Cape Cod Canal Transportation Study, Fifth Working Group Meeting.

Bourne, Plymouth, Sandwich, Wareham.

Massachusetts Maritime Academy

July 26, 2016 4:00 to 6:00

massDOT
Massachusetts Department of Transportation

Agenda.

- Welcome and Introductions.
- Study Process & Framework.
- Study Framework: Goals and Objectives.
- Future No-Build Traffic Conditions.
- Alternatives Development.
- Schedule/Next Steps.

Welcome and Introductions.

- MassDOT:
  - Ethan Britland – Project Manager.
- US Army Corps of Engineers.
  - Craig Martin, P.E. / Michael Walsh, P.E.
- Study Team:
  - Bill Reed, P.E., Principal in Charge (Stantec).
  - Mike Paiewonsky, AICP- Team Project Manager (Stantec).
  - Ed Hollingshead, AICP – Team Senior Advisor (Stantec).
  - Heather Ostertog, P.E. –Transportation Engineer (Stantec).
  - Sudhir Murthy, P.E., PTOE –Trans. Modeler (TrafInfo).
  - Alison Leflore, AICP – Public Involvement (Cecil Group).

Study Process & Framework.

- Step 1: Goals and Objectives, Evaluation Criteria, and Public Involvement Plan.
- Step 2: Existing Conditions.
- Step 3: Future Conditions, Alternatives Development, and Issues Evaluation.
- Step 4: Alternatives Analysis.
- Step 5: Recommendations

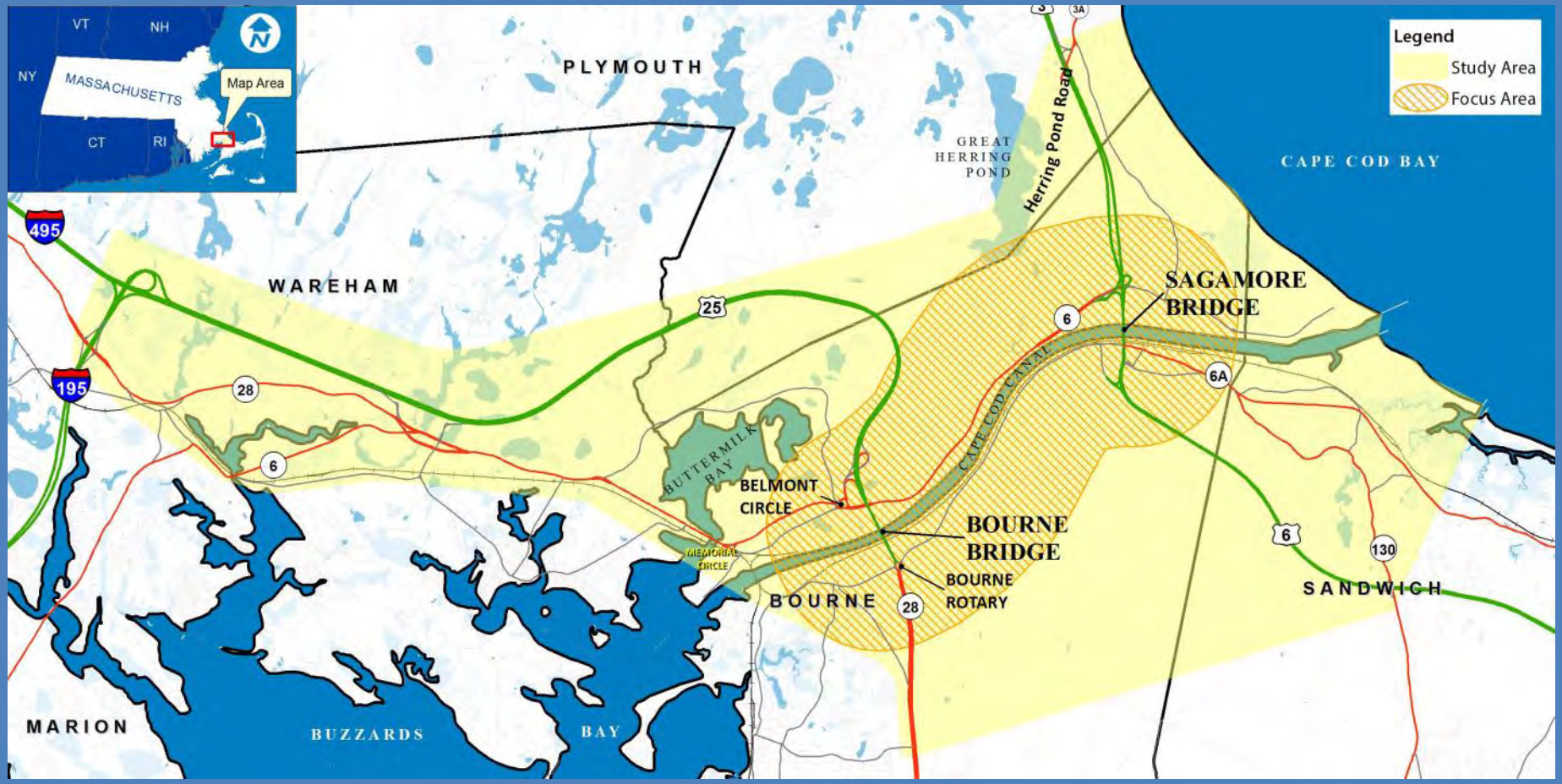
Study Framework: Goals.

- To create/improve multimodal mobility in the Cape Cod Canal area.
- To establish an alternative or replacement crossing of the Cape Cod Canal to address the diminishing quality and reliability of year-round connectivity over the Cape Cod Canal, due to the aging Sagamore and Bourne Bridges.

Study Framework: Objectives.

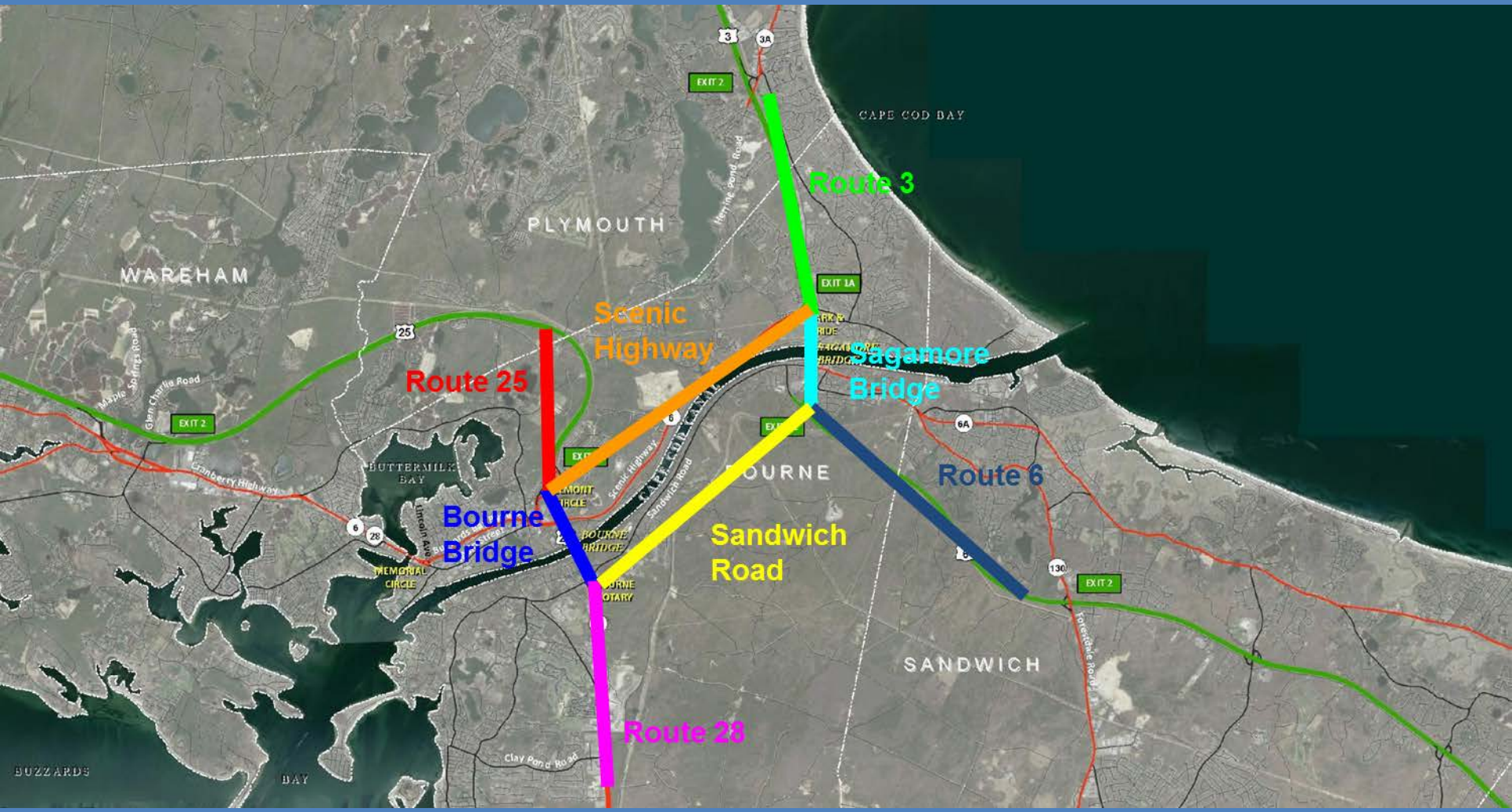
- Create reliable multimodal connectivity and mobility levels such that the quality of life on Cape Cod is not diminished by unreliable connectivity across the Cape Cod Canal.
- Create a reliable multimodal connection across the Cape Cod Canal to maintain/enhance public safety in the event of the need for an emergency evacuation of portions of Cape Cod and to accommodate first responders accessing Cape Cod.
- Ensure that cross canal connectivity does not become a barrier to reliable intra-community connectivity for the Towns of Bourne and Sandwich.

Study Area.


VT
NH
NY
MASSACHUSETTS
Map Area
CT
RI
PLYMOUTH
GREAT HERRING POND
Herring Pond Road
CAPE COD BAY
Legend
Study Area
Focus Area
495
WAREHAM
25
SAGAMORE BRIDGE
6
6A
195
28
6
CAPE COD CANAL
BUTTERMILK BAY
BELMONT CIRCLE
BOURNE BRIDGE
MEMORIAL CIRCLE
BOURNE ROTARY
BOURNE
28
6
130
SANDWICH
MARION
BUZZARDS
BAY

Analysis of Existing Traffic Operations (Brief Review).

