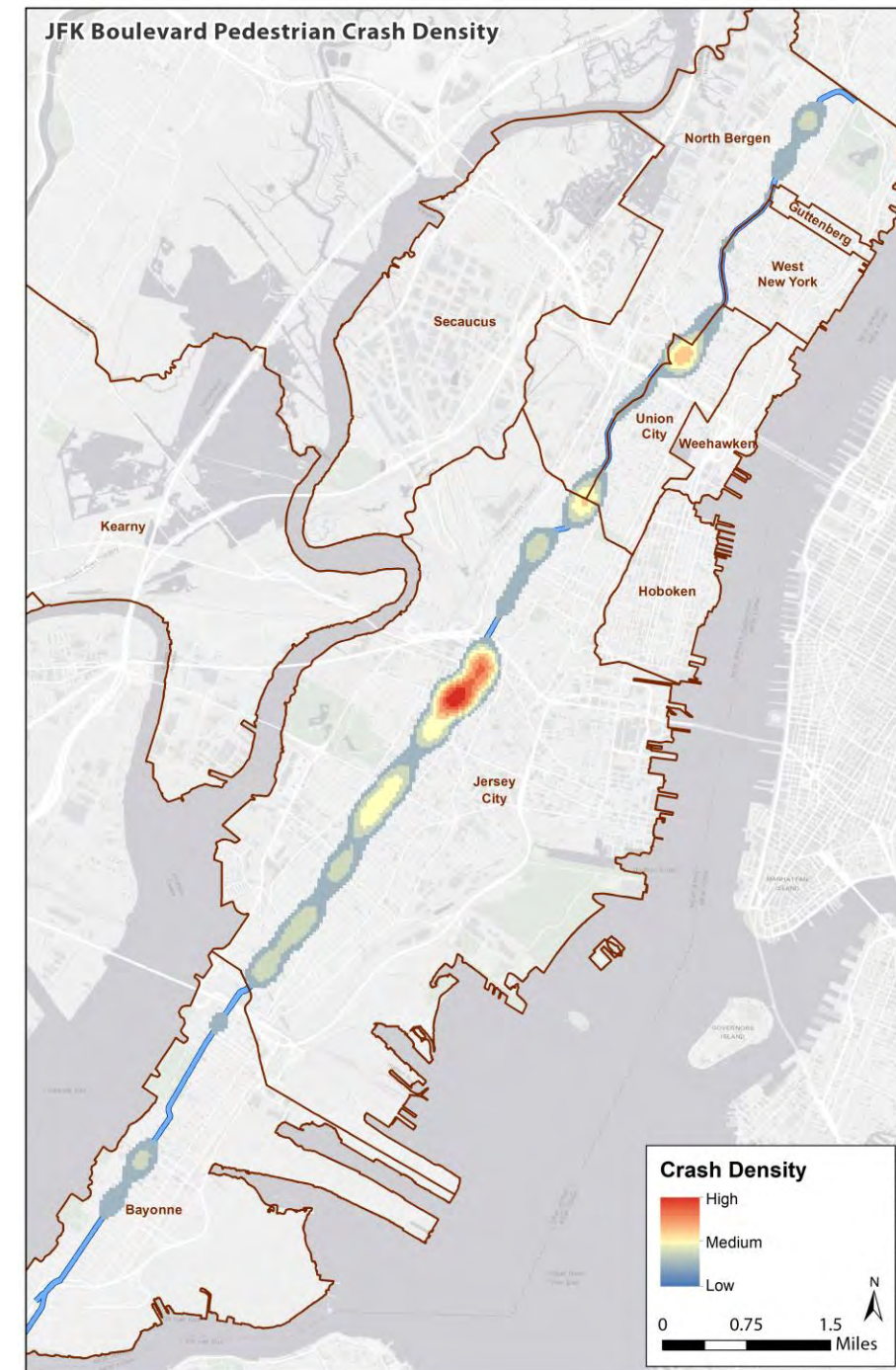




# PRELIMINARY VISUALIZATION OF PEDESTRIAN CRASHES

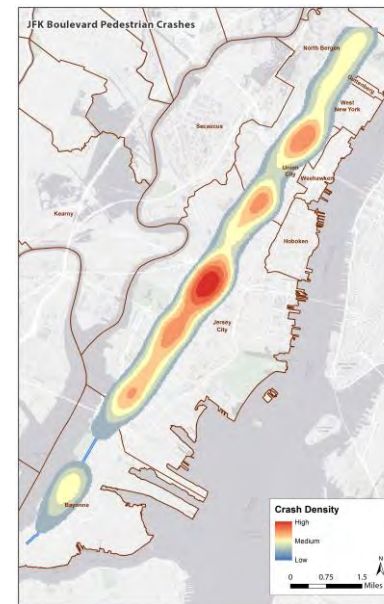
## Kernel Density Estimation (KDE)

- The kernel density tool in ArcMap was used to estimate the density of crashes
- The population field in the kernel density was used to provide a 'weight' for crash severity
  - No injury – 1
  - Pain - 2
  - Moderate injury – 3
  - Incapacitating injury – 4
  - Fatality – 5
- This provided a limited overview of problem areas
  - Useful for early discussion
  - Highlighted known problem areas in Journal Square



# SPATIAL PATTERN ANALYTICAL TOOLS IN ARC MAP FOR CRASH ANALYSIS

- Kernel Density
  - Does not evaluate statistical significance of distribution of accidents
  - Results are subject to search bandwidth
    - If it is too small, it will not produce a continuous smooth surface
    - If it too large it will suppress spatial variation of events
- Hotspot analysis tools
  - Can determine statistical significance
  - It's difficult to determine which locations pose the highest threat
  - Not much literature about use along a single road
- Consideration of street network distance
  - Need to generate a network spatial weights matrix file
  - This could be imported into the hotspot analysis tool to define the conceptualization of spatial relationships
  - Requires Network Analyst extension
- Could be used as the basis for more complex spatial statistical analysis



5,000 foot search radius



1,500 foot search radius



Street network distance = 3,825 feet

Spatial distance = 3,085 feet

# DEVELOPING A GEOSPATIAL ANALYSIS OF VEHICLE-PEDESTRIAN CRASHES ON JFK BLVD

## Tactics for identifying focus areas

### Divide study area into equal segments

Create objective and equal segments of JFK Blvd that span 1 to 2 intersections



### Consider crash frequency and severity

Employ crash severity data as a weighting factor to compliment crash frequency in a manner that does not overstate fatalities with extreme values in terms of crash cost



### Quantify pedestrian crash risk

Develop a metric to quantify and rank sections of JFK Blvd based on crash data over 10 years



### Remove areas that are undergoing safety improvement projects

Several areas on the Blvd are undergoing safety improvement projects and must be removed from analysis in a way that will not distort results of current analysis





# CREATING SEGMENTS FOR ANALYSIS

- Create manageable sections of JFK Blvd
  - To identify and rank most dangerous areas
  - Provide a reasonable stretch of roadway for recommending and eventually implementing safety improvements
  - Aim to include 2 intersections in each section
- Split JFK Blvd into segments
  - JFK Blvd was extracted from NJDOT road centerline data
  - Split line tool was used to create equal sections
  - 144 sections were created, each approx. 500 feet long

The screenshot shows two windows from ArcGIS. The left window displays the 'Split' tool interface with the following settings:

- Line Length: 72362.154
- Split Options:
  - Distance
  - Into Equal Parts (144)
  - Percentage
  - By Measure (0)
- Orientation:
  - From Start Point of Line
  - From End Point of Line

The right window shows a table with 144 rows, each representing a segment. The table has three columns: OBJECTID, Shape, and Shape\_Length.

OBJECTID	Shape	Shape_Length
1	Polyline	502.514985
2	Polyline	502.514892
3	Polyline	502.514863
4	Polyline	502.51517
5	Polyline	502.514749
6	Polyline	502.514977
7	Polyline	502.515041
8	Polyline	502.5151
9	Polyline	502.51492
10	Polyline	502.514777
11	Polyline	502.514916
12	Polyline	502.515135
13	Polyline	502.514827
14	Polyline	502.515102
15	Polyline	502.51486
16	Polyline	502.514968
17	Polyline	502.515006
18	Polyline	502.514947
19	Polyline	502.515042
20	Polyline	502.51493
21	Polyline	502.514865
22	Polyline	502.514902
23	Polyline	502.515166



# CRASH SEVERITY INDEX (SI)

- JFK Blvd has wide distribution of crash areas
  - Areas that have not experienced vehicle-pedestrian crashes are less common than areas that have
  - Identifying the most dangerous spots should consider both crash counts and crash severity
- Conducted literature review to examine how crash frequency and severity was measured in several studies
  - “Using GIS to Identify Pedestrian-Vehicle Crash Hot Spots and Unsafe Bus Stops” in the Journal of Public Transportation applied a severity index in an urban environment with a similar data structure
  - Slight modification to that SI was made for difference in crash severity attributes

$$SI = 3.0 * X_4 + 1.8 * X_3 + 1.3 * X_2 + X_1$$

Where:

$X_4$ = total number of fatal crashes

$X_3$ = total number of serious injury crashes

$X_2$ = total number of other injury crashes

$X_1$ = total number of property-damage-only crashes



$$SI = 3.0 * X_5 + 1.8 * X_4 + 1.3 * X_3 + 1.1 * X_2 + X_1$$

Where:

$X_5$ = total number of fatal crashes

$X_4$ = total number of incapacitating Injury crashes

$X_3$ = total number of moderate Injury crashes

$X_2$ = total number of crashes resulting in pain

$X_1$ = total number of property-damage-only crashes

# CALCULATE SI FOR EACH SECTION

Spatial join was used to add crash point attributes to JFK Blvd line sections

Summarize results for each section by the sum of the SI field

OBJECTID	Shape	Sum_Output_TARGET_FID	Sum_Output_Sum_SI	Shape_Length
1	Polyline	717	1.1	502.514985
2	Polyline	1536	1.3	502.514892
3	Polyline	1537	3.2	502.514863
4	Polyline	1538	0	502.51517
5	Polyline	1539	2.4	502.514749
6	Polyline	1540	1.1	502.514977
7	Polyline	1541	4.3	502.515041
8	Polyline	1542	1.3	502.5151
9	Polyline	1543	4.6	502.51492
10	Polyline	1544	1.1	502.514777
11	Polyline	1545	5.7	502.514916
12	Polyline	1546	3.2	502.515135
13	Polyline	1547	5.9	502.514827
14	Polyline	1548	4	502.515102
15	Polyline	1549	4.5	502.51486
16	Polyline	1550	1.8	502.514968
17	Polyline	1551	7.2	502.515006
18	Polyline	1552	13.4	502.514947
19	Polyline	1553	3.1	502.515042
20	Polyline	1554	2.2	502.51493
21	Polyline	1555	2.4	502.514865
22	Polyline	1556	1.1	502.514902
23	Polyline	1557	1.3	502.515166
24	Polyline	1558	0	502.514996
25	Polyline	1559	0	502.51478



Shape_Length	Severity	Pedestrian	Rating	SI
502.514896	Moderate Injury	Yes	3	1.3
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Property Damage Only	Yes	1	1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Moderate Injury	Yes	3	1.3
502.514896	Pain	Yes	2	1.1
502.514896	Property Damage Only	Yes	1	1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Pain	Yes	2	1.1
502.514896	Fatal	Yes	5	3
502.514899	Pain	Yes	2	1.1
502.514899	Pain	Yes	2	1.1
502.514899	Pain	Yes	2	1.1
502.514899	Pain	Yes	2	1.1
502.514899	Pain	Yes	2	1.1
502.514899	Pain	Yes	2	1.1
502.5149	Pain	Yes	2	1.1
502.5149	Property Damage Only	Yes	1	1
502.5149	Pain	Yes	2	1.1

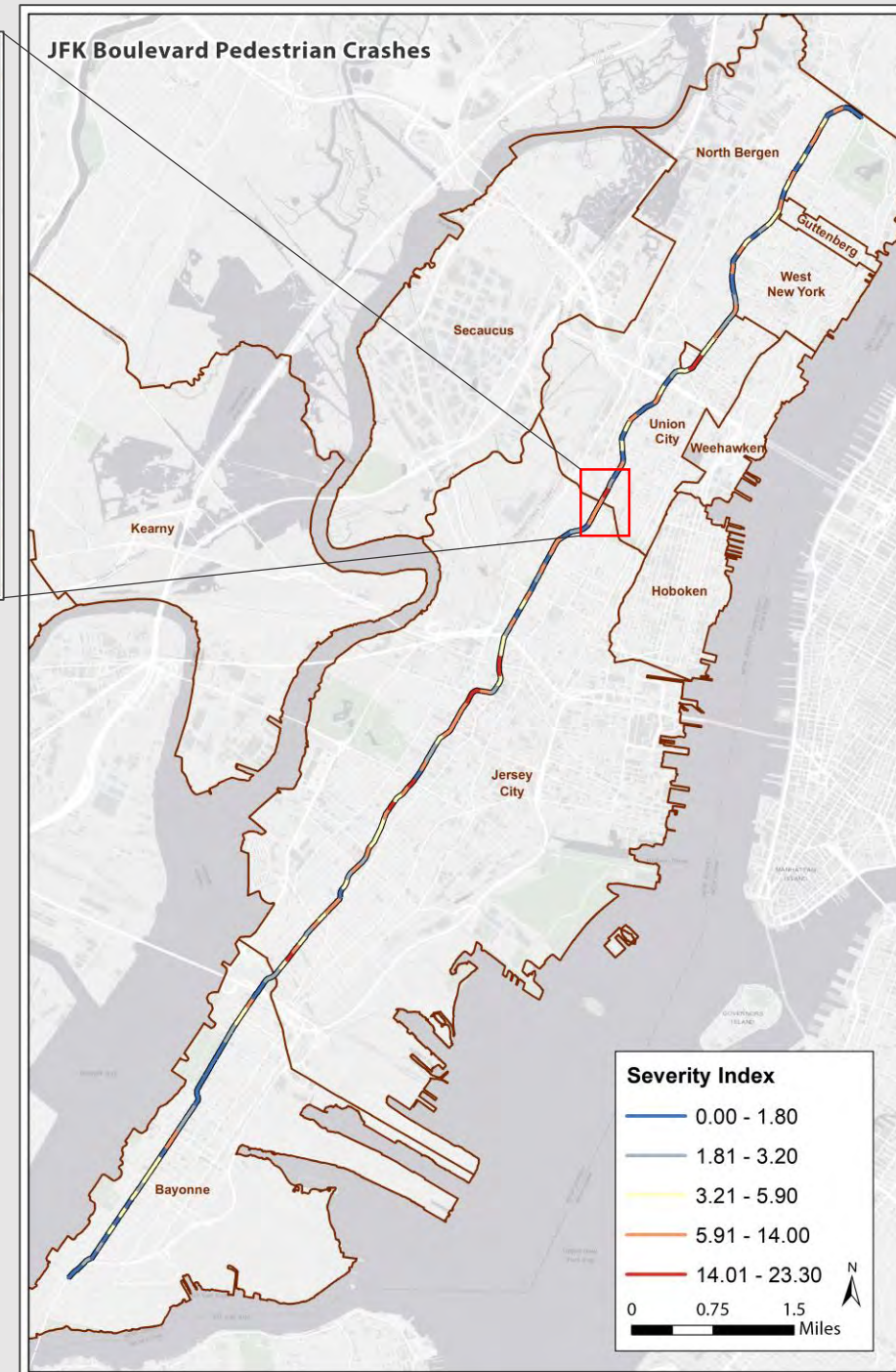
Created a new field and calculated the SI for each of the 5 crash severities

Join the summarized output file to the road segment layer using common field ID



# RESULTS

- Severity Index for the sections
  - Lowest score of 0 where no incidents occurred
  - Highest score of 23.3 – well known high conflict area where improvements are already planned
  - Mean score of 5.17
- 10 highest rated crash segments
  - Accounted for 144 of 618 vehicle-pedestrian crashes
  - About 23% of vehicle-pedestrian crashes occurred in sections that make up less than 7% of the roadway length
  - Only 3 of the 17 fatalities occurred in these segments



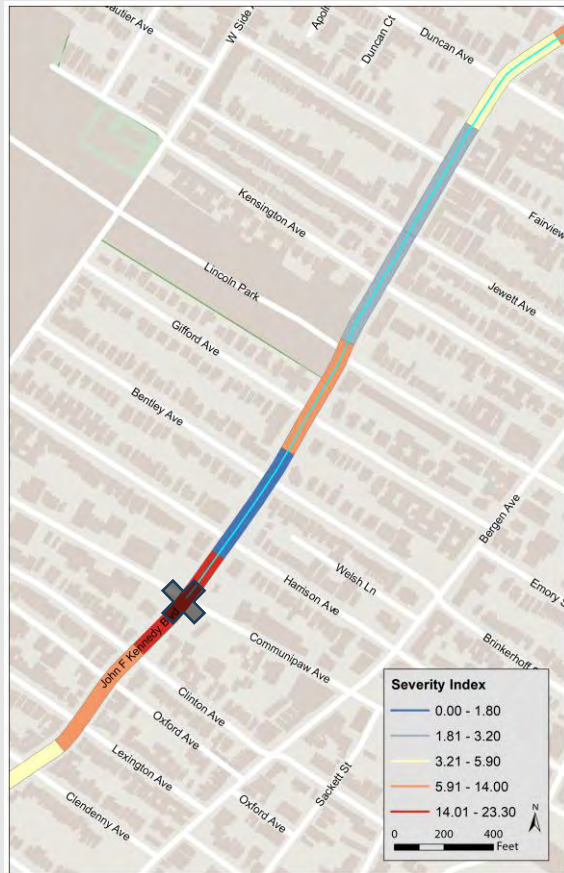
SI Score	No Injury	Pain	Moderate Injury	Incapacitating Injury	Fatal	Total Crashes
23.3	2	17	2	0	0	21
21.6	0	14	2	2	0	18
20.2	0	16	2	0	0	18
18.1	0	7	2	1	2	12
15.2	2	8	2	1	0	13
15.0	1	8	4	0	0	13
14.7	1	5	4	0	1	11
14.6	1	10	2	0	0	13
14.4	1	7	3	1	0	12
14.3	2	10	1	0	0	13

Table with 10 highest SI crash segments



# REMOVING SEGMENTS WITH SAFETY IMPROVEMENTS PENDING

- Road Safety Audits (RSA) were previously conducted along dangerous portions of JFK Blvd
  - These sections should not be considered for this study
  - 4 of the 10 segments with the highest SI score are in previously studied areas



## NJTPA LOCAL SAFETY PROGRAM

## HUDSON COUNTY



Thomas DeGise  
Hudson County Executive  
NJTPA Trustee

### Safety improvements along Park Avenue, John F. Kennedy Boulevard East and John F. Kennedy Boulevard in Hudson County

**Funding awarded:**  
**\$3,539,700**

Hudson County received a \$3,539,700 grant for this project through the NJTPA's FY 2017-2018 Local Safety Program (LSP). The grant includes funding for design, construction and construction inspection services. The project will improve safety and overall operations at 34 intersections along three corridors.

#### Project Details

Improvements will include: traffic signal upgrades at 30 intersections along a 3-mile stretch of John F. Kennedy Boulevard East from Hoboken through North Bergen, on Park Avenue at 15th and 19th streets in Hoboken and on John F. Kennedy Boulevard at Oxford and Linden Avenues in Jersey City; pedestrian refuge islands at Park Avenue and 19th Street, and at JFK Blvd. East and 74th Street; a mid-block crosswalk on John F. Kennedy Boulevard East between Highwood Terrace and Parkview Avenue and curb extensions at those two intersections and at Bull's Ferry Road.

#### About the Project Area

John F. Kennedy Boulevard is ranked first in the region on the NJTPA's list of high-crash corridors. Park Avenue becomes John F. Kennedy Boulevard East where it connects to the Lincoln Tunnel Helix. All three corridors have high traffic volumes and significant pedestrian activity. These corridors traverse neighborhoods that are a mix of residential and commercial properties.

#### The Local Safety Program

The LSP specializes in cost-effective solutions that can make an immediate impact on their target areas. The LSP is federally funded, utilizing Highway Safety Improvement Program funds. It was established by the NJTPA in conjunction with the Federal Highway Administration and New Jersey Department of Transportation to advance safety initiatives on county and local roads. For more information, visit [www.njtpa.org/LocalSafety](http://www.njtpa.org/LocalSafety).



# ADDITIONAL STEPS

- Provided analysis to consultants Fitzgerald & Halliday, Inc. & Stantec
  - They expanded dataset to include all crash records (not just vehicle-pedestrian) from two sources
    - SafetyVoyager (1/1/07-12/31/17)
    - NJDOT (1/1/07-12/31/16)
  - Performed data cleaning/quality control
    - Removed duplicate records between the two datasets
    - Identified inaccurate clustering of data (crash data not recorded at site of crash)
  - Expanded analysis to include two separate categories
    - Vehicle-pedestrian/cyclist crashes
    - Vehicle-vehicle crashes
    - A top ten crash list (excluding the areas where improvements are planned) was created for each category

Top Ten Vehicle-Vehicle Crash Cluster Locations

#	South Boundary	North Boundary	Location
1	28 <sup>th</sup> St	Sip St	N Bergen/Union City
2	90 <sup>th</sup> St	91 <sup>st</sup> St	North Bergen
3	Lexington Ave	Communipaw Ave	Jersey City
4	Bergen Tpke	35 <sup>th</sup> St	Union City
5	Carlton Ave	Manhattan Ave	Jersey City
6	NJ 139	Beacon Ave	Jersey City
7	Cliff St	Carlton Ave	Jersey City
8	Hague St	Secaucus Rd	Jersey/Union Cities
9	Glenwood Ave	DeKalb Ave	Jersey City
10	37 <sup>th</sup> St	39 <sup>th</sup> St	Union City

Top Ten Vehicle-Pedestrian Crash Cluster Locations

#	South Boundary	North Boundary	Location
1	Fairmount Ave	Glenwood Ave	Jersey City
2	Lexington Ave	Communipaw Ave	Jersey City
3	Glenwood Ave	DeKalb Ave	Jersey City
4	37 <sup>th</sup> St	39 <sup>th</sup> St	Union City
5	6 <sup>th</sup> St	8 <sup>th</sup> St	N Bergen/Union City
6	W 18 <sup>th</sup> St	W 21 <sup>st</sup> St	Bayonne
7	Van Houten Ave	Audubon Ave	Jersey City
8	Gates Ave	Neptune Ave	Jersey City
9	Carlton Ave	Manhattan Ave	Jersey City
10	Greenville Ave	Danforth Ave	Jersey City



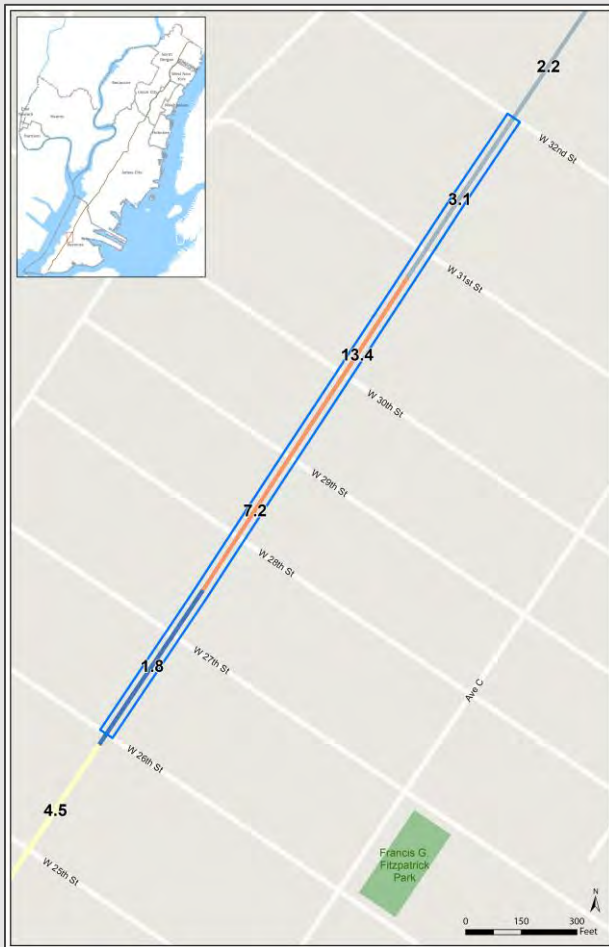
# TECHNICAL ADVISORY COMMITTEE (TAC)

- The two top ten crash location lists were shared with stakeholders
  - TAC members included county and municipal officials
  - The TAC was ask to provide feedback to help determine 4 overall focus areas
- Selection of the four focus areas
  - Following the first TAC meeting, Hudson County reached out to municipalities to discuss the list of potential focus areas
  - This feedback was crucial to determining the local issues facing the crash clusters identified by the analysis and prioritizing the locations accordingly
- Four focus areas
  - Data-driven safety analysis of JFK in conjunction with TAC feedback was the basis for selecting the focus areas
  - The four areas are roughly 1500' to 2500' in length
    - W 26th Street to W 32nd Street in Bayonne
    - Gates Ave. to Danforth Ave. in Jersey City
    - Hague Street to 10th Street in Jersey City/Union City/North Bergen
    - 37th Street to 43rd Street in Union City/North Bergen

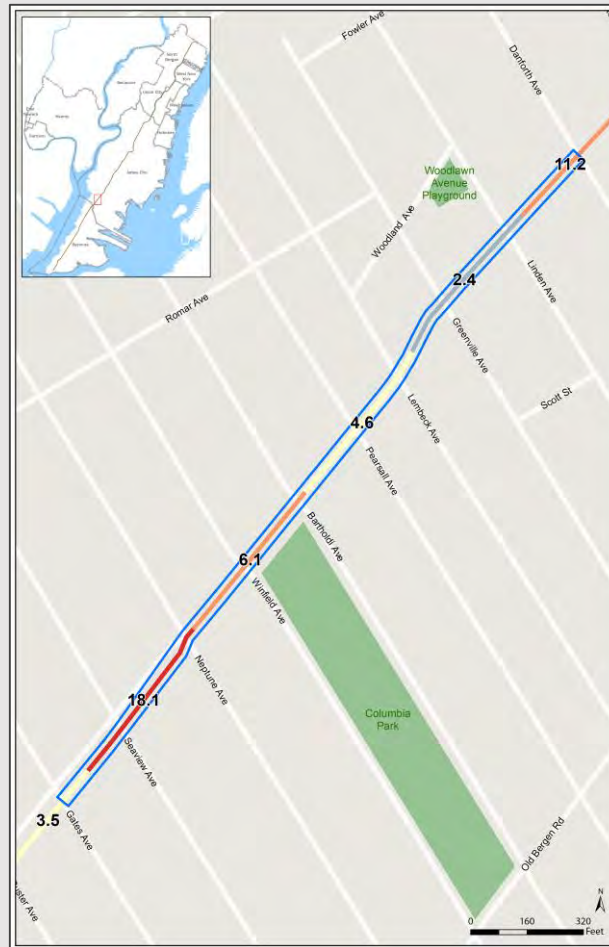


# JFK BLVD FOCUS AREAS

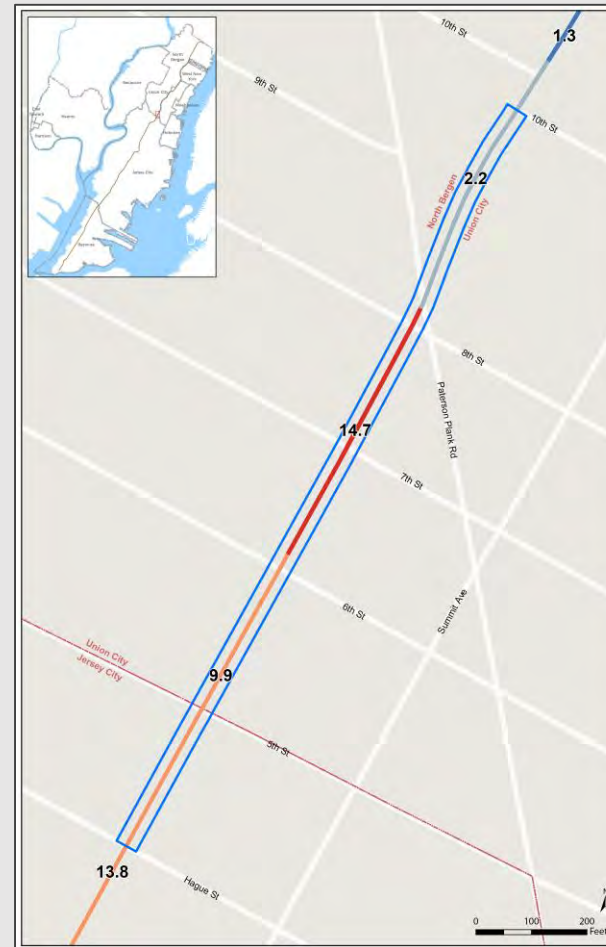
Selected focus areas with vehicle-pedestrian Crash Severity Index scores



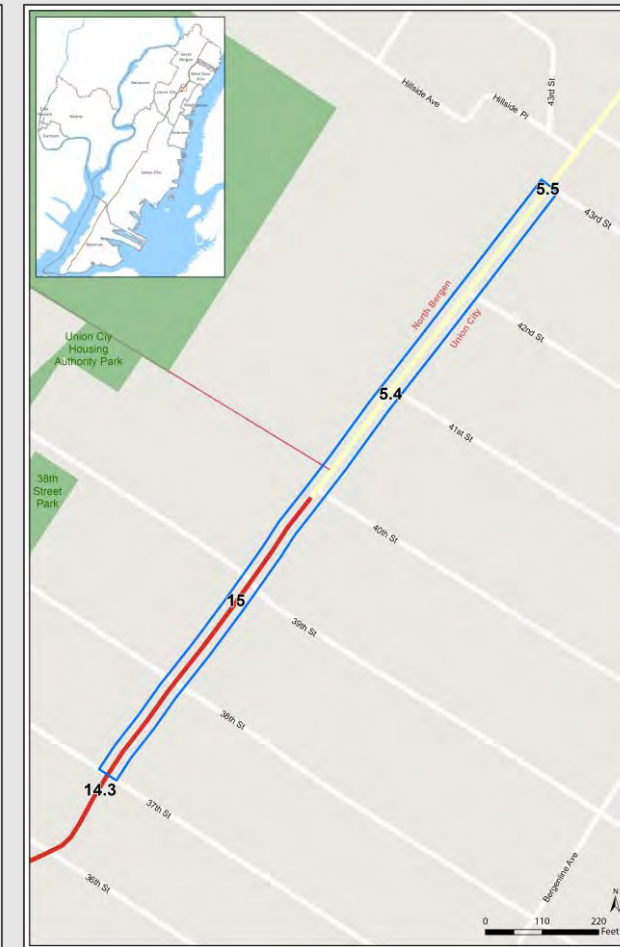
W 26th St to W 32nd St



Gates Ave to Danforth Ave



Hague St to 10th St

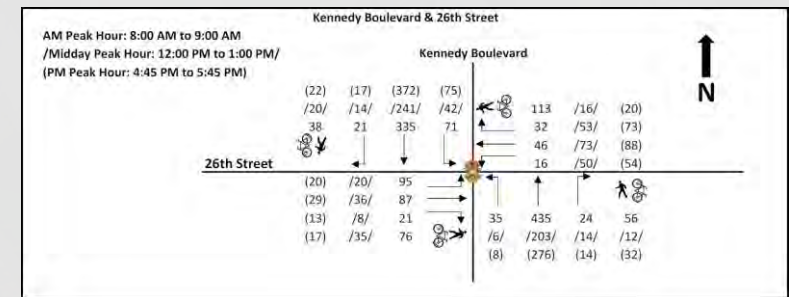
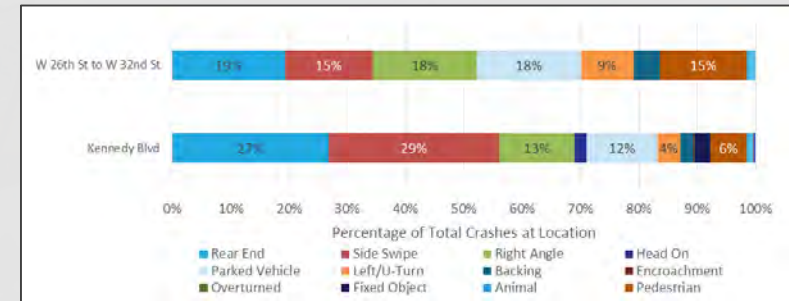
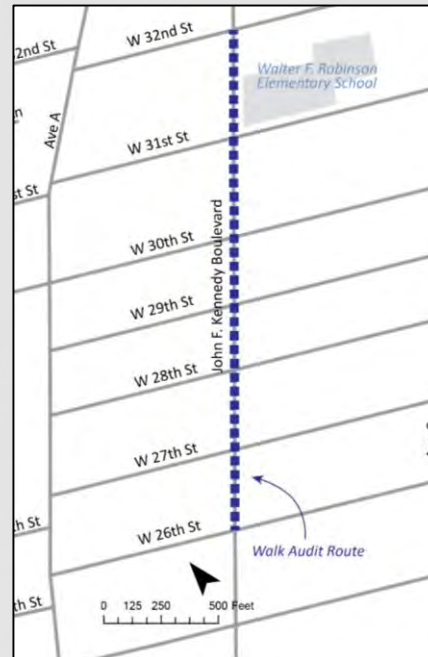


37th St to 43rd St



# NEXT STEPS

- Examine focus areas
  - Review police investigation reports
  - Acquire high-res updated imagery
  - Walk audits
  - Traffic counts
  - Video conflict analysis
  
- Final TAC meeting
  - Review recommendations
  - Receive feedback
  
- Consultants issue final report (report pending)
  - Submit recommendations to the NJTPA Local Capital Project Delivery Program for implementation



Graphic credits – FHI & Stantec



# FEEDBACK AND QUESTIONS

An aerial, high-angle view of a dense urban cityscape. The buildings are packed closely together, with a variety of architectural styles. A prominent, tall, cylindrical skyscraper stands out in the middle ground. The sky is overcast and grey, creating a muted, monochromatic color palette for the scene.