Travel Corridors

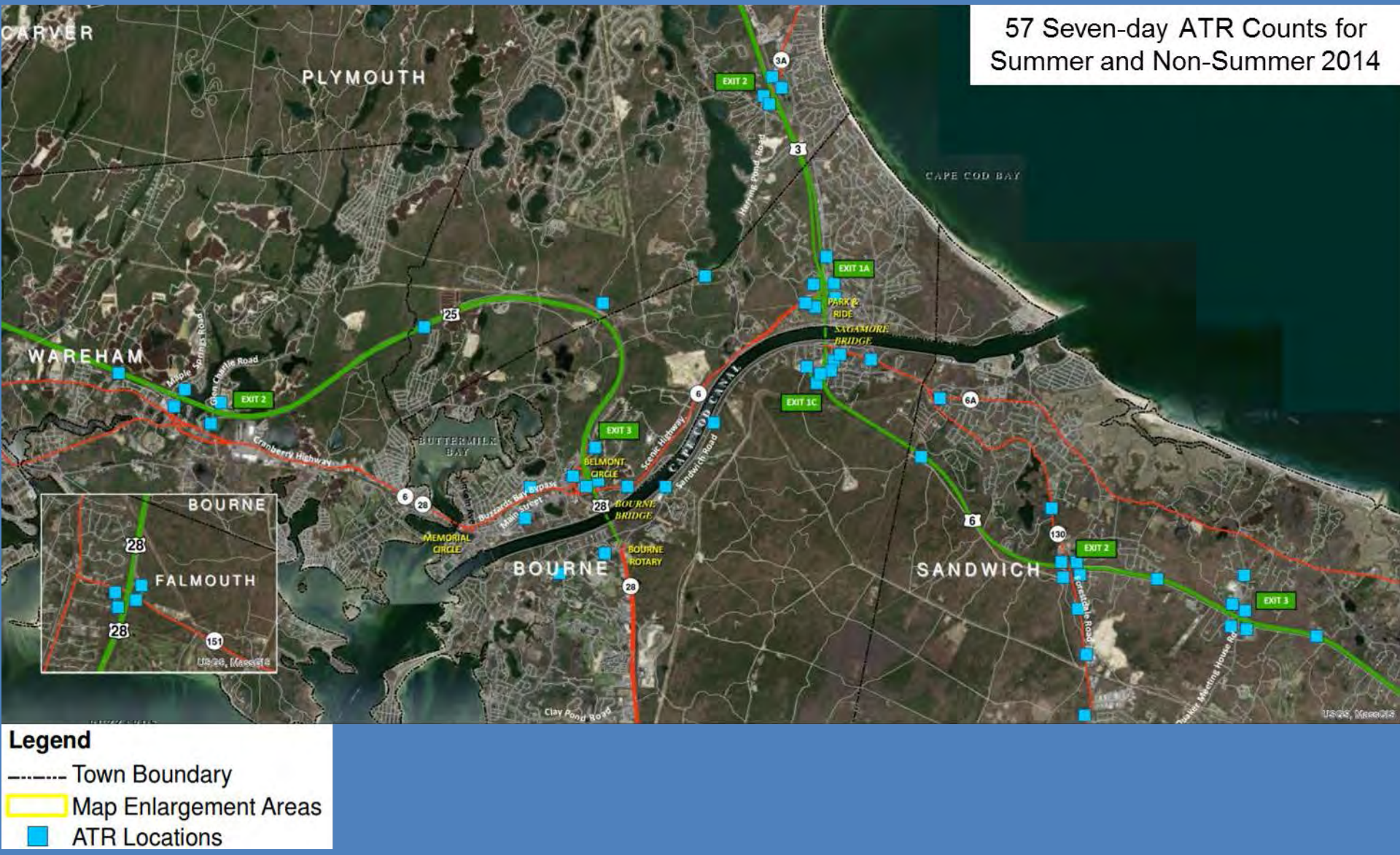


Data Collection Methods

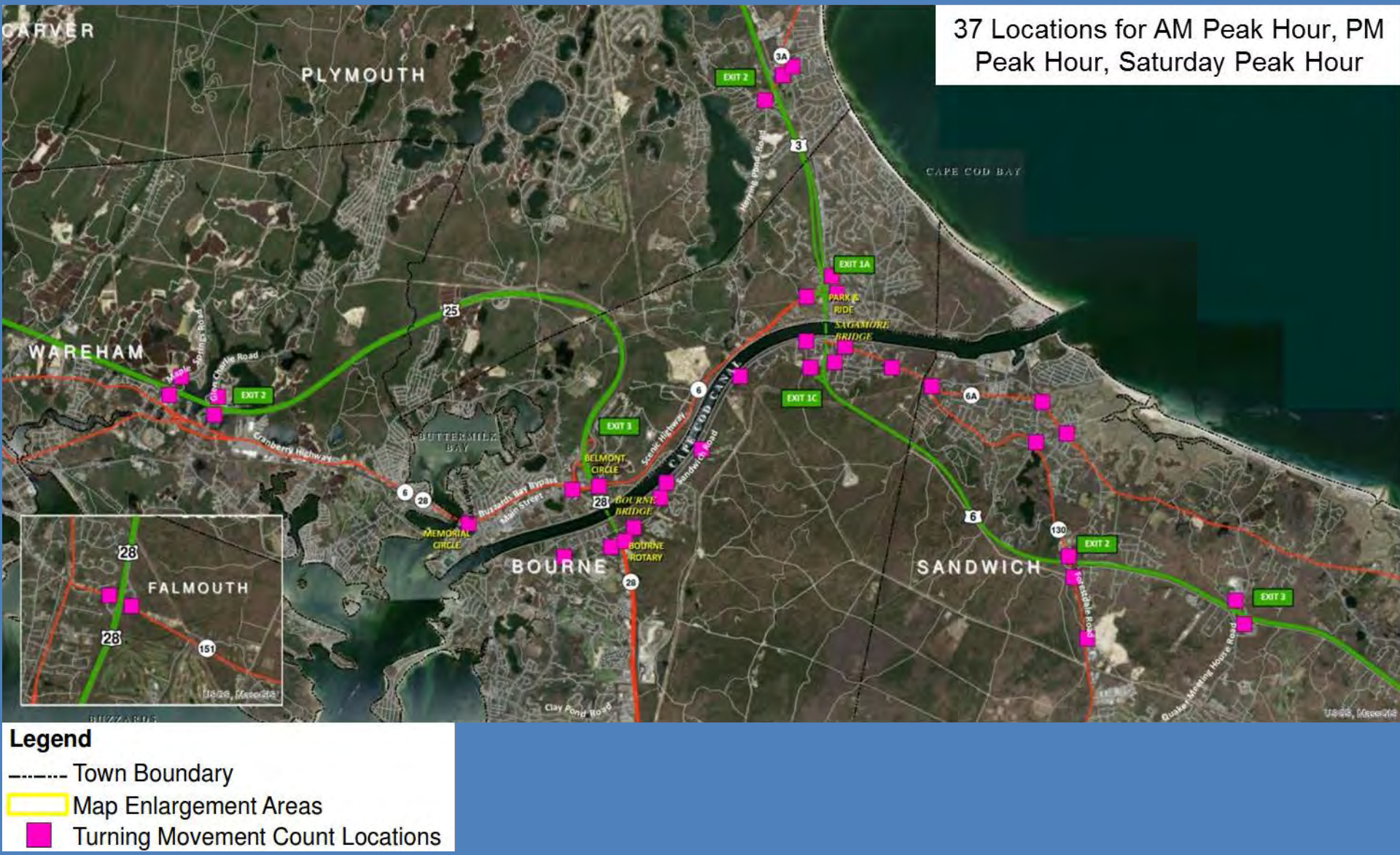
Data Collection Methods

- ATR- Automatic Traffic Recorders – Pneumatic tubes that are placed on the road and count traffic volumes for 24 hours.
- TMC – Turning Movement Counts – Manual counts taken at intersections for the peak period of traffic volumes (weekday 7-9am and 4-6pm. Vacation areas on Saturday 10-12pm.
- BlueTOAD – Used to determine the origin and destination of the vehicles in a study areas using Bluetooth technology.

Automatic Traffic Recorder (ATR) Locations



Turning Movement Count (TMC) Locations



BlueTOAD Locations.

Cape Cod’s Summer vs. Non-Summer Seasons

2014 Summer and Non Summer Daily Traffic Volumes

Scenic Highway	
Summer	38,664
Non-Summer	22,908
Change (%)	51%

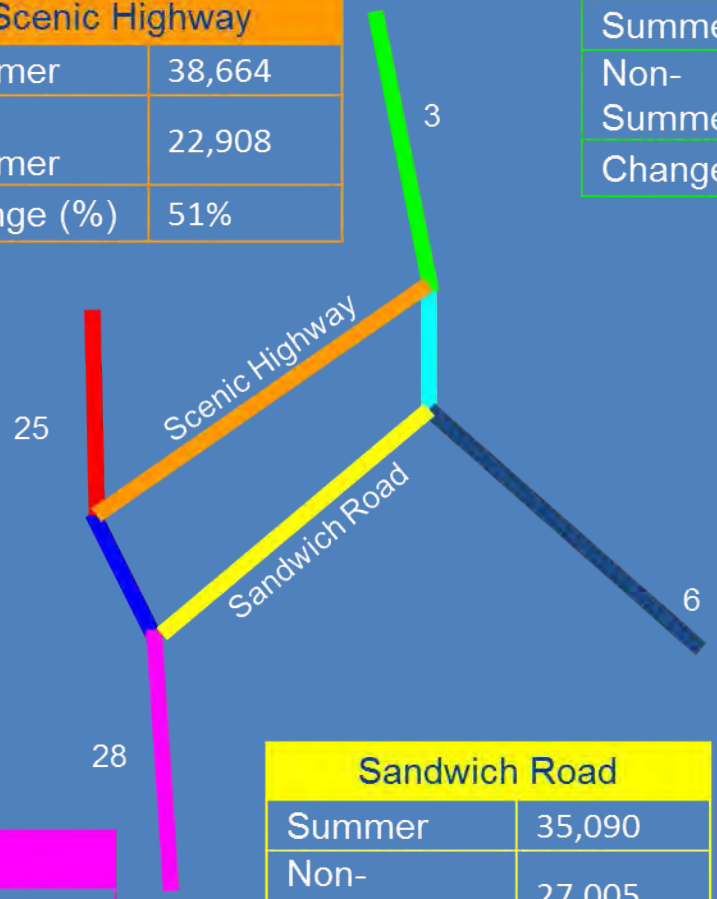
Route 3	
Summer	51,613
Non-Summer	38,848
Change (%)	28%

Route 25	
Summer	67,734
Non-Summer	42,648
Change (%)	45%

Sagamore Bridge	
Summer	73,371
Non-Summer	49,837
Change (%)	38%

Bourne Bridge	
Summer	62,655
Non-Summer	44,794
Change (%)	33%

Route 6	
Summer	78,709
Non-Summer	41,114
Change (%)	63%



Sandwich Road	
Summer	35,090
Non-Summer	27,005
Change (%)	26%

Route 28	
Summer	52,145
Non-Summer	30,000
Change (%)	54%

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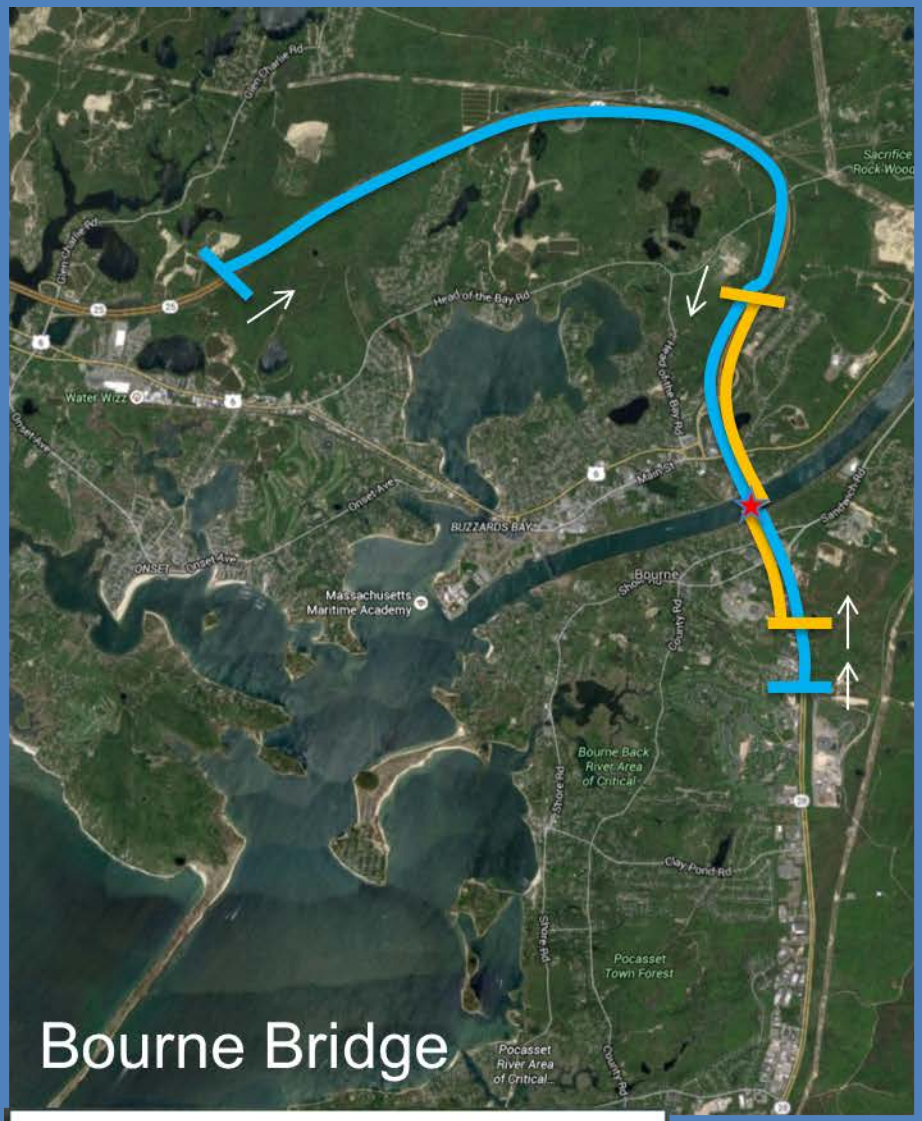
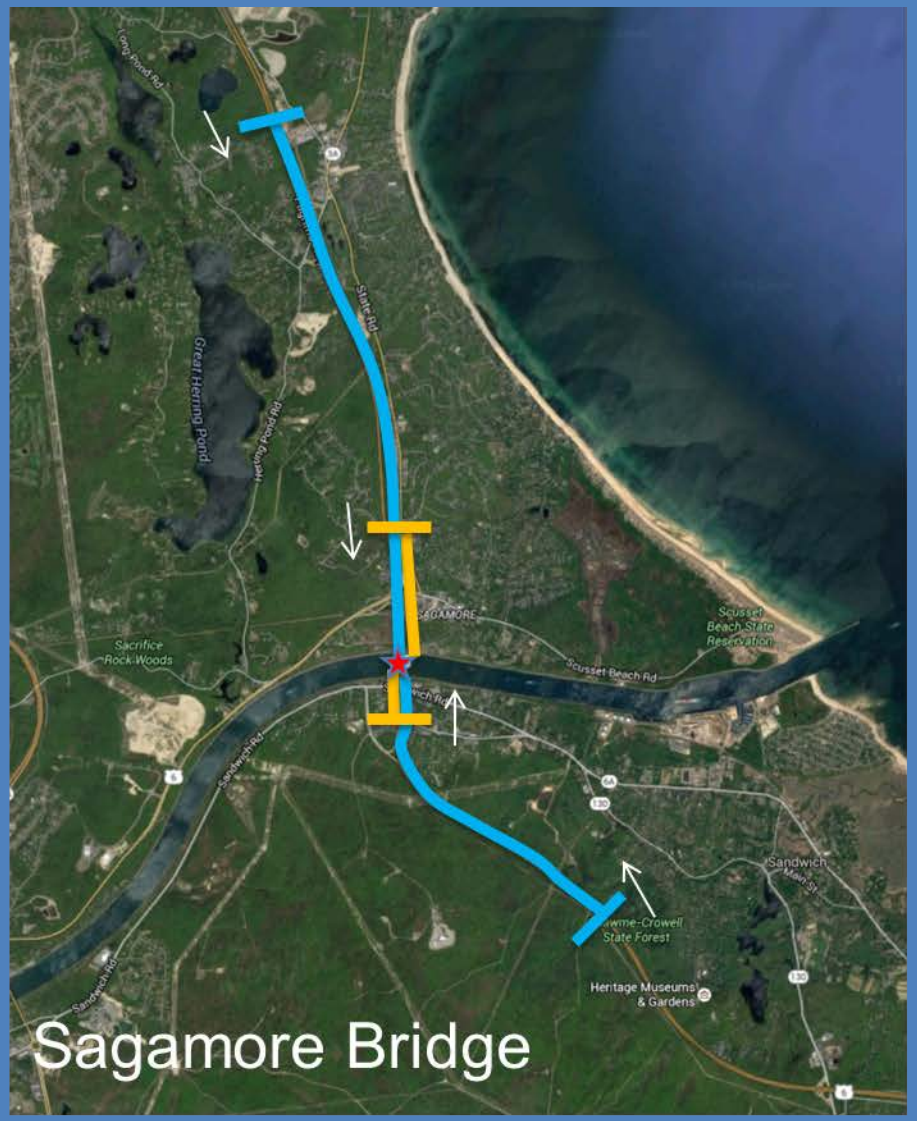
What are some of the Implications of those Traffic Volumes?

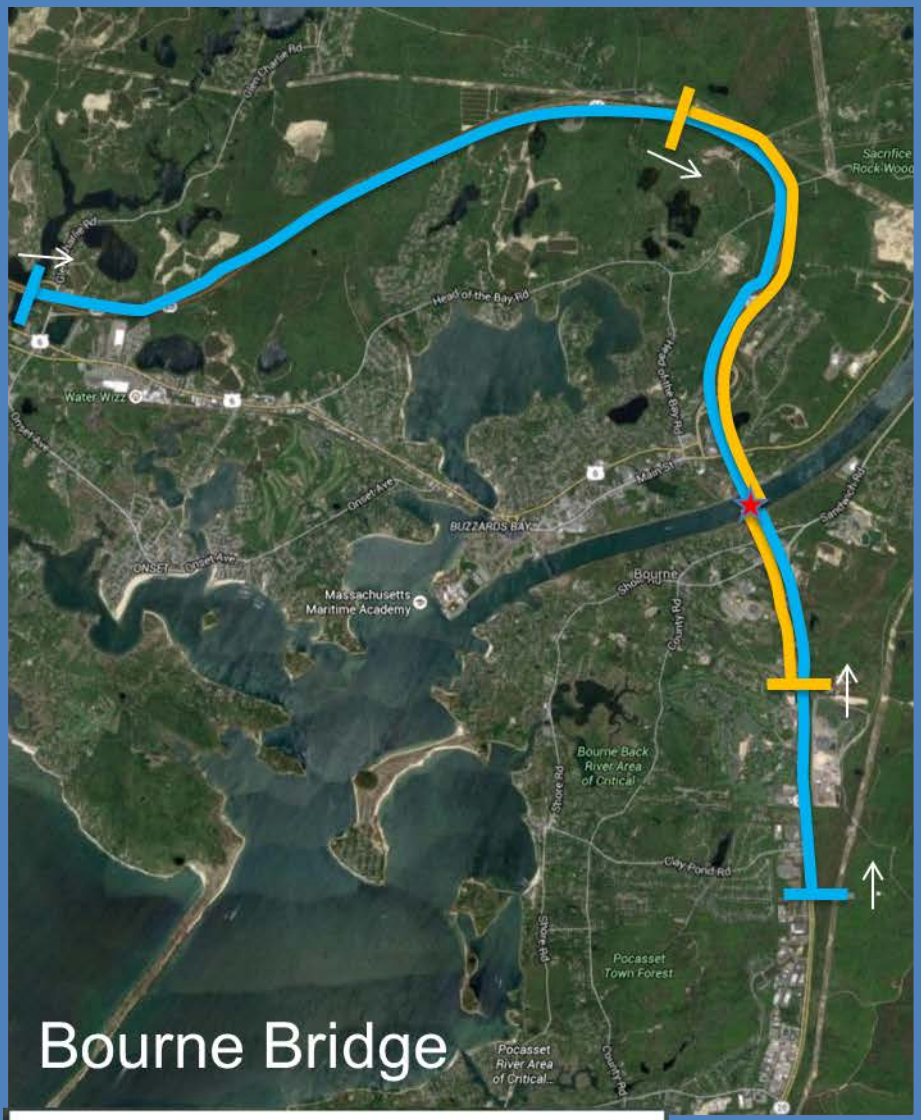
2014 Saturday Peak Hour (10 – 11 AM)
Typical (95th percentile) Queues from Bridges

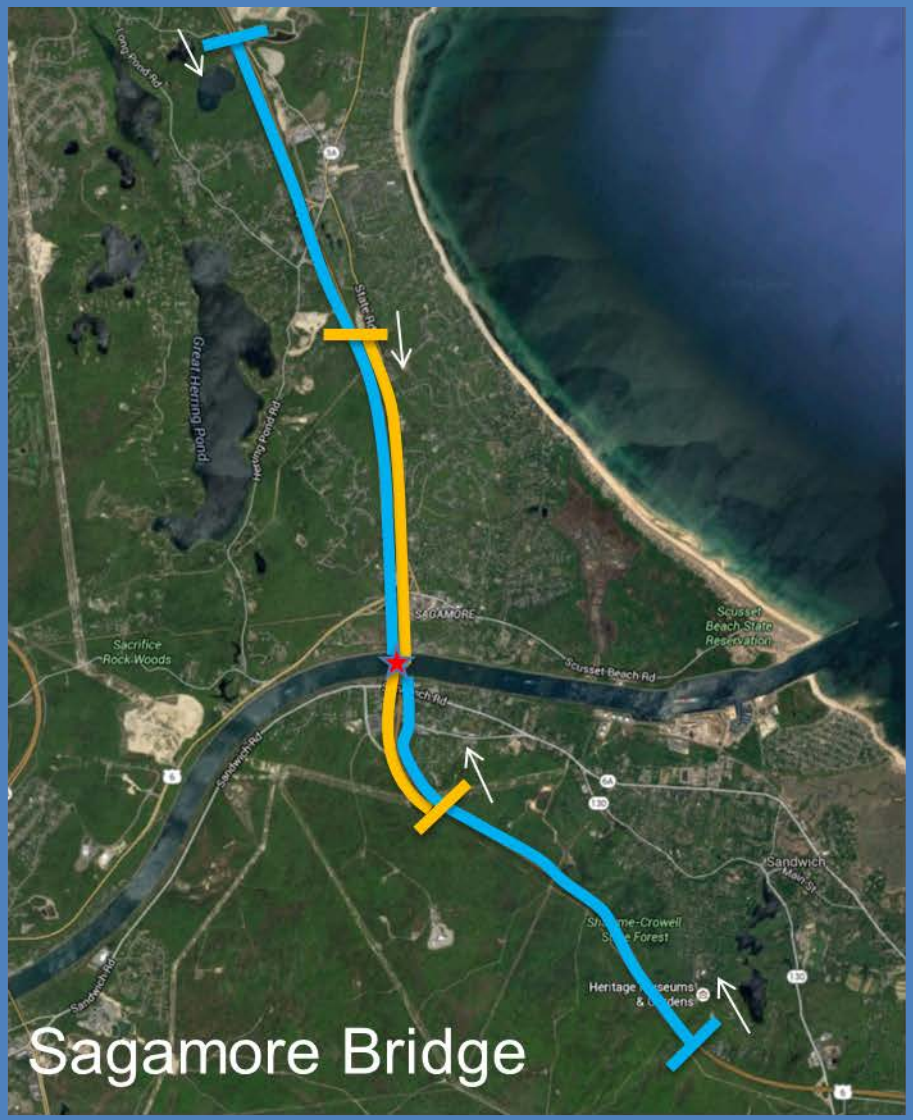




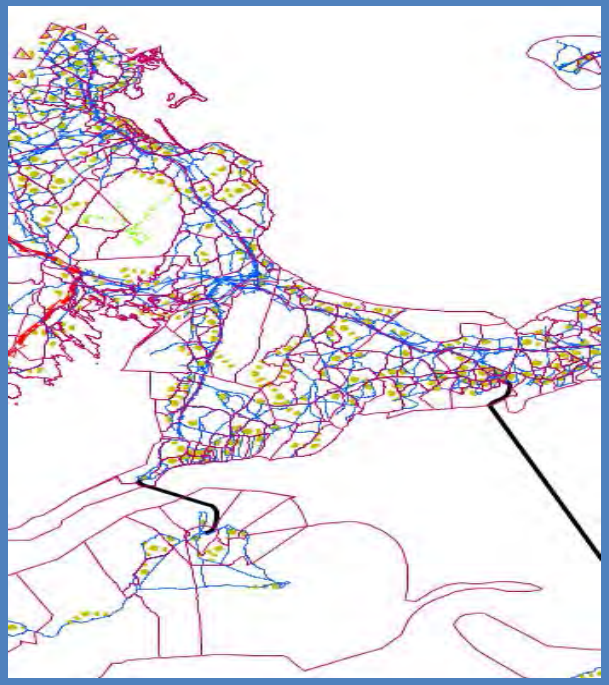
Back of Peak Queue (Summer)
Back of Peak Queue (Fall)

2040 Saturday Peak Hour (10 – 11 AM)
Typical (95th percentile) Queues from Bridges





Regional Travel Demand Model (another brief review).



- Includes roadway network for entire Cape Cod and portions of mainland.
- Used to forecast traffic for future years 2020 and 2040 for the No-Build and Build Alternatives.

Model Development Process

- Network and Traffic Analysis Zone (TAZ) Development.
- Trip Generation – based on socio-economic data (population & employment).
- Trip Distribution – development of an initial origin-destination trip table.
- Calibration – adjusting the trip table till assigned volumes matches actual counts.

Sources of Traffic

Commute Trips:

- Work Trips on/off the Cape.
- School Trips on/off the Cape.

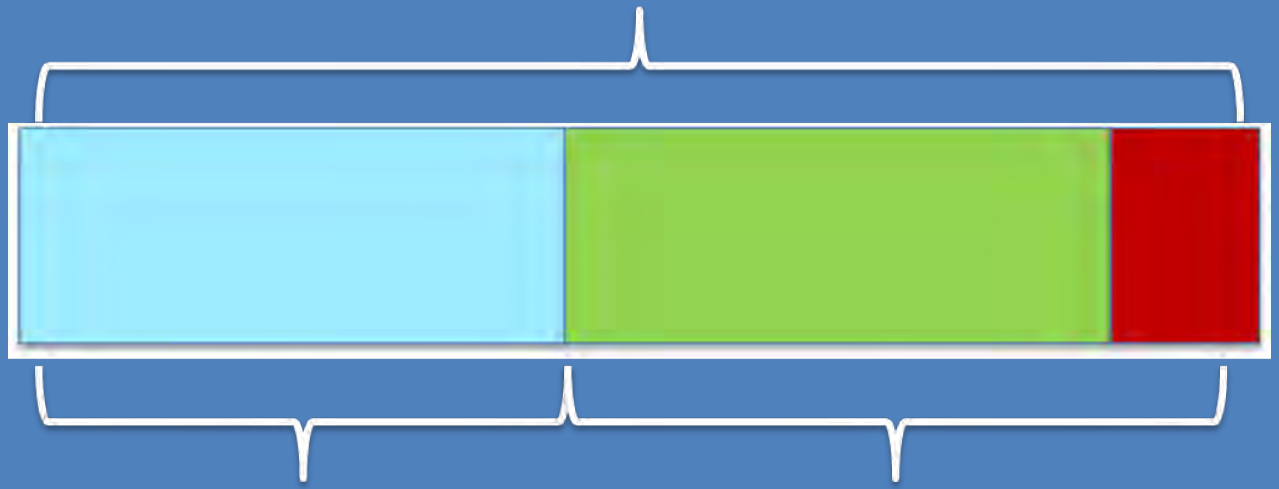
Non-Commute Trips:

- Shopping, recreational, etc.
- Deliveries, lunch trips, etc.

AND visitor trips

Visitor Trips on the Bridge Crossing CTPS Method.

TOTAL DAILY BRIDGE VOLUME



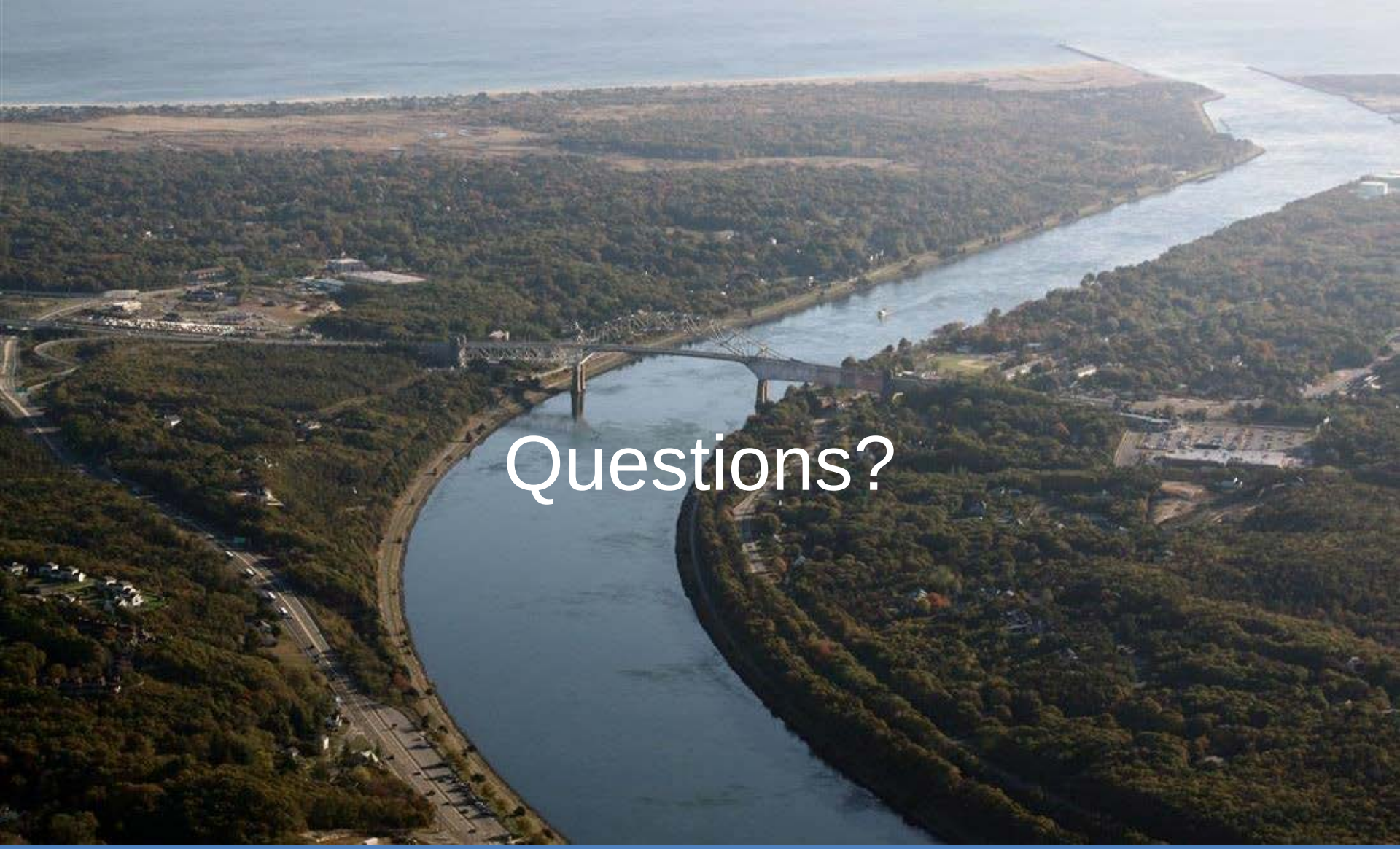
Commute Trips
(from Mass. Travel Survey)

Non-Commute Trips:

- **First estimated non-visitor trips**
- **Remaining are visitor trips**
- **(*Cape Cod MPO's Regional Transportation Plan*)**

Future (2040) Traffic Volumes.

- Commute and Non-Commute trips based on 2040 CTPS socio-economic data. Includes known future development
- Visitor trips based on an economic analysis of trends in hotel and restaurant industry and other factors.
- Visitor growth forecast to increase 0.26% to 0.69% annually. After Cape Cod Commission coordination, will use 0.69% increase for this study.



Comments and feedback can be emailed to

Ethan Britland - ethan.britland@state.ma.us

Comparison of Existing (2015) to Future (2040) No-Build Traffic Conditions

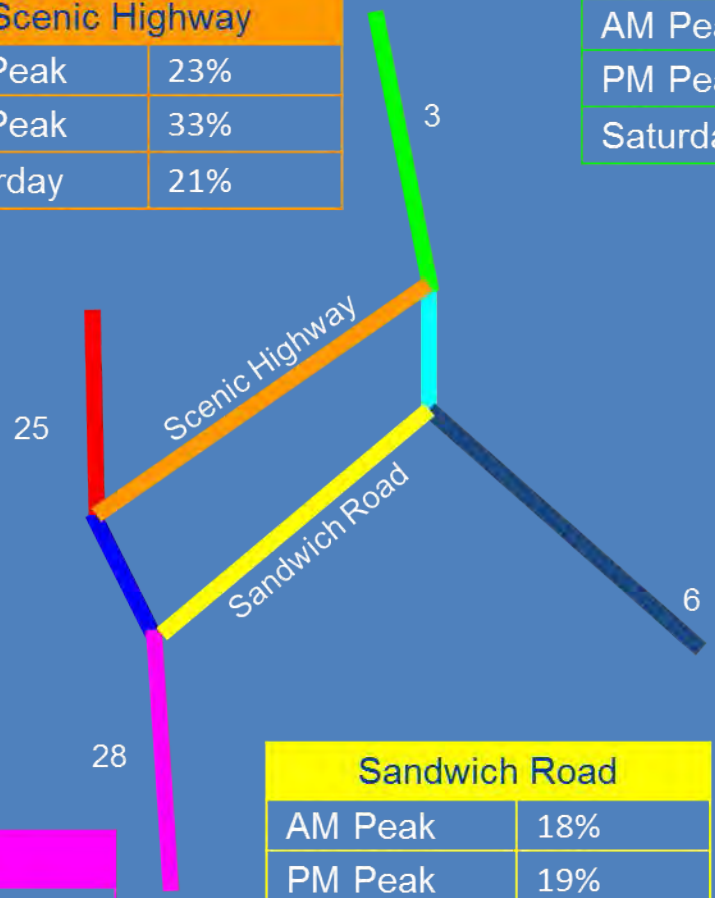
2015 – 2040 % Change in Traffic Volumes - Summer

Scenic Highway	
AM Peak	23%
PM Peak	33%
Saturday	21%

Route 3	
AM Peak	37%
PM Peak	48%
Saturday	29%

Route 25	
AM Peak	6%
PM Peak	15%
Saturday	14%

Sagamore Bridge	
AM Peak	41%
PM Peak	42%
Saturday	40%



Bourne Bridge	
AM Peak	6%
PM Peak	14%
Saturday	25%

Route 6	
AM Peak	25%
PM Peak	26%
Saturday	30%

Sandwich Road	
AM Peak	18%
PM Peak	19%
Saturday	38%

Route 28	
AM Peak	6%
PM Peak	15%
Saturday	5%

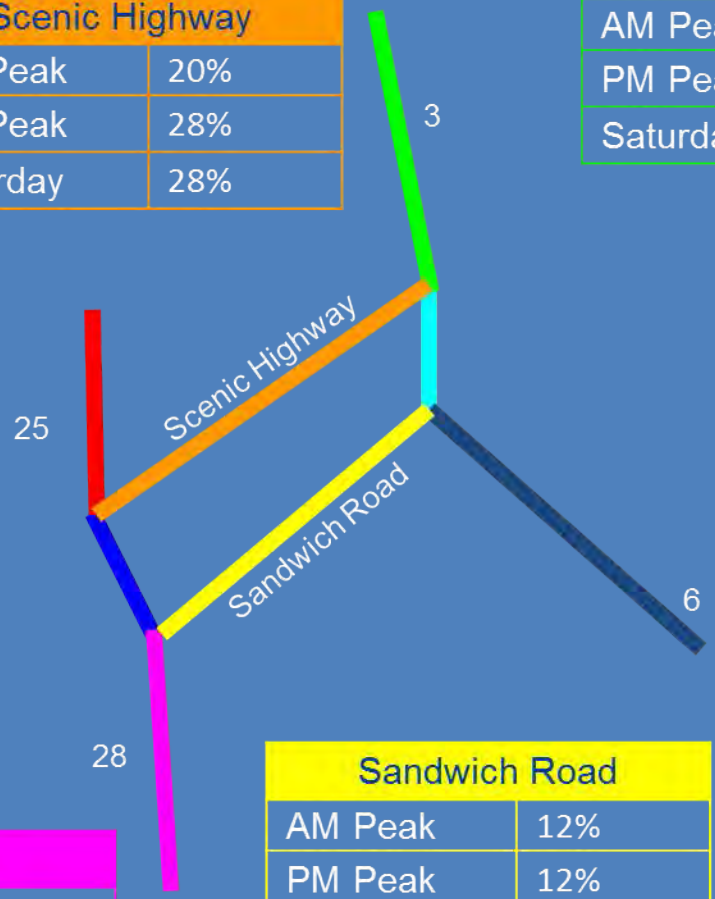
2015 – 2040 % Change in Traffic Volumes – Non-Summer