Hudson County Planning  
Daryl Krasnuk  
GIS Specialist  
[dkrasnuk@hcnj.us](mailto:dkrasnuk@hcnj.us)  
(201) 217-5137



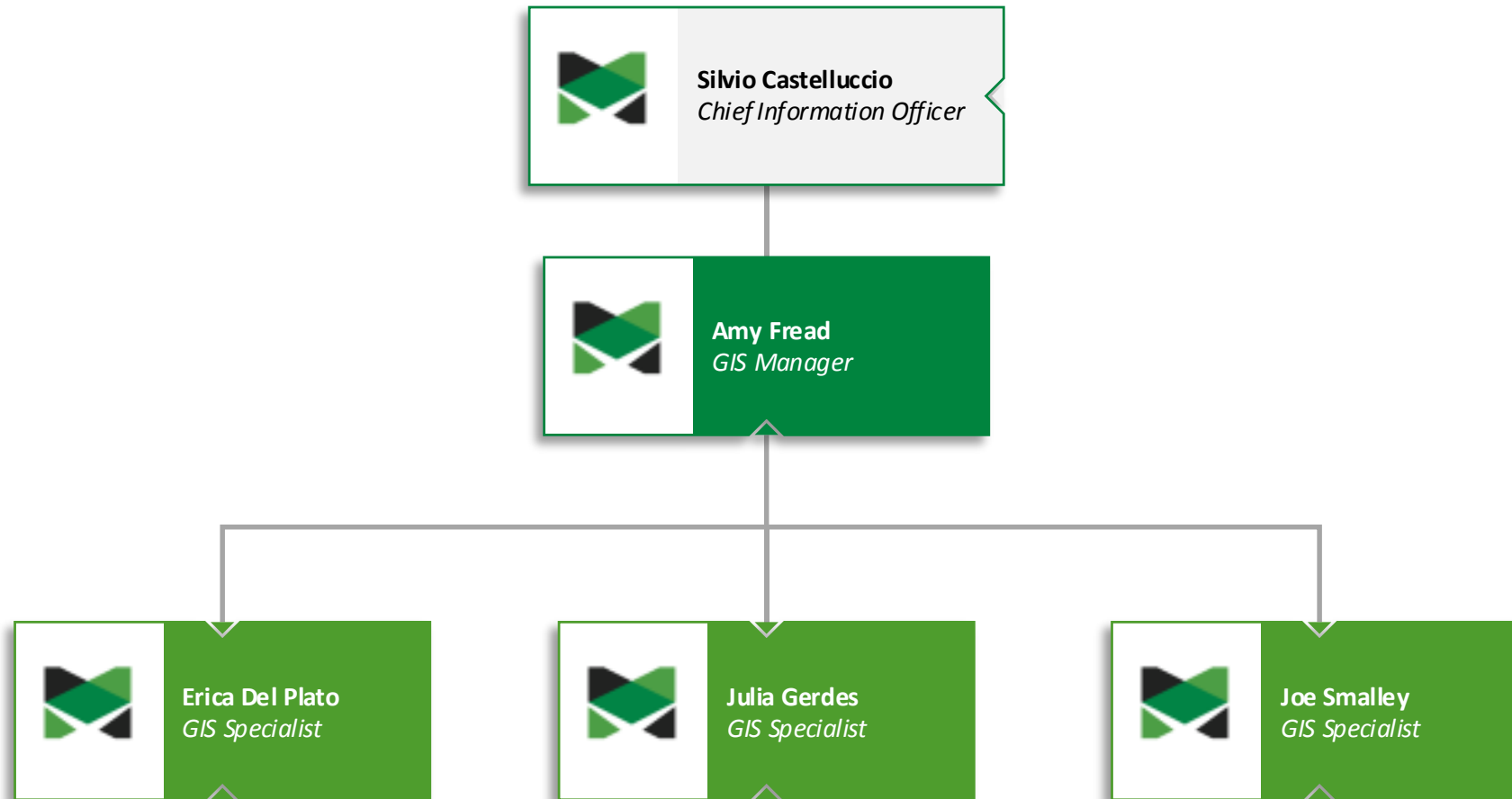
# Coordinating Infrastructure Project Mapping at Middlesex County



03.13.2019

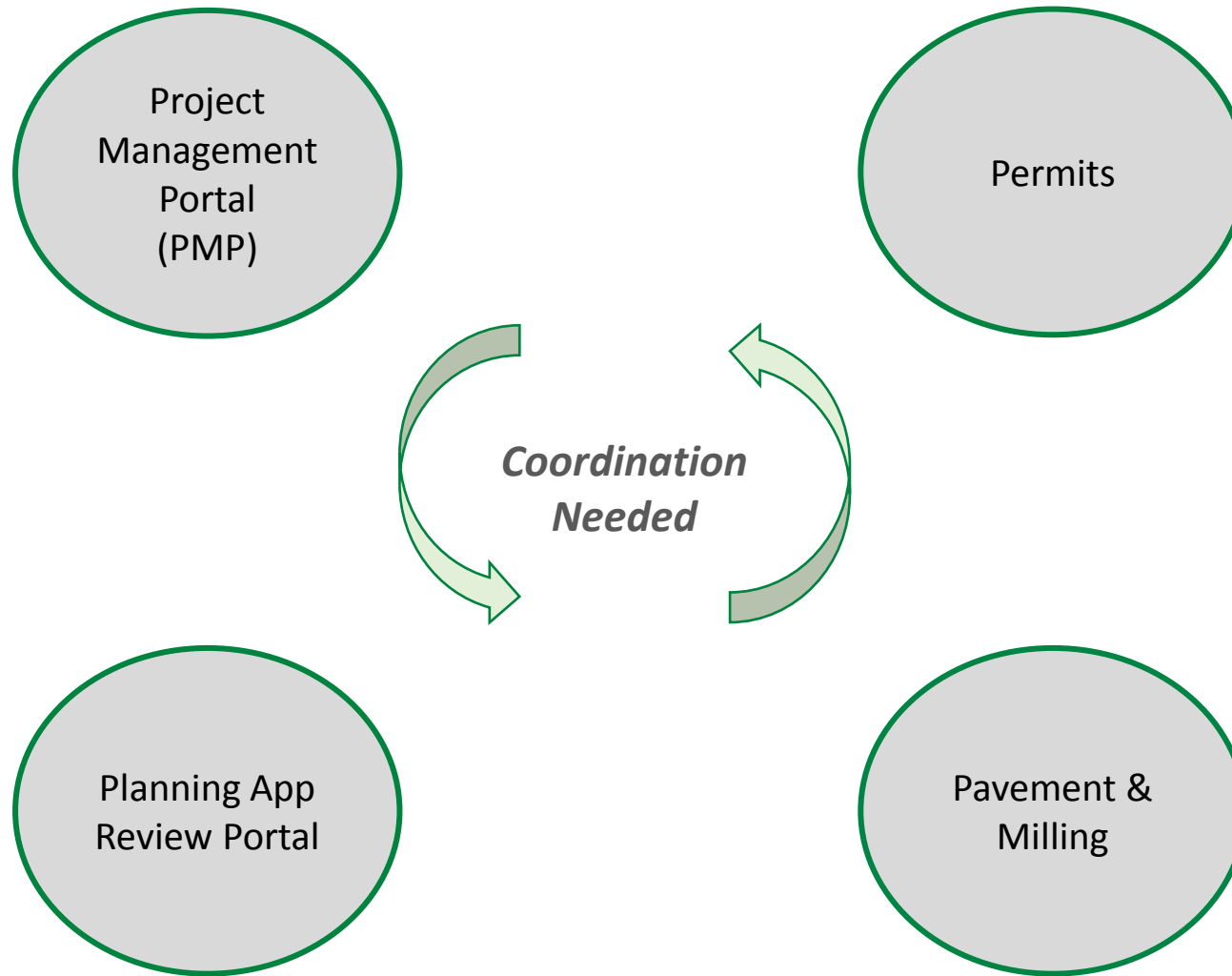
by Brian Kehoe, Helene Abode Maroun,  
Erica Del Plato, and Amy Fread

Middlesex County  
Office of Information Technology  
**Division of GIS**





# Purpose & Intent



# Project Management Portal (PMP)

## Overview

- Created to allow Engineers & County Administration to track the progress of projects through their various phases from inception to completion with respect to budget & project schedule



Project Management Portal

bettie

Projects | **Map** | Reports

PROJECTS

All Projects

search for projects here

- Bridge - Plainfield Underpass, ED1529 Sidewalk/Retaining Wall
- Bridge 122B081 Clinton Ave
- Bridge 122B129 South Randolphville Rd
- Bridge 122B157 Raritan Ave
- Bridge 122B160 Baekeland Ave
- Bridge 122B517 First Ave.
- Bridge 123B040 Rt 516 over Lefferts Lake
- Bridge 123B093 Veterans Memorial Overhead Lighting
- Bridge 123B146 Burnett St.
- Bridge 125B131 Perrineville Rd
- Culvert 121C015 Port Reading Ave
- Culvert 121C022 Rahway Ave
- Culvert 121C028 Rahway Ave
- Culvert 121C036 Chain O Hill Rd
- Culvert 121C087 Thornall St
- Culvert 121C124 Orchard Ave

Dashboard

## Project Management Portal Dashboard

Click on a project to the left to see more detail.

Or click on the tabs in the top left to view the projects on a map or run reports.

COUNTY - NJ

# Project Management Portal

## Dashboard - Projects



Projects | Map | Reports

### PROJECTS

All Projects

search for projects here

- Bridge - Plainfield Underpass, ED1529 Sidewalk/Retaining Wall
- Bridge 122B081 Clinton Ave
- Bridge 122B129 South Randolphville Rd
- Bridge 122B157 Raritan Ave
- Bridge 122B160 Baekeland Ave
- Bridge 122B517 First Ave.
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- Culvert 121C022 Rahway Ave
- Culvert 121C028 Rahway Ave
- Culvert 121C036 Chain O Hill Rd
- Culvert 121C087 Thornall St
- Culvert 121C124 Orchard Ave

### Dashboard

#### Road - Nighttime Milling and Resurfacing Main Street from Route 9 to Rahway Avenue, WBR514 [jump to project](#)

10/6/2011 to 7/10/2017  
Roadway Improvement Ped signal, design complete. Waiting for Authorization to bid. construction admin part of design.

##### Financial

Estimated Budget: ██████████  
Actual Budget: ██████████

##### Project Progress

96%

##### County Progress

41%

##### Ven./Ctr. Progress

41%

##### Details

Project Manager: pretek  
Type: Roads  
Office: Engineering  
Municipality: Woodbridge Township

Notes

Executive Order ██████████ all work on TTF projects  
MCAD\pretek on 8/19/2016 1:58 PM  
This project includes both Design and Construction administration in one contract.  
MCAD\pretek on 1/25/2016 2:56 PM

#### Design Phase

11/10/2011 to March 1, 2016 - Awarded October 6, 2011

##### Financial

1 Estimated ██████████  
1 Proposal: ██████████  
1 Independent: ██████████  
1 Actual ██████████  
1 Payments ██████████

##### Budget Progress

96%

##### County Progress

100%

##### Vendor Progress

100%

##### Details

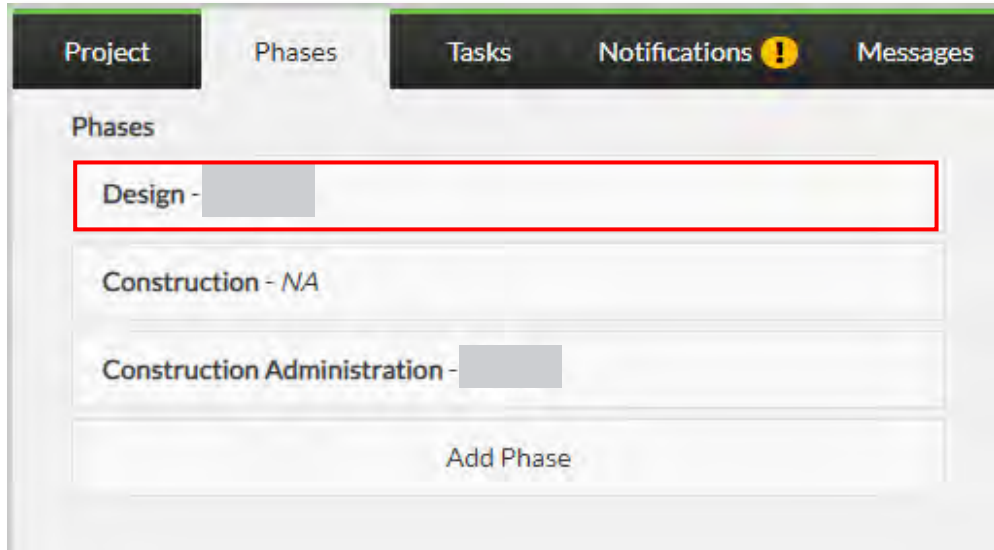
Status: Active  
Phase Manager: daloiv  
Vendor ██████████  
Description: design

5

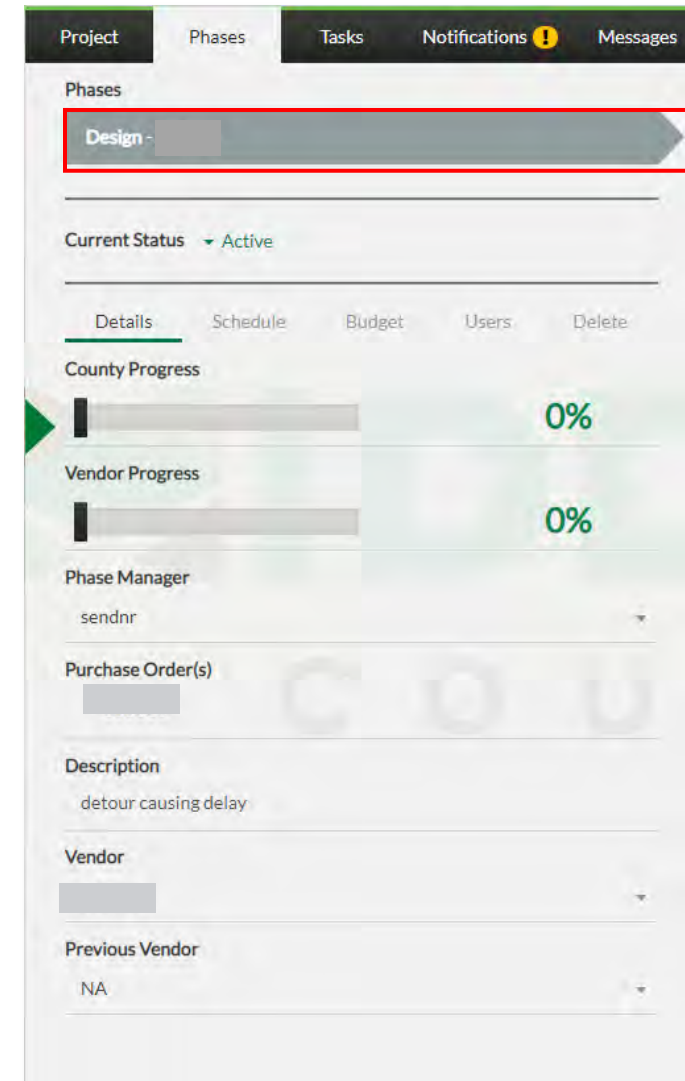


# Project Management Portal

## Project Phases



Select Phase  
to view  
more details



Phases Tab - shows all the information pertaining to Phase for CIP

- Details of Phase
- Schedule of Phase
- Budget (tied into our Financial System)

Updates to a Phase

- Engineering sends to Administrator's Office to update via email (Ex. Change of schedule, Budget info.)

# Project Management Portal

## Dashboard - Map



Office of Engineering manages & the Office of County Administrator helps maintain

- Engineering Office: enters the project into PMP along with financials
- Administrator's Office: updates details (change in budget, schedule, etc.)

# Project Management Portal

## Dashboard - Reports



Projects Map **Reports**

### REPORTS

Type  
Vendor Summary ▼

Status  
Awarded ▼

Start/End  
2019 ▼ to 2019 ▼

Municipality  
All ▼

Vendor  
All ▼

Run Report

## Reports

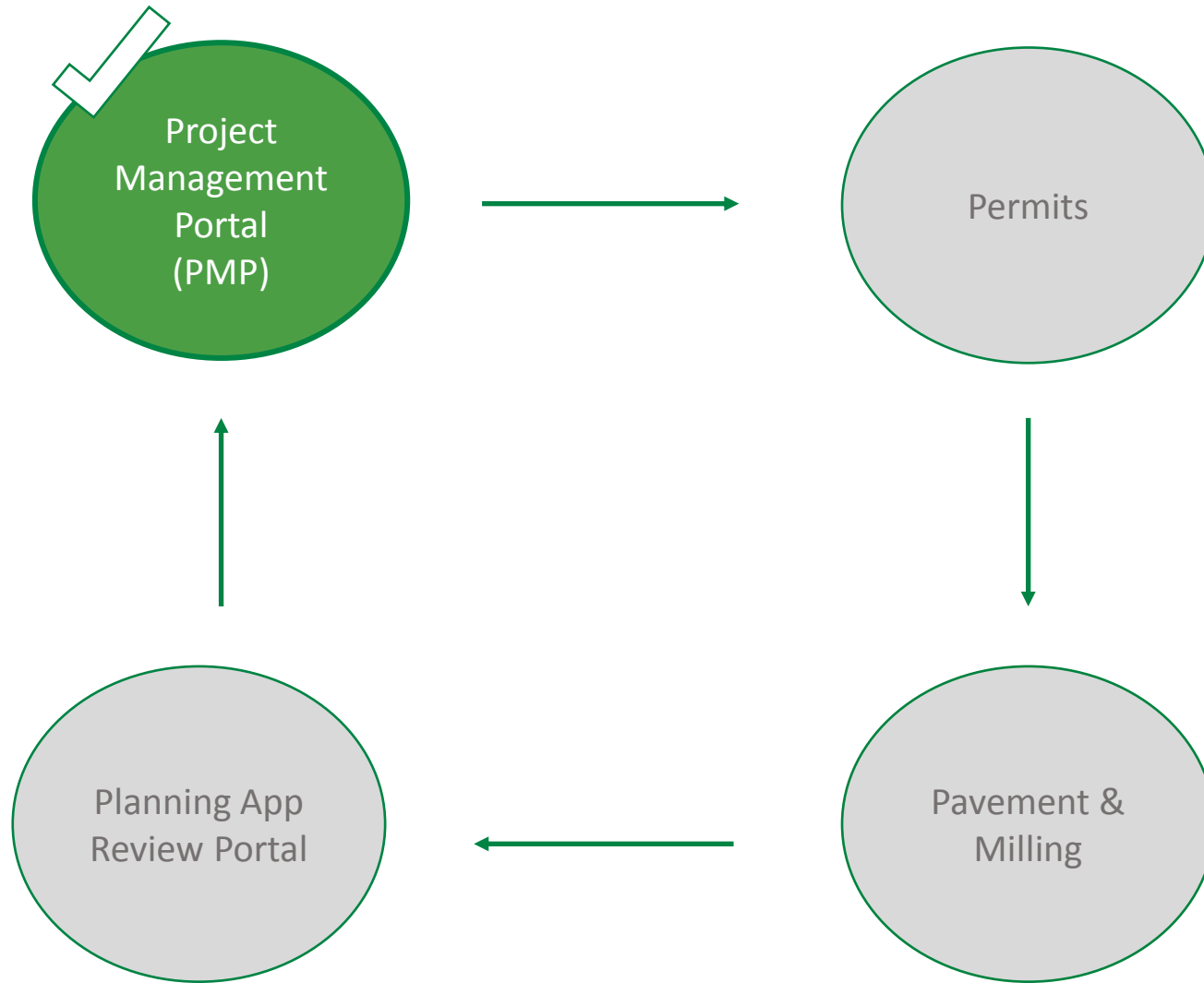
Type:

- Vendor Summary
- By Project Type & Status
- Project Summary
- Traffic Control Costs
- By Vendor

Status:

- Awarded
  - Projected
  - Combined
- Specify Start/End Date, Year
  - Select Municipality or All
  - Select Vendor or All
  - Can Export into Excel Spreadsheet



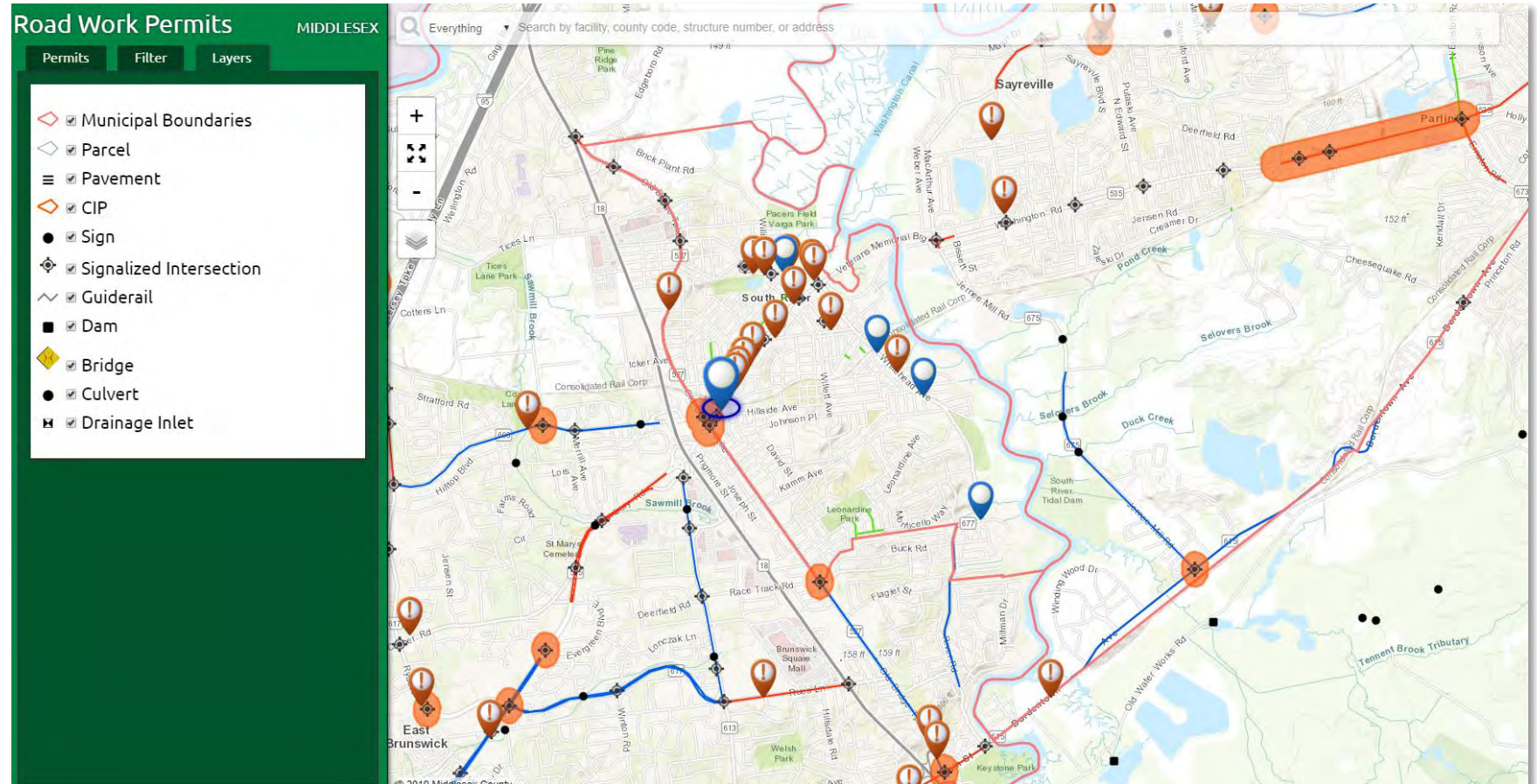


# Permit Application

## Construction Permits – Enter Permit for Job Completion



- Permit issuing application filled out by public works
- Permit requests from vendors/contractors are entered
- Internal staff can track, manage, & view permit status
- Permits are visible within PMP as well as CIP statuses within permit app
- Permit dictates schedule for project completion



# Permit Application

## Construction Permit Tracking



- Permit dictates specific start/end date for work to be completed

### Status



Work Expired



Exceeded work start deadline



Needs attention



Work in progress



Work pending

### Road Work Permits

MIDDLESEX

Permits Filter Layers

clear filter

Type: Any

Permit No.

Name of Contractor

Name of Owner

Municipality: Any

Name of Road

County Road No.

Lot No.

Block No.

Name of Application

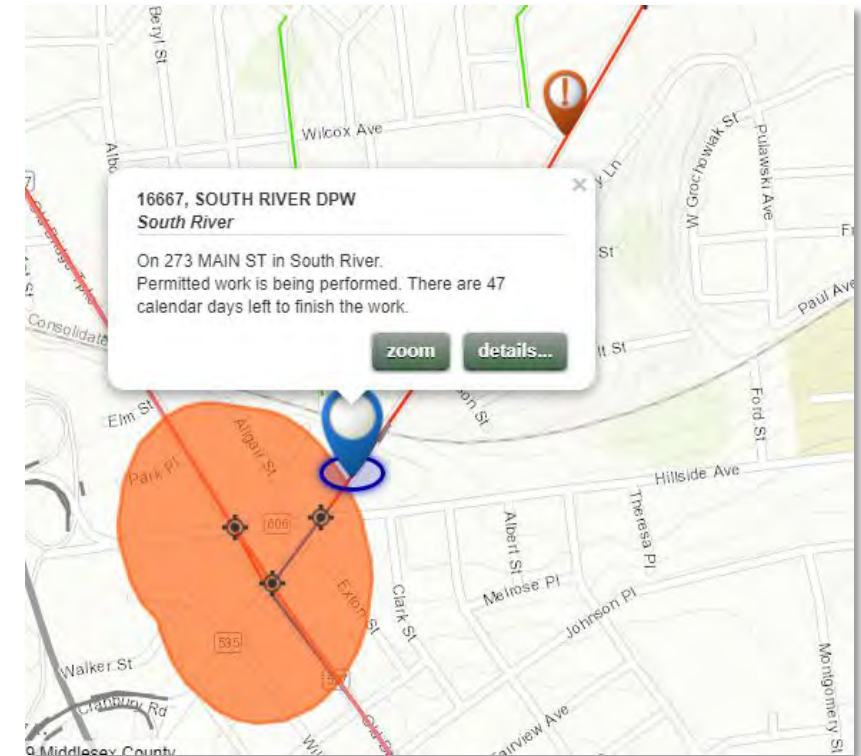
Application Date

Issue Date

Work Start Date

Work End Date

clear filter





# Permit Application

## Construction Permit Tracking



- Once vendor performs work, Public Works can now begin paving/milling
- More information about each permit is listed in “details”
- Can view:
  - Contractor
  - Block/Lot
  - Application Date
  - Comments

**Road Work Permits** MIDDLESEX

Permits Filter Layers

**16497, WILLIAM MURRAY Metuchen**

Type: Public Works  
Name of Contractor: MURRAY PAVING&CONCRETE  
Name of Road: WOODBRIDGE AVE  
County Road No.: 660  
Lot No.: 33&33.01  
Block No.: 182  
Name of Application: MURRAY PAVING & CONCRETE  
Application Date: 9/26/18  
Issue Date: 9/26/18  
Comments: SIDEWALK RECONSTRUCTION METUCHEN POST OFFICE

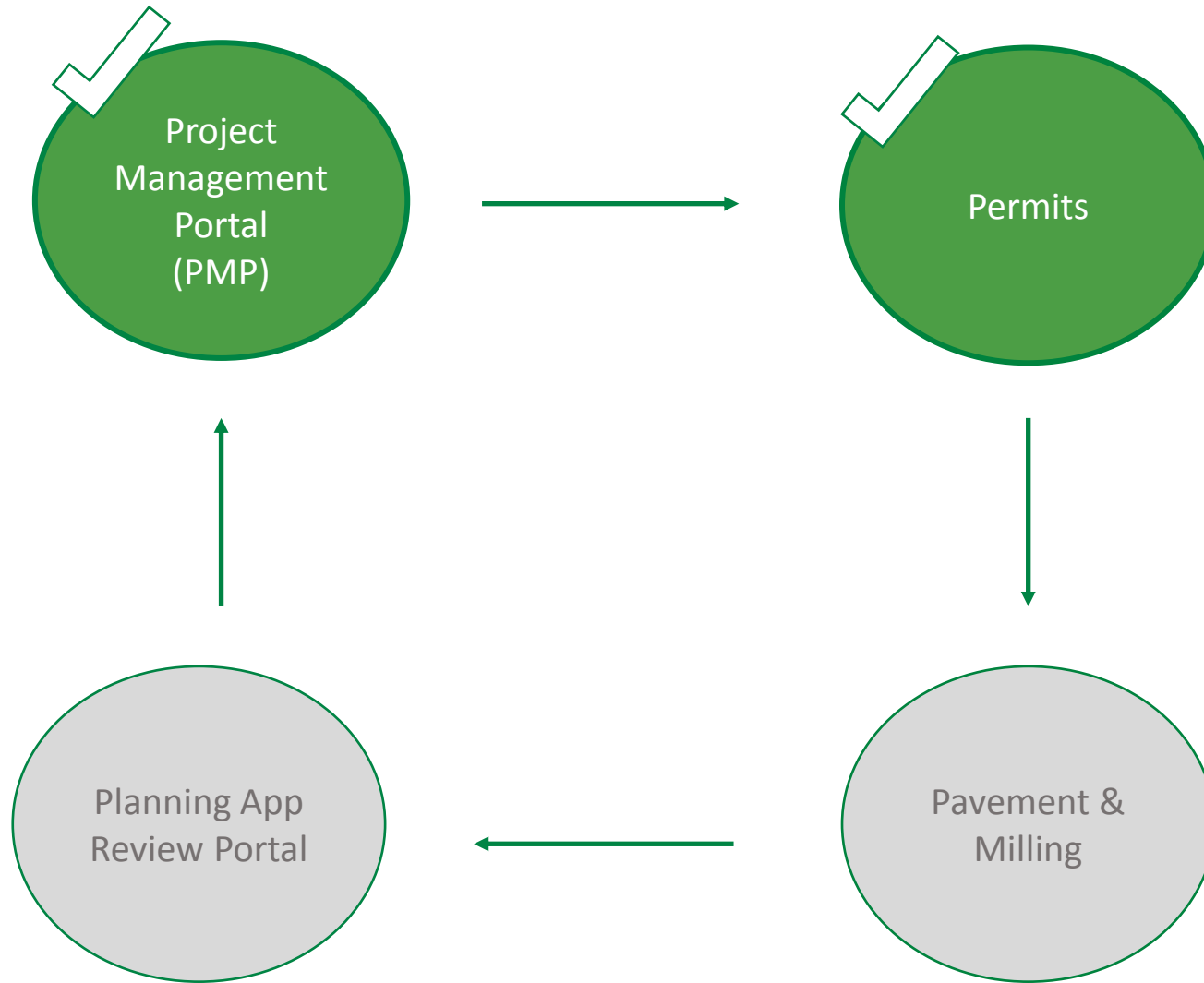
There are 0 attachments.

Everything Search by facility, county code, structure number, or address

16497, WILLIAM MURRAY Metuchen

On WOODBRIDGE AVE in Metuchen. The permit is 161 days old and work has not yet started. Please provide an on or about start date. Permit will expire in 204 days.

zoom details...

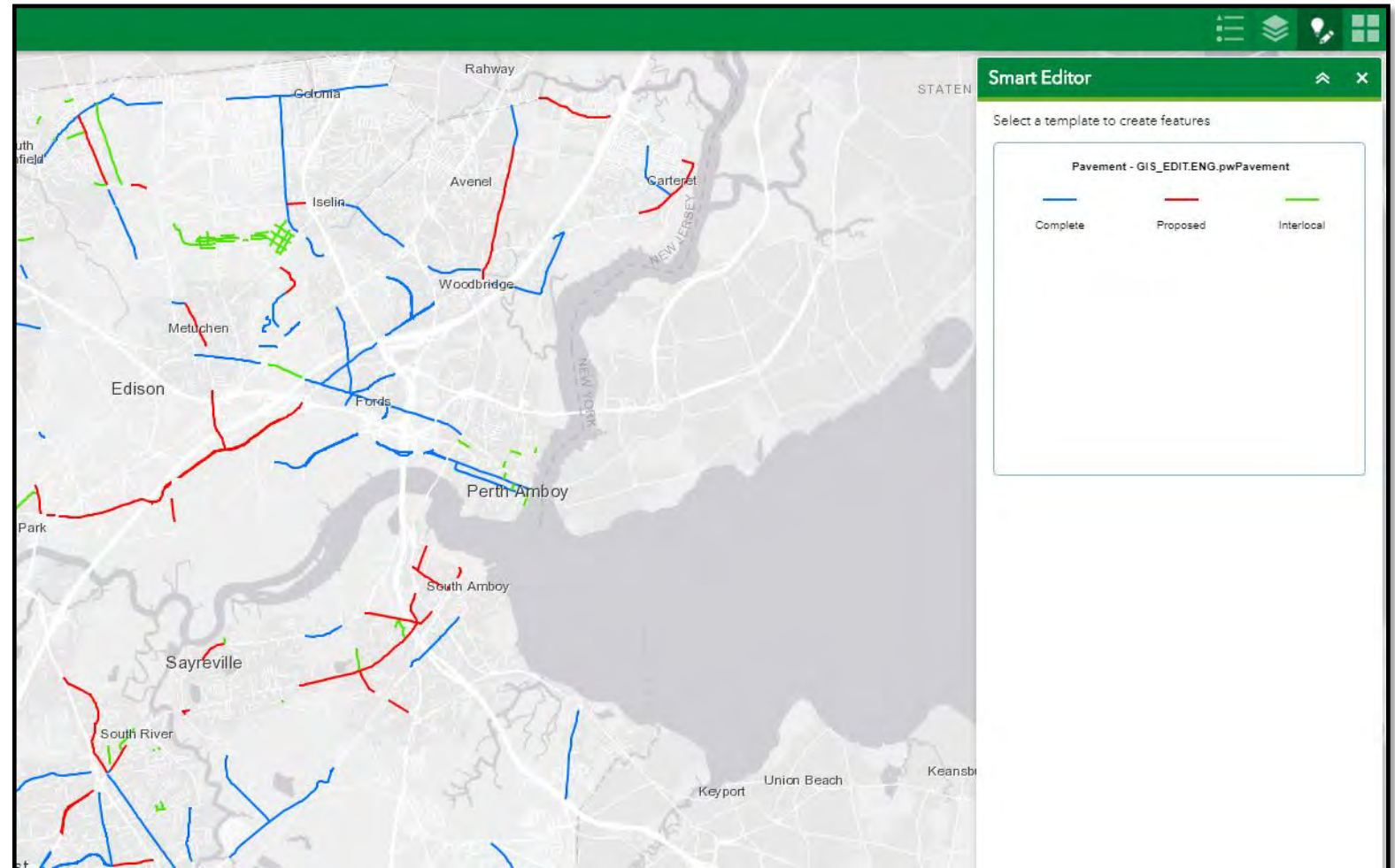


# Paving & Milling Application

## Tracks all Paving & Milling jobs throughout the County



- Solution needed for Public Works to track all paving & milling jobs performed by the County
- Built web app and trained Public Works on editing, populating, & maintaining
- Public Works Crew now maintains their own data in GIS through this app
- Categorized by Status:
  - Complete
  - Proposed
  - Interlocal





# Paving & Milling Application

## Editor View – Add Nighttime Paving/ Milling Project Data



**Smart Editor**

Pavement - GIS\_EDIT.ENG.pwPavement

Municipality: Woodbridge

Road Name: Green Street

Road\_Limits: Rt. 9 to Rahway Avenue

Mill Start: 4/22/2016, 8:00:00 PM

Mill End: 4/22/2016, 8:00:00 PM

Duration Milling: 3

Milling Quantity: 21397.00

Pave Start: 4/29/2016, 8:00:00 PM

Pave\_End\_1: 5/9/2016, 8:00:00 PM

Duration Paving: 4

Paving\_Quantity: 2552.02

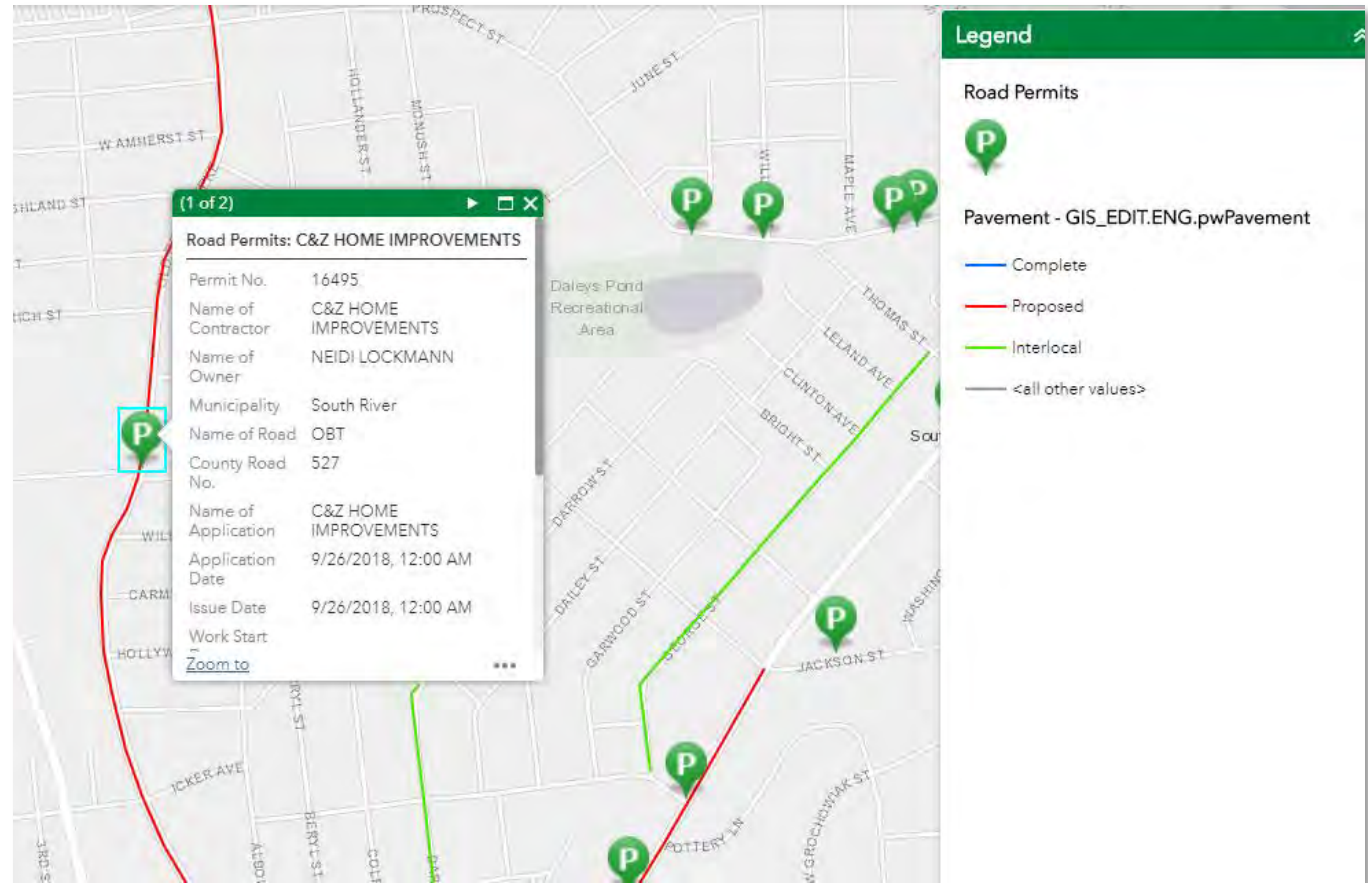
Buttons: Clear, Delete, Save

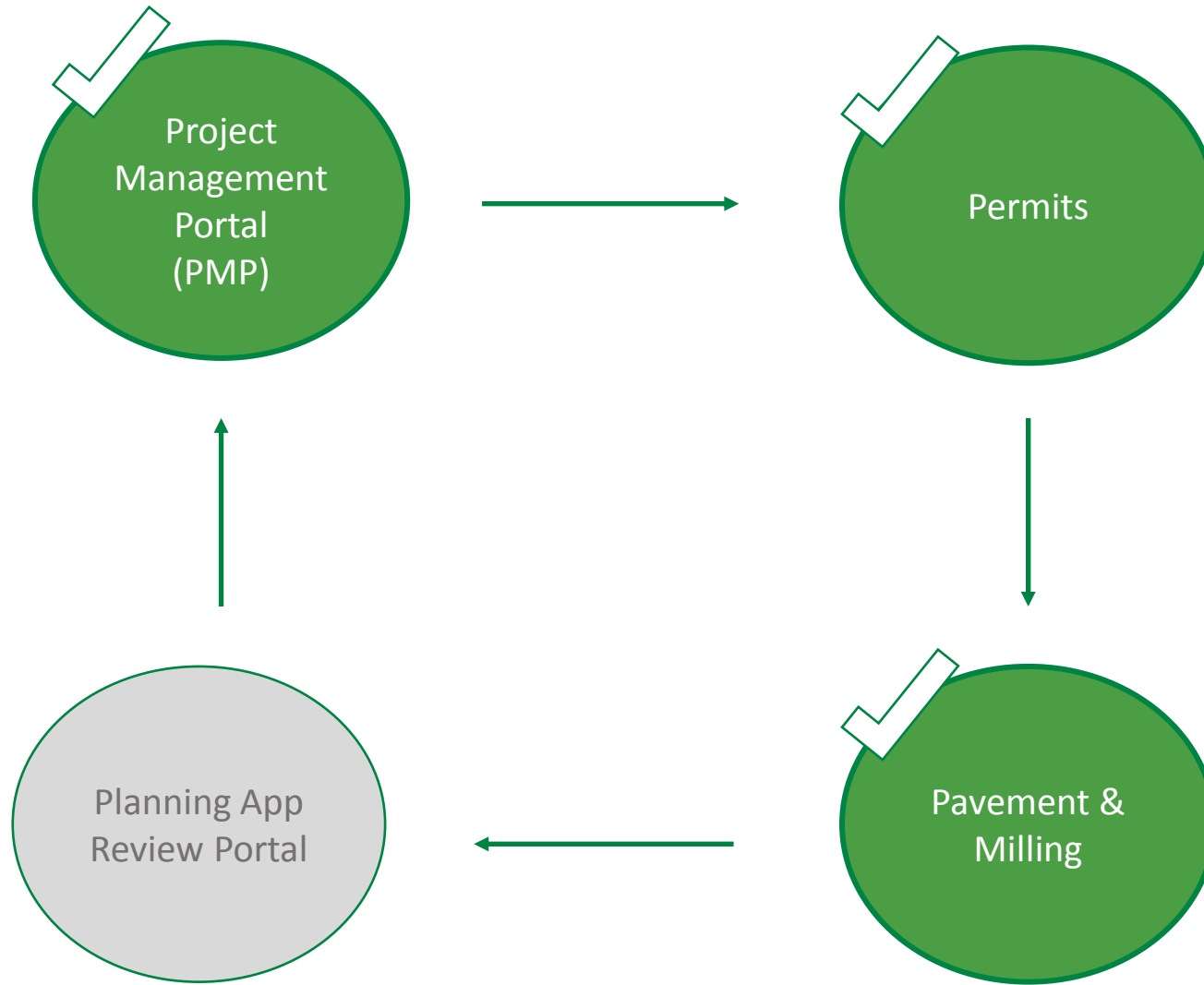
# Paving & Milling Application

## Permit Tracking Viewable in Paving App



- See where a proposed road for paving is located and if any new road opening permits are issued
- Contractor does work before the County paves road
- Coordination with municipalities and utilities on the paving schedule
- 45 days before paving season starts the Municipalities, utility companies, and the public are notified



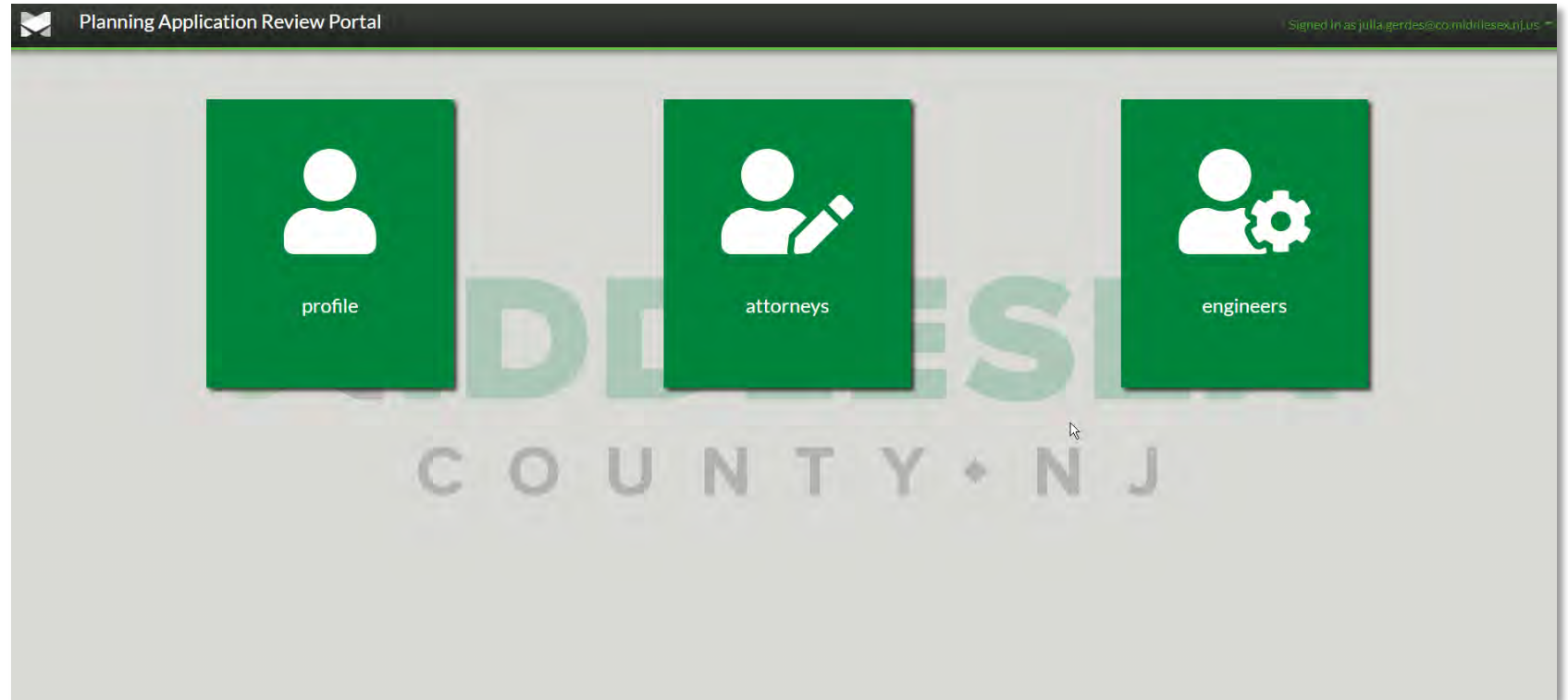




# Planning Application Review Portal

## Under Development

- Intended for planning, engineering, other County staff, & private developers
- Designed to allow developers to upload different plans/documents to seek approval
- Uploaded plans are reviewed by a planner and any other necessary County employees
- Reviews are sent back to the developers and eventually to the Planning Board for official approval
- Planning Review Portal offers the opportunity for each entity involved in the project schedule to communicate and prevent conflicts





- Enabling Offices to become stewards of their own data, sense of ownership
- Work in progress, continuing to work with other Offices



- Using GIS to strengthen coordination between offices
- Helping to eliminate redundant work efforts

# Division of GIS POCs

## Contact Information



## QUESTIONS?

Amy Fread, GIS Manager  
732-745-3349  
[amy.fread@co.middlesex.nj.us](mailto:amy.fread@co.middlesex.nj.us)

Julia Gerdes, GIS Specialist  
732-296-6944  
[julia.gerdes@co.middlesex.nj.us](mailto:julia.gerdes@co.middlesex.nj.us)

Erica Del Plato, GIS Specialist  
732-745-4085  
[erica.delplato@co.middlesex.nj.us](mailto:erica.delplato@co.middlesex.nj.us)

Joe Smalley, GIS Specialist  
732-745-3863  
[joe.smalley@co.middlesex.nj.us](mailto:joe.smalley@co.middlesex.nj.us)





## **Board of Chosen Freeholders**

Ronald G. Rios, Director

Charles E. Tomaro, Deputy Director

Kenneth Armwood

Charles Kenny

Leslie Koppel

Shanti Narra

Blanquita B. Valenti

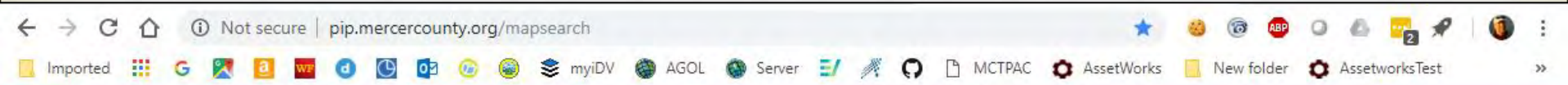
Alternative Methods for  
Bicycle Planning in Mercer County  
or  
Adventures in LRS



Matthew Lawson, PP, AICP, GISP  
Principal Planner - Transportation  
MAGTUG/IREG March 13, 2019

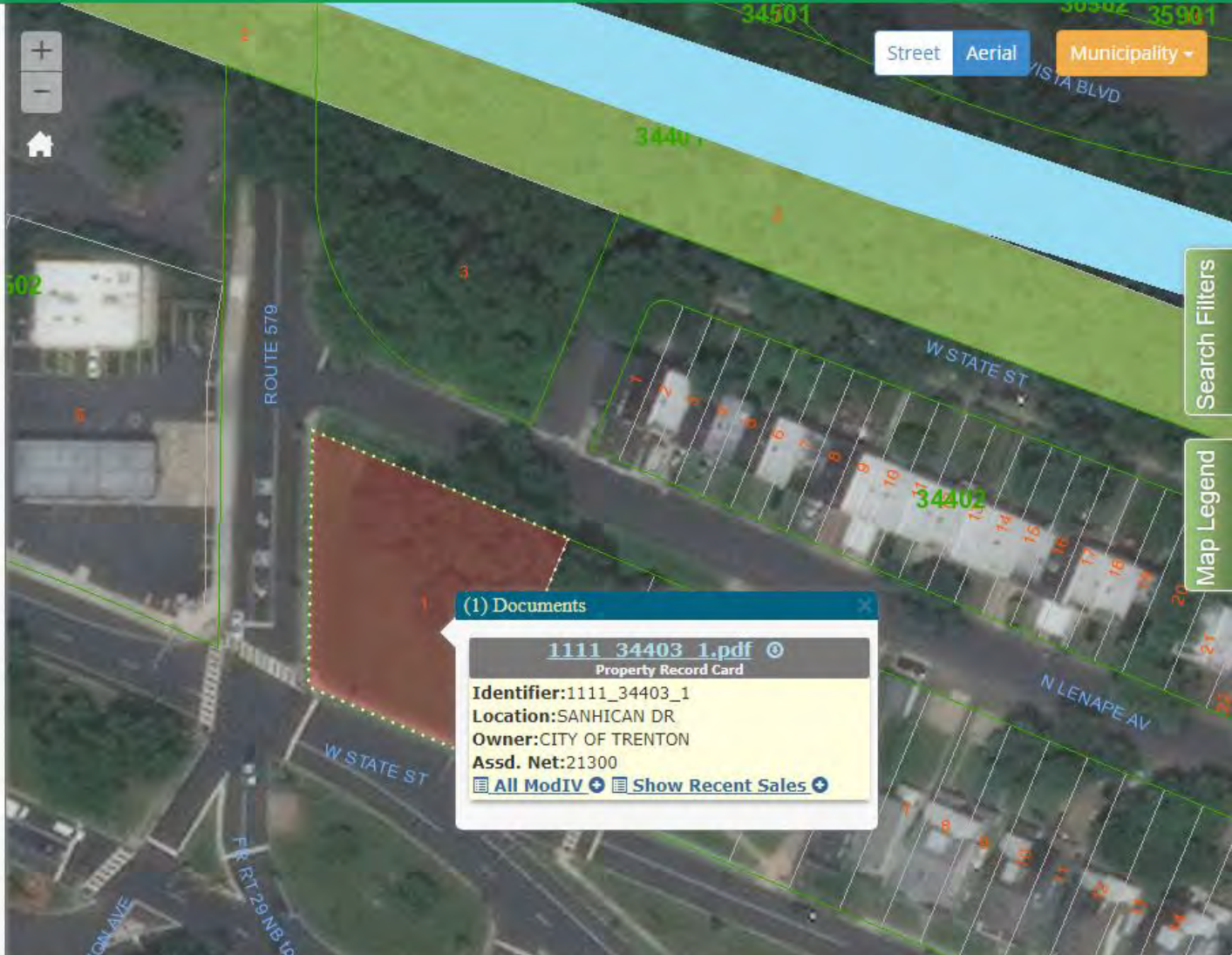


# Mercer Property Information Portal (PIP)



Dashboard hide

- Address Search**  
Search parcels by street address and then use parcel information to find other documents using a text search. For address searches, fewer keywords & house numbers will turn up more records.
- Owner Search**  
Search parcels by owner name and use parcel information to search documents.
- Parcel Search**  
Search documents by parcel number.
- Search by Shape**  
Draw a shape on the map to spatially query for documents in that area.





# Planning History

Goal: Master Plan to Drive Capital Program

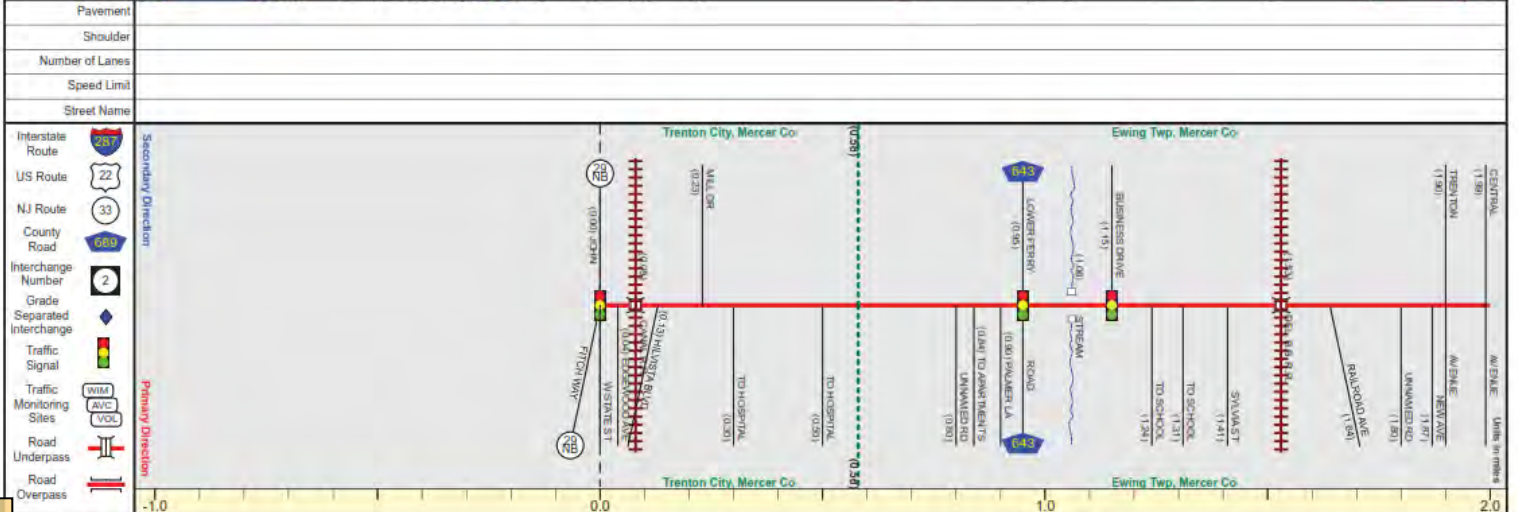


- ❧ 2007 GMTMA Mercer County Bike-Ped Task Force
- ❧ 2009 DVRPC Bicycle Level of Service Analysis and Wiki
- ❧ 2011 NJDOT (RBA/NV5) Multi-Jurisdiction Bicycle Plan
- ❧ 2011 NJDOT (M Baker) CR 546 Bike Plan
- ❧ 2010 & 2012 Mercer County complete streets policies
- ❧ 2012-15 MCBPTF identify priority routes
- ❧ 2017 DVRPC/Mercer Bike Plan
- ❧ 2017 NJDOT Complete Streets Design Guide
- ❧ 2018 DVRPC Bike Plan Process Memo
- ❧ 2019 Mercer County Bicycle Master Plan
- ❧ 2019 GMTMA Greater Mercer Trail Plan
- ❧ 2020 DVRPC Bicycle Facility Design Review

- Main Menu
- 500 Routes
- MP 0.00 - 2.00
- MP 2.00 - 5.00
- MP 5.00 - 8.00
- MP 8.00 - 11.00
- MP 11.00 - 12.05
- MP 14.36 - 14.64
- MP 14.72 - 17.00
- MP 17.00 - 19.22
- MP 19.33 - 20.00
- MP 20.00 - 23.00
- MP 23.00 - 26.00
- MP 26.00 - 27.78
- MP 27.85 - 29.00
- MP 29.00 - 32.00
- MP 32.00 - 35.00
- MP 35.00 - 37.24

# ROUTE 579 (South to North)

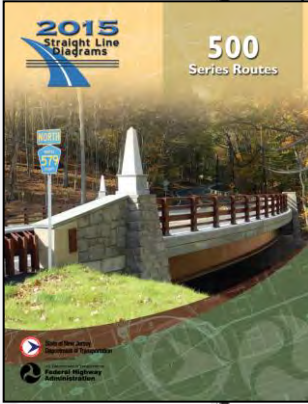
Mile Posts: 0.000 - 2.000



Street Name	Sullivan Way				
Jurisdiction	County				
Functional Class	Urban Major Collector				
Federal Aid - NHS By	STP				
Control Section					
Speed Limit	40			35	
Number of Lanes	2				
Med. Type	None				
Med. Width	0				
Pavement	30	24	30	24	30
Shoulder	0	2	0	4	0
Traffic Volume					
Traffic Sta. ID					
Structure No.	N/A			N/A	
Enlarged Views					

SRI = 00000579\_

Date last inventoried: October 2012



Mercer\_County\_Data\_01-29-16 : Database (Access 2002 file format)

Open Design New

- Objects
- Tables
- Queries
- Forms
- Reports
- Pages
- Macros
- Modules
- Groups
- Favorites

dbo_In_shou_in_width	dbo_lst_curb	dbo_lst_island	dbo_lst_shoulder	dbo_pt_bridge_moveable
dbo_In_sidewalk	dbo_lst_delineator	dbo_lst_jurisdiction_type	dbo_lst_shoulder_parking	dbo_pt_bridge_ped
dbo_In_special_light	dbo_lst_ditch	dbo_lst_large_truck_access	dbo_lst_sidewalk	dbo_pt_call_box
dbo_In_speed	dbo_lst_fed_aid	dbo_lst_legislative_dist	dbo_lst_sign_code	dbo_pt_camera
dbo_In_street_name	dbo_lst_fence	dbo_lst_location	dbo_lst_sign_type	dbo_pt_cross_drain
dbo_In_tunnel	dbo_lst_func_class_type	dbo_lst_manhole	dbo_lst_speed	dbo_pt_dam
dbo_In_urban_code	dbo_lst_f_system_code	dbo_lst_medan_type	dbo_lst_urban_code	dbo_pt_elec_warn_device
dbo_lst_attenuater	dbo_lst_guiderail	dbo_lst_munic	dbo_pt_aadt_5year	dbo_pt_environmental
dbo_lst_brdg_rte_relation	dbo_lst_guiderail_end_treat	dbo_lst_nhs_type	dbo_pt_attenuator	dbo_pt_headwall
dbo_lst_bridge_type	dbo_lst_guiderail_grnd_treat	dbo_lst_noise_wall	dbo_pt_bridge	dbo_pt_highway_lighting
dbo_lst_cnty	dbo_lst_hwy	dbo_lst_route_type	dbo_pt_bridge_deck	dbo_pt_inlet
	dbo_lst_inlet	dbo_lst_segment_type	dbo_pt_bridge_fixed	dbo_pt_intersection

dbo\_In\_shou\_width : Table

id	sri	mp_start	mp_end	descr	inv_date	parent_sri	parent_mp_star	parent_mp_end
174348	00000571__	40.22	40.87		2 012 8:02:31 PM	00000571__	40.87	40.22
174349	00000571__	41.21	41.434		1 012 8:02:31 PM	00000571__	41.434	41.21
174350	00000571__	41.434	42.25		6 012 8:02:31 PM	00000571__	42.25	41.434
174351	00000571__	42.25	42.31		0 012 8:02:31 PM	00000571__	42.31	42.25
174352	00000571__	42.31	43.45		10 012 8:02:31 PM	00000571__	43.45	42.31
174353	00000571__	43.45	43.96		0 012 8:02:31 PM	00000571__	43.96	43.45
174354	00000571_S	1.65	1.73		0 012 8:02:31 PM	00000571__	42.31	42.25
174394	00000579__	0	0.215		0 012 8:11:17 PM	00000579__	0.215	0
174395	00000579__	0.215	0.95		2 012 8:11:17 PM	00000579__	0.95	0.215
174396	00000579__	0.95	1.41		0 012 8:11:17 PM	00000579__	1.41	0.95
174397	00000579__	1.41	1.64		4 012 8:11:17 PM	00000579__	1.64	1.41
174398	00000579__	1.64	2.3		0 012 8:11:17 PM	00000579__	2.3	1.64
174399	00000579__	2.3	3.63		6 012 8:11:17 PM	00000579__	3.63	2.3
174401	00000579__	6.51	7.66		6 012 8:11:17 PM	00000579__	7.66	6.51

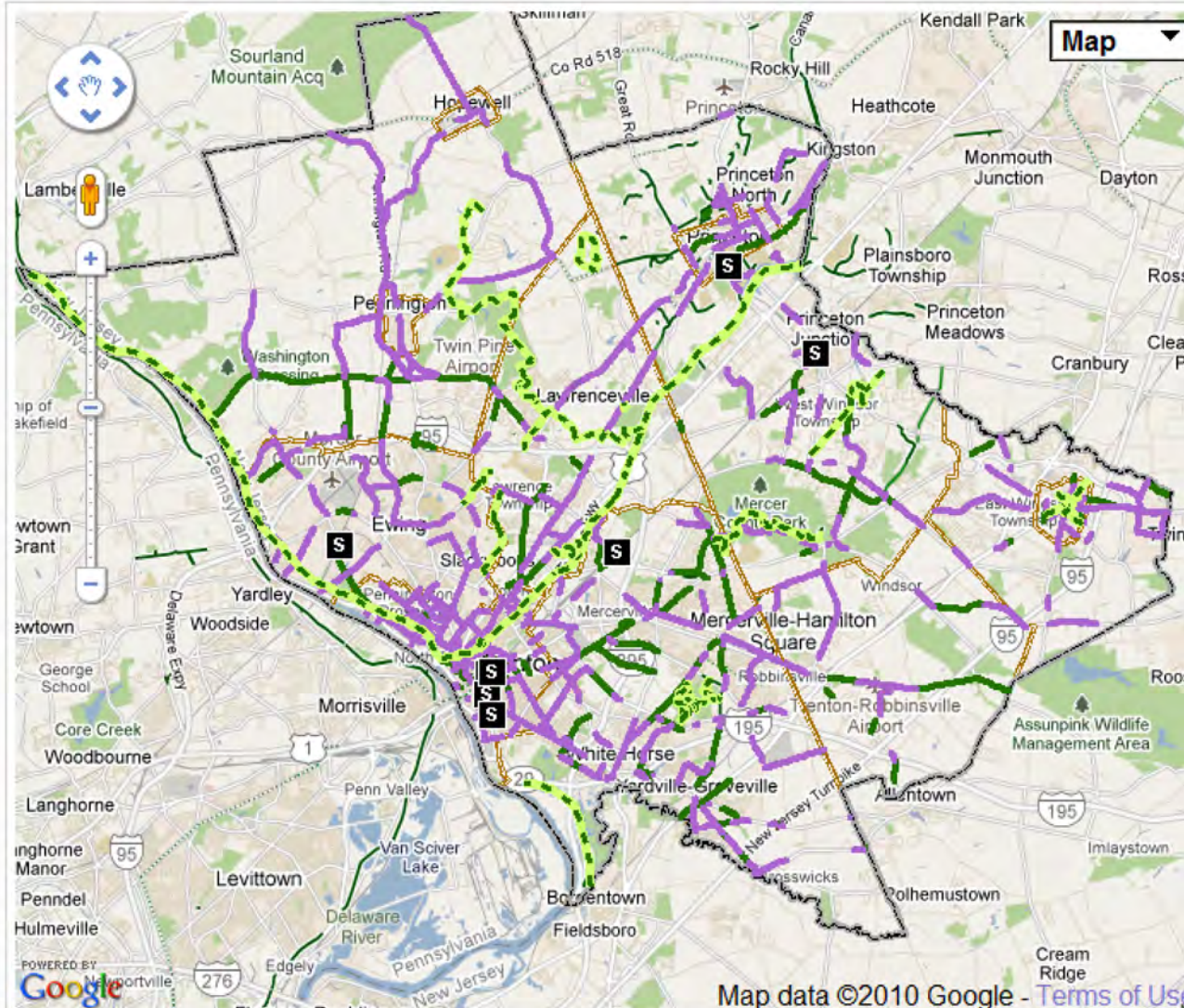
Record: 1 of 4820



	B	C	D	E	G	J	K	L	M	N	O	P	W	X	AB	AC
1	FID_1	SRI	MP_START	MP_END	LANES	IRI	PAV_WI	SHLD_W	SPEED	AADT_AVG	AREA_TYPE	FUNCCLS	SCORE	BLOS	EDITS	BIKE_TYPE1
1024	1171	00000579	1.730	2.000	2	291.500	30	0	35	10288	SUBURBAN	17	6.890	F		BL5
1025	1206	00000579	0.130	0.500	2	265.300	24	2	40	12689	SUBURBAN	17	5.420	E	Higher	BL5
1026	1215	00000579	0.000	0.130	2	265.300	30	0	40	12860	SUBURBAN	17	5.280	E	Higher	BL5
1027	1318	00000579	0.840	0.900	2	197.600	30	0	40	10898	SUBURBAN	17	5.310	E	Higher	BL5
1028	1353	00000579	4.250	4.300	2	211.300	22	0	40	7319	SUBURBAN	16	6.090	F		BL5
1029	1066	00000579	1.310	1.500	2	239.600	24	6	40	10288	SUBURBAN	17	4.960	E	Higher	BL5
1030	1077	00000579	0.500	0.580	2	197.600	24	3	40	12689	SUBURBAN	17	4.890	E	Higher	BL5
1031	1188	00000579	1.500	1.640	2	336.800	24	6	40	10288	SUBURBAN	17	11.210	F	Higher	BL5
1032	1224	00000579	1.700	1.730	2	291.500	30	0	40	10288	SUBURBAN	17	7.060	F		BL5
1033	1337	00000579	0.580	0.840	2	197.600	24	3	40	11572	SUBURBAN	17	4.840	E	Higher	BL5
1034	1260	00000579	8.900	9.000	2	259.300	22	2	45	7866	RURAL	7	5.850	F		SH6
1035	1379	00000579	9.500	9.800	2	296.800	20	0	45	7707	RURAL	7	12.570	F		SH6
1036	1388	00000579	6.900	7.660	2	173.900	26	5	50	9768	RURAL	7	4.200	D		SH8
1037	1200	00000579	2.300	2.370	2	159.300	26	6	40	14961	SUBURBAN	16	3.600	D		BL5
1038	1472	00000579	4.500	4.580	2	188.000	26	3	40	7097	RURAL	16	4.210	D		SH4
1039	1284	00000579	0.950	1.100	2	321.500	30	0	40	9951	SUBURBAN	17	5.870	F	Higher	BL5
1040	1414	00000579	2.000	2.210	2	262.000	30	0	35	10288	SUBURBAN	17	12.800	F		BL5
1041	1603	00000579	8.500	8.550	2	259.300	22	2	45	8722	RURAL	7	5.900	F		SH6
1042	1217	00000579	4.300	4.310	2	282.000	22	0	40	7319	SUBURBAN	16	5.750	F		BL5
1043	1299	00000579	3.010	3.110	4	208.900	45	0	45	14915	SUBURBAN	16	5.720	F		BL6
1044	1585	00000579	6.680	6.900	2	137.800	26	5	50	9768	RURAL	7	4.010	D		SH8
1045	1193	00000579	2.600	2.800	2	179.500	24	6	45	13830	SUBURBAN	16	3.990	D		BL6
1046	1474	00000579	3.400	3.600	2	224.300	26	6	40	13730	SUBURBAN	16	3.720	D		BL5
1047	1478	00000579	2.210	2.300	2	262.000	26	6	40	14961	SUBURBAN	16	11.330	F		BL5
1048	1084	00000579	0.900	0.950	2	321.500	30	0	40	10898	SUBURBAN	17	5.920	F	Higher	BL5
1049	1138	00000583	8.570	8.700	2	208.100	30	0	25	16394	URBAN	16	4.380	D		BL5
1050	1179	00000583	9.100	9.110	2	404.400	30	0	25	16394	URBAN	16	5.590	F		BL5
1051	1402	00000583	6.200	6.520	2	185.300	24	0	50	8876	SUBURBAN	16	5.490	E	Higher	BL6
1052	1529	00000583	8.700	8.900	2	472.500	30	0	25	16394	URBAN	16	6.290	F		BL5
1053	1530	00000583	7.460	7.500	2	242.000	24	0	45	9458	SUBURBAN	16	5.420	E	Higher	BL6
1054	1676	00000583	8.900	9.100	2	404.400	30	0	25	16394	URBAN	16	5.590	F		BL5
1055	1076	00000583	2.300	2.600	2	184.800	44	0	25	21067	SUBURBAN	16	5.460	E	Higher	BL5



[About This Site](#) | [Legend](#) | [How To Use](#) | [Disclaimer](#)



⊗ Show/Hide Tools

### Layers

- Bikeable Mercer County Trails
- Rail Stations in Mercer County
- Places (click to identify)

### Bikeability Scores

#### Major Roads

- Excellent
- Fair
- Unfavorable
- Unbikeable

#### Minor Roads

- Favorable
- Unfavorable

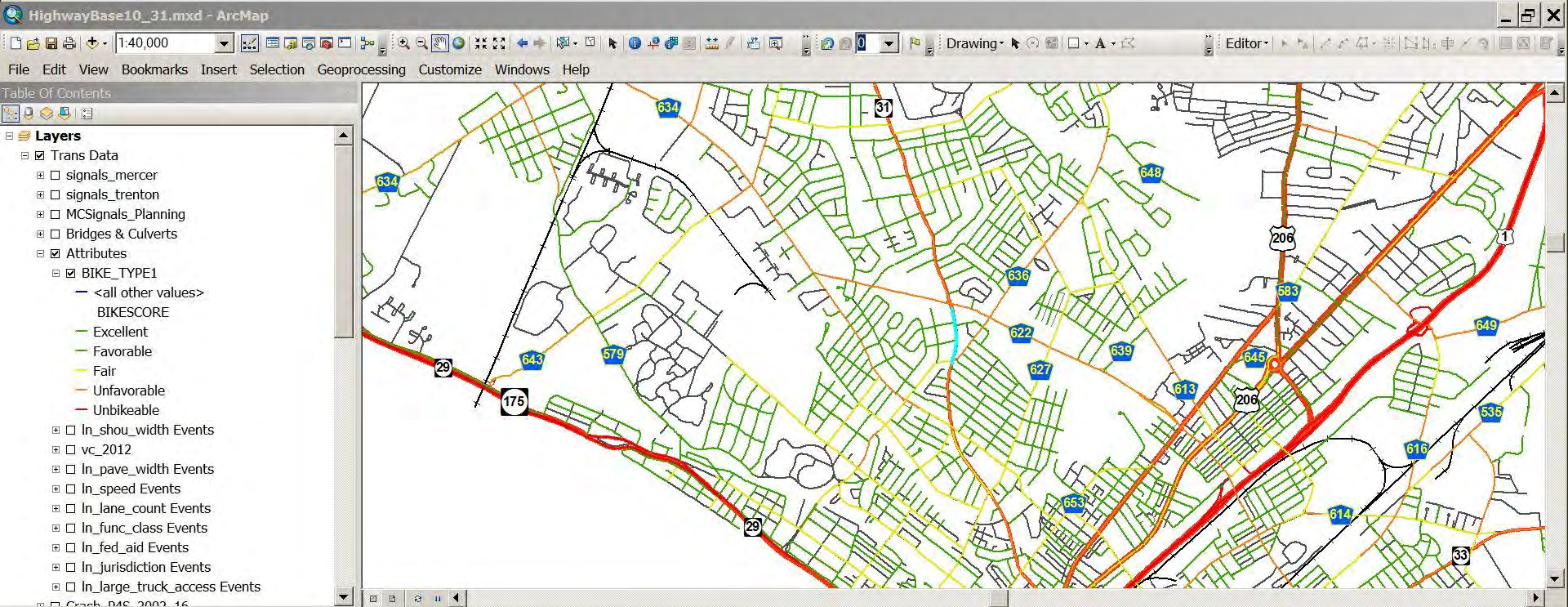
**NOTE:** We are still collecting additional information on existing bikeable trails. New trails will be added periodically; please check back for updated trails mapping.