Scenic Highway	
AM Peak	20%
PM Peak	28%
Saturday	28%

Route 3	
AM Peak	68%
PM Peak	61%
Saturday	43%

Route 25	
AM Peak	4%
PM Peak	6%
Saturday	12%

Sagamore Bridge	
AM Peak	53%
PM Peak	48%
Saturday	44%



Bourne Bridge	
AM Peak	6%
PM Peak	7%
Saturday	14%

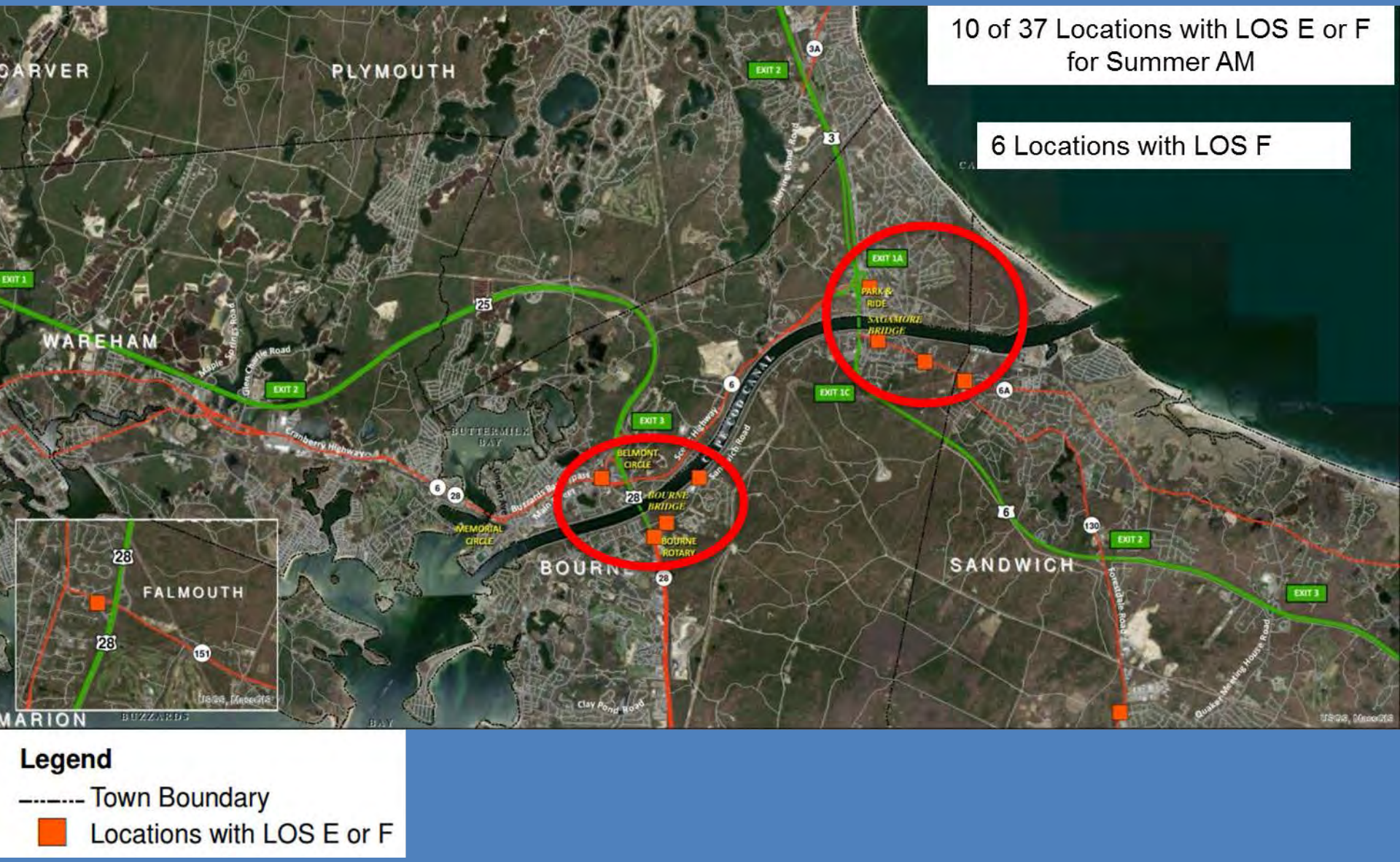
Route 6	
AM Peak	35%
PM Peak	37%
Saturday	56%

Sandwich Road	
AM Peak	12%
PM Peak	12%
Saturday	35%

Route 28	
AM Peak	4%
PM Peak	7%
Saturday	24%

Levels of Service
(Based on delay at Intersections)

2014 Intersections with LOS E or F: Summer AM (weekday 7 – 9 am)



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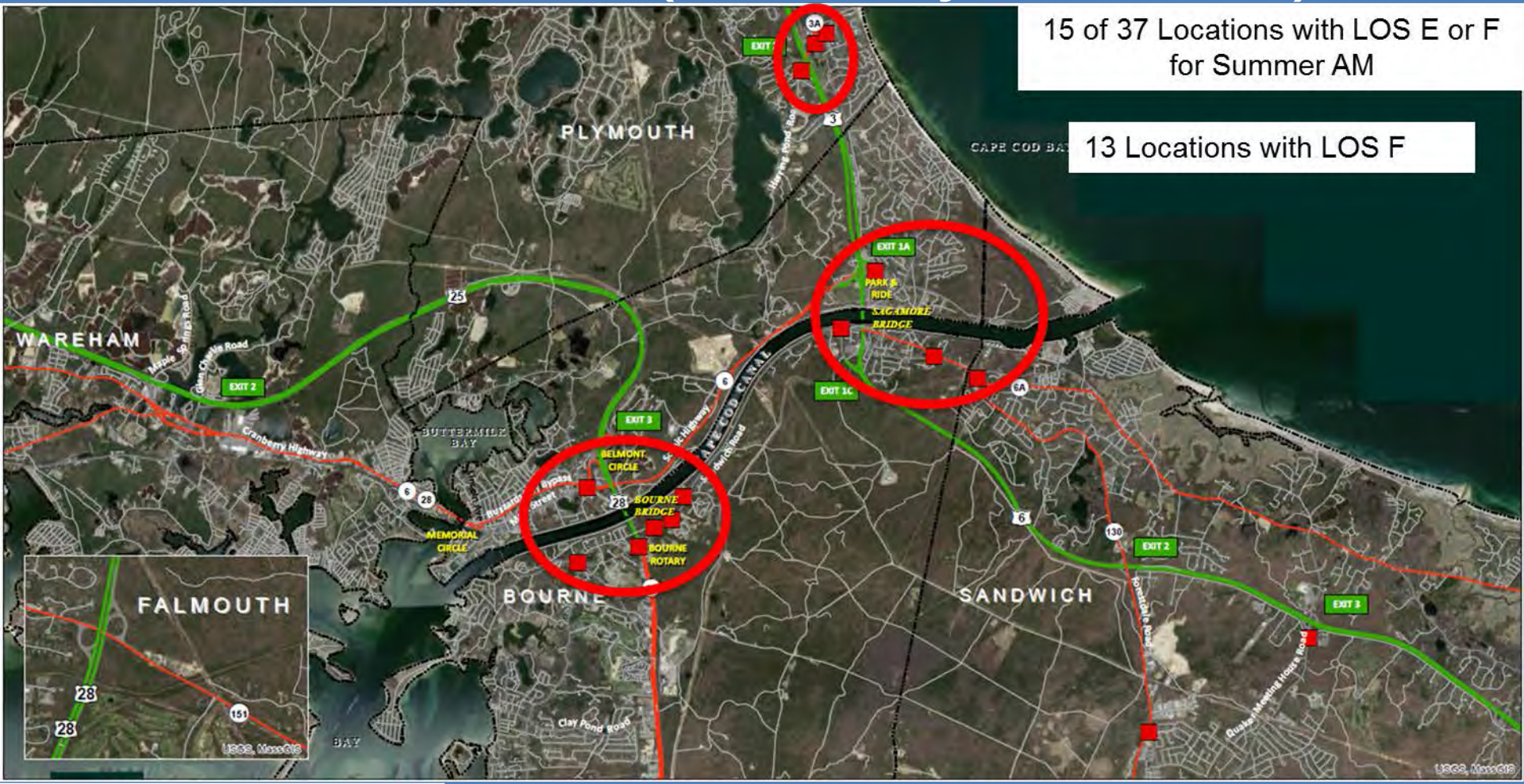
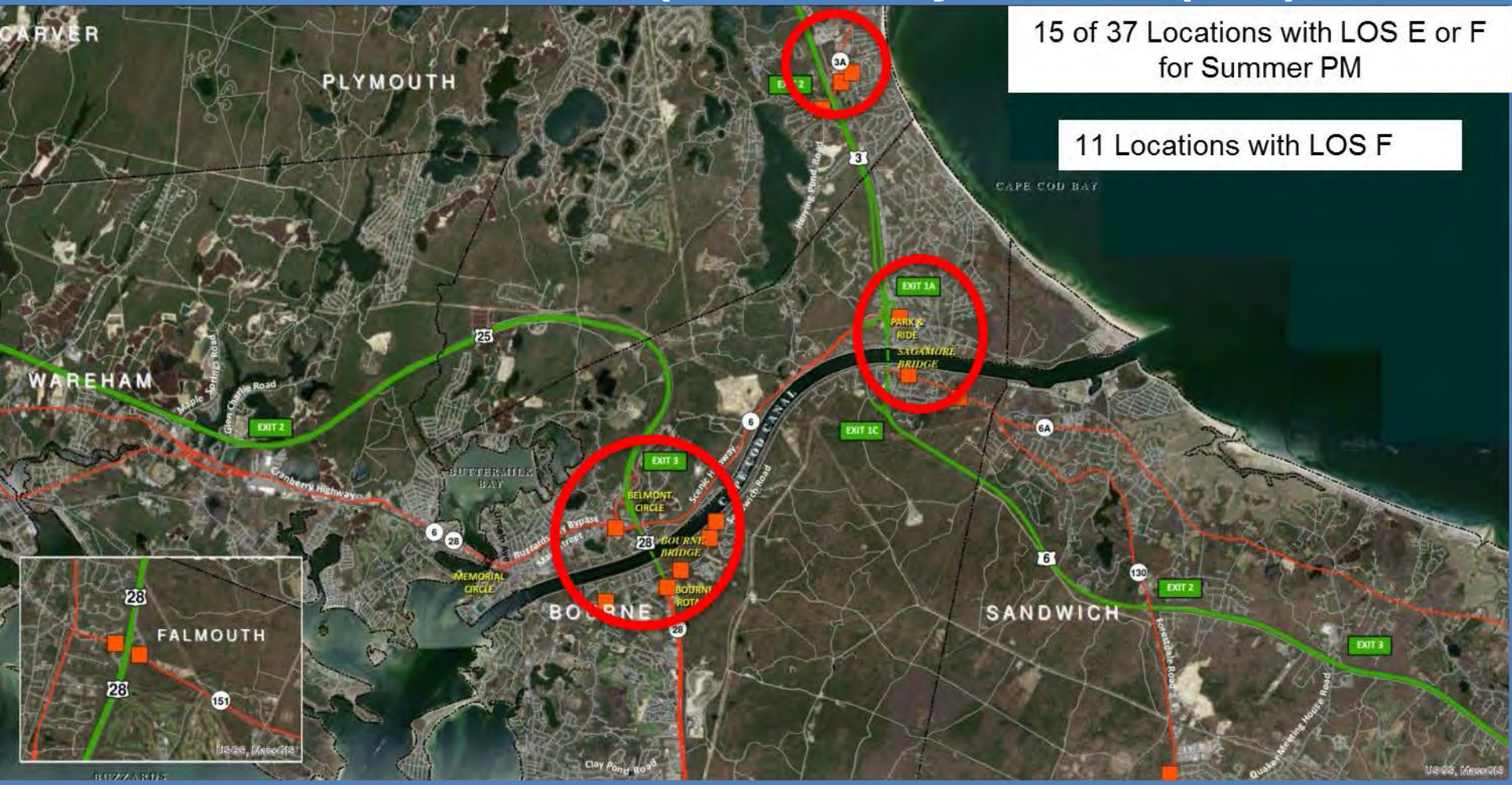