Zoom To...

Map data ©2010 Google - [Terms of Use](#)



# LRS Data in ArcGIS Desktop



Table

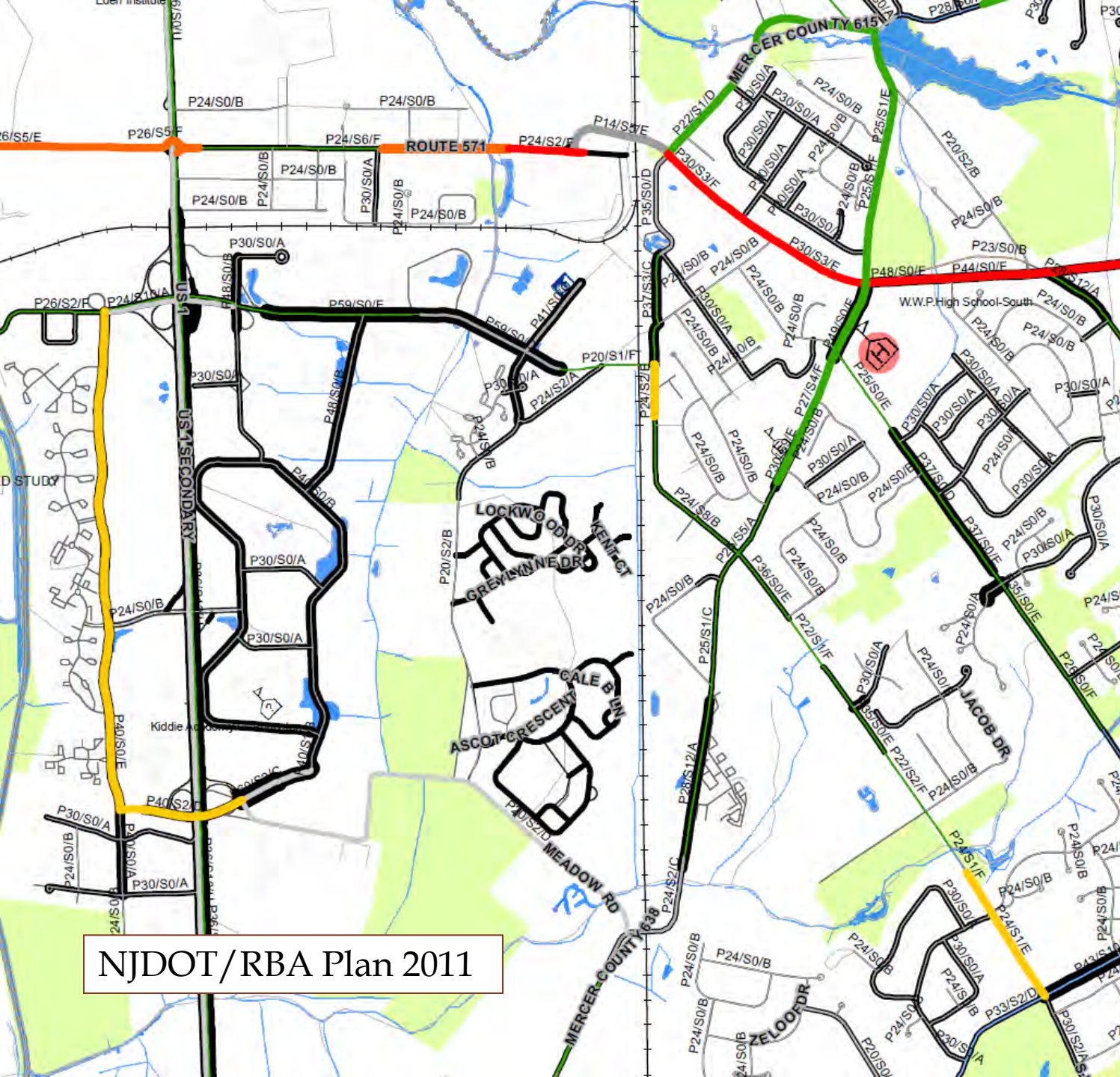
BIKE\_TYPE1

FID	Shape	OBJECTID	FID_1	SRI	MP_START	MP_END	HWY_TYPE	LANES	PQI_MRM	PDI_MRM	IRI	PAV_WID	SHLD_WID	SPEED	AADT_AVG	AREA_TYPE	FUNCCLS	SEG_MILES	OSP_PCT	STATUS
2272	Polyline M	4983	601	00000031	6.2	6.835	0	2	0	0	0	24	8	45	22180	RURAL	14	0.6369	0	1
2274	Polyline M	4987	684	00000031	4.93	4.947	1	2	0	0	0	46	0	45	29906	RURAL	14	0.0167	0	1
2275	Polyline M	4990	726	00000031	3.4	3.81	0	4	0	0	0	44	0	40	14564	SUBURBAN	14	0.4111	0	1
2276	Polyline M	4991	728	00000031	6.09	6.175	1	2	0	0	0	32	0	45	12869	RURAL	14	0.0852	0	1
2277	Polyline M	4992	739	00000031	1.51	1.52	0	4	0	0	0	44	0	35	7456	SUBURBAN	14	0.0099	0	1
2278	Polyline M	4993	747	00000031	4.67	4.84	1	2	0	0	0	24	12	45	9996	SUBURBAN	14	0.171	0	1
2279	Polyline M	4995	766	00000031	1.52	1.82	0	4	0	0	0	44	0	35	9407	SUBURBAN	14	0.3013	0	1
2280	Polyline M	4996	769	00000031	8.02	8.59	0	2	0	0	0	24	8	40	21294	SUBURBAN	14	0.5717	0	1
2281	Polyline M	5002	55	00000029	16.790001	17	0	2	0	0	0	24	4	45	10386	RURAL	14	0.2098	0	1

1595 (1 out of 4327 Selected)

BIKE\_TYPE1





NJDOT/RBA Plan 2011

**Priority Reccs**

- Sharrow
- Striping Only
- No Parking
- Road Diet
- Diet or Widen
- Widening - Minor
- Widening

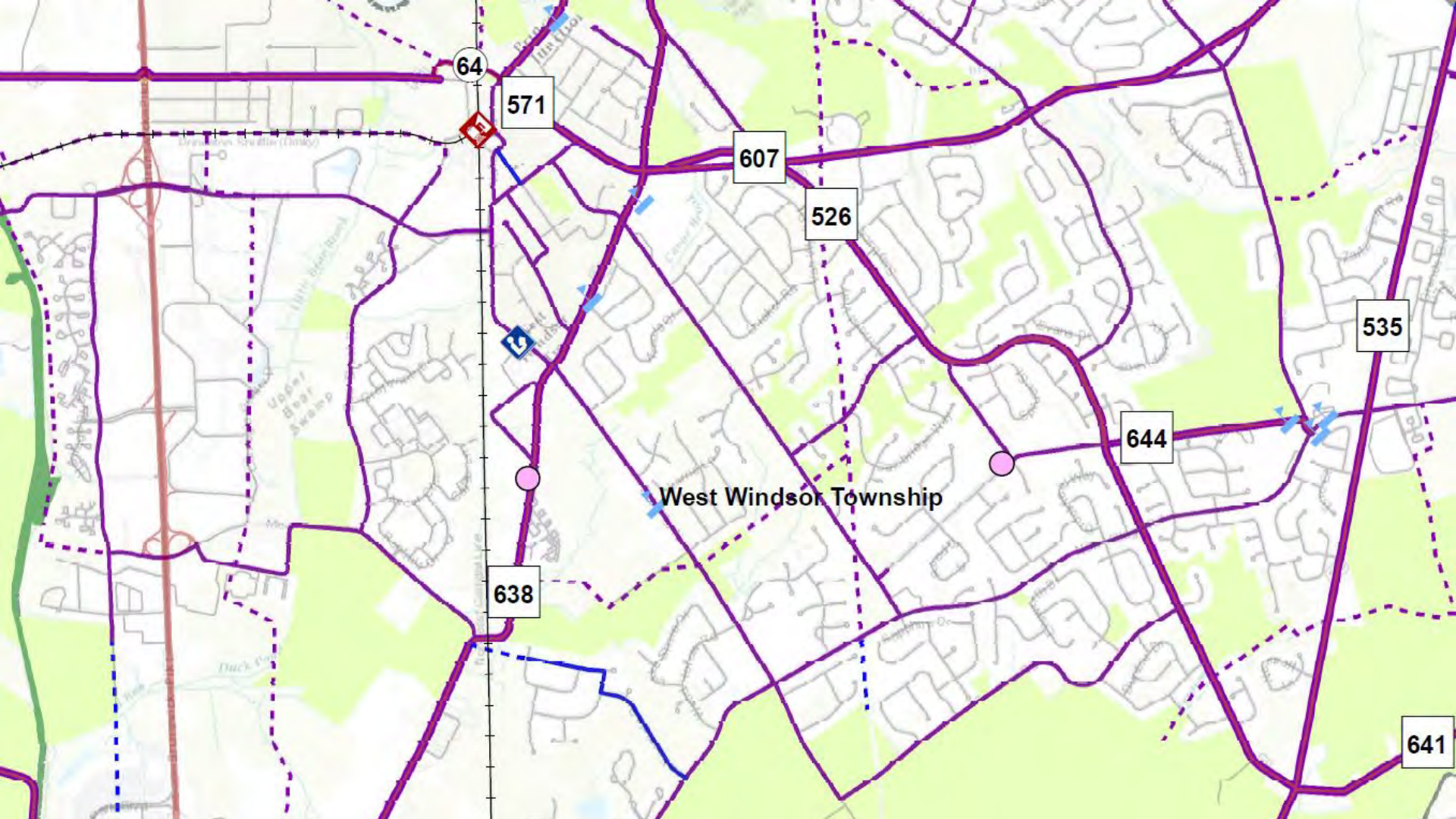
**Bikeway Reccs**

- No Recc
- Shared Low Vol
- Shared Lane 14'
- Shoulder 4'
- Shoulder 6'
- Shoulder 8'
- Bike Lane 5'
- Bike Lane 6'

**Cartway Width (ft)**

- 0 - 25
- 26 - 36
- 37 - 48
- 49 - 60
- 61 - 72





**Legend**

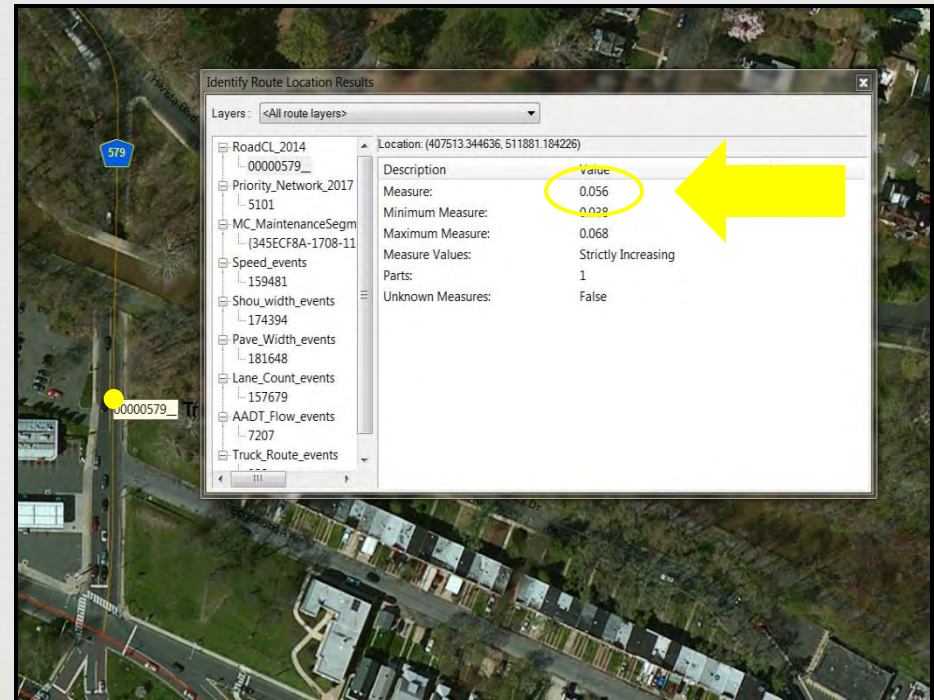
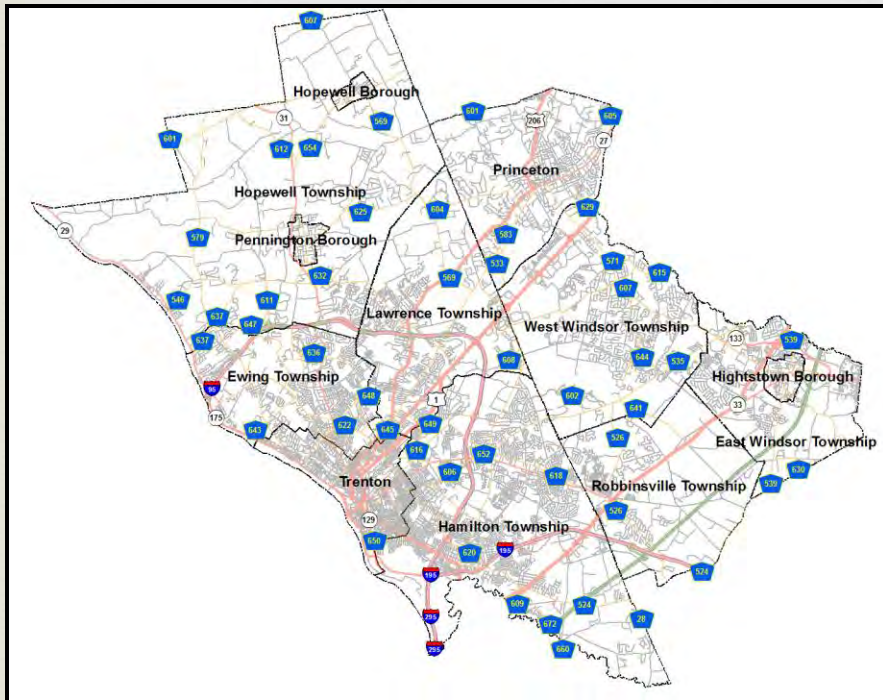
Priority_Network_2017	Trail/Muni	Local/Muni	County/Plan	County/Muni	State/Muni
<all other values>	Local/Muni	Local/Muni	County/Plan	State/Muni	State/Muni
Trail/Muni	Local/Muni	Local/Muni	County/Plan	State/Muni	State/Muni
Trail/Plan	Local/Muni	Local/Muni	County/Plan	State/Plan	State/Muni
Trail/Plan	Local/Muni	Local/Muni	County/Muni	State/Muni	State/Muni
Trail/Plan	Local/Plan	Local/Muni	County/Muni	County/Muni	State/Muni
Trail/Muni	Local/Plan	County/Muni	County/Muni	County/Muni	State/Plan



# 2017 Methods



- NJOGIS 2014 centerline adopted as MC standard routes, linear referencing allows segments of any length to be created





Mercer County Bike Plan  
Coded Values

Category	Code	Description	Cost/mi	Notes
Facility_Type	1	Sharrow		ADT<10,000; Speed<25; or obstructing structure
	2	Shoulder		ADT<10,000; Speed<35
	3	Lane		ADT<10,000; Speed<35; signed route
	4	Buffered		ADT>10,000; Speed<50
	6	Side Path		ADT>10,000; Speed>50
Speed	NULL	No Change		Desired speed to accommodate facility type
	##	Desired		
Improvement	0	None	\$ -	
	2	Sharrow	\$ 10,560	Plaque & sign every 1000'
	0.5	Edge Stripe	\$ 2,640	Paint edge line (x2)
	1.3	Lane Diet (10')	\$ 6,864	Mill & paint edge line (x2)
	1.4	Lane Diet (11')	\$ 7,392	Mill & paint edge line (x2)
	3.5	Road Diet	\$ 18,480	Mill 5, paint 4, TWTL plaque OR multiple lane diets
	2.2	No Parking	\$ 11,616	Sign every 100(x2), edge line (x2)
	2.8	Half Parking	\$ 14,784	Sign every 100(x1), mill & stripe CL, edge line (x2)
	110	Widen (<6')	\$ 580,800	Mill, subbase, 8" HMA, edge line
	170	Widen (6-12')	\$ 897,600	Mill, subbase, 8" HMA, edge line
	320	Widen (16')	\$ 1,689,600	Mill, subbase, 8" HMA, edge line
	200	Side Path	\$ 1,056,000	Widen (6-12') + Clearing 18'
1000	Intersection	\$ -	New signals & stripes, 200' segment (\$200k total)	
Design	1	Paint	\$ 5,280	Simple
	2	Paint & Signs	\$ 10,560	More complex
	20	Widen	\$ 105,600	Consider drainage, etc.
	50	ROW	\$ 264,000	DES only, ROW cost not included
	60	ROW & NEPA	\$ 316,800	DES & permitting, ROW cost not included

This table specifies coded values ('code') to be entered into attributes ('category') for each road segment to create a bicycle facility with a reasonable level of traffic stress. When the 'improvement' and 'design' values are multiplied by the segment length, an order of magnitude cost for implementation results. Only the 'intersection' improvement type has a pre-defined segment length (100' either side of an intersection node) to generate an appropriate improvement cost. Note that 'costs' are for planning purposes only; they are not estimates of actual project costs.

# Value Codes Applied to Each Segment

Cost estimates from NJDOT 2016 construction bids and from Portland State & UNC surveys.

Minor differences in cost distinguish facility types.

SRI	MP_Start	MP_End	Fac_Type	Speed	Improvement	Design	Comments	Length(ft)	CONcost	DEScost	TOTcost
00000579__	0.000	0.071	1	25	1.4	2	29' CW	375	\$ 525	\$ 750	\$ 1,275
00000579__	0.071	0.091	1	25	200	20	D&R Underpass onto Sidewalk	106	\$ 21,120	\$ 2,112	\$ 23,232
00000579__	0.091	0.135	1	25	1.4	2	29' CW	232	\$ 325	\$ 465	\$ 790
00000579__	0.135	0.285	2	35	170	20	need reconstruction anyway	792	\$ 134,640	\$ 15,840	\$ 150,480
00000579__	0.285	1.083	2	35	1.4	1	30' CW	4,213	\$ 5,899	\$ 4,213	\$ 10,112
00000579__	1.083	1.300	2	35	170	20	widen for LTL for NJM and Katz	1,146	\$ 194,779	\$ 22,915	\$ 217,694
00000579__	1.300	1.635	2	35	1.4	1	40' CW	1,769	\$ 2,476	\$ 1,769	\$ 4,245
00000579__	1.635	2.169	2	25	1.3	1	Grand Ave, narrow to 10' lanes	2,820	\$ 3,665	\$ 2,820	\$ 6,485
00000579__	2.169	2.210	2	25	170	20	Planned widening @ W Upper Ferry	216	\$ 36,802	\$ 4,330	\$ 41,131
00000579__	2.210	3.000	2	35	1.4	1	40' CW	4,171	\$ 5,840	\$ 4,171	\$ 10,011
00000579__	3.000	3.271	2	35	1.4	2	I-95 interchange	1,431	\$ 2,003	\$ 2,862	\$ 4,865
00000579__	3.271	4.876	2	35	1.4	1	40' CW	8,474	\$ 11,864	\$ 8,474	\$ 20,339
00000579__	4.876	7.660	2	45	0.5	1	40' CW	14,700	\$ 7,350	\$ 14,700	\$ 22,049
00000579__	7.660	8.546	2	45	1.4	1	30' CW	4,678	\$ 6,549	\$ 4,678	\$ 11,227

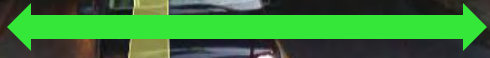




	B	C	D	E	G	J	K	L	M	N	O	P	W	X	AB	AC
1	FID_1	SRI	MP_START	MP_END	LANES	IRI	PAV_W	SHLD_W	SPEED	AADT_AVG	AREA_TYPE	FUNCCLS	SCORE	BLOS	EDITS	BIKE_TYPE1
1024	1171	00000579	1.730	2.000	2	291.500	30	0	35	10288	SUBURBAN	17	6.890	F		BL5
1025	1206	00000579	0.130	0.500	2	265.300	24	2	40	12689	SUBURBAN	17	5.420	E	Higher	BL5
1026	1215	00000579	0.000	0.130	2	265.300	30	0	40	12860	SUBURBAN	17	5.280	E	Higher	BL5
1027	1318	00000579	0.840	0.900	2	197.600	30	0	40	10898	SUBURBAN	17	5.310	E	Higher	BL5
1028	1353	00000579	4.250	4.300	2	211.300	22	0	40	7319	SUBURBAN	16	6.090	F		BL5
1029	1066	00000579	1.310	1.500	2	239.600	24	6	40	10288	SUBURBAN	17	4.960	E	Higher	BL5
1030	1077	00000579	0.500	0.580	2	197.600	24	3	40	12689	SUBURBAN	17	4.890	E	Higher	BL5
1031	1188	00000579	1.500	1.640	2	336.800	24	6	40	10288	SUBURBAN	17	11.210	F	Higher	BL5
1032	1224	00000579	1.700	1.730	2	291.500	30	0	40	10288	SUBURBAN	17	7.060	F		BL5
1033	1337	00000579	0.580	0.840	2	197.600	24	3	40	11572	SUBURBAN	17	4.840	E	Higher	BL5
1034	1260	00000579	8.900	9.000	2	259.300	22	2	45	7866	RURAL	7	5.850	F		SH6
1035	1379	00000579	9.500	9.800	2	296.800	20	0	45	7707	RURAL	7	12.570	F		SH6
1036	1388	00000579	6.900	7.660	2	173.900	26	5	50	9768	RURAL	7	4.200	D		SH8
1037	1200	00000579	2.300	2.370	2	159.300	26	6	40	14961	SUBURBAN	16	3.600	D		BL5
1038	1472	00000579	4.500	4.580	2	188.000	26	3	40	7097	RURAL	16	4.210	D		SH4
1039	1284	00000579	0.950	1.100	2	321.500	30	0	40	9951	SUBURBAN	17	5.870	F	Higher	BL5
1040	1414	00000579	2.000	2.210	2	262.000	30	0	35	10288	SUBURBAN	17	12.800	F		BL5
1041	1603	00000579	8.500	8.550	2	259.300	22	2	45	8722	RURAL	7	5.900	F		SH6
1042	1217	00000579	4.300	4.310	2	282.000	22	0	40	7319	SUBURBAN	16	5.750	F		BL5
1043	1299	00000579	3.010	3.110	4	208.900	45	0	45	14915	SUBURBAN	16	5.720	F		BL6
1044	1585	00000579	6.680	6.900	2	137.800	26	5	50	9768	RURAL	7	4.010	D		SH8
1045	1193	00000579	2.600	2.800	2	179.500	24	6	45	13830	SUBURBAN	16	3.990	D		BL6
1046	1474	00000579	3.400	3.600	2	224.300	26	6	40	13730	SUBURBAN	16	3.720	D		BL5
1047	1478	00000579	2.210	2.300	2	262.000	26	6	40	14961	SUBURBAN	16	11.330	F		BL5
1048	1084	00000579	0.900	0.950	2	321.500	30	0	40	10898	SUBURBAN	17	5.920	F	Higher	BL5
1049	1138	00000583	8.570	8.700	2	208.100	30	0	25	16394	URBAN	16	4.380	D		BL5
1050	1179	00000583	9.100	9.110	2	404.400	30	0	25	16394	URBAN	16	5.590	F		BL5
1051	1402	00000583	6.200	6.520	2	185.300	24	0	50	8876	SUBURBAN	16	5.490	E	Higher	BL6
1052	1529	00000583	8.700	8.900	2	472.500	30	0	25	16394	URBAN	16	6.290	F		BL5
1053	1530	00000583	7.460	7.500	2	242.000	24	0	45	9458	SUBURBAN	16	5.420	E	Higher	BL6
1054	1676	00000583	8.900	9.100	2	404.400	30	0	25	16394	URBAN	16	5.590	F		BL5
1055	1076	00000583	2.300	2.600	2	184.800	44	0	25	21067	SUBURBAN	16	5.460	E	Higher	BL5



13 FT 8 IN



Approx 24 ft?


Will require additional and more complicated improvements than previous section





## FY 2016 UPWP Project

- County Highways Studied by Mercer County
- County Highways Studied by DVRPC



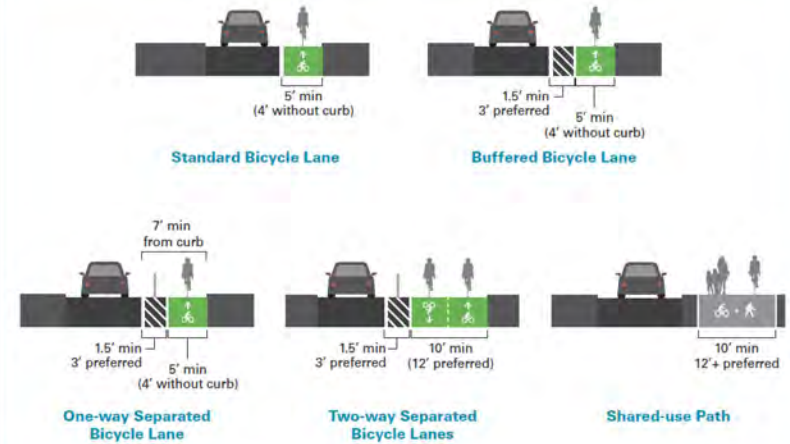




# 2017 State of New Jersey Complete Streets Design Guide



## Bikeway Treatments and Minimum Requirements



## A Bicycle Facility Table

ADT	85TH PERCENTILE SPEED <sup>1</sup>						
	≤ 20	25	30	35	40	45	≥50
≤ 2,500	ABCDEF	A <sup>2</sup> BCDEF	CDEF	CDEF	CDEF	DEF	F
2,500–5,000	BCDEF	BCDEF	CDEF	CDEF	DEF	DEF	F
5,000–10,000	B <sup>3</sup> CDEF	B <sup>3</sup> CDEF	CDEF	DEF	DEF	EF	F
10,000–15,000	DEF	DEF	DEF	DEF	EF	EF	F
≥15,000	DEF	DEF	DEF	EF	EF	F	F

**A:** Shared Street/Bicycle Boulevard    **B:** Shared-lane Markings    **C:** Bicycle Lane    **D:** Buffered Bicycle Lane

**E:** Separated Bicycle Lane    **F:** Shared-use Path

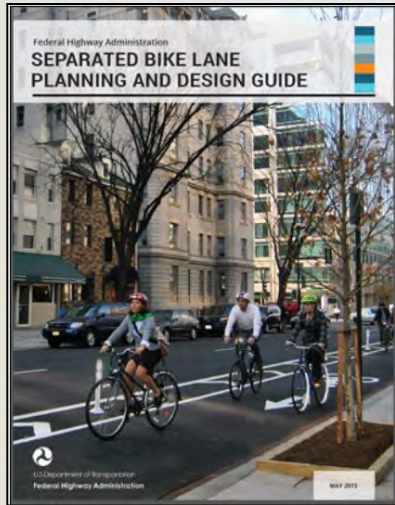
<sup>1</sup> If data not available, use posted speed

<sup>2</sup> Bicycle boulevards are preferred at speeds ≤25 mph

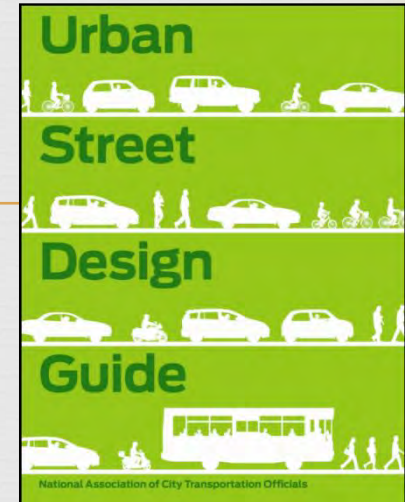
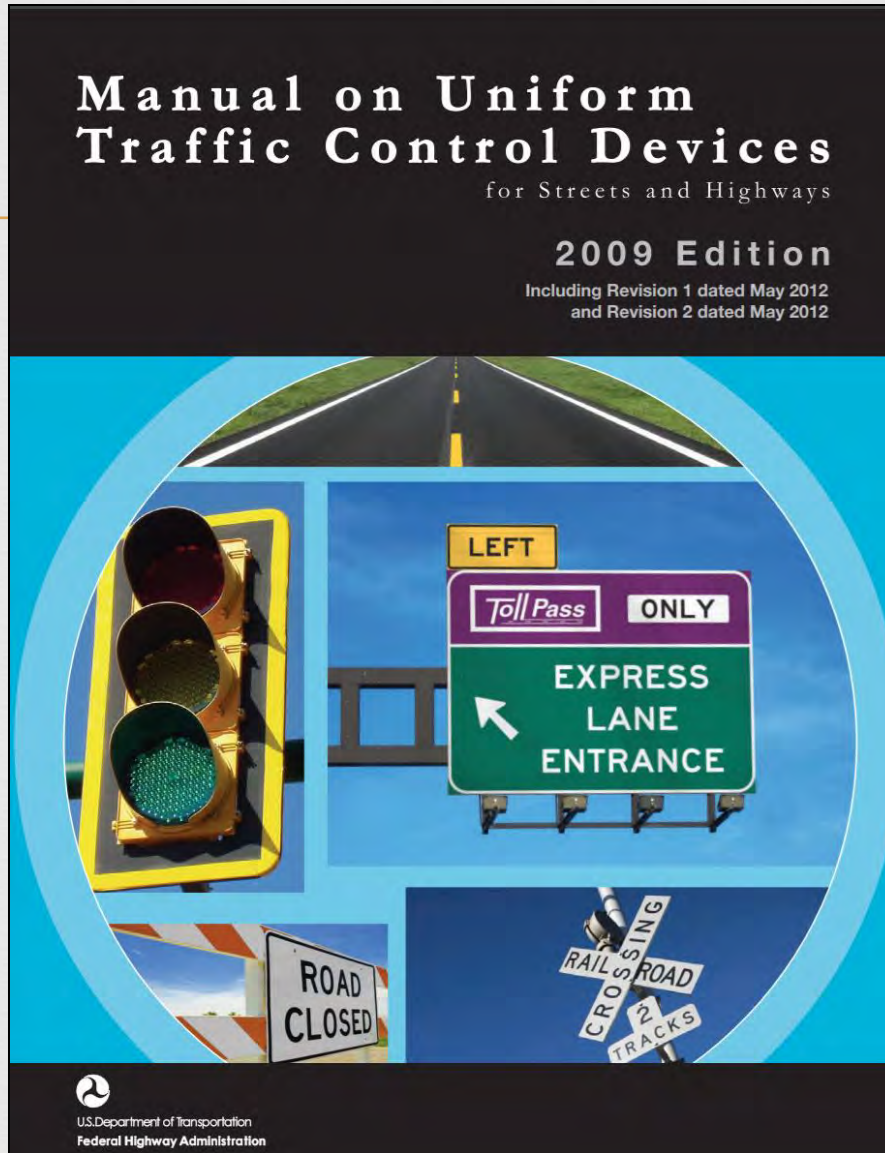
<sup>3</sup> Shared-lane markings are not a preferred treatment with truck percentages greater than 10%



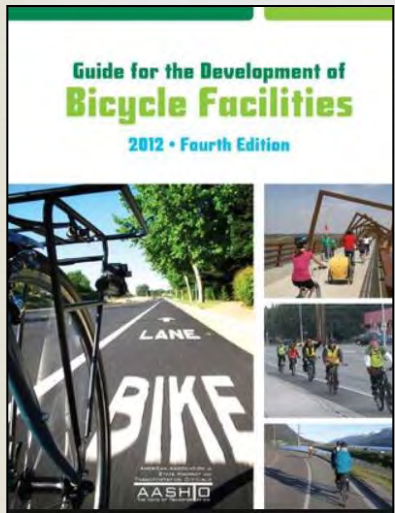
# Design Flexibility / Variability



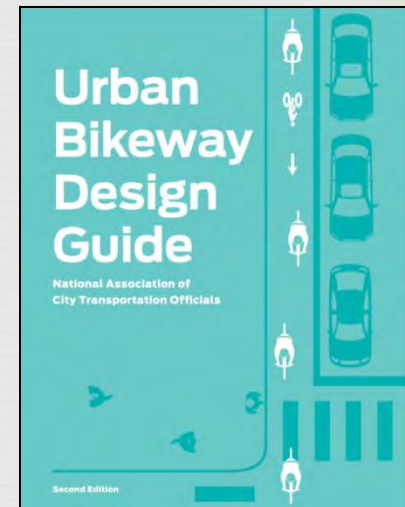
FHWA



NACTO



AASHTO



NACTO

# Mercer County Bicycle Facility Selection Table

USLIMITS2 Recommended Speed							
ADT	≤ 20	25	30	35	40	45	≥50
≤ 2,500	A B C D E F	A B C D E F	C D E F	C D E F	C D E F	D* E F	F
2,500–5,000	B C D E F	B C D E F	C D E F	C D E F	D* E F	D* E F	F
5,000–10,000	B C D E F	B C D E F	C D E F	C* D E F	D* E F	D* E F	F
10,000–15,000	C* D E F	C* D E F	C* D E F	C* D* E F	D* E F	D* E F	F
15,000-30,000	C* D E F	C* D E F	C* D E F	D* E F	E F	E* F	F
≥30,000	F	F	F	F	F	F	F

A: Shared Street/Bicycle Boulevard

B: Shared-lane Markings

C: Bicycle Lane

C\*: Bicycle Lane (After careful consideration)

D: Buffered Bicycle Lane

D\*: Buffered Bicycle Lane (After careful consideration)

E: Separated Bicycle Lane

E\*: Separated Bicycle Lane (After careful consideration)

F: Shared-use Path

1. If USLIMITS2 data not available, use posted speed
2. Bicycle boulevards are preferred at speeds ≤25 mph
3. Shared-lane markings are not a preferred treatment with truck percentages greater than 10%
4. Buffered Bike Lanes may include Rumble Strips if designed to Mercer County Standards.





**Intersection Challenges**



**Road Diet**



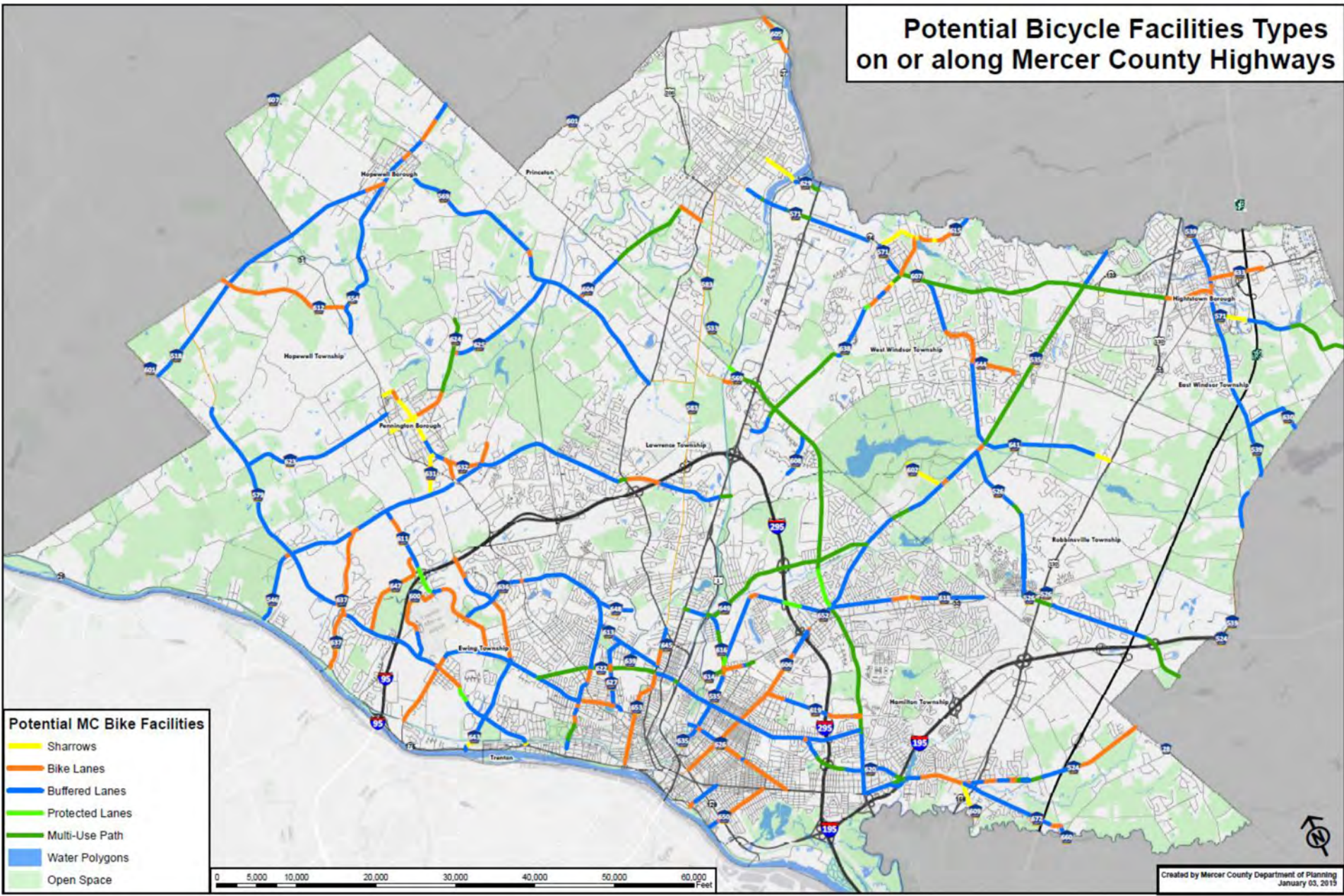
**Widen? Sidepath?**



**Rarely This Easy**

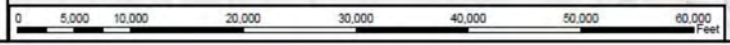


# Potential Bicycle Facilities Types on or along Mercer County Highways



**Potential MC Bike Facilities**

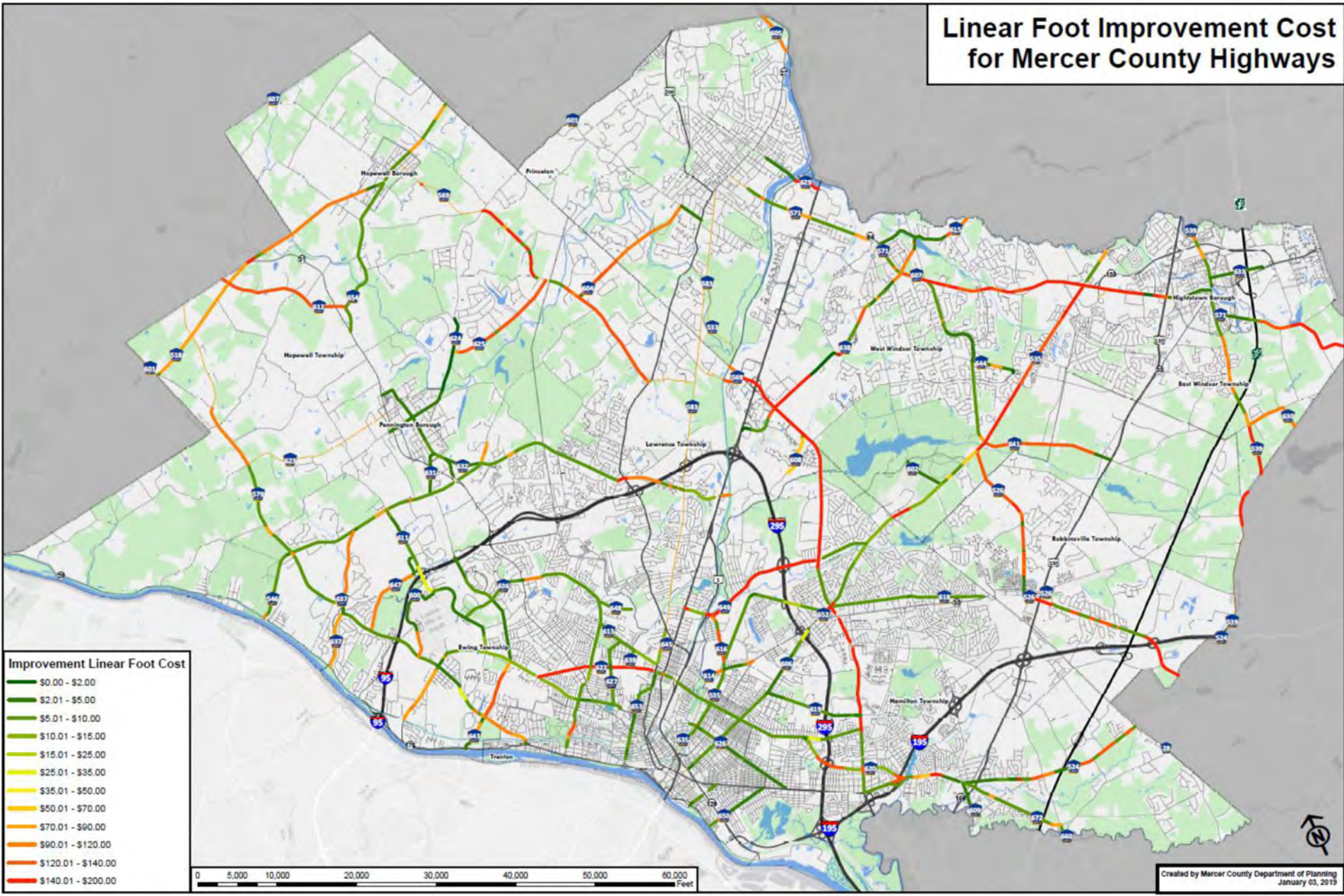
- Sharrows
- Bike Lanes
- Buffered Lanes
- Protected Lanes
- Multi-Use Path
- Water Polygons
- Open Space



Created by Mercer County Department of Planning  
January 03, 2013



# Linear Foot Improvement Cost for Mercer County Highways

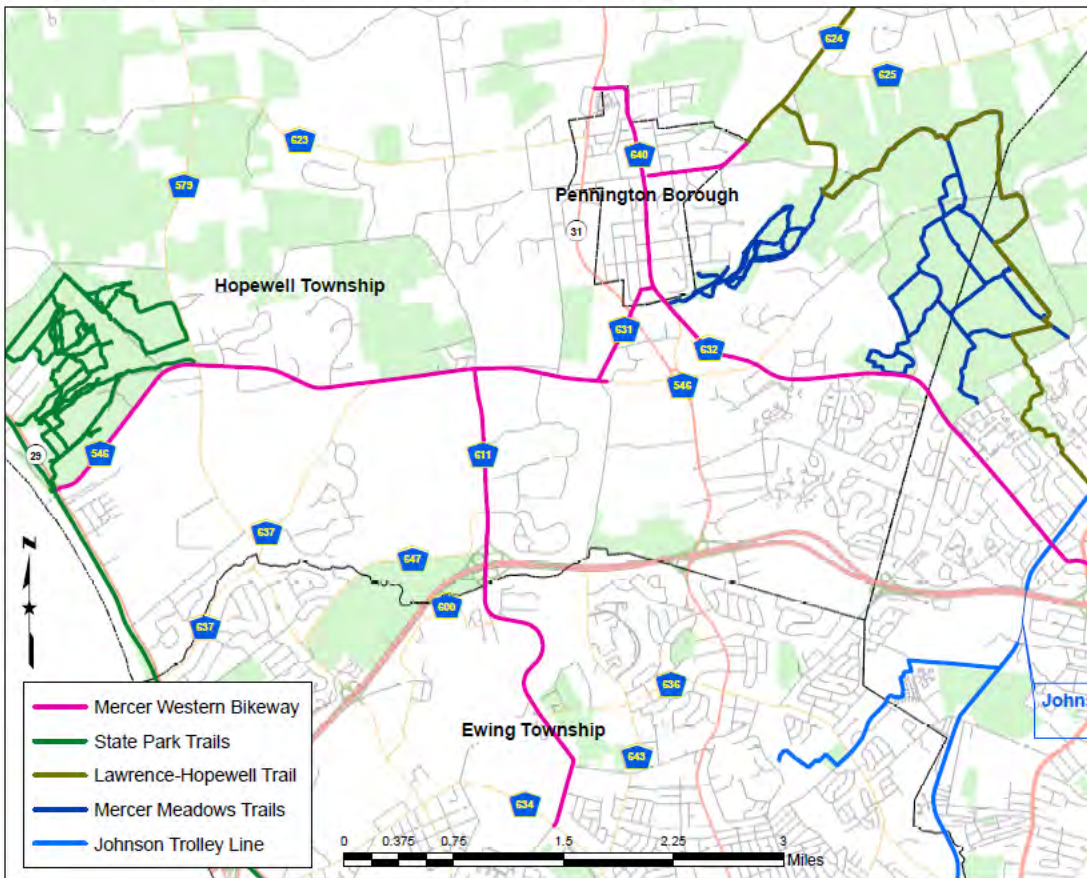




# Implementation



Mercer 2017 Regional TAP -- Bikeway & intersecting Trails



State of New Jersey  
 DEPARTMENT OF TRANSPORTATION  
 P.O. Box 600  
 Trenton, New Jersey 08625-0600

PHILIP D. MURPHY  
 Governor  
 SHEILA Y. OLIVER  
 Lieutenant Governor

DIANE GUTIERREZ-SCACCETTI  
 Commissioner

November 7, 2018

Mr. Barry Seymour  
 Executive Director, DVRPC  
 190 N. Independence Mall West, 8th Floor  
 Philadelphia, PA 19106-1520

Dear Mr. Seymour:

New Jersey Department of Transportation Commissioner, Diane Gutierrez-Scaccetti, recently announced her Commitment to Communities Initiative to help local governments succeed in delivering transportation projects. On behalf of the Commissioner, we are pleased to inform you the following projects in the Delaware Valley Regional Planning Commission (DVRPC) region have been selected for funding through the Regional Transportation Alternatives Program (RTAP).

Project Name	Project Sponsor	Amount
Arney's Mount - Fairgrounds Connector	Burlington County	\$3,223,000
Mercer County Great Western Bikeway and Approaches	Mercer County	\$2,365,900

As you know, the New Jersey Department of Transportation, in partnership with the North Jersey Transportation Planning Authority (NJTPA), the DVRPC, and the South Jersey Transportation Planning Organization (SJTPO), is administering the Regional TAP Program. Six projects totaling \$16,688,900 were recommended by the Regional TAP Selection Committee. The Selection Committee was comprised of representatives from NJDOT Local Aid, NJDOT Bureau of Environmental Resources, NJTPA, DVRPC and SJTPO.

NJDOT will be notifying each recipient regarding their approved Regional TAP grant. Failure to authorize within two years of this notification may jeopardize funding for these projects.



# Spruce Street and Arctic Parkway (Ewing, NJ)

Resurfaced Spring, 2018

2018-2020 MC PAVING SCHEDULE

No.	Street Name	Township	CR	From	To	Year	Date to be completed	Budget	Remarks
2018-06	Wash Cross Penn Rd (RT 546)	Hopewell	546	River Road	Bear Tavern Road	2017	4/15/2018	Done	
2018-13	Spruce Street (CR 613)	Ewing	613	Arctic Parkway	Prospect Ave.	2016	4/15/2018	Done	
2018-14	Spruce Street (CR 613)	Ewing	613	Prospect Ave.	Parkside Ave.	2018	4/16/2018	Done	
2018-17	Monmouth Street (CR 633)	Hightstown	633	N. Main St. (RT 539)	Broad St	2017	5/21/2018	Done	
2018-18	Monmouth Street (CR 633)	Hightstown	633	Rt #33	Boro Line	2017	5/21/2018	Done	
2018-19	Monmouth Street (CR 633)	Hightstown	633	Boro Line		2017	5/21/2018	Done	
2018-22	Lower Ferry Road (CR 643)	Ewing	643	Sullivan Way	Stuyvesant Ave	2017	7/2/2018	Done	
2018-15	Penn-Harbourton Road (CR 623)	Hopewell	623	Route 31	Scotch Road	2016	7/16/2018	Done	





**Before Resurfacing**

© 2018 Google  
© 2018 Google

Google





## **After Resurfacing (Phase I)**

2 Weeks from noticing sign to striping plan coordinated with Engineering.



Alternative Methods for  
Bicycle Planning in Mercer County  
or  
Adventures in LRS



Matthew Lawson, PP, AICP, GISP  
Principal Planner - Transportation  
MAGTUG/IREG March 13, 2019

Thank You!

Matthew Lawson  
Principal Planner-Transportation  
Mercer County Planning Dept.  
v. 609-989-6551  
[mlawson@mercercounty.org](mailto:mlawson@mercercounty.org)

# Increasing Tidal Flooding Situational Awareness in Cape May County, NJ Using ESRI Solutions for Flood

Calen Daugherty, GIS Specialist



DVRPC IREG  
March 2019



# Historical Coastal Flooding Events in New Jersey

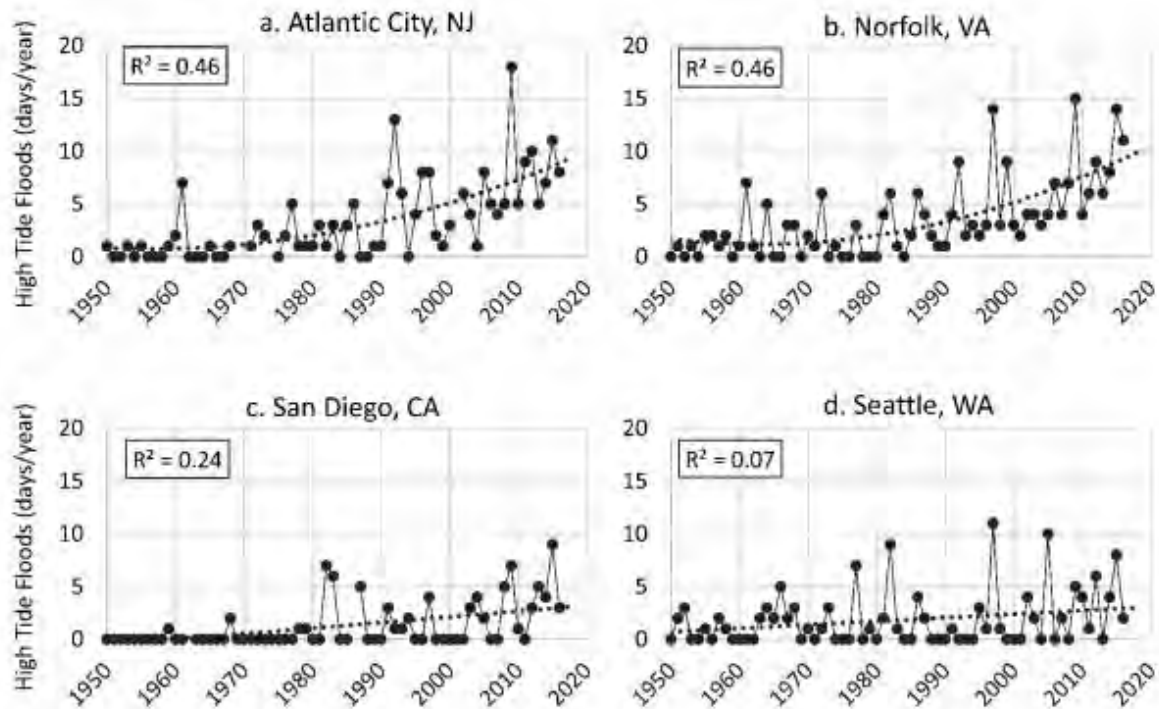
- March 1962  
Nor'Easter
- Dec 1992  
Nor'Easter
- Hurricane  
Sandy 2012
- Nor'Easter  
"Jonas",  
January 2016



Source: Press of Atlantic City

# Increasing Number of “High Tide Flood” Days

highest water levels, which are approximately Gaussian relative to the flood threshold (Sweet and Park, 2014) as illustrated in Figure 1b.



Source: Patterns and Projections of High Tide Flooding Along The U.S. Coastline Using a Common Impact Threshold (NOAA Technical Report NOS CO-OPS 086)

# Chronic Coastal Flooding a Growing Concern

- According to a recent study by the Union of Concerned Scientists:
  - 25,000 NJ homes worth ~\$10 billion at risk of chronic flooding by 2035
  - Atlantic City, Ocean City, North Wildwood, and Wildwood each have more than 800 at-risk properties

Study - Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate (2018)



# Impacts from Chronic Flooding

- Potential loss of real estate value
- Transportation / utility infrastructure
- Livability of area



Source: Union of Concerned Scientists

# Cape May County Emergency Management

- Staff has good local knowledge of local flooding conditions
- Want to improve situational awareness



# Operational Need for App

- Want to be able to answer 3 questions
  - When is the flood coming ?
  - What will the flood look like?
  - Who will be affected by the flood?



Source: Press of  
Atlantic City



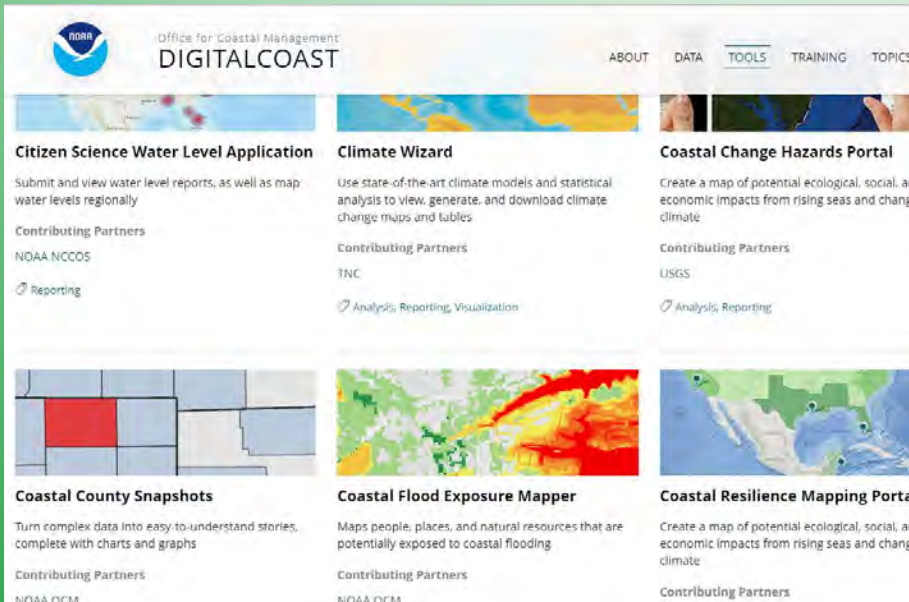
# Application Considerations

- Want a “real time” component
- Full hydrological modeling entails large costs and efforts



# Existing Resources

- What's already out there?
  - NOAA Digital Coast data/services (njfloodmapper.com)
  - FEMA flood hazard layers
  - NOAA tide gauge data and forecasts



The screenshot shows the NOAA Digital Coast website. The header includes the NOAA logo and the text "Office for Coastal Management DIGITALCOAST". Navigation tabs for "ABOUT", "DATA", "TOOLS", "TRAINING", and "TOPICS" are visible. The main content area features six cards, each with a title, a brief description, and a list of contributing partners. The cards are: "Citizen Science Water Level Application", "Climate Wizard", "Coastal Change Hazards Portal", "Coastal County Snapshots", "Coastal Flood Exposure Mapper", and "Coastal Resilience Mapping Portal".

**NOAA Office for Coastal Management DIGITALCOAST**

ABOUT DATA TOOLS TRAINING TOPICS

**Citizen Science Water Level Application**  
Submit and view water level reports, as well as map water levels regionally  
Contributing Partners: NOAA NCCOS  
Reporting

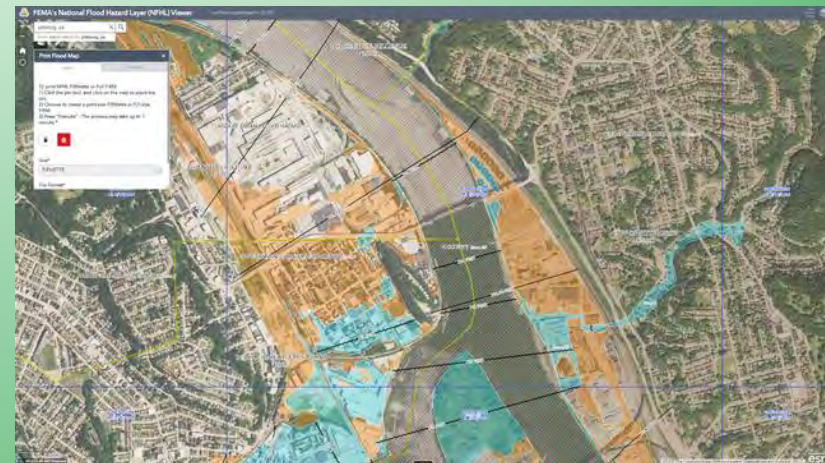
**Climate Wizard**  
Use state-of-the-art climate models and statistical analysis to view, generate, and download climate change maps and tables  
Contributing Partners: TNC  
Analysis, Reporting, Visualization

**Coastal Change Hazards Portal**  
Create a map of potential ecological, social, and economic impacts from rising seas and changing climate  
Contributing Partners: USGS  
Analysis, Reporting

**Coastal County Snapshots**  
Turn complex data into easy-to-understand stories, complete with charts and graphs  
Contributing Partners: NOAA OCM

**Coastal Flood Exposure Mapper**  
Maps people, places, and natural resources that are potentially exposed to coastal flooding  
Contributing Partners: NOAA OCM

**Coastal Resilience Mapping Portal**  
Create a map of potential ecological, social, and economic impacts from rising seas and changing climate  
Contributing Partners:




# Aggregate and Augment


- Utilize existing resources where we can
- Focus on Cape May County local area and needs of Emergency Management
  - 3 Zones
  - Coastal Only
- Solution should be available any time (planning or during live event)
- Work with County's existing GIS infrastructure




# Flood Management for ArcGIS Template

Complete Flood Management with ArcGIS

A story map [f](#) [t](#) [e](#) 

Flood Management with ArcGIS | When is the flood coming? | What will the flood look like? | Who will be affected? | Planning your Response | 



## Flood Management with ArcGIS

Floods are the costliest natural disasters in the world in terms of both human and monetary impact. Knowing when a flood is going to happen, what will be flooded, who will be affected, and how to respond is of great importance to reducing loss of life and property.

Using ArcGIS to manage flood planning, response, recovery, and mitigation allows for easy visualization and gives every member of your organization and local partner's access to the information they need to make the most effective decisions. In the following examples you will see how ArcGIS can help you address many aspects of flood management.

# Create Inundation Layers

- Create inundation layers from LIDAR elevation data
- Publish services and create web maps

The screenshot displays the ArcGIS interface. On the left, a 'Layers' panel shows a checked layer named 'north1124temp' with a value range from -22.1784 to 15.336. The main map area shows a grayscale elevation map of a coastal area with a river and a road network. Below the map, a Notepad++ window shows a Python script generated by ArcGIS/ModelBuilder. The script includes a description, an import statement for arcpy, and local variables for flood values, project area, and output folder. To the right, a 'Create\_Inundation\_Rasters' model diagram is visible, showing a flowchart of processing steps represented by yellow and green boxes connected by lines.

```
FILEROOM\CS\9100068\GIS\APPS\1_Create_Initial_Minus_Raster.py - Notepad++
# (generated by ArcGIS/ModelBuilder)
# Description:
#
-----
# Import arcpy module
import arcpy

# Local variables:
FloodValues = ["2.93","3.43","3.93","4.43","4.93","5.43","5.93","6.43",
"6.93","7.43"]
ProjectArea_South_tif =
"W:\\FILEROOM\\CS\\9100068\\GIS\\SPATIAL\\BG18\\Rasters\\Project_Area_Cl
ipped_DEM\\ProjectArea_South.tif"
outputfolder = "W:\\FILEROOM\\CS\\9100068\\GIS\\SPATIAL\\BG18\\TEMP\\"

Create_Inundation_Rasters
Model Edit Insert View Windows Help
Model Edit Insert View Windows Help
```



# Cape May County Tidal Flooding Awareness

## Cape May County Tidal Flooding Awareness

A Story Map [f](#) [t](#) [e](#)



Introduction

Tidal Flooding Dashboard

What Will the Flood Look Like?

Who Will be Affected by the Flood?

The Cape May County Tidal Flooding Awareness Application is a suite of web applications that helps users gain a better understanding of the potential impacts of tidal flooding inundation in the Cape May County Region.

### Tidal Flooding Dashboard

The dashboard provides near-real time readings of tidal gauges, current weather watches and warnings, and water level forecasts where available, all from authoritative NWS/NOAA sources.

### What Will the Flood Look Like?

This component of the application allows the user to view inundation levels based on selected tide gauge readings for the Southern, Central, and Northern areas of the county. For example, a user may want to see what streets in Wildwood may be inundated by a moderate flood event. Please see the splash screen of this component for information on how the inundation levels shown may differ from actual flood events.

### Who Will be Affected by the Flood?



This component of the application allows the user to view inundation levels based on selected tide gauge readings for the Southern, Central, and Northern areas of the county, and see how inundation levels may impact critical infrastructure. For example, a user may want to see if the area around the police station in Ocean City may be inundated by a major flood event. Please see the splash screen of this component for information on how the inundation levels shown may differ from actual flood events.





# Tidal Flooding Dashboard

## Cape May County Tidal Flooding Awareness

A Story Map   



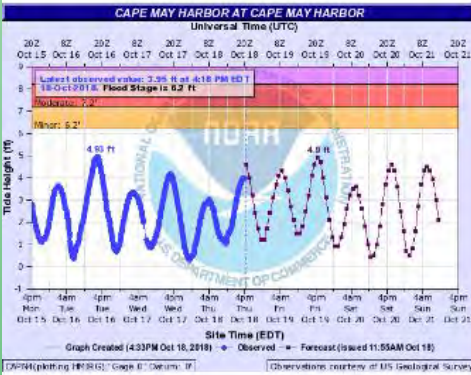
Introduction

**Tidal Flooding Dashboard**

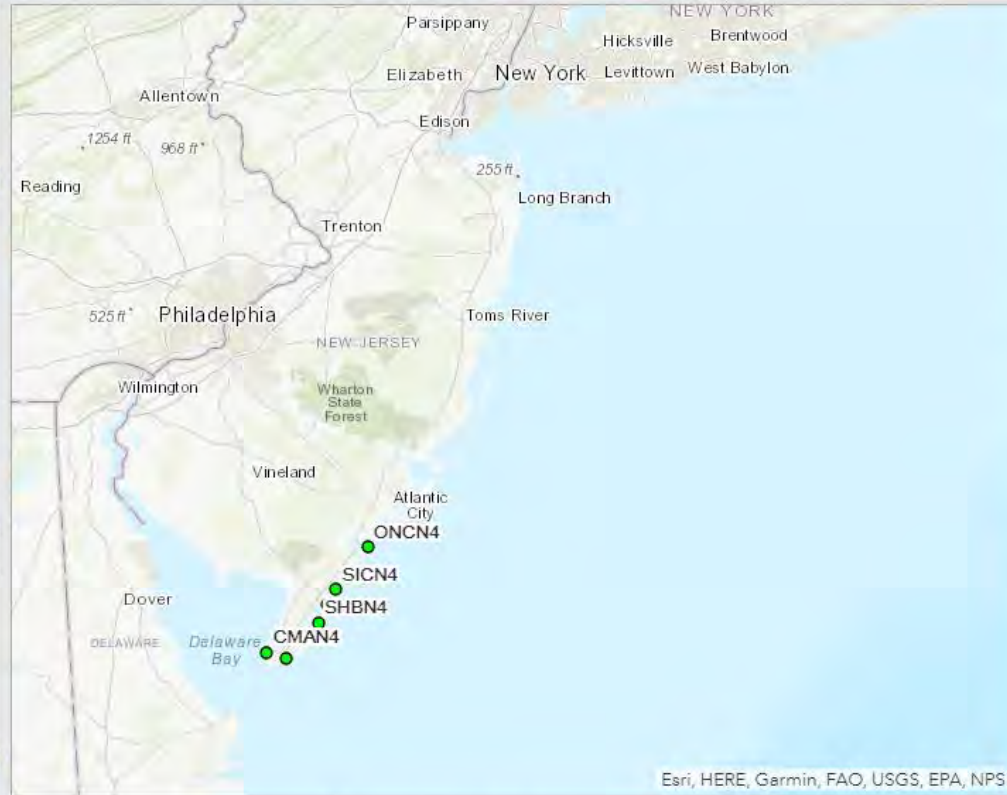
What Will the Flood Look Like?

Who Will be Affected by the Flood?

### Observations and 48 HR Forecast for Cape May Harbor (CAPN4)



### Observations and 48 HR Forecast for Great Egg Harbor Bay at Ocean City (ONCN4)



#### Observed Tide Gauge Stages

- Major Flooding
- Moderate Flooding
- Minor Flooding
- Near Flood
- No Flooding
- Flood Category Not Defined
- At or Below Low Water Threshold
- Observations Are Not Current
- Out of Service

**CAPN4** (Cape May Harbor)

Stage (ft): **3.81**

Flood Stage Levels (ft)  
 Minor: 6.20 (3.43 ft NAVD88)  
 Moderate: 7.20 (4.43 ft NAVD88)  
 Major: 8.20 (5.43 ft NAVD88)

Observation Time: 2018-10-18 19:18:00  
 Last update: 2 minutes ago

**SICN4** (Ludlum Thorofare at Sea Isle City)

Stage (ft): **3.42**

Flood Stage Levels (ft)  
 Minor: 5.70 (3.47 ft NAVD88)  
 Moderate: 6.70 (4.47 ft NAVD88)  
 Major: 7.70 (5.47 ft NAVD88)

Observation Time: 2018-10-18 19:36:00  
 Last update: 2 minutes ago

**ONCN4** (Great Egg Harbor Bay at Ocean City)



Stage (ft): **3.01**

Flood Stage Levels (ft)  
 Minor: 5.30 (3.24 ft NAVD88)  
 Moderate: 6.30 (4.24 ft NAVD88)  
 Major: 7.30 (5.24 ft NAVD88)

Observation Time: 2018-10-18 19:36:00  
 Last update: 2 minutes ago

# Tidal Flooding Dashboard - Configuration

## Cape May County Tidal Flooding Awareness

A Story Map    

Introduction | **Tidal Flooding Dashboard** | What Will the Flood Look Like? | Who Will be Affected by the Flood?

### Observations and 48 HR Forecast for Cape May Harbor (CAPN4)



Embedding this widget into the dashboard is indicated by a red arrow.

### Observations and 48 HR Forecast for Great Egg Harbor Bay at Ocean City (ONCN4)



Embedding this widget into the dashboard is indicated by a red arrow.

### Map of Tidal Flooding



Embedding this map into the dashboard is indicated by a red arrow.

### Observed Tide Gauge Stages

- Major Flooding
- Moderate Flooding
- Minor Flooding
- Near Flood
- No Flooding
- Flood Category Not Defined
- At or Below Low Water Threshold
- Observations Are Not Current
- Out of Service

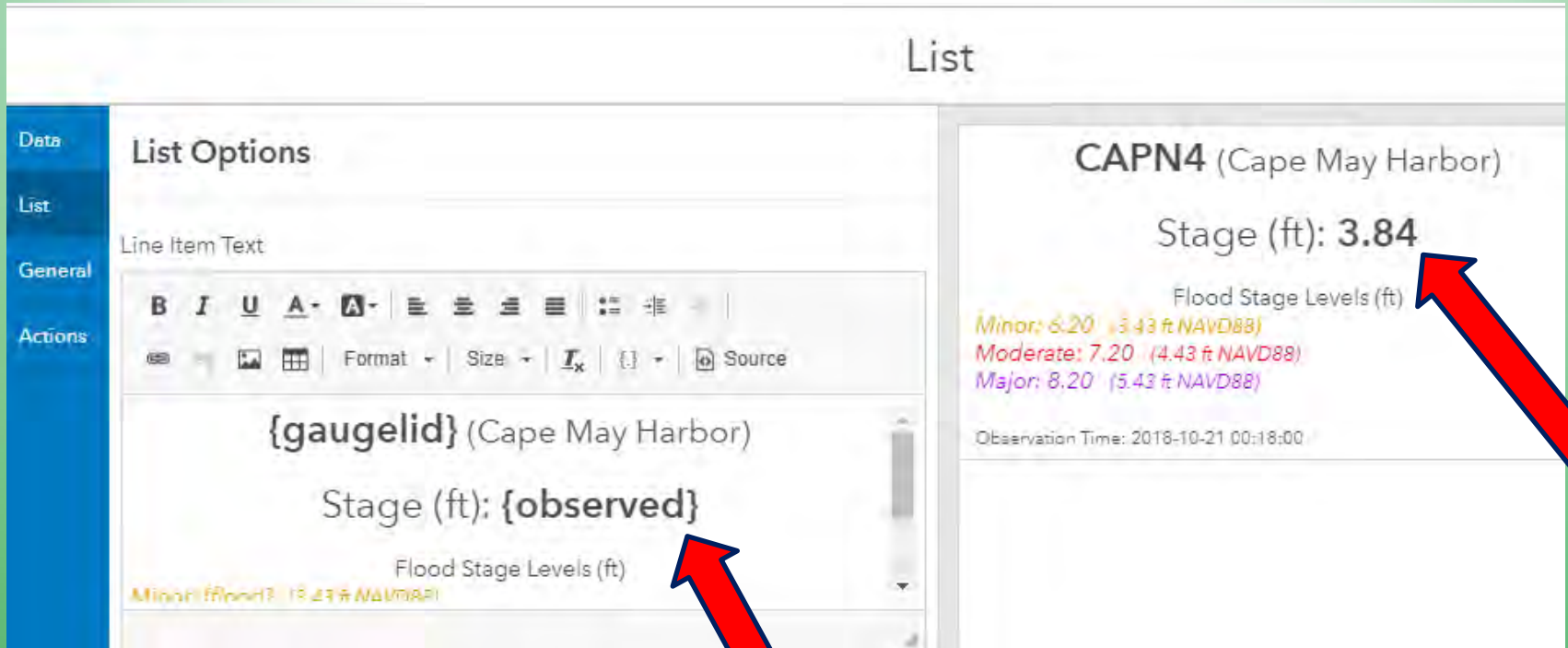
### List Widgets

Embedding these list widgets into the dashboard is indicated by red arrows.