2014 Intersections with LOS E or F: Summer PM (weekday 4 – 6 pm)



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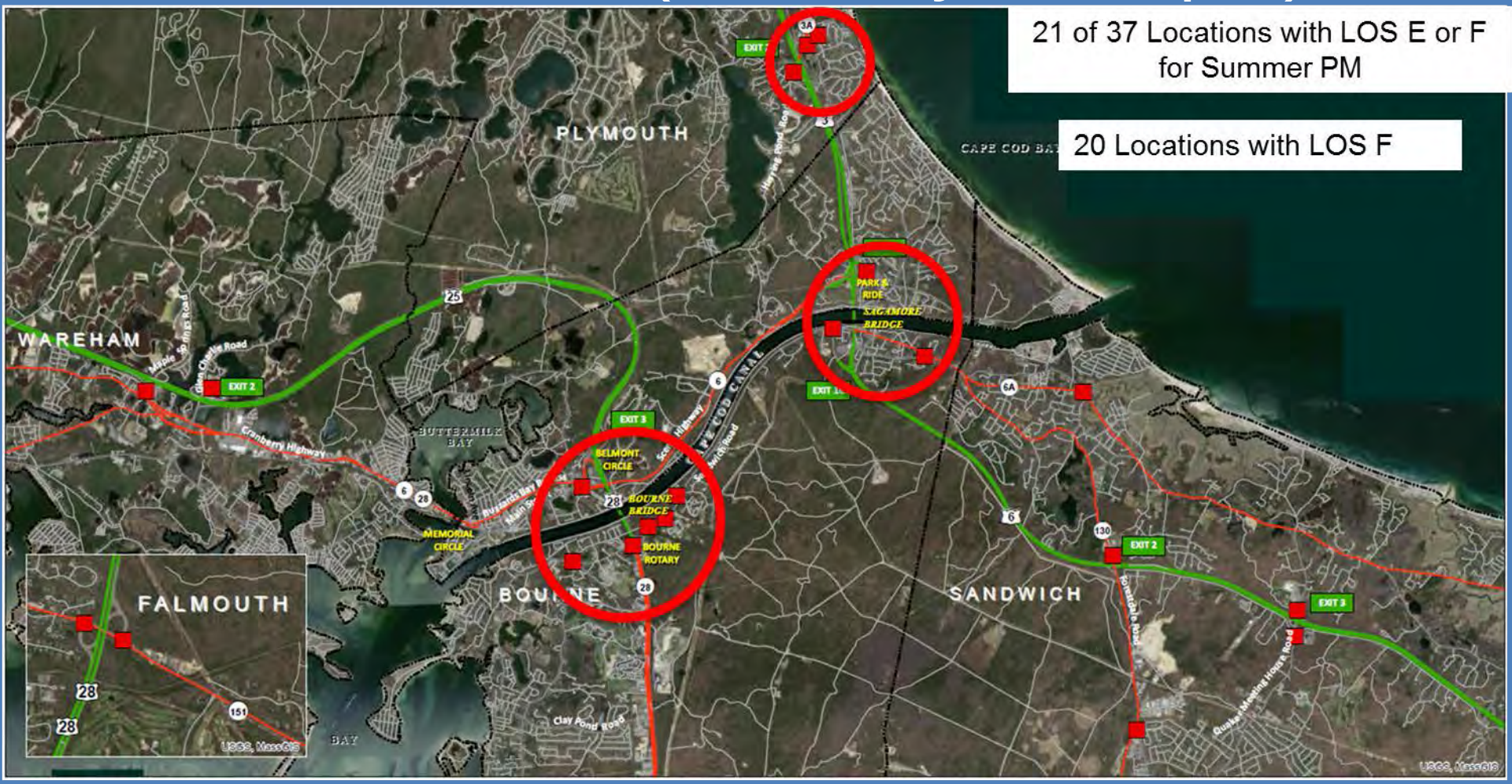
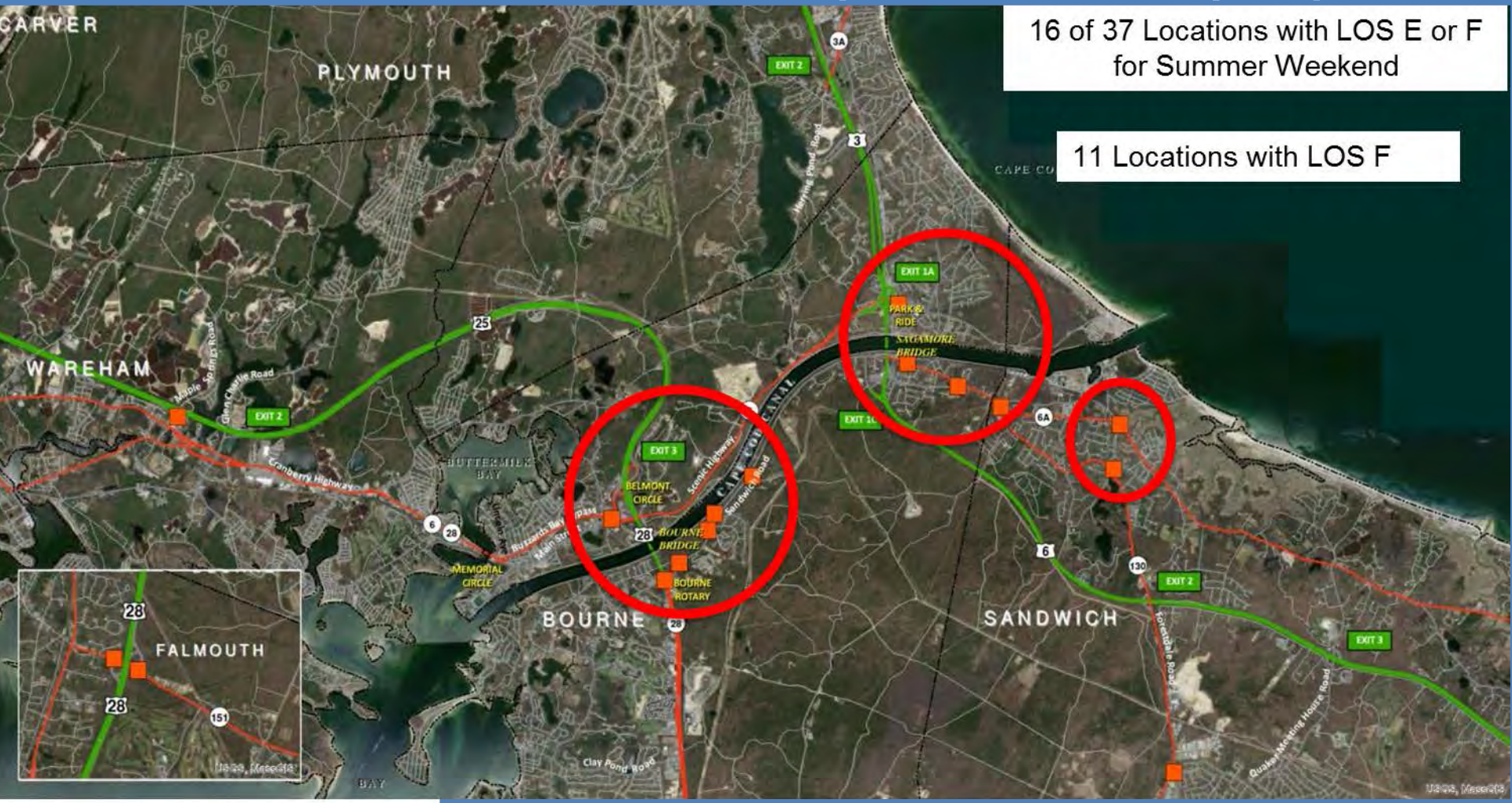


2014 Intersections with LOS E or F: Summer Weekend (10 am -12 pm)



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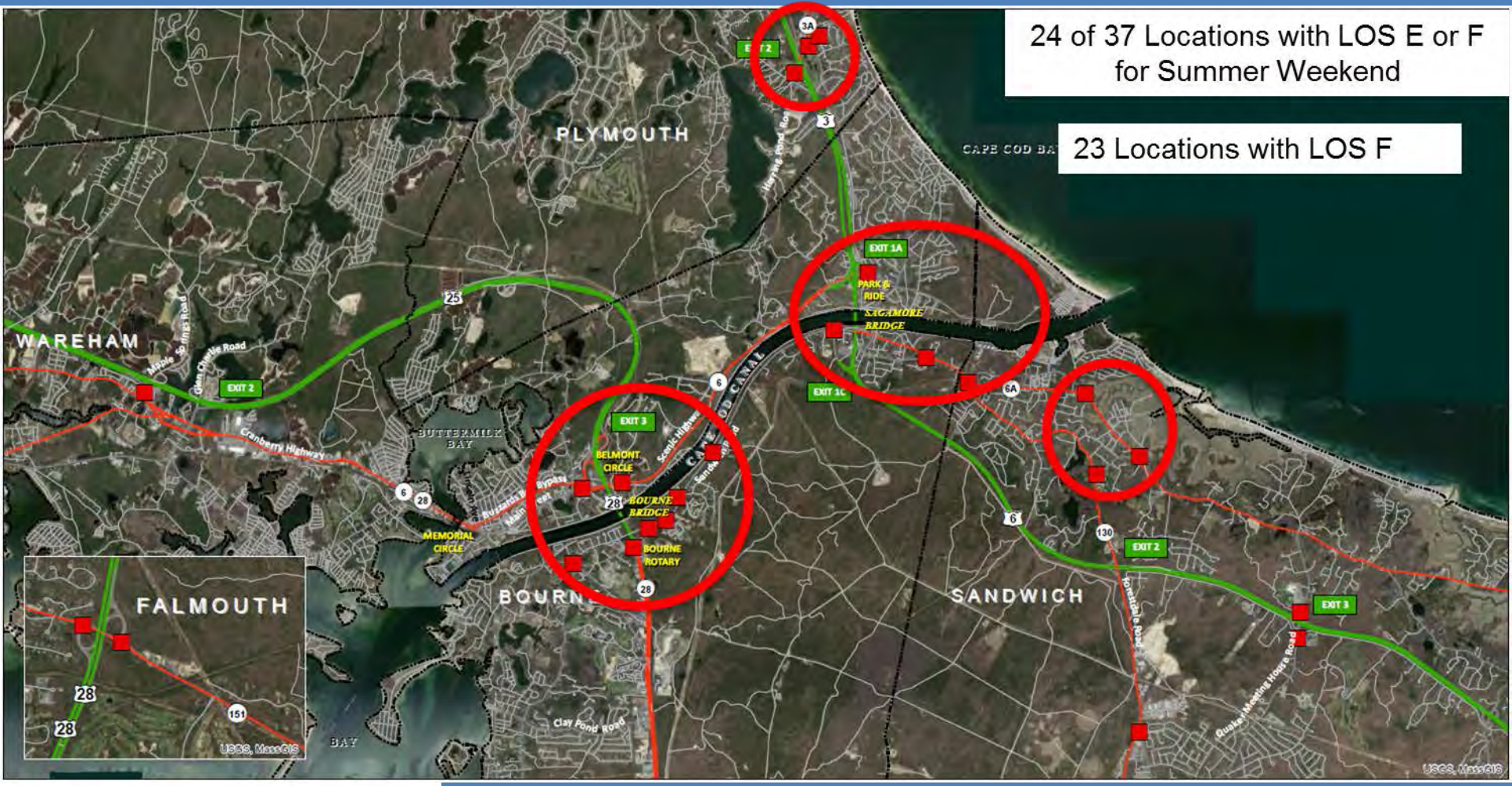
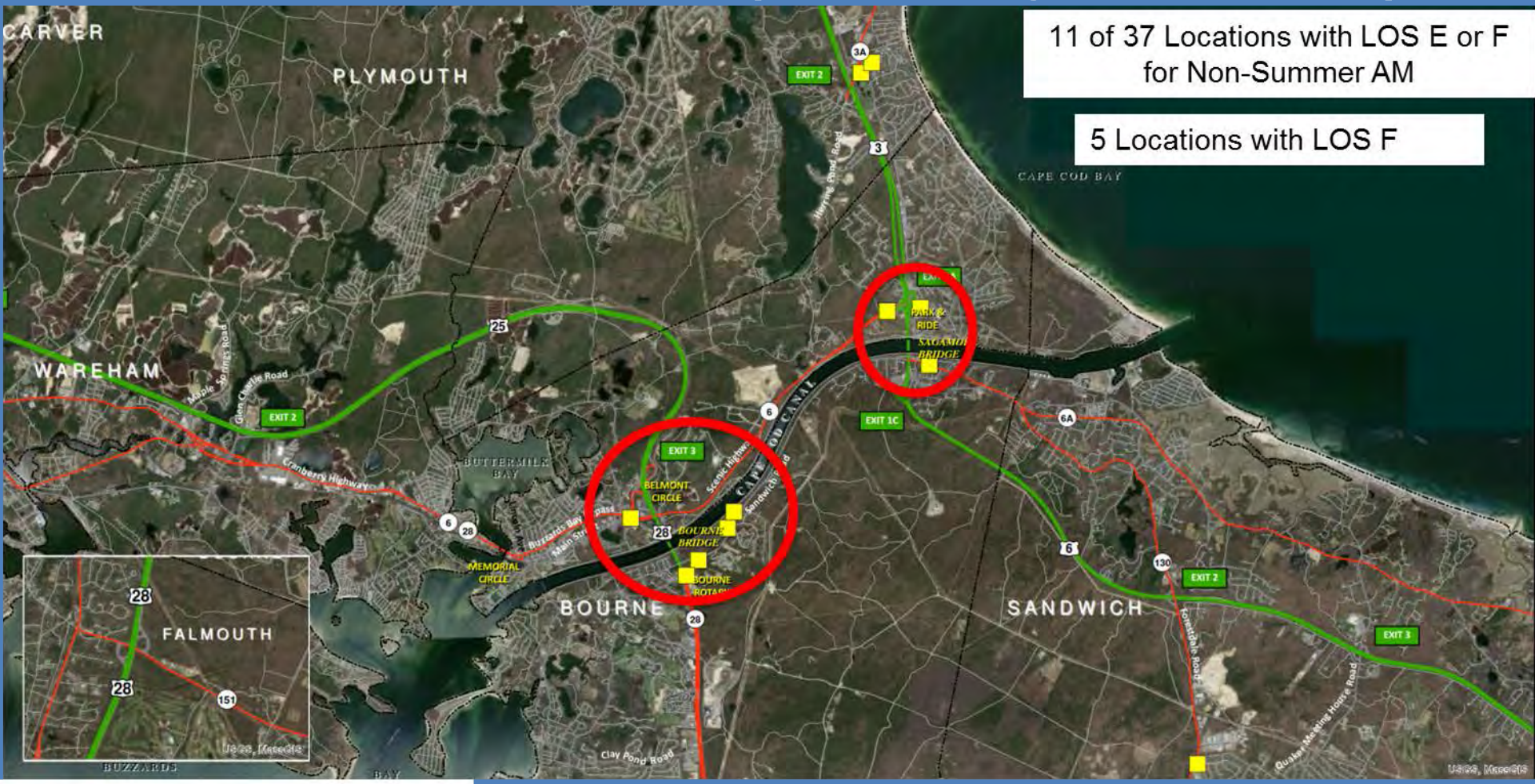


Legend

- Town Boundary
- Locations with LOS E or F

2014 Intersections with LOS E or F: Non-Summer AM (weekday 7 – 9 am)



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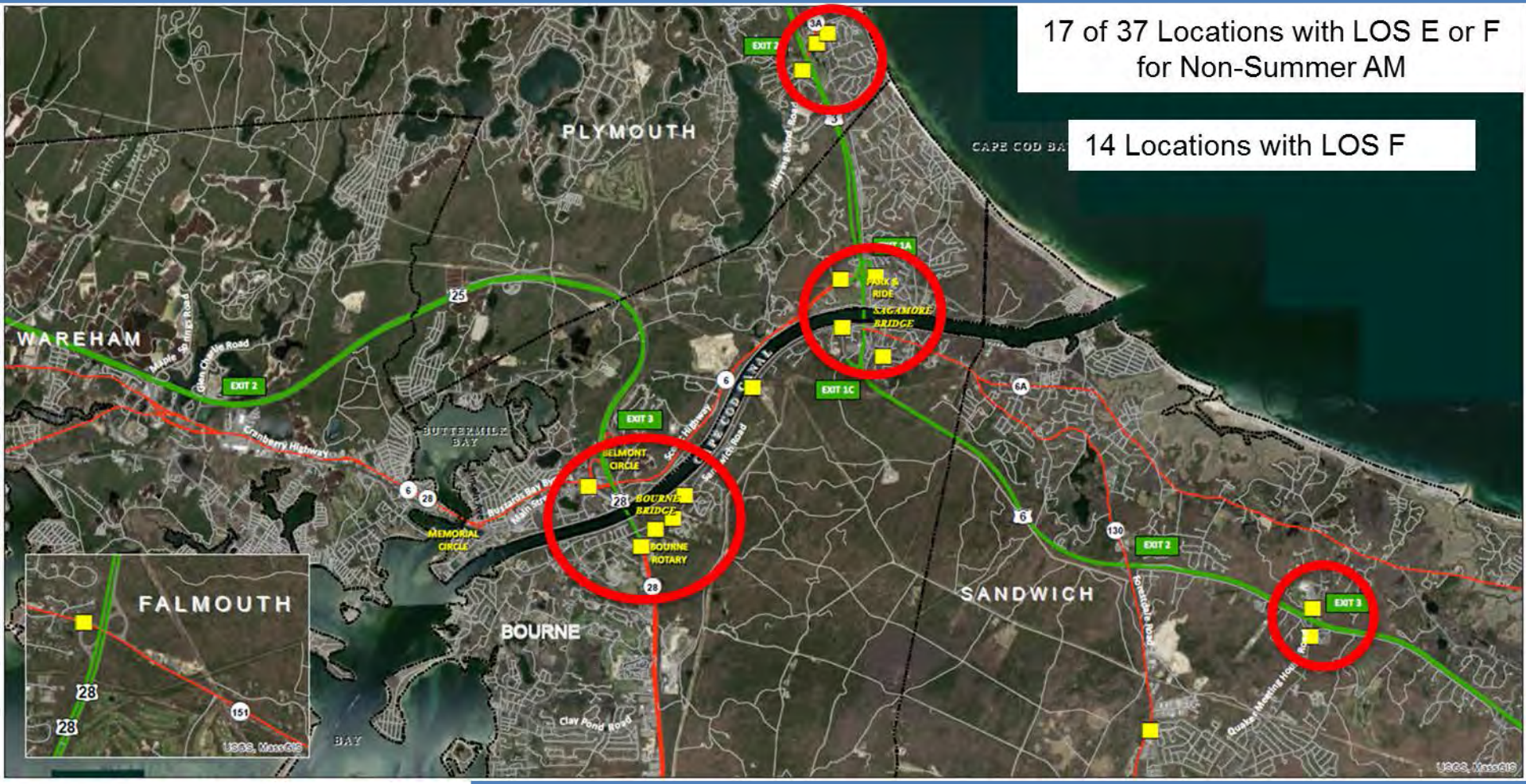

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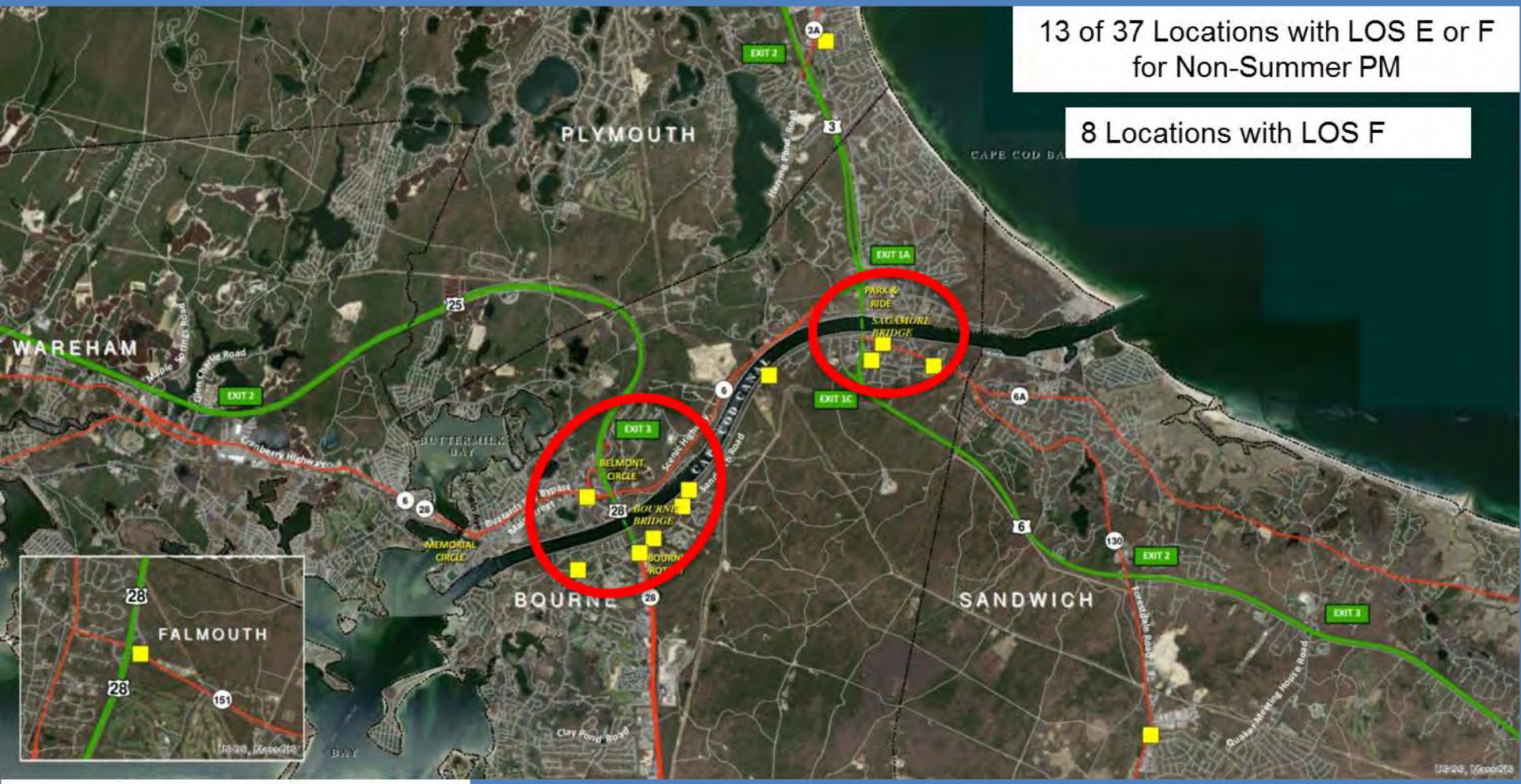

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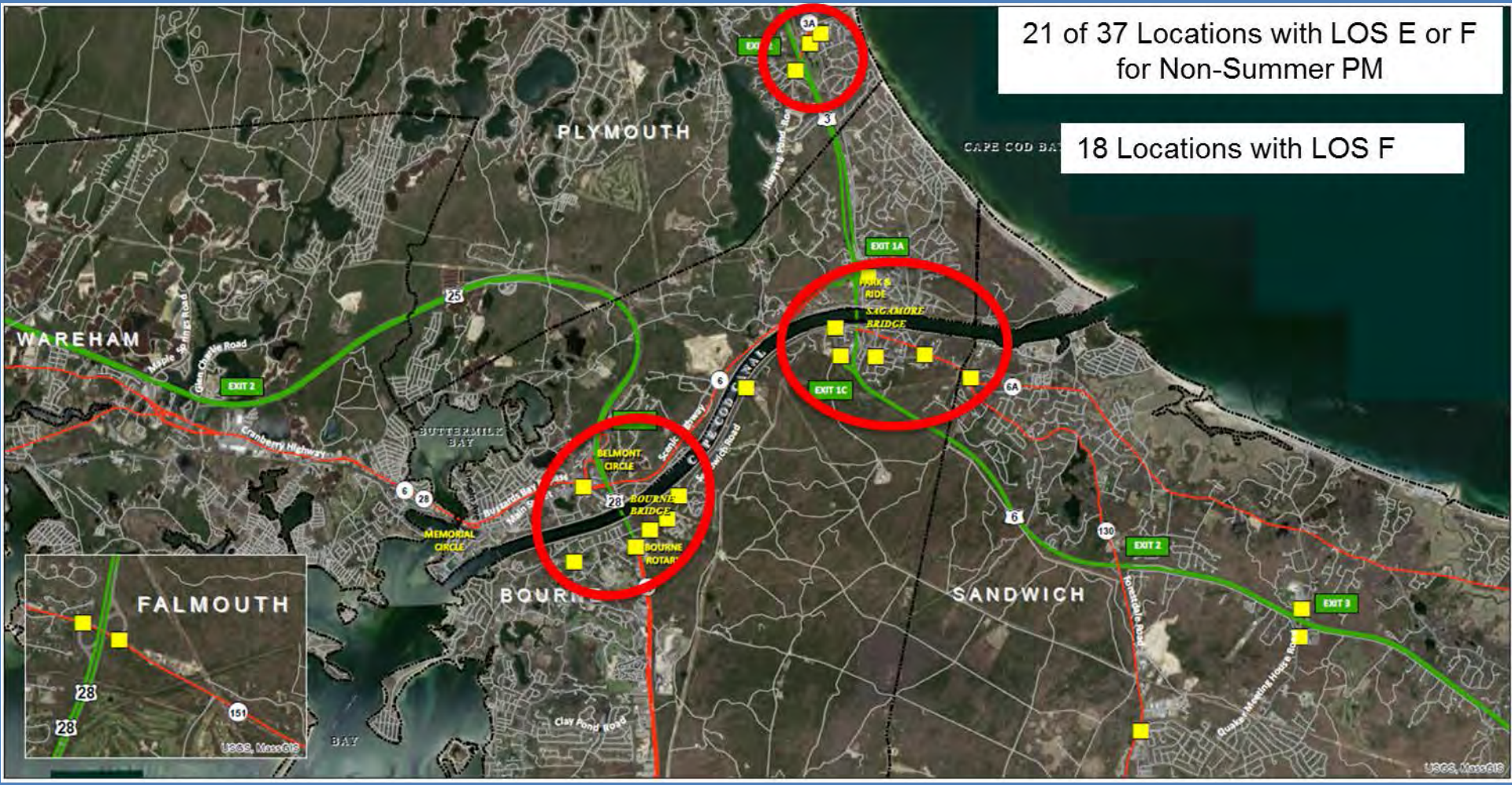

Legend

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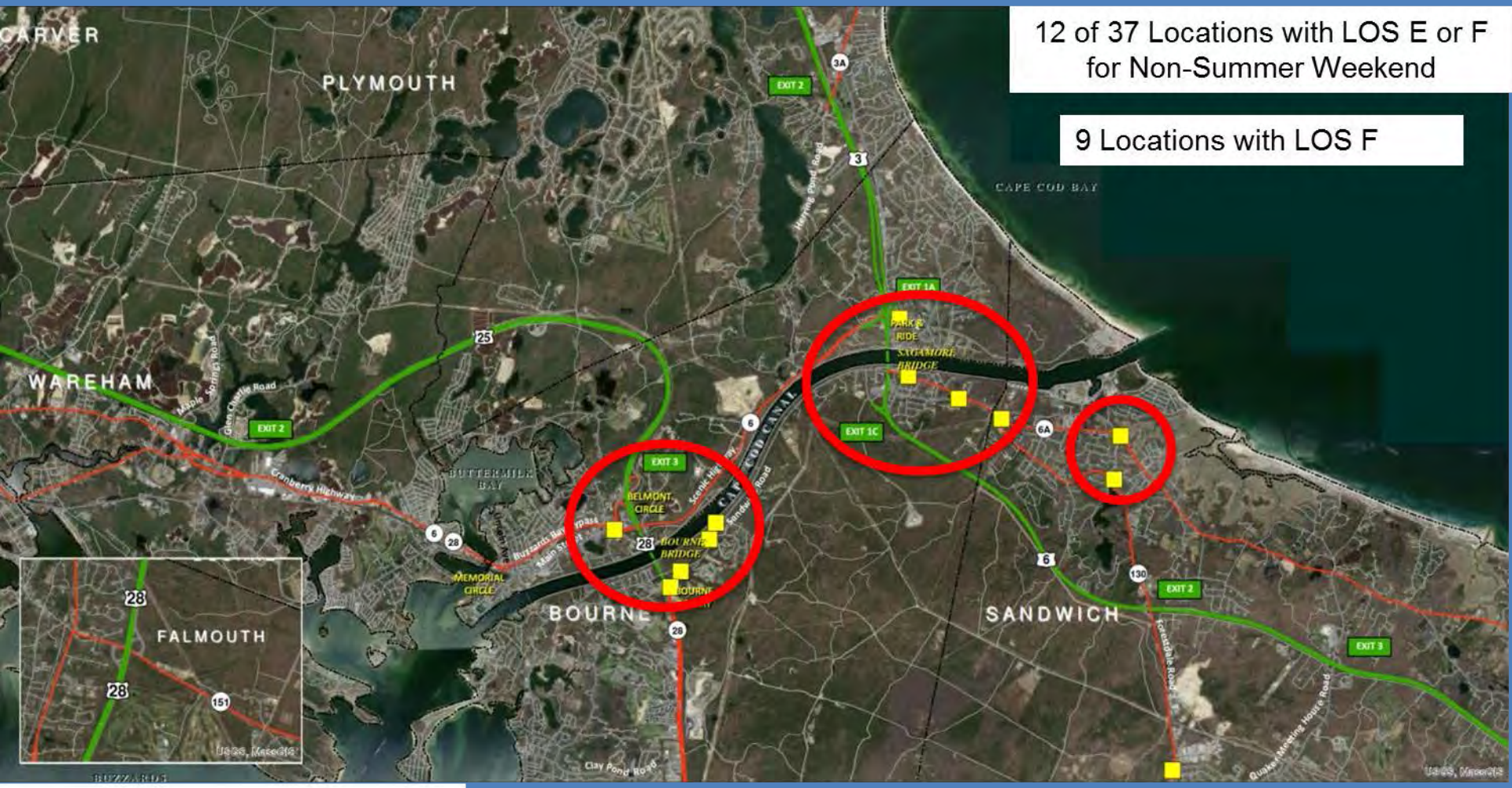
2014 Intersections with LOS E or F: Non-Summer Weekend (10 am -12 pm)



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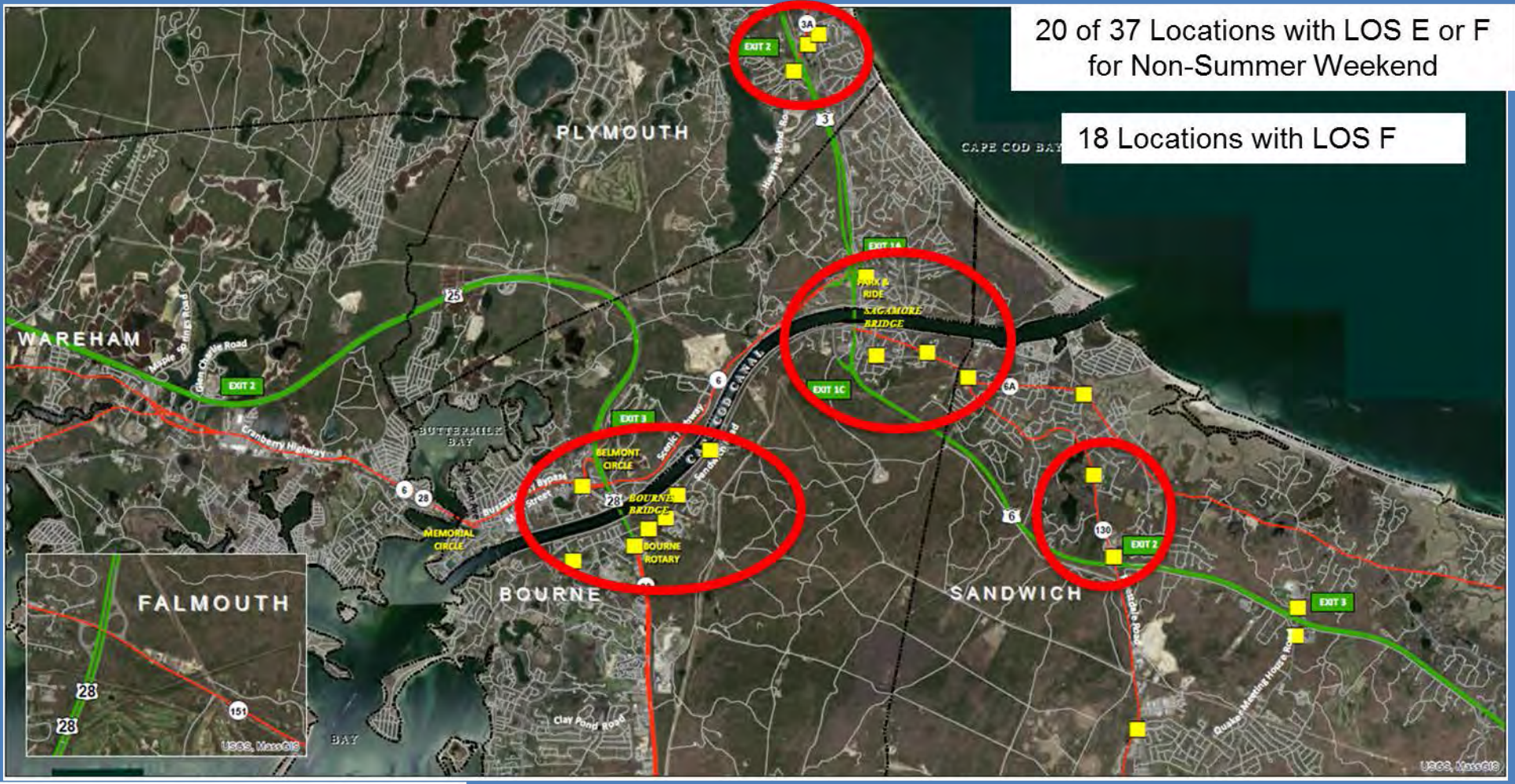
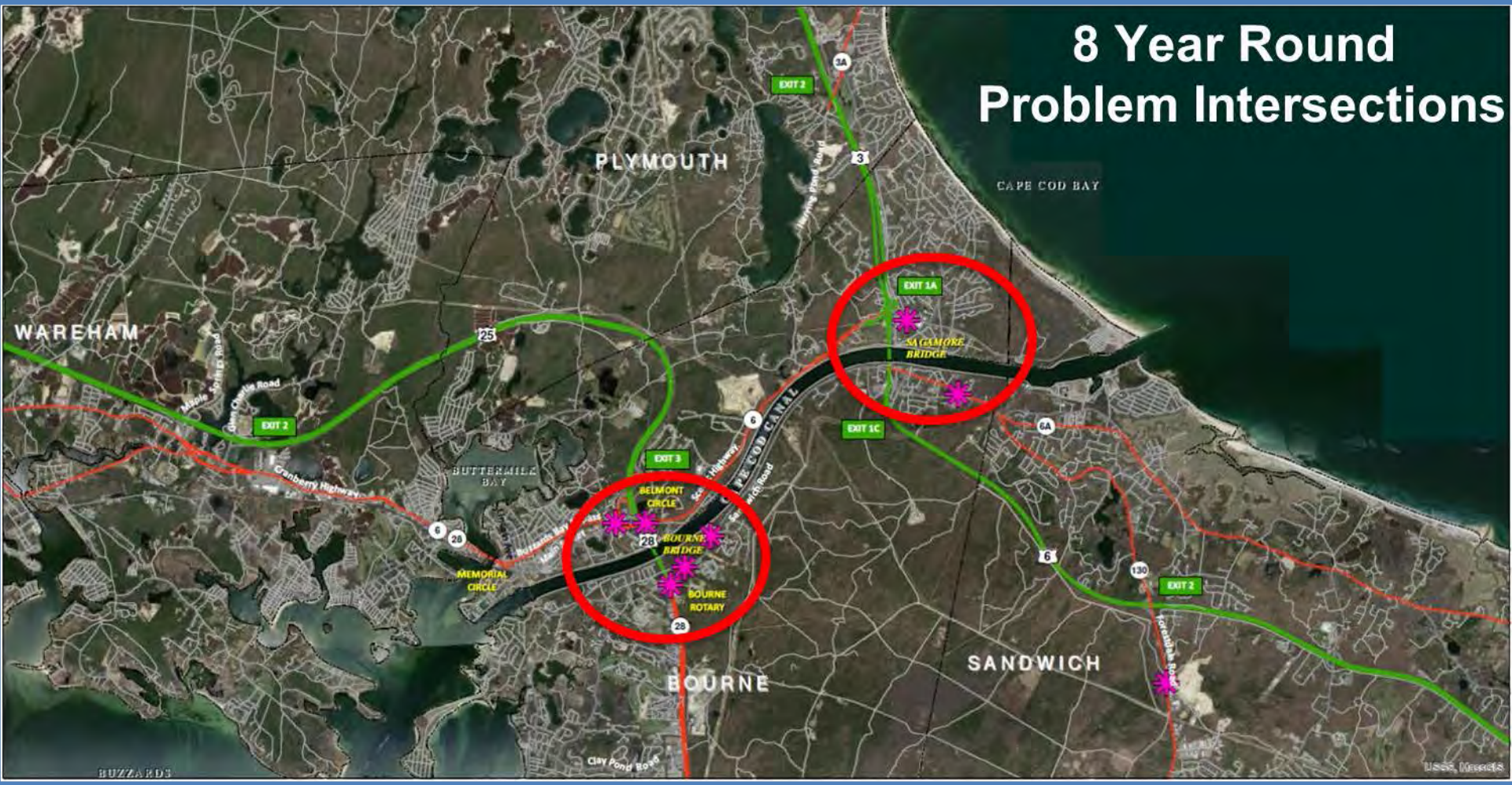