Gauge ID	Location	Stage (ft)	Minor (ft)	Moderate (ft)	Major (ft)
CAPN4	Cape May Harbor	3.81	6.20 (3.43 ft NAVD88)	7.20 (4.43 ft NAVD88)	8.20 (5.43 ft NAVD88)
SICN4	Thorofare at Atlantic City	3.42	5.70 (3.47 ft NAVD88)	6.70 (4.47 ft NAVD88)	7.70 (5.47 ft NAVD88)
ONCN4	Great Egg Harbor Bay at Ocean City	3.01	5.30 (3.24 ft NAVD88)	6.30 (4.24 ft NAVD88)	7.30 (5.24 ft NAVD88)



# Tidal Flooding Dashboard - Configuration



The screenshot displays the configuration interface for a Tidal Flooding Dashboard. On the left, a blue sidebar contains navigation tabs: "Data", "List", "General", and "Actions". The "List" tab is active. The main area is titled "List" and is divided into two panels.

The left panel, titled "List Options", shows the configuration for a list item. The "Line Item Text" field contains the following HTML-like structure:

```
{gaugelid} (Cape May Harbor)  
Stage (ft): {observed}  
Flood Stage Levels (ft)  
Minor: 6.20 (3.43 ft NAVD88)
```

The right panel displays the live data for the selected gauge, "CAPN4 (Cape May Harbor)". It shows the current stage as 3.84 ft. Below this, the flood stage levels are listed:

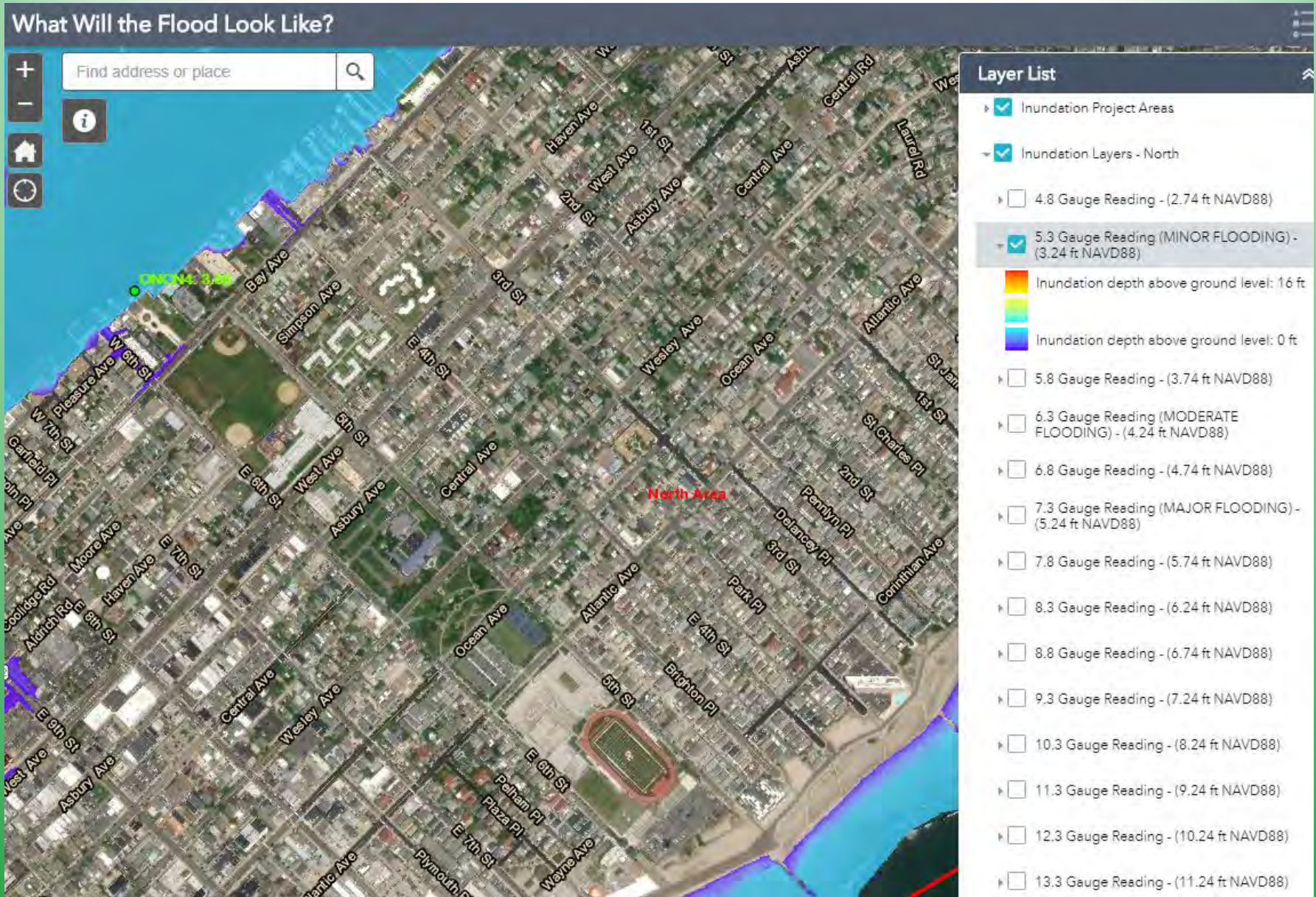
- Minor: 6.20 (3.43 ft NAVD88)
- Moderate: 7.20 (4.43 ft NAVD88)
- Major: 8.20 (5.43 ft NAVD88)

The observation time is noted as 2018-10-21 00:18:00.

Two red arrows are overlaid on the image. One arrow points from the "observed" text in the configuration panel to the "3.84" value in the live data panel. The second arrow points from the "3.84" value in the live data panel to the "Flood Stage Levels (ft)" label in the configuration panel.

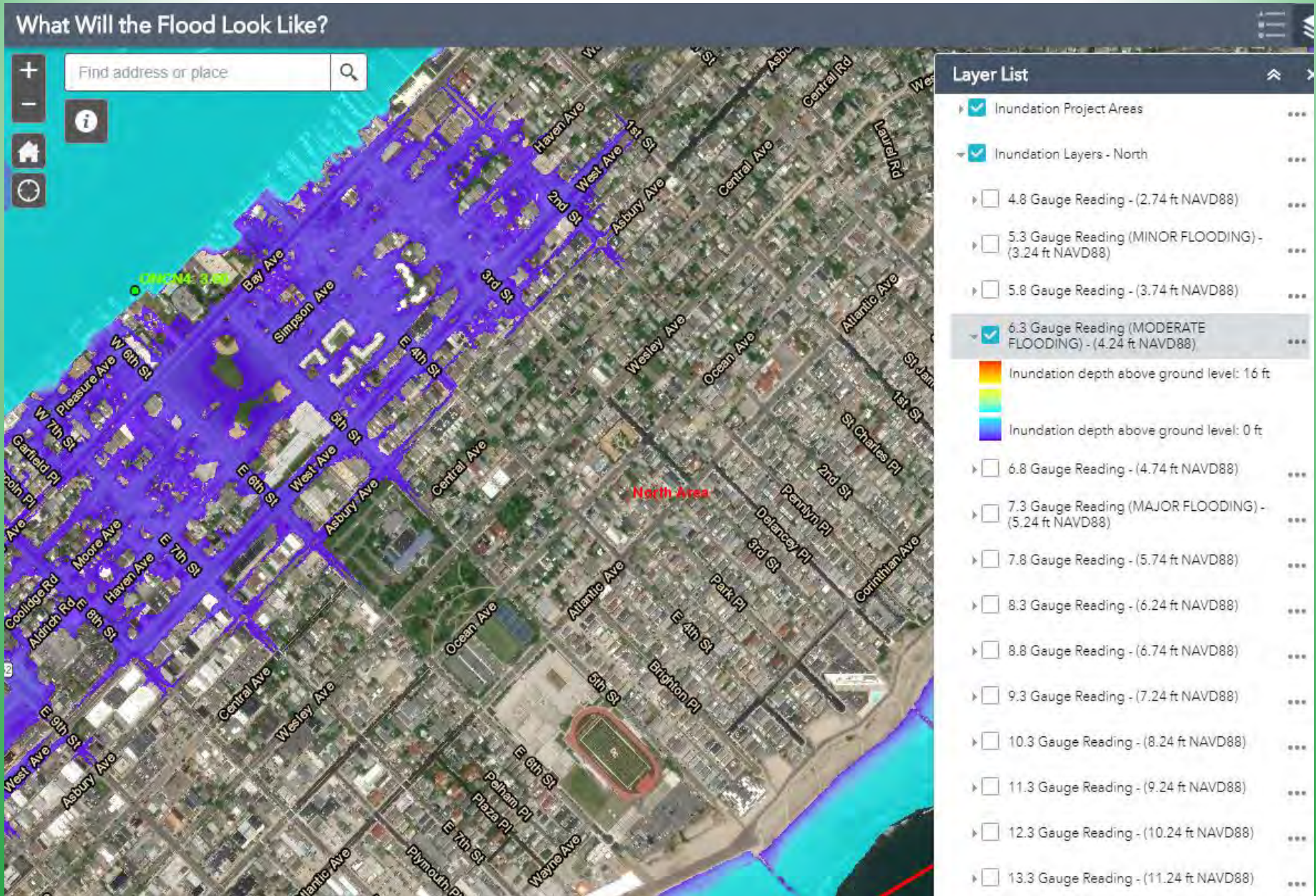


# What Will the Flood Look Like



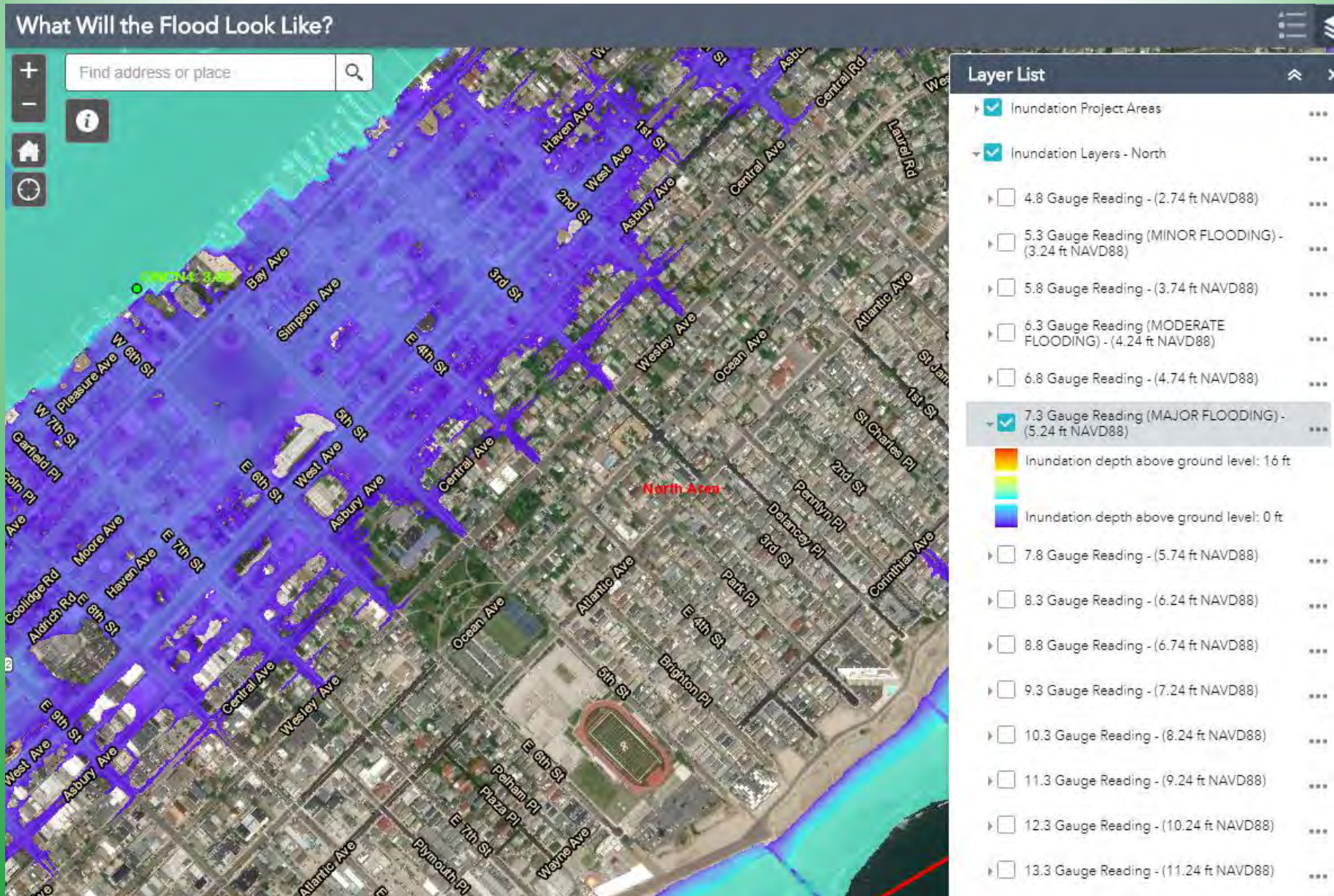


# What Will the Flood Look Like



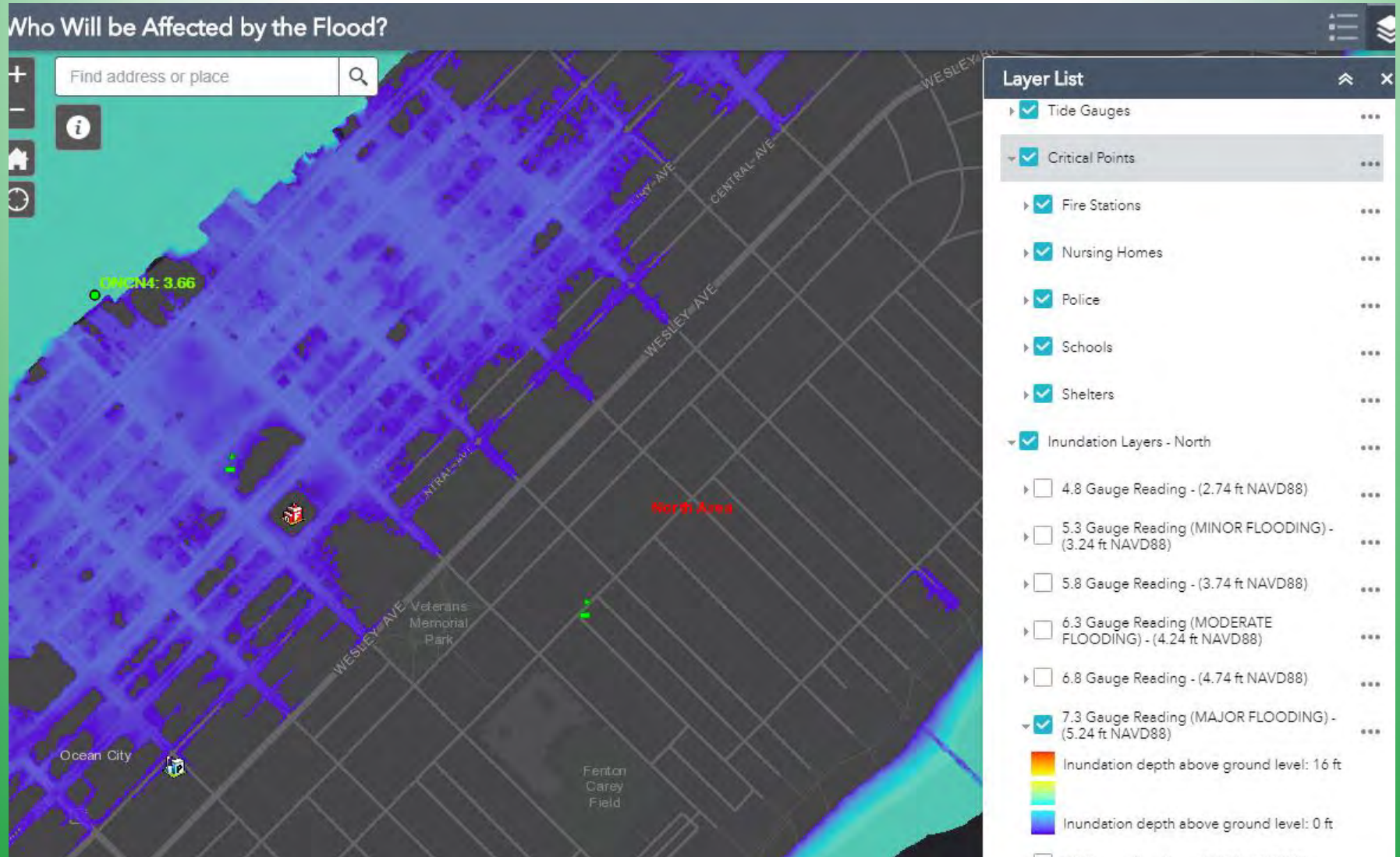


# What Will the Flood Look Like

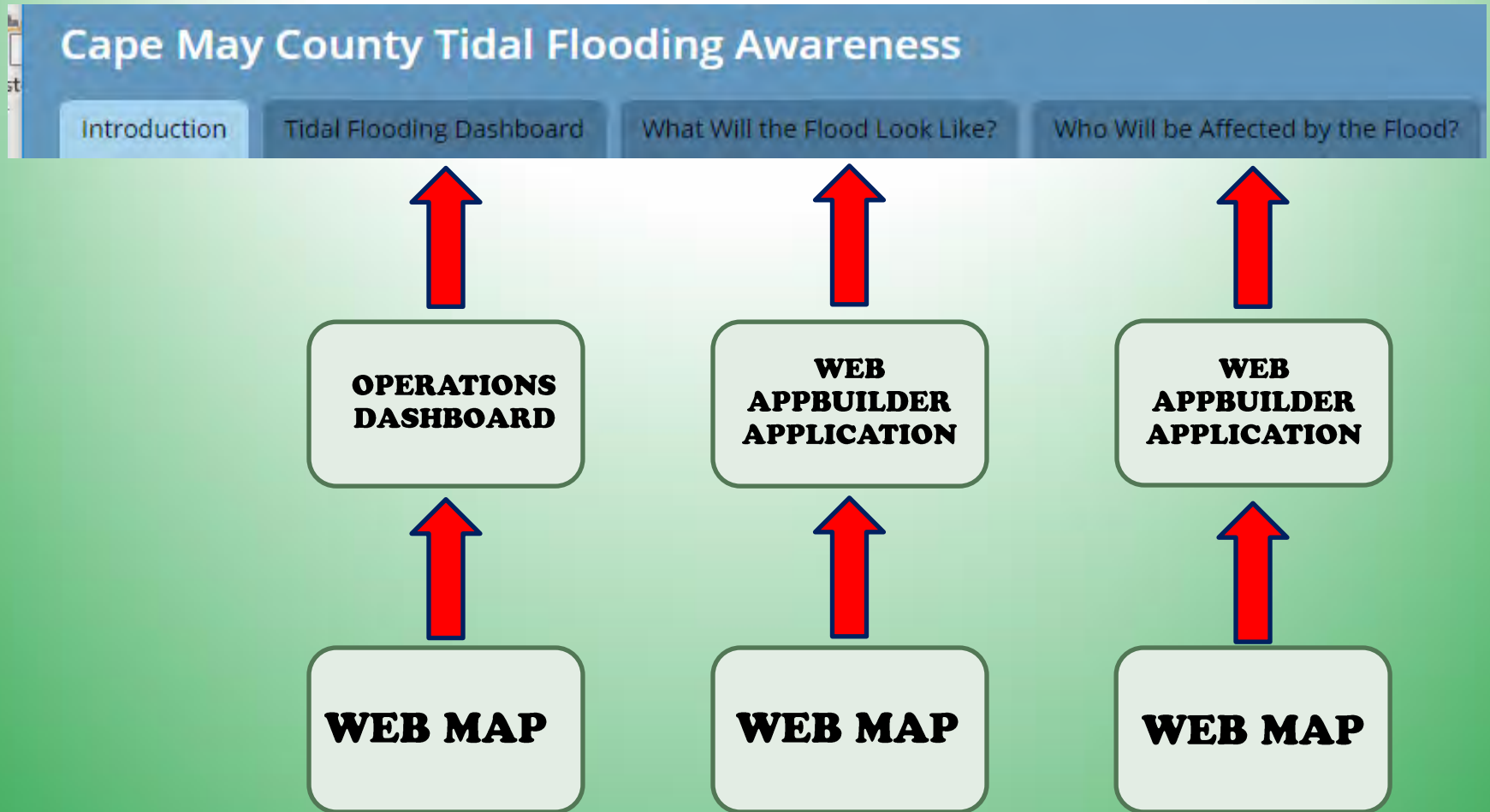




# Who Will be Affected by the Flood?



# Application Diagram



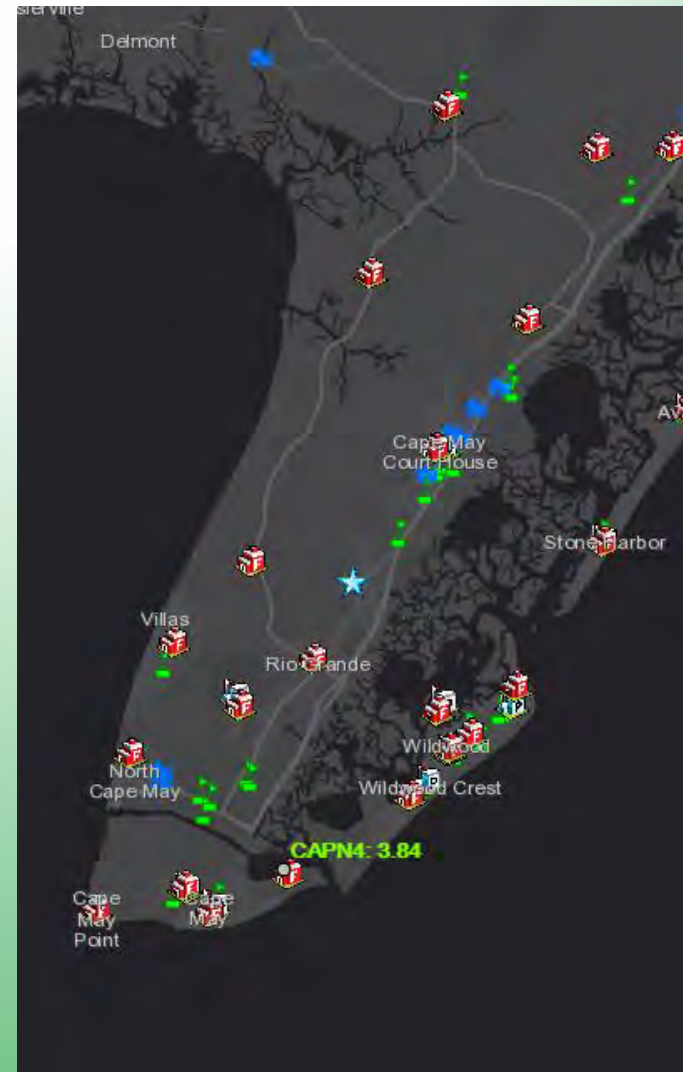


# Important Assumptions and Limitations

- Inundation graphics not a model of what a given storm inundation might look like at snapshot in time
- Timing differences of high tide
- Local factors (wind, wave action, rainfall)
- Disconnected low areas

# Potential Augmentations

- County can add additional layers to web maps
- Add beach / street level view web cam points
- Sensors/modeling





# National Flood Insurance Program Community Rating System Benefits

- Voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements
- Application fulfills requirements and add points in areas such as
  - Map Information
  - Outreach Programs
- More points results in reduced flood insurance premiums for towns

# Takeaways

- Use of Story Map as aggregation / mash up tool rather than narrative tool
- Provide benefits to municipalities at no cost



## National Weather Service Data as OGC Web Services

This page is for data that is available as Geospatial Information System (GIS) Web Services. The main [REST Services Page](#) has links to the pages containing the NWS and other NOAA Line Offices web service. This page contains web services that follow the Open Geospatial Consortium (OGC) standards for web services. Three standards are supported - Web Mapping Services (WMS), Web Feature Services (WFS) and Web Coverage Services (WCS). A limited set of data are available at this time and the links are below.

The following links will lead you to a REST page for services or a download page for images.

Current Weather	Forecasts	Past Weather/Climate
<b>Watches, Warnings and Radar</b> <ul style="list-style-type: none"><li>• <a href="#">Base Reflectivity Radar</a></li><li>• <a href="#">Base Reflectivity Radar (time_enabled)</a></li><li>• <a href="#">Watch/Warn Polygons</a></li><li>• <a href="#">NOHRSC Snow Analysis</a></li></ul>	<b>Hurricanes/Tropical Storms</b> <ul style="list-style-type: none"><li>• <a href="#">Atlantic Hurricane Forecast</a></li><li>• <a href="#">East Pacific Hurricane Forecast</a></li></ul> <b>Water</b> <ul style="list-style-type: none"><li>• <a href="#">AHPS River Gauge Observations/Forecasts</a></li><li>• <a href="#">National Significant River Flood Outlook</a></li><li>• <a href="#">Quantitative Precip Fcst (QPF) from WPC</a></li><li>• <a href="#">Hourly Quantitative Precip Est (QPE) from RFC</a></li><li>• <a href="#">Daily Quantitative Precip Est from RFC</a></li><li>• <a href="#">Gridded Flash Flood Guidance</a></li><li>• <a href="#">Alaska River Breakup Status</a></li></ul> <b>Air Quality</b> <ul style="list-style-type: none"><li>• <a href="#">Air Quality Surface Dust</a></li><li>• <a href="#">Air Quality Vertical Dust</a></li><li>• <a href="#">Air Quality One Hour Average Ozone</a></li><li>• <a href="#">Air Quality One Hour Maximum Ozone</a></li><li>• <a href="#">Air Quality 8 Hour Average Ozone</a></li><li>• <a href="#">Air Quality 8 Hour Maximum Ozone</a></li><li>• <a href="#">Air Quality Surface Smoke</a></li></ul>	<b>From the Climate Prediction Center (CPC)</b> <ul style="list-style-type: none"><li>• <a href="#">6 to 10 Day Precipitation and Temperature Outlooks</a></li><li>• <a href="#">8 to 14 Day Precipitation and Temperature Outlooks</a></li><li>• <a href="#">Daily 0.25 Deg CMORPH</a></li><li>• <a href="#">GFS Precipitation Anomalies</a></li><li>• <a href="#">Monthly Precipitation Outlooks</a></li><li>• <a href="#">Monthly Temperature Outlooks</a></li><li>• <a href="#">Seasonal Precipitation Outlooks</a></li><li>• <a href="#">Seasonal Temperature Outlooks</a></li><li>• <a href="#">Weekly Sea Surface (SST) Temperatures</a></li><li>• <a href="#">CPC Drought Outlook</a></li></ul>

# Thanks!

The May County Tidal Flooding Awareness System is a suite of web applications that helps users gain a better understanding of the potential impacts of tidal flooding inundation in the May County Region.

## Flooding Dashboard

The dashboard provides near-real time readings of tidal current weather watches and warnings, and level forecasts where available, all from authoritative NWS/NOAA sources.

## Will the Flood Look Like?

This component of the application allows the user to view inundation levels based on selected tide gauge stations for the Southern, Central, and Northern areas of the county. For example, a user may want to see what a Wildwood may be inundated by a moderate event. Please see the splash screen of this application for information on how the inundation levels may differ from actual flood events.

## What Will be Affected by the Flood?

This component of the application allows the user to view inundation levels based on selected tide gauge stations for the Southern, Central, and Northern areas of the county, and see how inundation levels may impact critical infrastructure. For example, a user may want to see how much ground the police station in Ocean City would be inundated by a major flood event. Please see the



[cdaug@arh-us.com](mailto:cdaug@arh-us.com)





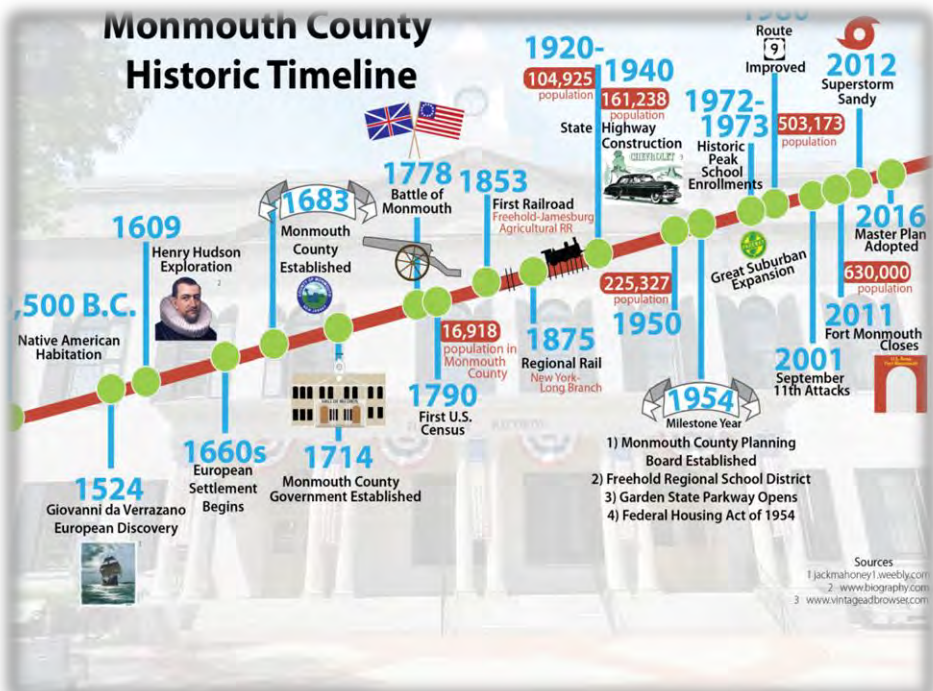
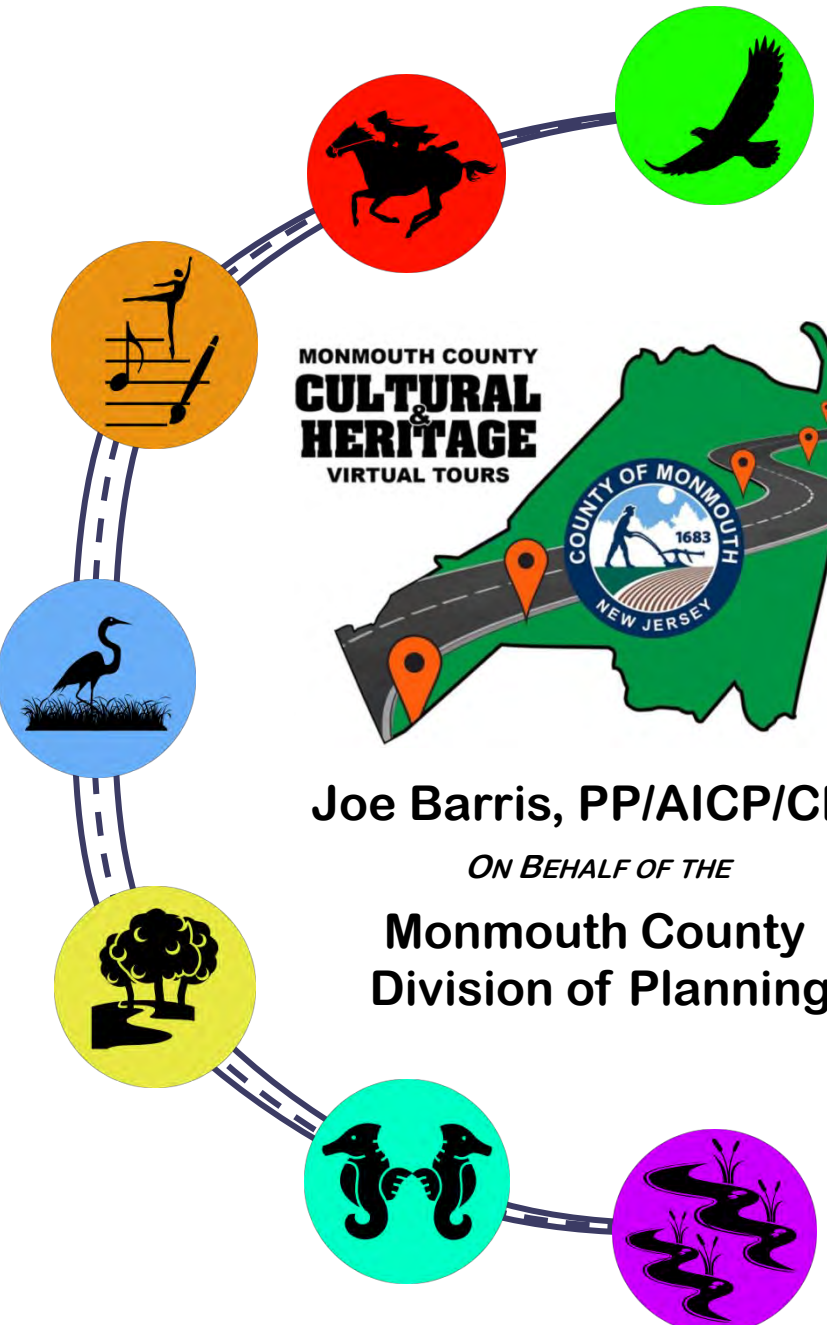
**MONMOUTH COUNTY  
CULTURAL  
& HERITAGE  
VIRTUAL TOURS**



**Joe Barris, PP/AICP/CFM**

*ON BEHALF OF THE*

**Monmouth County  
Division of Planning**



# MONMOUTH COUNTY, NJ

- ‘Central Jersey’ comprised of farmland, small towns, suburban, smaller scale urban centers, shore towns
- 476 square miles | 625,000 people
- 53 towns | 300 to 66,000 people | 0.1 to 62 mi<sup>2</sup>
- 27 miles of Atlantic Ocean coastline | 26 miles of coastline along Raritan Bay
- Proximity to NYC | beaches | excellent public schools | county parks | arts | history
- Definitive ‘beach season’ vs ‘local’ vibes
- Music, Food, & Seasonal Festival Culture,