Legend

- Town Boundary
- Locations with LOS E or F

2014 Year Round Problem Intersections

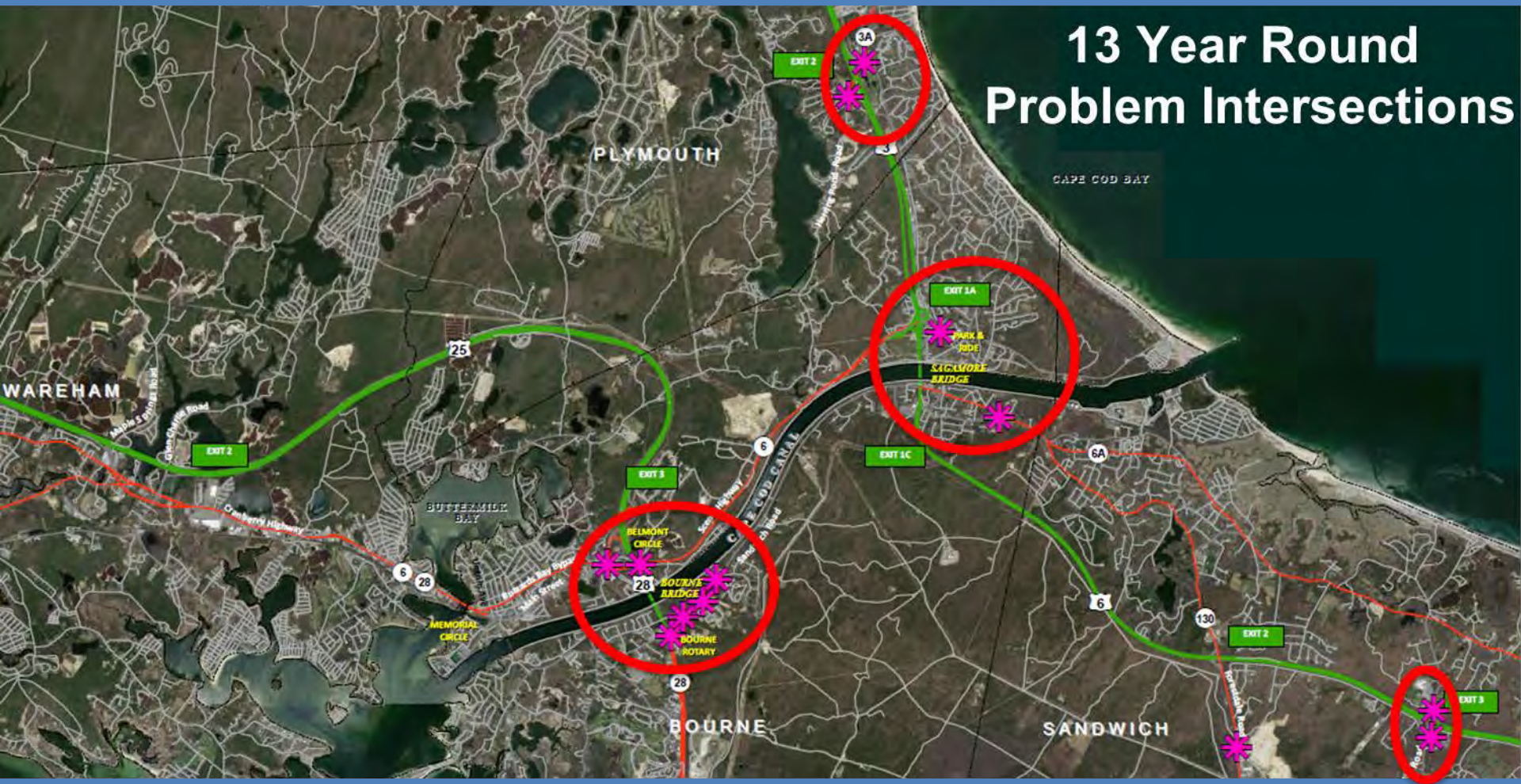


Legend

Town Boundary

Year Round Problem Intersections

2040 Year Round Problem Intersections



Legend

----- Town Boundary

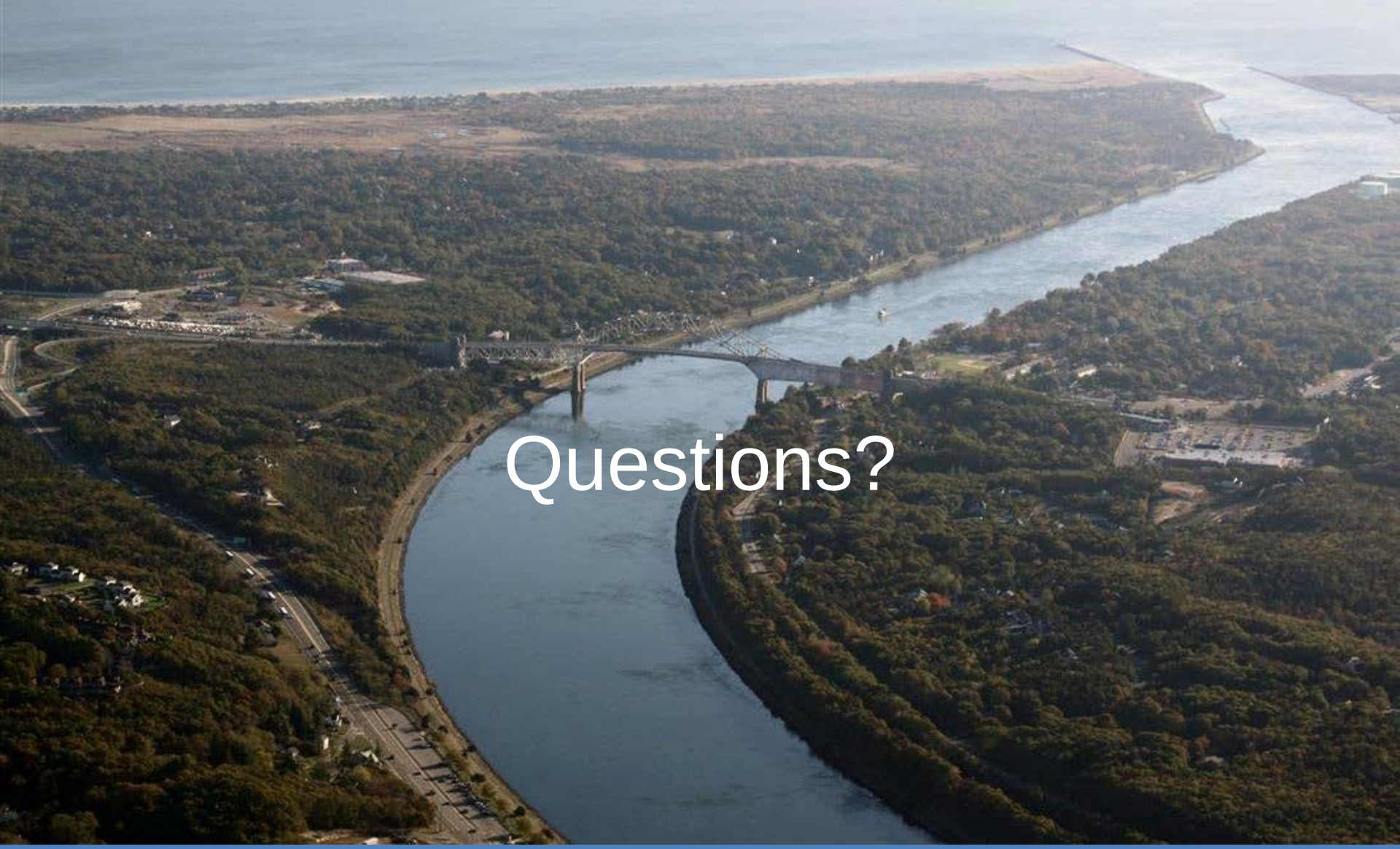
✱ Year Round Problem Intersections

2014 Year Round Problem Intersections by LOS and Crashes

Location	High Crash	LOS E or F?	Town
Bourne Rotary	Yes	Yes	Bourne
Sandwich Road at Bourne Rotary Connector	No	Yes	Bourne
Sandwich Road at Harbor Lights Road	No	Yes	Bourne
Belmont Circle	Yes	Yes	Bourne
Scenic Highway at Nightingale Pond Road	Yes	No	Bourne
Scenic Highway at Canal Road/State Road	Yes	No	Bourne
Route 6A at Cranberry Hwy/Sandwich Road	No	Yes	Bourne
Route 130 at Cotuit Road	Yes	Yes	Sandwich

2040 Year Round Problem Intersections by LOS and Crashes

Location	High Crash	LOS E or F?	Town
Bourne Rotary	Yes	Yes	Bourne
Sandwich Road at Bourne Rotary Connector	No	Yes	Bourne
Sandwich Road at High School Drive	No	Yes	Bourne
Sandwich Road at Harbor Lights Road	No	Yes	Bourne
Belmont Circle	Yes	Yes	Bourne
Scenic Highway at Nightingale Pond Road	Yes	No	Bourne
Scenic Highway at Canal Road/State Road	Yes	Yes	Bourne
Route 6A at Cranberry Hwy/Sandwich Road	No	Yes	Bourne
Route 130 at Cotuit Road	Yes	Yes	Sandwich
Herring Pond Road at Exit 2 Southbound	Yes	Yes	Plymouth
Herring Pond Road at Exit 2 Northbound	No	Yes	Plymouth
Quaker Meetinghouse Road At Exit 3 Eastbound	Yes	Yes	Sandwich
Quaker Meetinghouse Road At Exit 3 Westbound	No	No	Sandwich



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Task 3: Preliminary Alternatives Development

Standard Approach to Preliminary Alternatives Development

Seeking Alternatives that:

1. Satisfy Study Goals and Objectives from Task 1
2. Based on Identified Issues, Constraints, and Opportunities from Task 2
3. Minimize Property, Community, and Environmental Impact

Study Framework: Goals

- To create/improve multimodal mobility in the Cape Cod Canal area
- To establish an alternative or replacement crossing of the Cape Cod Canal to address the diminishing quality and reliability of year-round connectivity over the Cape Cod Canal, due to the aging Sagamore and Bourne Bridges

Study Framework: Objectives

- Create reliable multimodal connectivity and mobility levels such that the quality of life on Cape Cod is not diminished by unreliable connectivity across the Cape Cod Canal
- Create a reliable multimodal connection across the Cape Cod Canal to maintain/enhance public safety in the event of the need for an emergency evacuation of portions of Cape Cod and to accommodate first responders accessing Cape Cod.
- Ensure that cross canal connectivity does not become a barrier to reliable intra-community connectivity for the Towns of Bourne and Sandwich.

Summary of Completed Task 2

- Existing Traffic Conditions;
- Environmental Conditions;
- Bicycle, Pedestrian, Transit Facilities;
- Travel Demand Model;
- Future (2040) No-Build Traffic; and
- Engagement with Army Corps.

Major Task 2 Findings

- Problems include:
  - Sagamore and Bourne Bridges,
  - Areas clustered north and south of bridges;
- 2040 traffic conditions will worsen;
- Lack of bicycle and pedestrian connections.
- Many environmental constraints;

Additional Considerations for Preliminary Alternatives Development.

- US Army Corps of Engineers (USACE) plan for bridges.
- Examination of Prior Alternatives Developed for the Public Private Partnership (P3) Process.
- Review of Outside Submissions
- Development of New Alternatives (Short, Medium and Long-Term).

Army Corps of Engineers Update

Continued Coordination with USACE

- USACE Conducting ‘Major Rehabilitation Evaluation Study’ to Determine Rehabilitation or Replacement of both Sagamore and Bourne Bridges.
- For the Purpose of this Study’s Analysis, Assuming Both Bridges will be Replaced and Toll Free.

Examination of Preliminary P3 Concepts

- P3 Concepts were Developed in Response to Increasing USACE Maintenance on the Bridges and Intended to Compliment Aging Infrastructure.
- Examine Prior Concepts and also New P3 Opportunities, if Applicable

Assumptions for Preliminary Alternatives Development Process.

- Focus on 2040 year round non-summer safety and mobility problems.
- Further improvements to accommodate some level of summer peak.
- Not trying to resolve all peak season traffic problems, this would have significant impacts

Factors Affecting Future Volumes

Cape traffic is more affected by socio-economic trends, not necessarily Canal Area infrastructure.