# MONMOUTH COUNTY, NJ





# **CULTURAL & HERITAGE BYWAYS TELLS STORIES ABOUT PEOPLE & PLACES**

**HISTORY**

**INDIGINOUS CULTURE(S)**

**IRREPLACIBLE COMMUNITY ASSETS**

**COMMUNITY PRIDE**

**SUCCESSIVE GENERATIONS / LAYERING LEGACY**

**PUBLIC AWARENESS / EDUCATION / KNOWLEDGE**

**ECONOMIC DEVELOPMENT / TOURISM**

**LAND USE / TECHNOLOGY / INNOVATION**

**ARTS / CREATION**

**INTRIGUE / ENTERTAINMENT / MYSTERY / MACABRE / TRAGEDY**

**ACCOMPLISHMENTS / CONTROVERSIES / SOCIETAL CHANGES**

# **CULTURAL & HERITAGE BYWAYS**

## **INTRINSIC QUALITIES**

### **STATE SCENIC BYWAYS:**

- 1. SCENIC**
- 2. HISTORIC**
- 3. ARCHITECTURE**
- 4. ARCHAEOLOGICAL**
- 5. NATURAL**
- 6. RECREATIONAL**

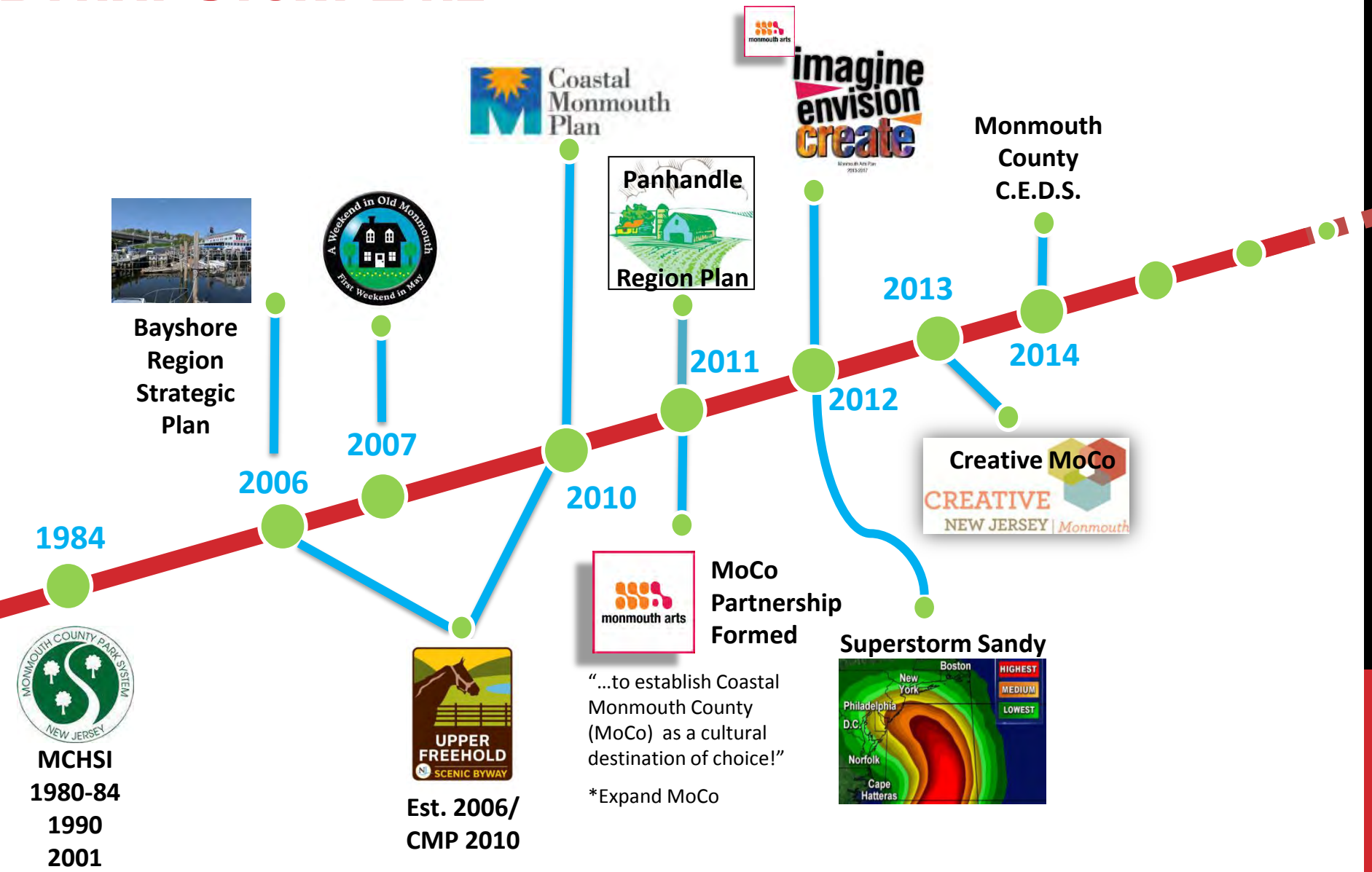
### **COUNTY HERITAGE AND CULTURAL VIRTUAL BYWAY TOURS:**

#### **STATE SCENIC BYWAYS PLUS.....**

- ART**
- BURIAL SITES & CEMETERIES**
- CEREMONIAL PLACES**
- CIVIC INSTITUTIONS**
- COMMEMORATIVE SITES**
- CROSSROADS/NODES/DOWNTOWNS**
- CULTURAL SIGNIFICANCE**
- DARK HISTORY**
- EDUCATIONAL FACILITIES**
- ENVIRONMENTAL FEATURES**
- MEMORIAL REMEBERANCES**
- MILITARY**
- MYTH, LORE, & LEGEND**
- NEIGHBORHOODS**
- POP CULTURE**
- POLITICAL BOUNDARIES**
- UNIQUE OR UNUSUAL SITES**
- SCIENCE & TECHNOLOGY**



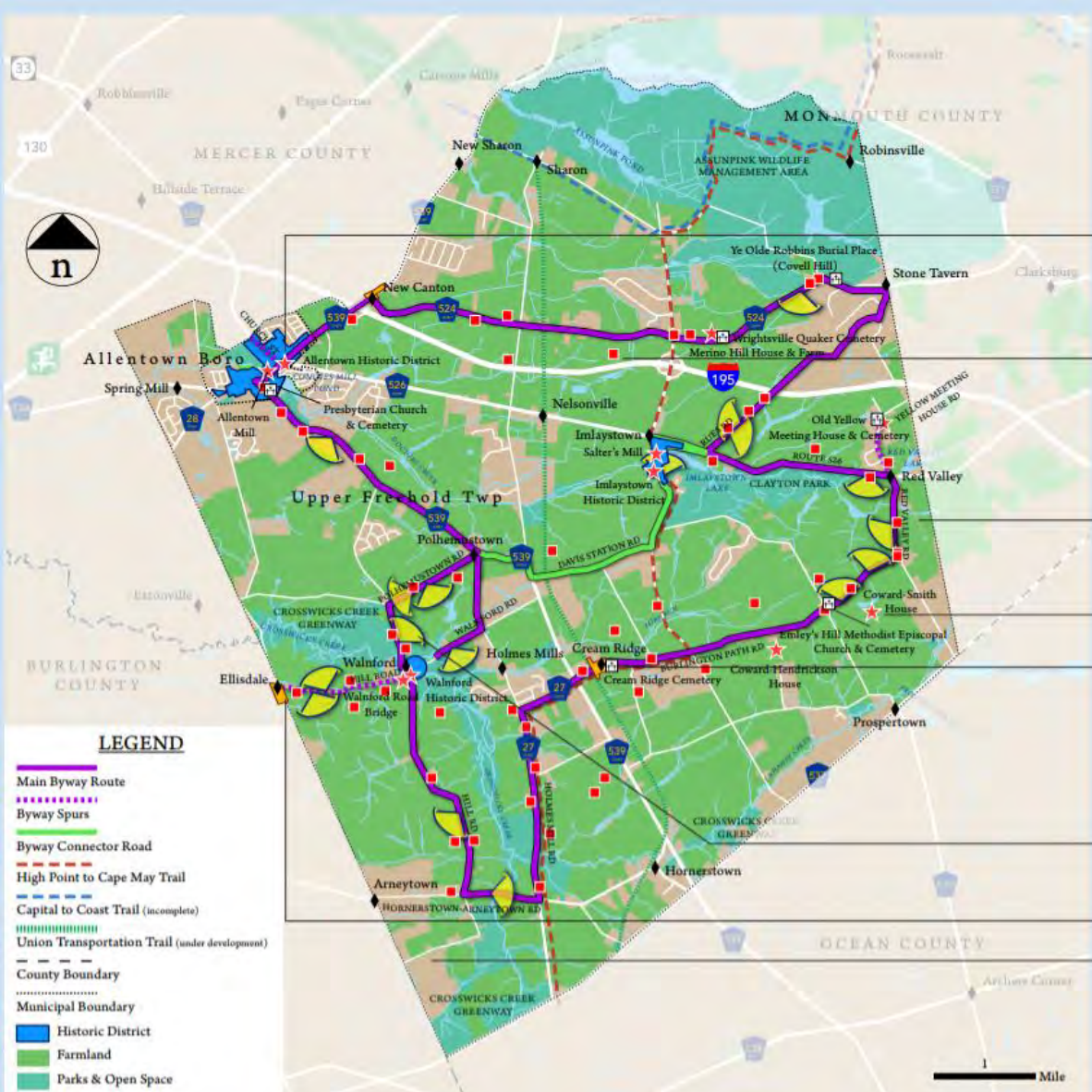
# BYWAY STORY-LINE



# UPPER FREEHOLD HISTORIC FARMLAND BYWAY – CMP

## Upper Freehold Historic Farmland Byway Corridor Characteristics Map

This map illustrates the wealth of intrinsic qualities along the byway including the historic sites and districts listed on the National Register of Historic Places.



Listed historic districts, New Jersey and National Registers of Historic Places (light blue) ▶



Potential historic farmhouses/farmsteads (red squares) ▶



National Historic Register sites (red stars) ▶

Cemeteries (white squares) ▶



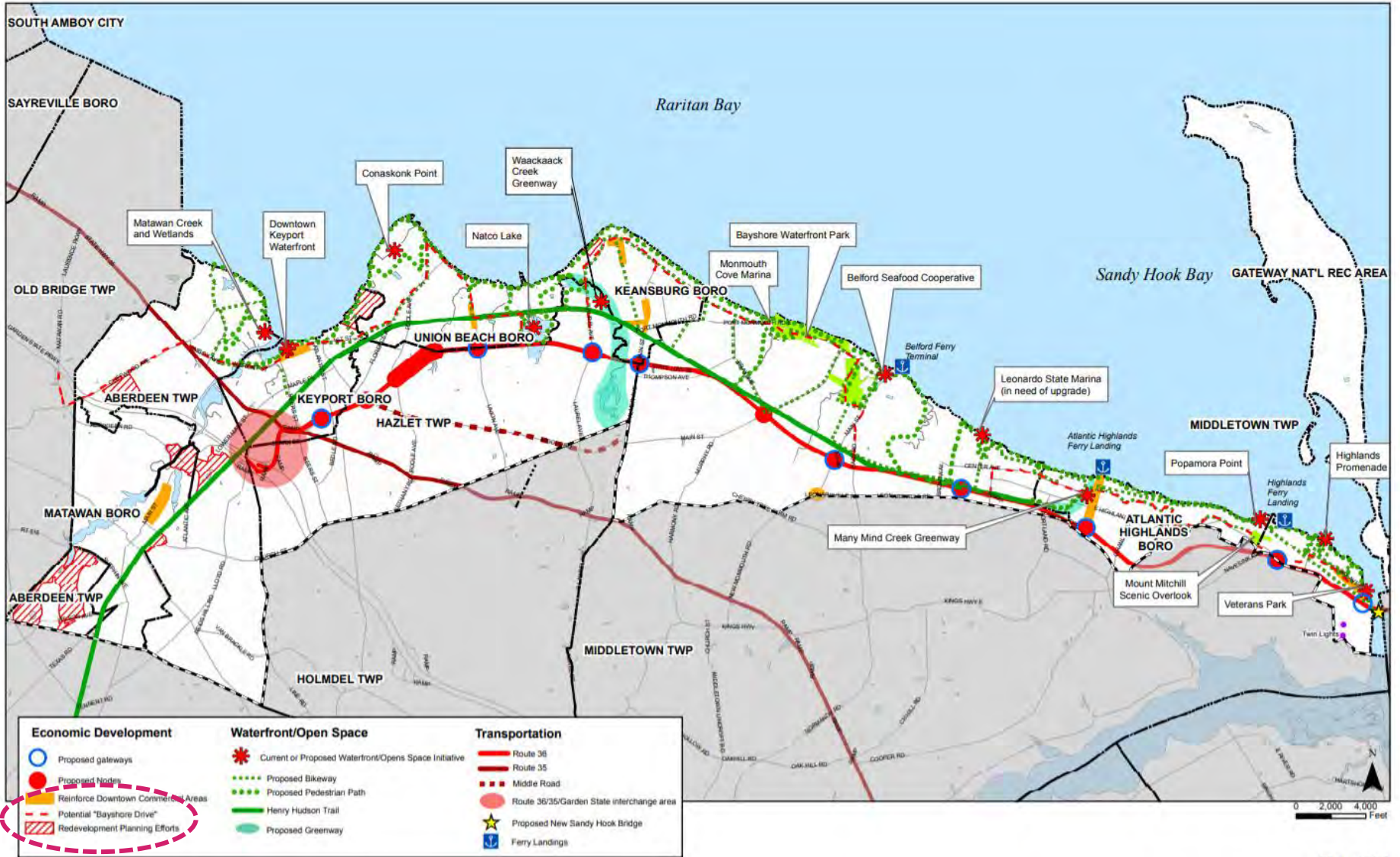
Rural scenic views (yellow cones) ▶

Potential historic streetscapes (orange) ▶

Unprotected lands (beige) ▶



# BAYSHORE REGION PLAN (2006)



Bayshore Region Strategic Plan

Figure 7-1  
Summary Map of Recommendations



# WEEKEND IN OLD MONMOUTH (2007)

1



**Burrowes Mansion Museum**  
94 Main Street  
Matawan, NJ 07747

An 18th century half - Georgian house, it originally consisted of an entrance hall, front and back parlors with bedrooms above, and a rear lean - to, which could have served as the kitchen. Subsequently, another period house was joined to the first to give the 5-bay appearance it has today.

In its long history the gambrel - roofed house has served as; an office / residence of a doctor, later dentists; a hotel during the steamboat era; a tea house in the 20th century; and home of prominent local families. Most notable among them were the Brown family, through whom the Borough acquired the mansion, and the Burrowes family, whose household was invaded by Tories in May of 1778.

The Matawan Historic Sites Commission oversees the upkeep of the buildings and grounds, while the Matawan Historical Society maintains the interior furnishings, coordinates exhibits and events, and conducts the tours of the mansion. In essence, the Borough of Matawan maintains the property while the Historical Society manages the museum within.

**Features, events and activities** This museum serves as the meeting place of the Matawan Historical Society, which meets at 7:30 pm on the fourth Monday of each month from March through June, and September through December. Guest speakers are regularly featured. Programs include, but not limited to, period re-enactments, book signings, slide presentations and demonstrations of period interest. Exhibits within the museum highlight local industry, business, textiles, and fashions. Events include Matawan Day, Memorial Day Parade, the ever-popular Christmas Musicale, annual Christmas Holiday dinner, participation in all Borough sponsored activities, and much more.

**Tour Change:** To go directly to bayshore Sites 6-8, reverse directions on Main Street, follow signs for Route 35, take south to Route 36 intersection, take Route 36 east to Atlantic Highlands, taking jug-handle turn to cross highway at First Avenue. Follow directions to Site 7.

**Web Site:** [www.matawanborough.com](http://www.matawanborough.com)

**Contact:** Robert Montfort, *President of Society*, phone 732-742-7735, e-mail [rwmontfort@aol.com](mailto:rwmontfort@aol.com)

**Regular Public Hours:** 2 - 4 pm on the 1<sup>st</sup> & 3<sup>rd</sup> Sundays from March thru December

**Phone:** 732-566-5605

Third Annual

## 2010 Tour Map

Monmouth County Historical Commission

Sponsored by the Monmouth County Board of Chosen Freeholders

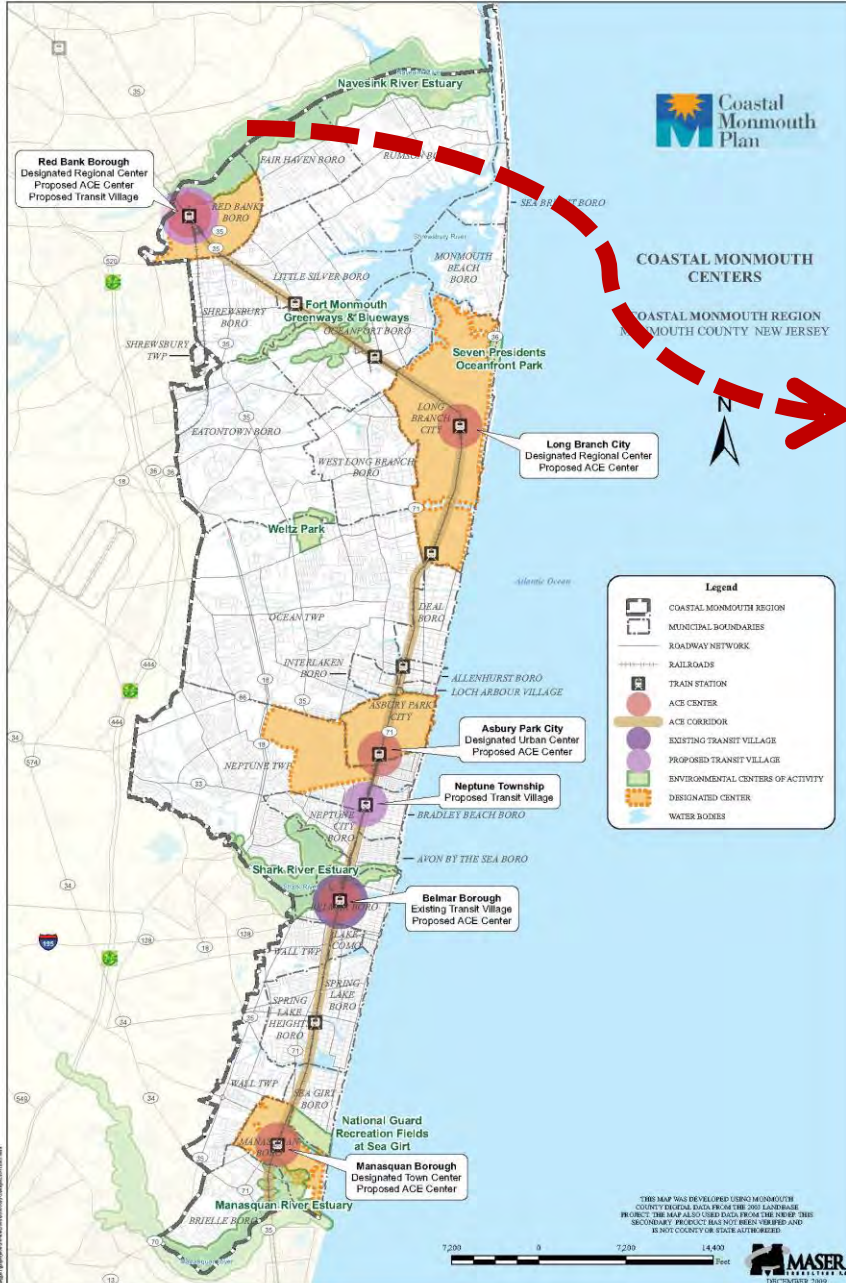
**Longstreet Farm**

**2** Tour Site name and location

Tour Site number corresponds with directions on the back of this Map and also the accompanying Booklet.



# COASTAL MONMOUTH PLAN (2010)



## Arts, Cultural and Entertainment (ACE) Nodes Coastal Monmouth Region - Monmouth County, New Jersey

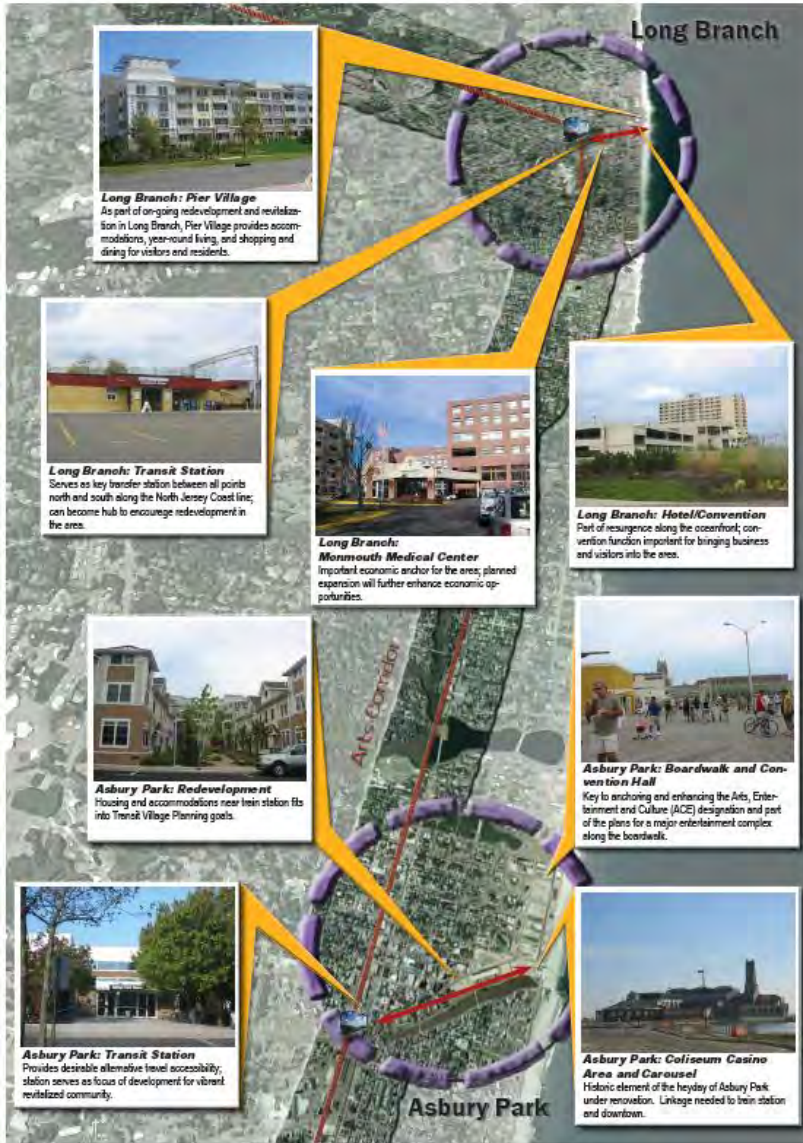
Red Bank

MAP II-4





# COASTAL MONMOUTH PLAN (2010)



Arts, Cultural and Entertainment (ACE) Nodes  
Coastal Monmouth Region - Monmouth County, New Jersey

Long Branch to Asbury Park



Arts, Cultural and Entertainment (ACE) Nodes  
Coastal Monmouth Region - Monmouth County, New Jersey

Belmar to Manasquan



# MoCo ARTS CORRIDOR PARTNERSHIP (2011)

- Regional Arts Corridor as recommended in the Coastal Monmouth Plan
- Tasked with “leveraging the economic power the arts to benefit the entire community”
- Rebranding Coastal Monmouth not just as a shore destination, but a destination for the arts to both visitors and residents
- Encourage local governments, businesses, and others to become partners
- Present and showcase “Stories of the Corridor”
- Begin a marketing campaign highlighting the benefits of cultural-business partnerships
- A more resilient year round “shore” economy and to attract new business investments into the County
- MOCO Subcommittee of





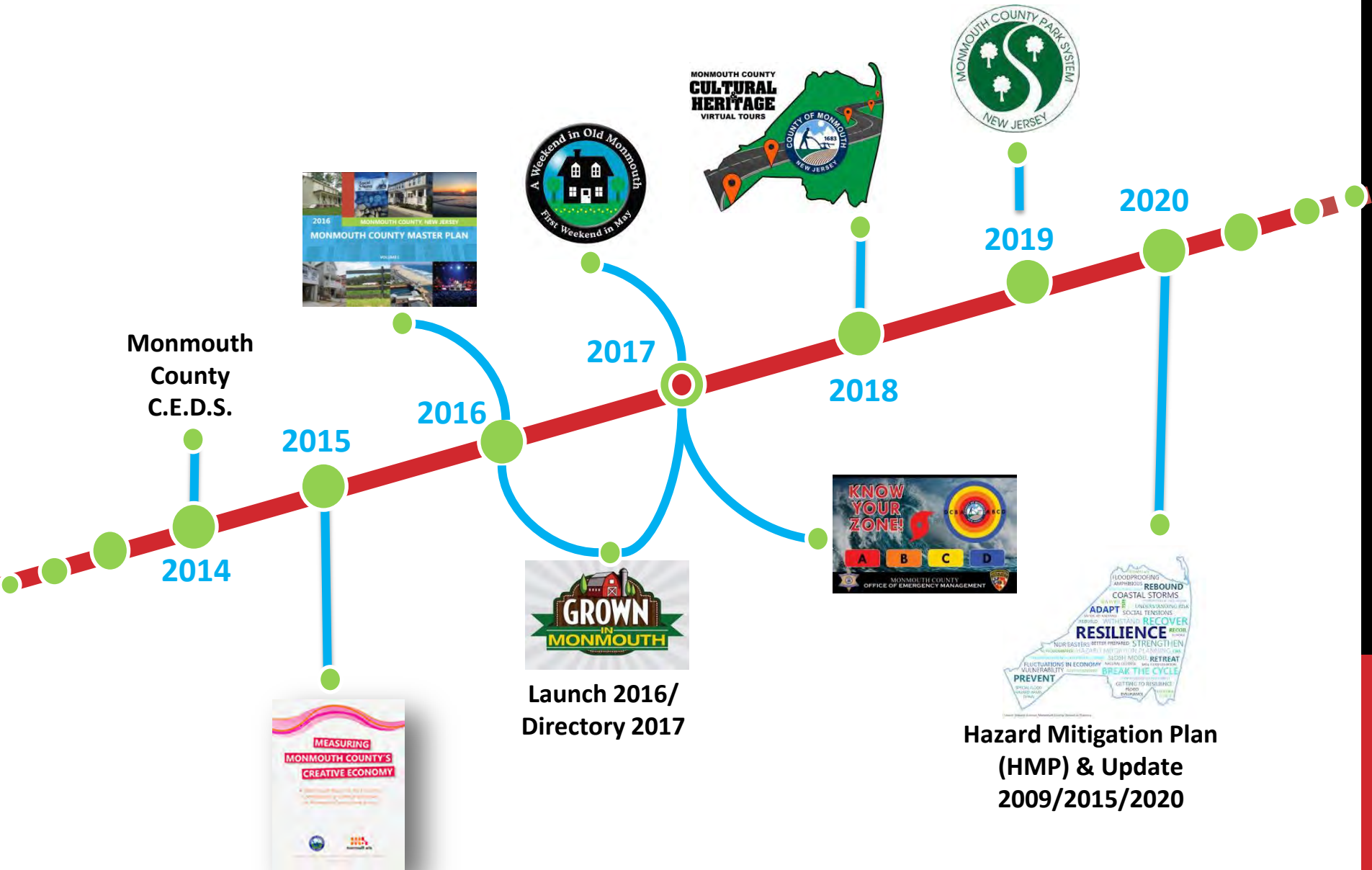
# COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY (C.E.D.S) 2014



USEDA Study to address losses from Telecommunications, Fort Monmouth, Post-Sandy

- Agricultural Industries
  - **Support Grown in Monmouth Branding**
  - **Address seasonal limitations** by expanding growing season and farm visitation (agritourism)
- Visitation and Related Industries
  - **Diverse cultural scene with arts and music**, good fit for attracting and retaining younger populations, creative people
  - **Continue to support MoCo Arts Partnership and promote eastern towns as a unified arts destination**
  - Support development activity in the coastal area that **extend year-round interest.**

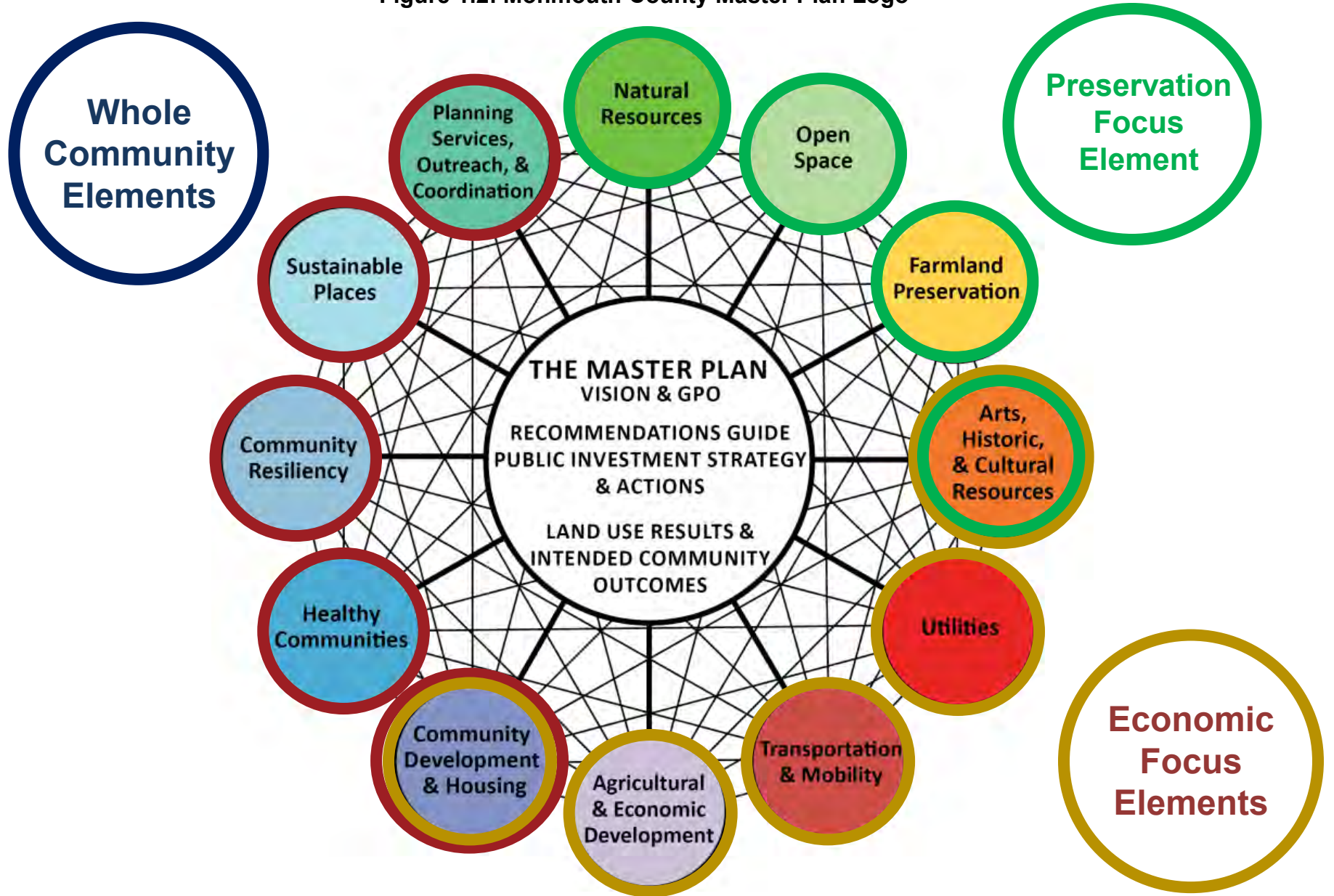
# BYWAY STORY-LINE





# MONMOUTH COUNTY MASTER PLAN (2016)

Figure 1.2: Monmouth County Master Plan Logo



**Master Plan Elements**



"Learn how to see. Realize that everything connects to everything else."

Leonardo da Vinci



# MASTER PLAN

## AHC RESOURCES RECOMMENDATIONS

**Recommendation 6.1:** Develop a county-based scenic byway system that provides interconnectivity of our arts, cultural, and historic assets.

**Recommendation 6.2:** Develop a geographic information system (GIS)-based, online mapping resource for the Monmouth County Park System's (MCPS) existing Monmouth County Historic Sites Inventory (HSI).

**Recommendation 6.3:** Continue to provide technical and professional support as a member of the MoCo Partnership and expand the concept to western Monmouth.

**Recommendation 6.4:** Incorporate the Monmouth Arts' cultural arts plan *Imagine, Envision, Create (2012)* as a component of the *Monmouth County Master Plan*.

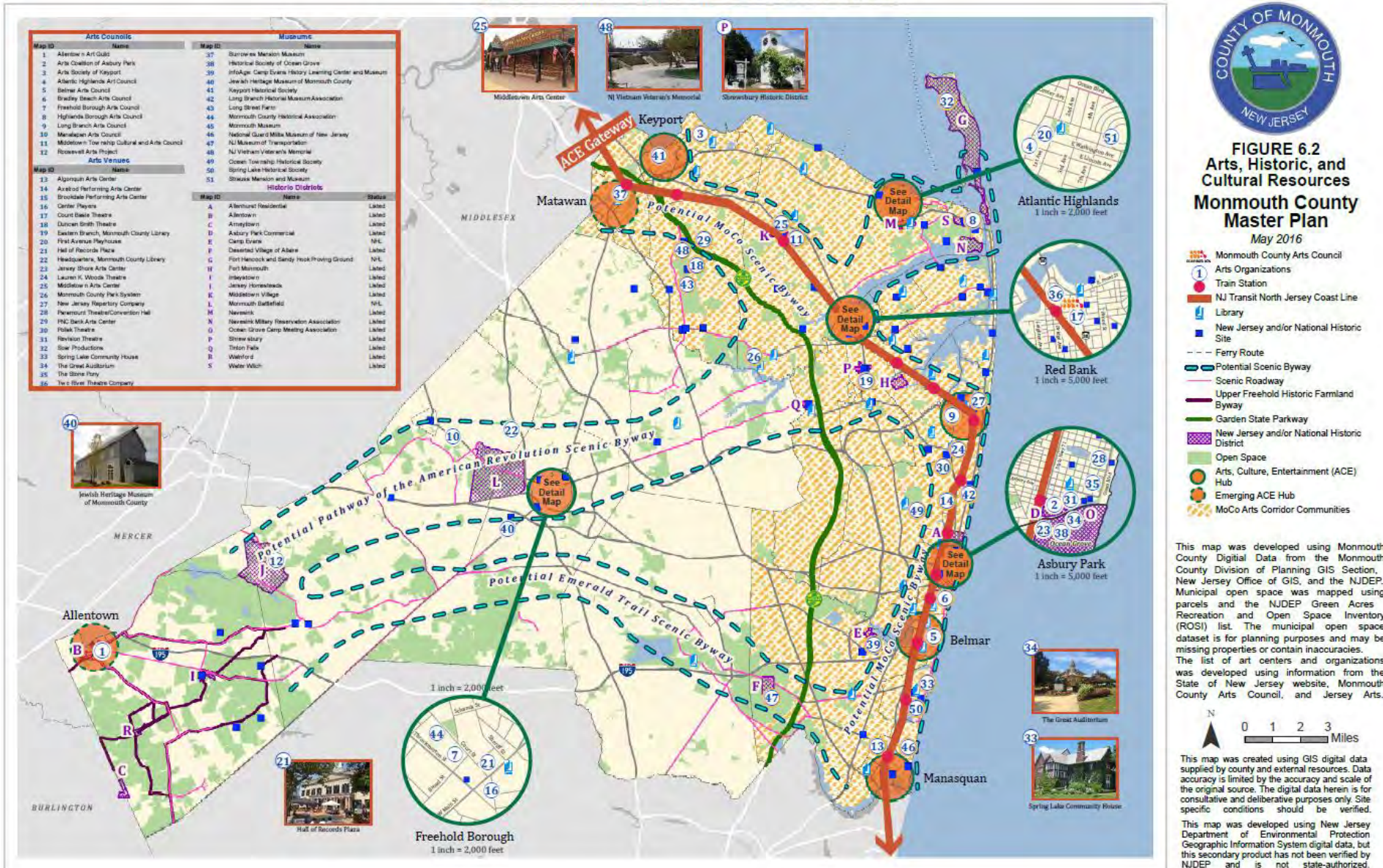
**Recommendation 6.5:** Respond to requests from our municipal partners for professional and technical assistance in creating cultural asset inventories and in the development of cultural and creative placemaking plans.





# ARTS, HISTORIC, & CULTURAL RESOURCES MAP (2016)

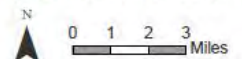
Figure 6.2: Arts, Historic, and Cultural Resources Map, 2016



**FIGURE 6.2**  
Arts, Historic, and Cultural Resources  
Monmouth County  
Master Plan  
May 2016

- Monmouth County Arts Council
- Arts Organizations
- Train Station
- NJ Transit North Jersey Coast Line
- Library
- New Jersey and/or National Historic Site
- Ferry Route
- Potential Scenic Byway
- Scenic Roadway
- Upper Freehold Historic Farmland Byway
- Garden State Parkway
- New Jersey and/or National Historic District
- Open Space
- Arts, Culture, Entertainment (ACE) Hub
- Emerging ACE Hub
- MoCo Arts Corridor Communities

This map was developed using Monmouth County Digital Data from the Monmouth County Division of Planning GIS Section, New Jersey Office of GIS, and the NJDEP. Municipal open space was mapped using parcels and the NJDEP Green Acres Recreation and Open Space Inventory (ROSI) list. The municipal open space dataset is for planning purposes and may be missing properties or contain inaccuracies. The list of art centers and organizations was developed using information from the State of New Jersey website, Monmouth County Arts Council, and Jersey Arts.



This map was created using GIS digital data supplied by county and external resources. Data accuracy is limited by the accuracy and scale of the original source. The digital data herein is for consultative and deliberative purposes only. Site specific conditions should be verified.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.



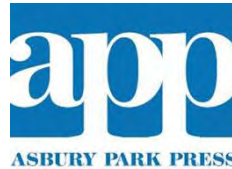
# CULTURAL & HERITAGE BYWAYS INTRINSIC QUALITIES



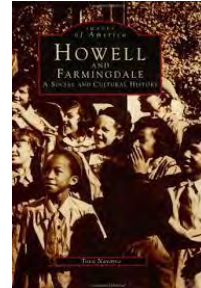
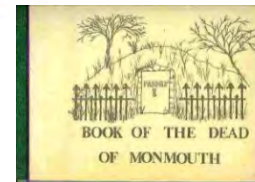
THE MONMOUTH COUNTY  
SCENIC ROADWAY PLAN



Monmouth County Planning Board



MONMOUTH COUNTY  
HISTORICAL ASSOCIATION



## COUNTY HERITAGE AND CULTURAL BYWAYS:

- ART
- BURIAL SITES & CEMETERIES
- CEREMONIAL PLACES
- CIVIC INSTITUTIONS
- COMMEMORATIVE SITES
- CROSSROADS/NODES/DOWNTOWNS
- CULTURAL SIGNIFICANCE
- DARK HISTORY
- EDUCATIONAL FACILITIES
- ENVIRONMENTAL FEATURES
- MEMORIAL REMEBERANCES
- MILITARY
- MYTH, LORE, & LEGEND
- NEIGHBORHOODS
- POP CULTURE
- POLITICAL BOUNDARIES
- UNIQUE OR UNUSUAL SITES
- SCIENCE & TECHNOLOGY

# BRANDING BYWAYS

**Recommendation 6.1:** Develop a county-based scenic byway system that provides interconnectivity of our arts, cultural, and historic assets.

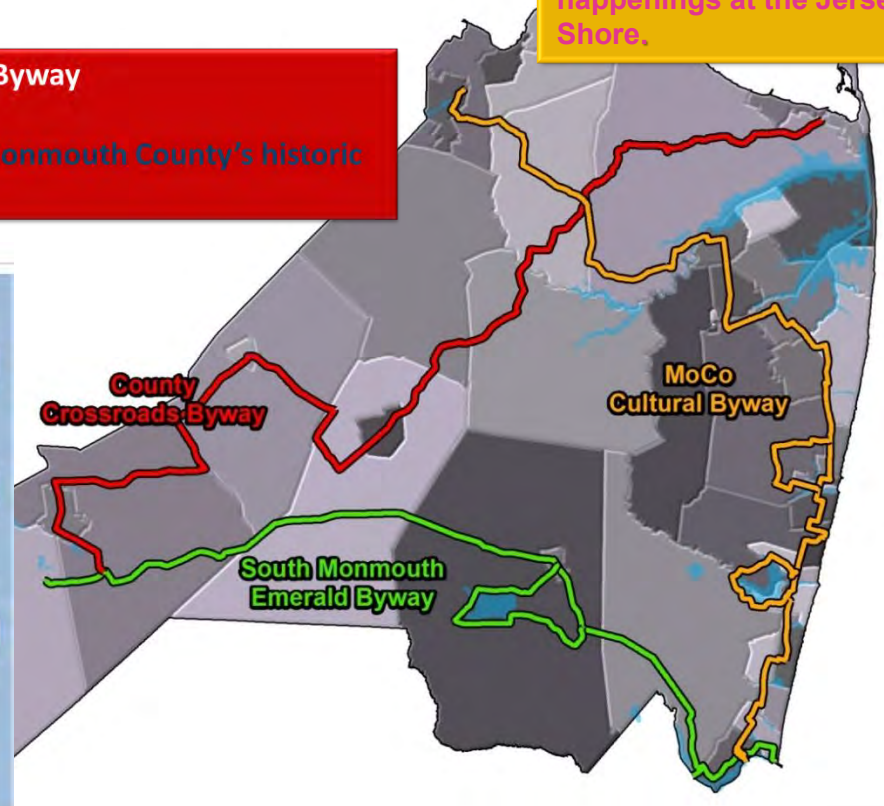
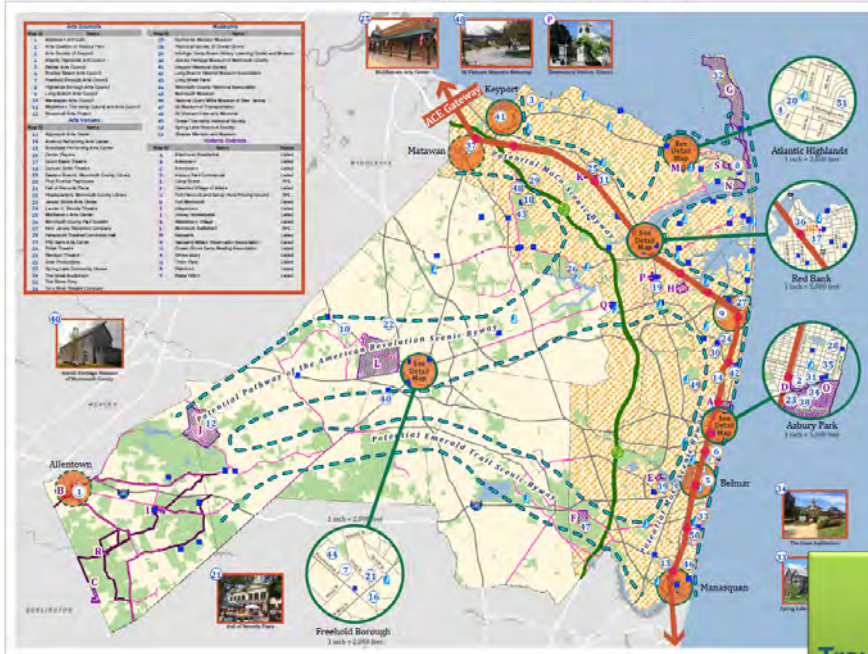
## Historic Crossroads Byway

Journey through American history along Monmouth County's historic crossroads.

## MoCo Cultural Byway

Discover the best cultural happenings at the Jersey Shore.

Figure 6.2: Arts, Historic, and Cultural Resources Map, 2016






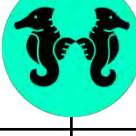
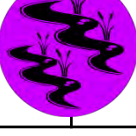


## Emerald Trail Byway

Travel a green passage that links our parks and open space along the Manasquan River Greenway

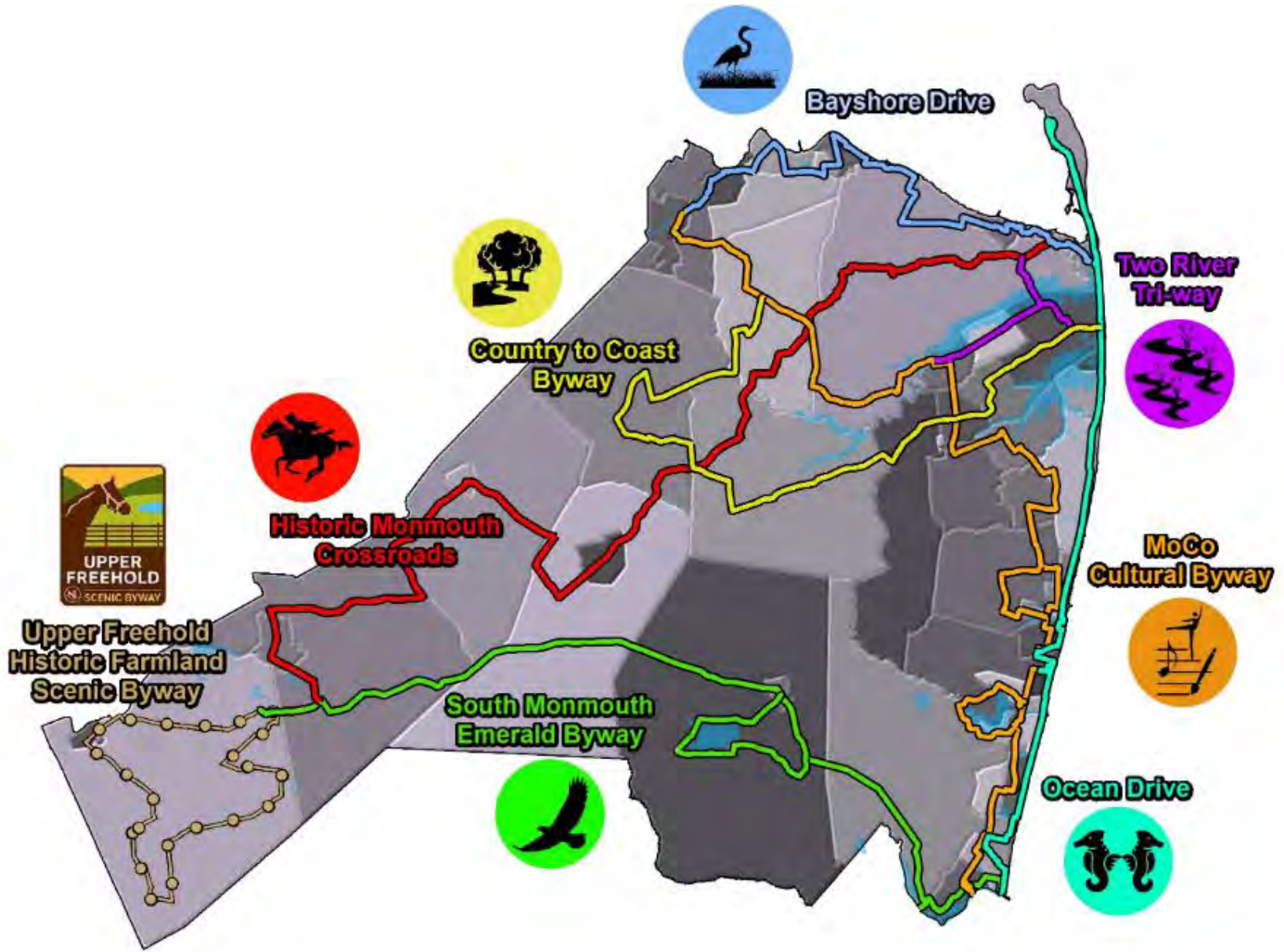


# BRANDING BYWAYS

Name	Concept Themes	Logo	Colors
<b>South Monmouth Emerald Byway</b> (Master Plan -2016)	Greenway, parks, wetlands, open space, forest, river and stream corridors	Eagle Soaring 	Emerald Green
<b>Historic Crossroads Byway</b> (Master Plan -2016)	History, revolutionary war, Battle of Monmouth, British relocation route, Colonial settlements/crossroads	Colonial Horseman 	Red
<b>MoCo Cultural Byway</b> (Coastal Monmouth Plan-2010) (Master Plan-2016)	Arts, culture, music, restaurants/bars, downtowns, shore towns, coastal lakes	Arts Images 	Orange
<b>Bayshore Drive</b> (Bayshore Plan-2006)	Small towns and downtowns, bay front, wetlands, sand dunes, alternative to highways, to Parkway/Train to Sandy Hook	Egret w Marsh plants 	Blue
<b>Country to Coast</b>	Horse farms, country roads, street trees & fruit orchards, historic farmsteads, county parks, streams, various historic eras	Apple Orchards 	Gold
<b>Ocean Drive</b> (Coastal Monmouth Plan-2010)	Coastline, boardwalk, ocean, beach, fishing, boats, bicycles, recreation, vacation, weekend getaway, marine life	Sea Horse 	Turquoise/Aqua
<b>Two River Tri-way</b>	Navesink River, Navesink Highlands, Shrewsbury River, Oceanic Bridge, Archetypical American towns,	Two Rivers 	Violet

“Created my free logo at LogoMakr.com”




# BYWAY CONCEPT EXPANDED





# CULTURAL & HERITAGE VIRTUAL TOURS STORY MAP

## Monmouth County's Cultural & Heritage Virtual Tours

Monmouth County, NJ   

Explore Monmouth County's cultural, environmental, & historic heritage through a Virtual Tour. Seven Virtual Tours are currently available to explore, covering almost every corner of Monmouth County.



Monmouth County's Virtual Tours

South Monmouth Emerald Byway

Historic Monmouth Crossroads

MOCO Cultural Byway

Bayshore Drive

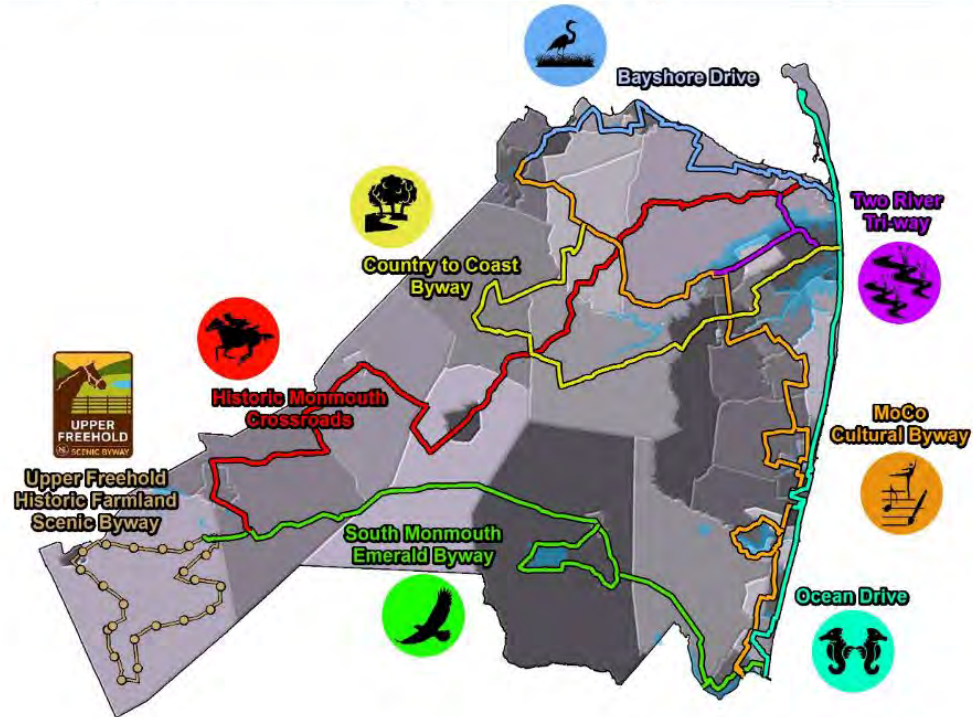
Two River Tri-way



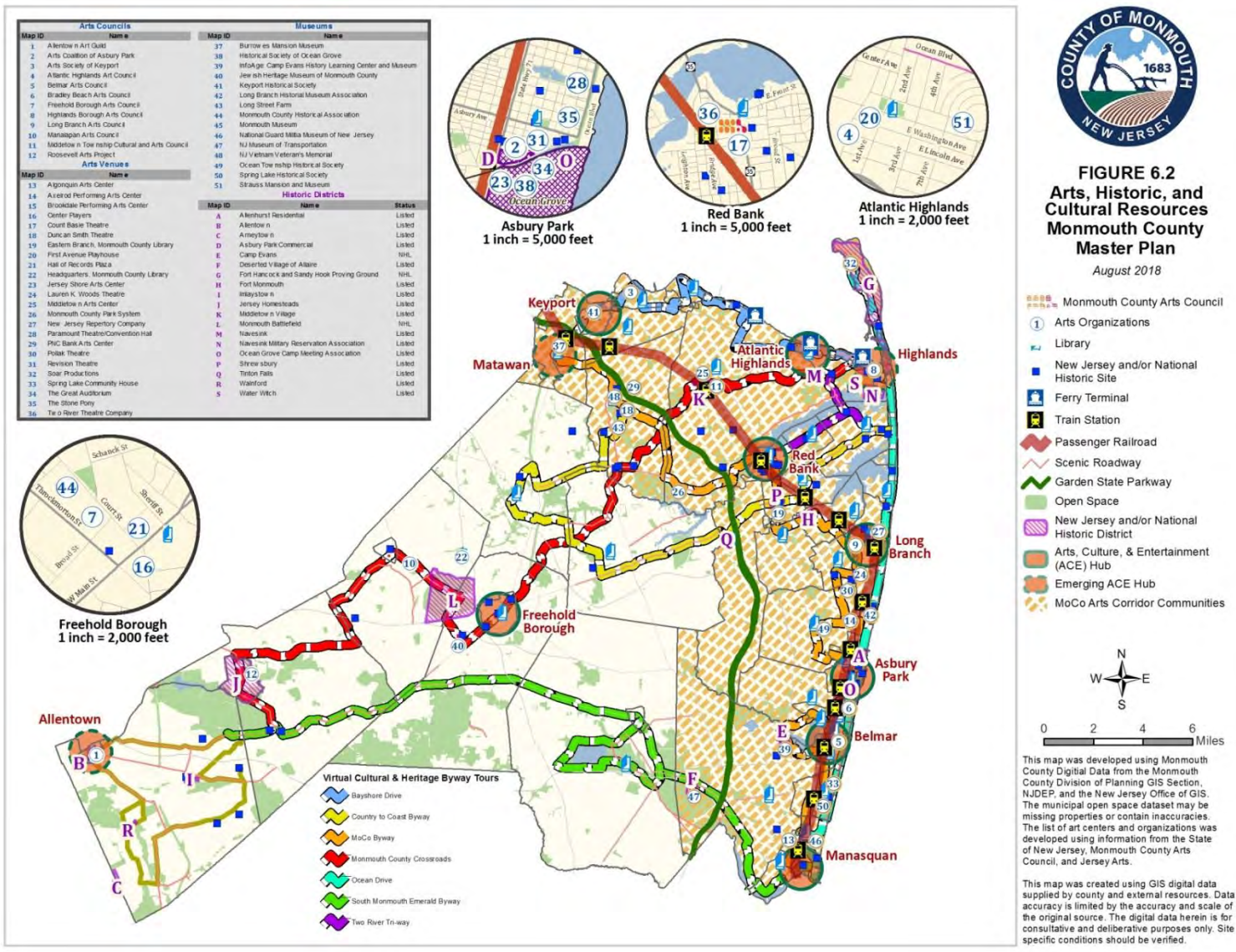
The 2016 Monmouth County Master Plan recommends providing a county-based network of interconnected historic, cultural, and arts assets modeled similarly to state and federal scenic byway programs. Rather than provide physical routes for travelers to follow throughout the County, the Monmouth County Division of Planning is developing a series of virtual cultural and heritage tours that users can enjoy and explore online. This approach permits more flexibility in route selection allowing planners to greatly expand the number and type of highlighted points-of-interest along each route.



The Cultural & Heritage Virtual Tours program is intended to elevate the public's awareness about the many natural, cultural, historic, scenic, architectural, institutional, and commemorative sites that are an irreplaceable component of our enhanced quality-of-life here in Monmouth County. These sites support our tourist industry attracting visitors from all over the state, if not the world. As such, they should be recognized as community assets that help convey the story of our cumulative experience. The Cultural & Heritage Virtual



# ARTS, HISTORIC, & CULTURAL RESOURCES MAP (2018)



**FIGURE 6.2**  
**Arts, Historic, and Cultural Resources Monmouth County Master Plan**  
 August 2018

This map was developed using Monmouth County Digital Data from the Monmouth County Division of Planning GIS Section, NJDEP, and the New Jersey Office of GIS. The municipal open space dataset may be missing properties or contain inaccuracies. The list of art centers and organizations was developed using information from the State of New Jersey, Monmouth County Arts Council, and Jersey Arts.

This map was created using GIS digital data supplied by county and external resources. Data accuracy is limited by the accuracy and scale of the original source. The digital data herein is for consultative and deliberative purposes only. Site specific conditions should be verified.



# OTHER MONMOUTH COUNTY STORY MAPS

## A Weekend in Old Monmouth (May 5 & 6, 2018)


Monmouth County, New Jersey

Welcome to Monmouth County History

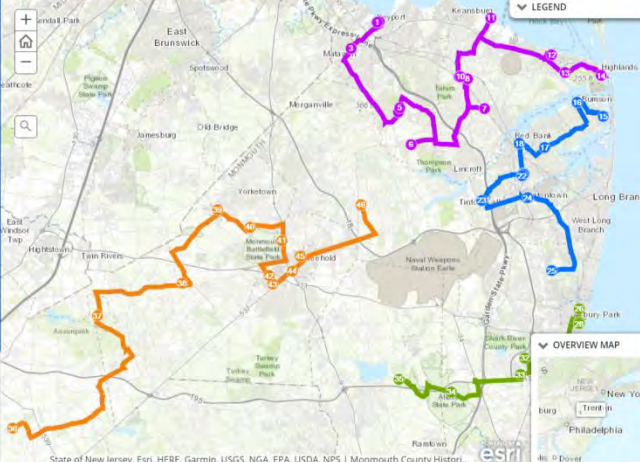
PURPLE (BAYSHORE) ROUTE | BLUE (TWIN RIVERS) ROUTE | GREEN (SEASHORE) ROUTE | ORANGE (WESTERN) ROUTE

The Monmouth County Board of Chosen Freeholders and the Historical Commission welcome you to the Eleventh Annual Weekend in Old Monmouth self-guided tour of historic sites. The 2018 tour includes 46 sites organized into four segments:

- Bayshore or Purple Tour, sites 1 - 14
- Two Rivers or Blue Tour, sites 15 - 25
- Seashore or Green Tour, sites 26 - 35
- Western or Orange Tour, sites 36 - 46



Experience indicates that some tour followers attempt to visit as many sites as possible while others opt for a small number, often those close to home. Regarding organization, the tour places some widely separated sites in a semblance of order. Conversely, other sites are located close together.

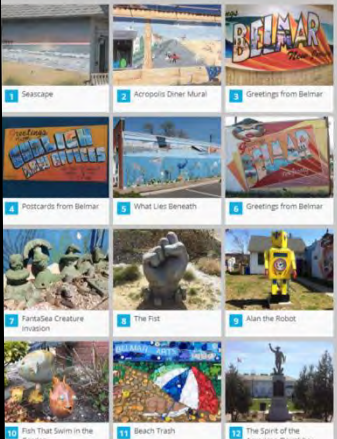
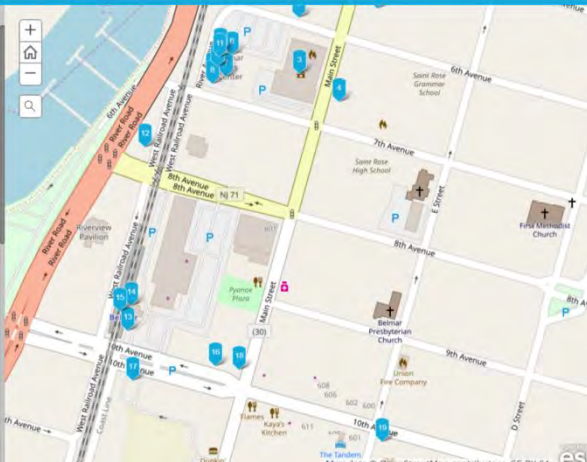


State of New Jersey, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | Monmouth County History

## Monmouth Arts - Belmar Public Art Tour

Monmouth County, New Jersey

Explore the MoCo Arts Corridor within an interactive web-based tour.

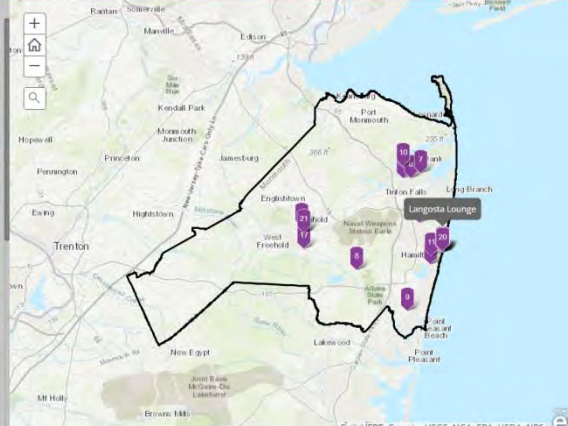
1 Seascape  
2 Acropolis Diner Mural  
3 Greetings from Belmar  
4 Postcards from Belmar  
5 What Lies Beneath  
6 Greetings from Belmar  
7 FantaSea Creature Invasion  
8 The First  
9 Alan the Robot  
10 Fish That Swim in the Garden  
11 Beach Trash  
12 The Spirit of the American Doughboy

Map data © OpenStreetMap contributors, CC-BY-SA, esri

## GROWN IN MONMOUTH DIRECTORIES

Monmouth County, New Jersey

Restaurants | Fall Fun Activities | Farmers Markets | Wineries/Breweries | Pick Your Own | Community Gardens | Distributors

Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS



## High Water Mark Initiative - Remembering Irene & Sandy

Monmouth County, New Jersey

### Introduction

Use the "buttons" on the left or scroll down to learn more.

The High Water Mark (HWM) Initiative, a component of the National Flood Insurance Program (NFIP), aims to increase local communities' awareness of flood risk and encourage risk mitigation actions. The HWM Initiative uses signs on public and private buildings to show the high water mark from past flooding events, like Hurricane Irene in 2011 and Superstorm Sandy in 2012.



# DETERMINING FLOOD HAZARD RISK

## AHC RESOURCES

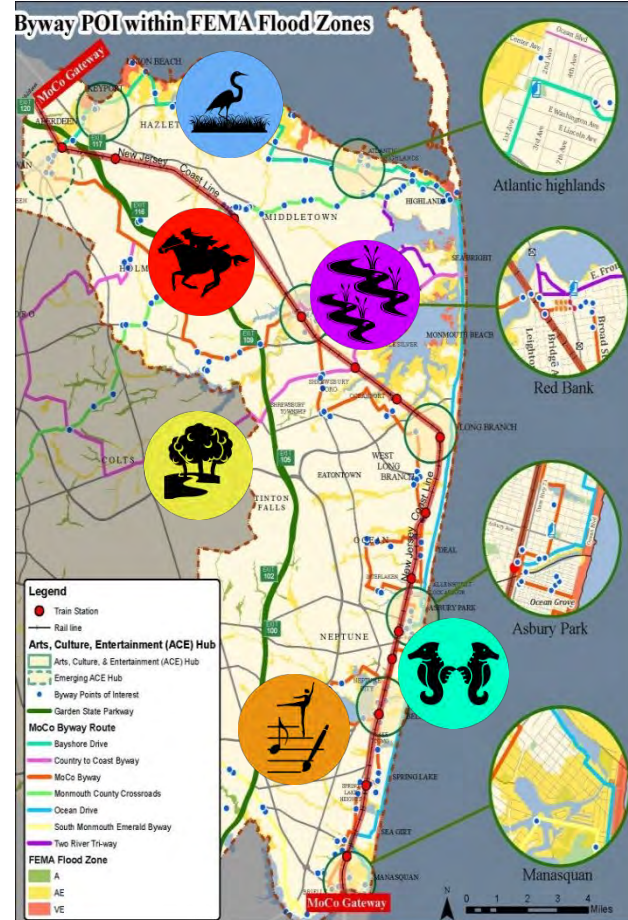
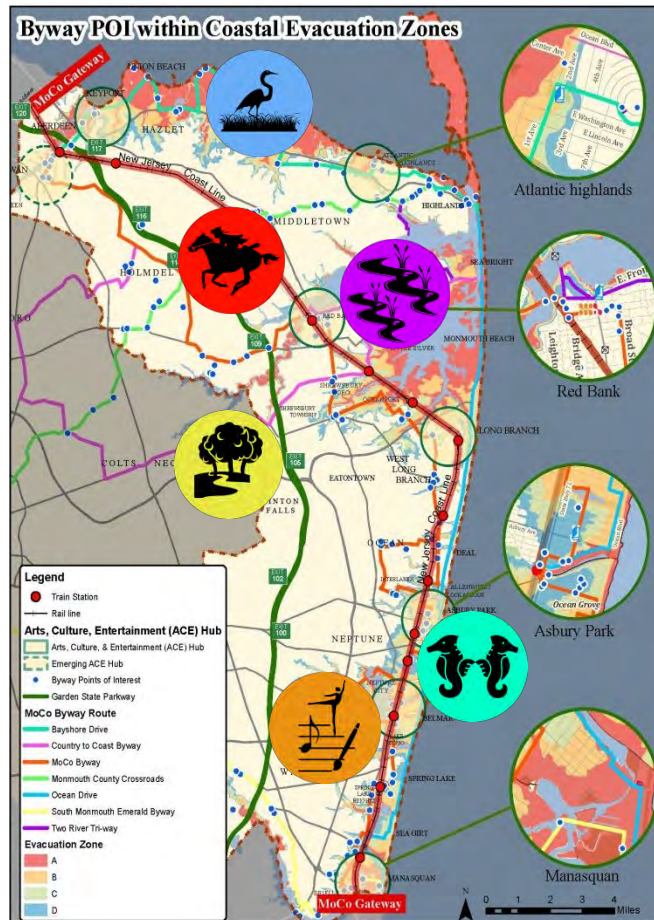
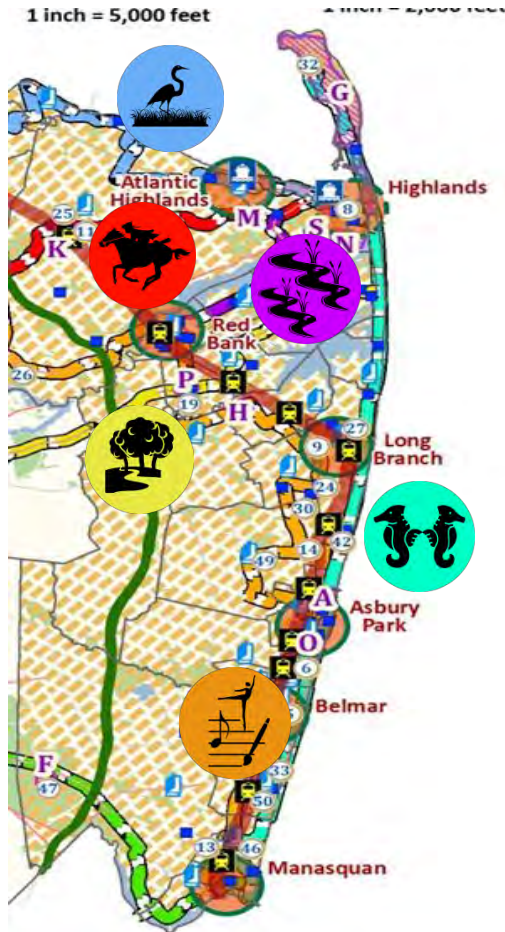
Determining Flood Vulnerability

Include arts and cultural assets and organizations in the mitigation conversation (2018-2021)

### Master Plan AHC Resources

### Know Your Zone

### FEMA FIRMs





# DETERMINING FLOOD HAZARD RISK

## AHC RESOURCES

AHC Resources	Resource Type	MCOEM Evacuation Zone	FEMA Flood Zone	Municipality	Flood Threat
Arts Society of Keyport	Arts Council	A	AE	Union Beach	1-Higher
Fort Hancock Life Saving Station	Historic Site	A	D	Middletown	1-Higher
Highlands Borough Arts Council	Arts Council	A	AE	Highlands	1-Higher
Mayfair Theatre [Demolished]	Historic Site	A	X	Asbury Park	1-Higher
Monmouth Boat Club	Historic Site	A	AE	Red Bank	1-Higher
North Shrewsbury Ice Boat and Yacht Club	Historic Site	A	AE	Red Bank	1-Higher
Palace Amusements Building [Demolished]	Historic Site	A	X	Asbury Park	1-Higher
Saint George's-by-the River Episcopal Church	Historic Site	A	X	Rumson	1-Higher
Sandy Hook Lighthouse	Historic Site	A	D	Middletown	1-Higher
Seabrook-Wilson House (Spy House)	Historic Site	A	AE	Middletown	1-Higher
Soar Productions	Theatre	A	D	Middletown	1 Higher
Squan Beach Life-Saving Station #9	Historic Site	A	AE	Manasquan	1-Higher
St. John's Episcopal Church	Historic Site	A	AE	Little Silver	1-Higher
U.S. Life-Saving Station #4	Historic Site	A	AE	Monmouth Beach	1-Higher
Asbury Park Convention Hall	Historic Site	B	VE	Asbury Park	1-Higher
Major John Burrowes Mansion	Historic Site	B	AE	Matawan	1-Higher
Paramount Theatre/Convention Hall	Arts Venue	B	VE	Asbury Park	1-Higher
Atlantic Highlands Art Council	Arts Council	B	X	Atlantic Highlands	2-Potential
Belmar Arts Council	Arts Council	B	X	Belmar	2-Potential
First Avenue Playhouse	Theatre	B	X	Atlantic Highlands	2-Potential
First Presbyterian Church of Oceanic	Historic Site	B	X	Rumson	2-Potential
George Wurt's Summer Home	Historic Site	B	X	Asbury Park	2-Potential
Gregory Primary School	Historic Site	B	X	Long Branch	2-Potential
North Long Branch School (Primary No. 3; Church Street School)	Historic Site	B	X	Long Branch	2-Potential
Seabright Lawn Tennis & Cricket Club	Historic Site	B	X	Rumson	2-Potential
The Stone Pony	Arts Venue	B	X	Asbury Park	2-Potential
Algonquin Arts Center	Arts Center	C	X	Manasquan	3-Lower
Allenhurst Railroad Station	Historic Site	C	X	Allenhurst	3-Lower
Bowne House	Historic Site	C	X	Middletown	3-Lower
Holy Trinity Episcopal Church	Historic Site	C	X	Spring Lake Boro	3-Lower
Keyport Historical Society	Museum	C	X	Keyport	3-Lower
Lauriston	Historic Site	C	X	Rumson	3-Lower
Little Silver Railroad Station	Historic Site	C	X	Little Silver	3-Lower
Martin Maloney Cottage	Historic Site	C	X	Spring Lake Boro	3-Lower
National Guard Militia Museum of New Jersey	Museum	C	X	Sea Girt	3-Lower

# MOVING FORWARD

- Official Cultural and Heritage Byway Program launch, completed 2018
- Created downloadable maps and POI list, completed 2019
- Work with Public Information & Tourism, 2019
- Municipal outreach & public input to coincide with the spring Tourism launch, 2019
- Park System GIS Inventory of Historic Sites, 2019
- Continue to update and monitor byway tours, January 2020
- Develop local walking tours and public art tours, incorporate into byway story map, 2019 + ongoing as requested
- Include Arts/Historic/Cultural Sites into Monmouth County Hazard Mitigation Plan Update, 2020