- Population is growing very slowly.
  2010 – 2020 Barn. County = 0.05%.
  Plymth. County = 1.85%.
- Job growth also forecast to be slow.
- Visitor growth = 0.69%/yr.

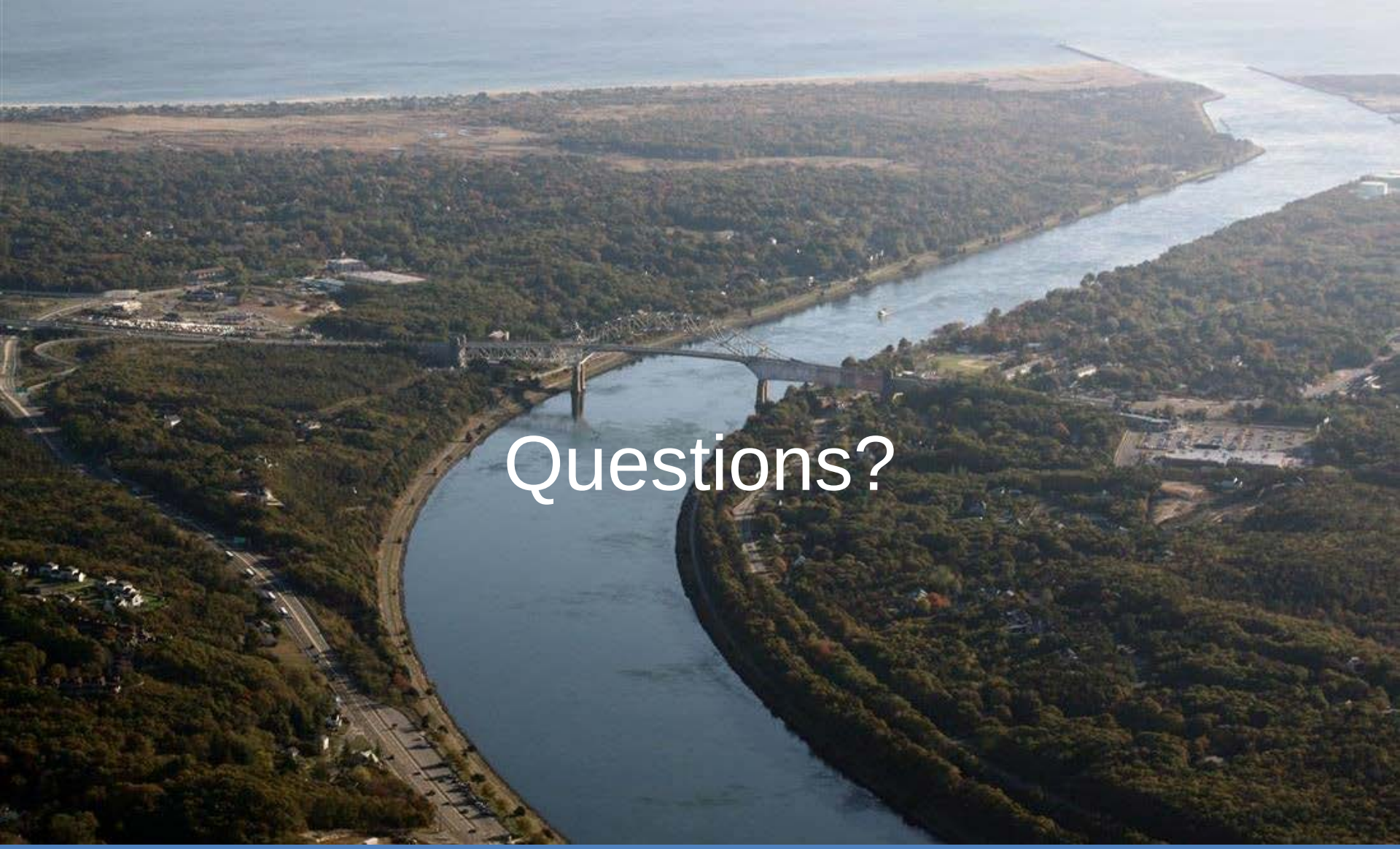
Factors Affecting Future Volumes

Changes in Demographics

- Number of retired persons in Barnstable County is growing.
  27% > 65 years old.
  Not working, drive less.
- Conversion of seasonal homes to permanent homes reduces vacation home stock (>20%)

Factors Affecting Future Volumes

- Infrastructure outside of Study Area also acts as a constraint to ‘induced demand’
- Transit and Passenger/Freight Ferry Service Demand and Levels
- Cape Cod Commission’s Land Use Plan for the Long Range Regional Transportation Plan Update



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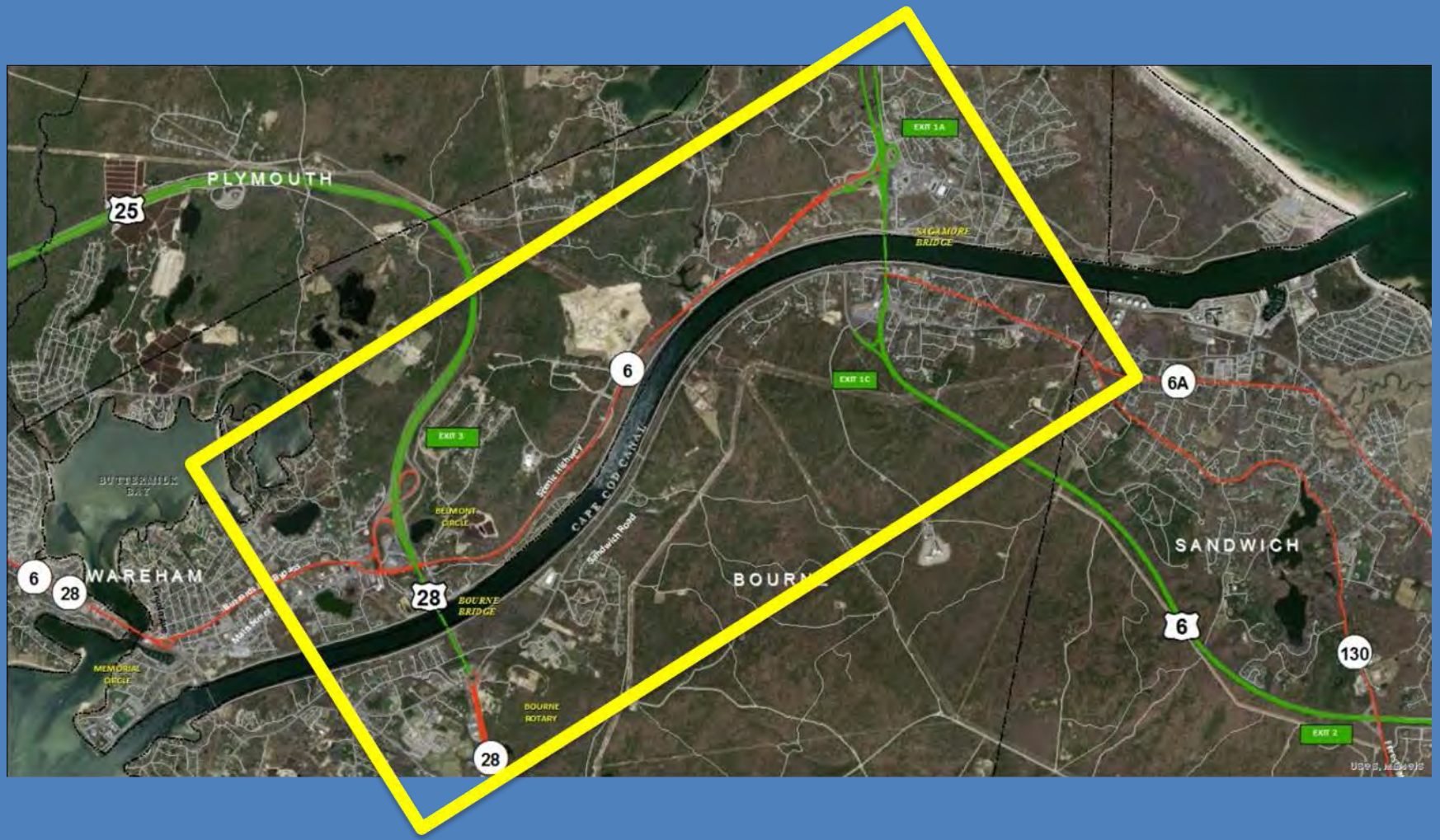
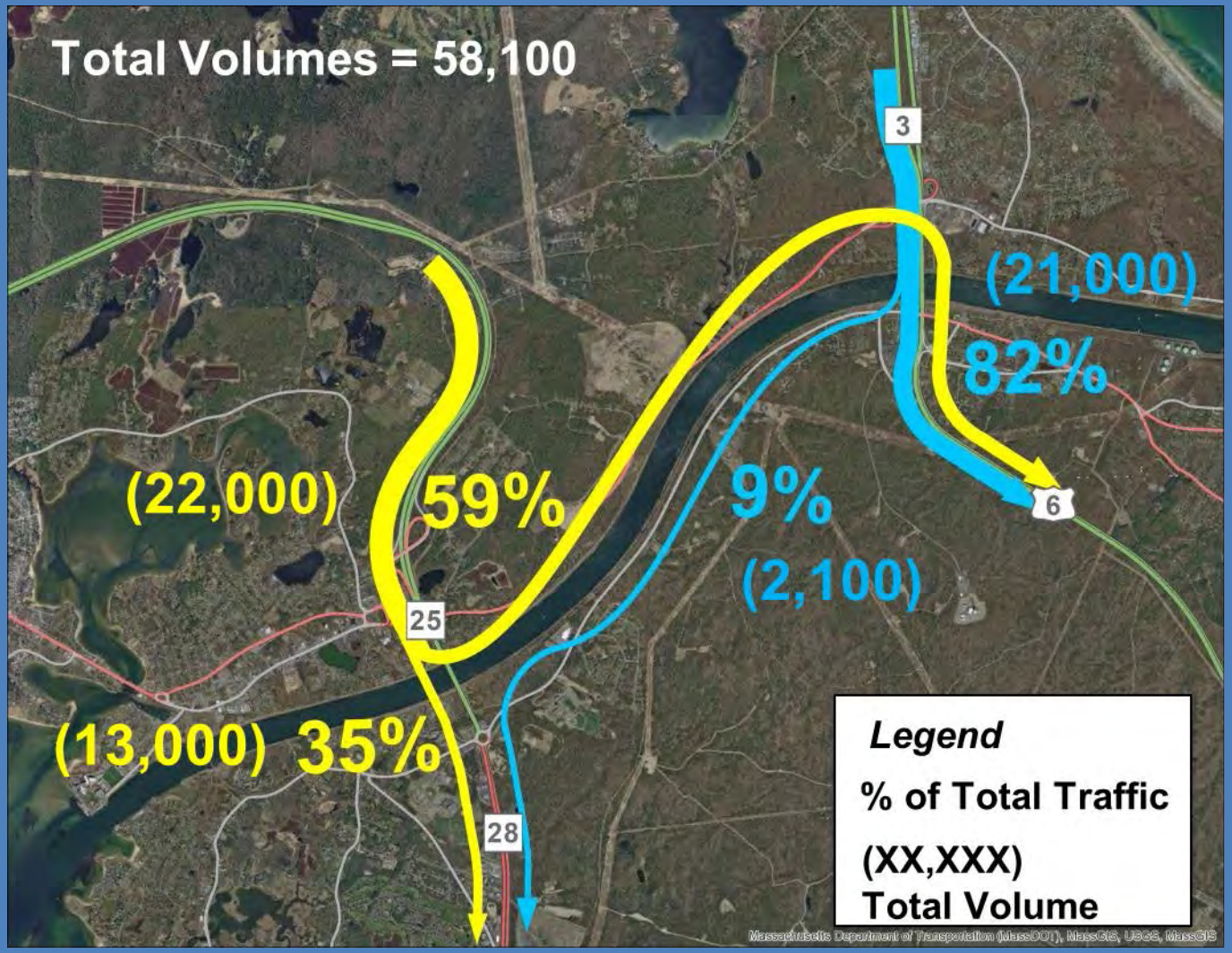
Preliminary Alternatives - Goal is to Improve the Transportation System's Mobility and Safety

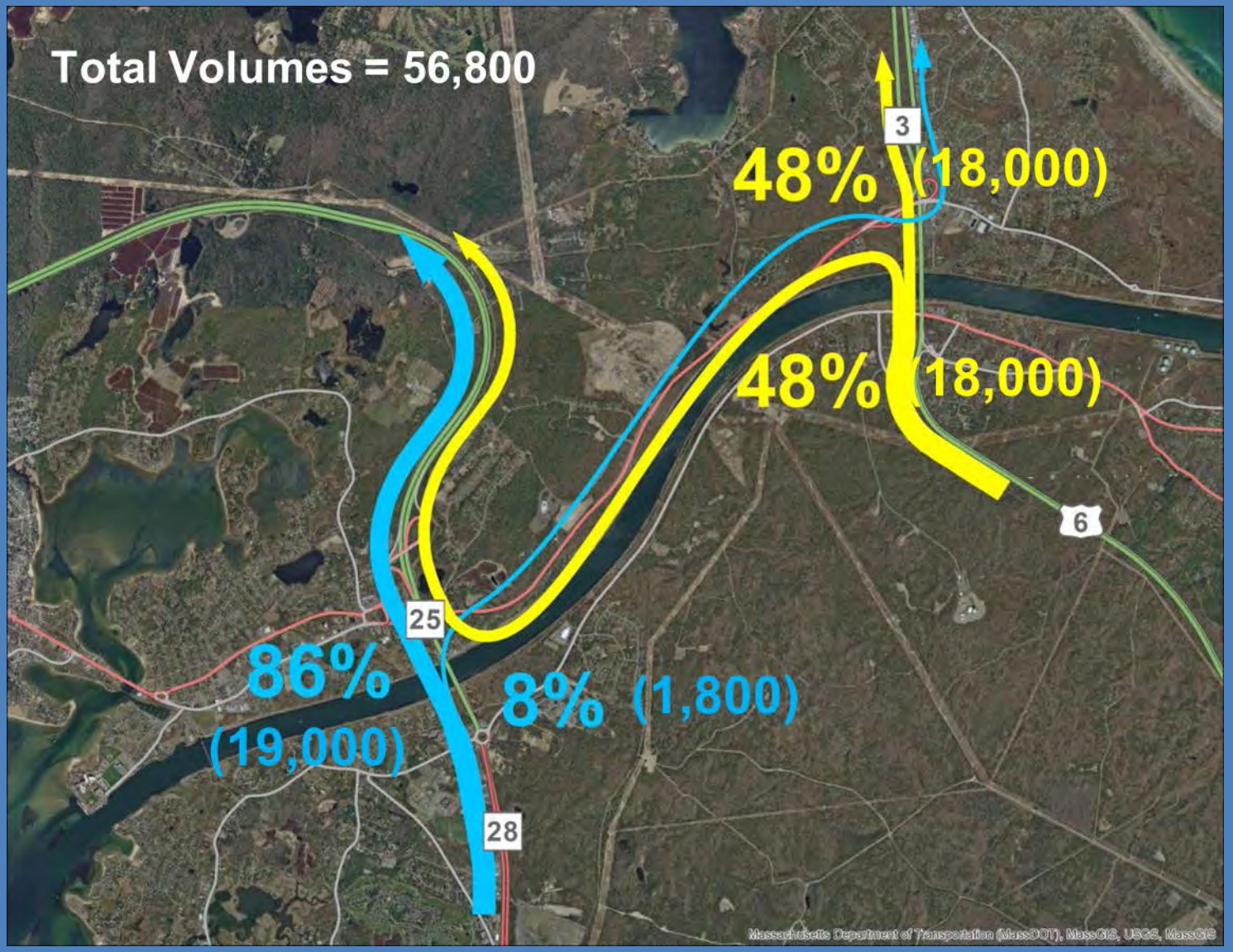


Travel Patterns within the Study Area Strongly Influence Preliminary Alternatives Development.

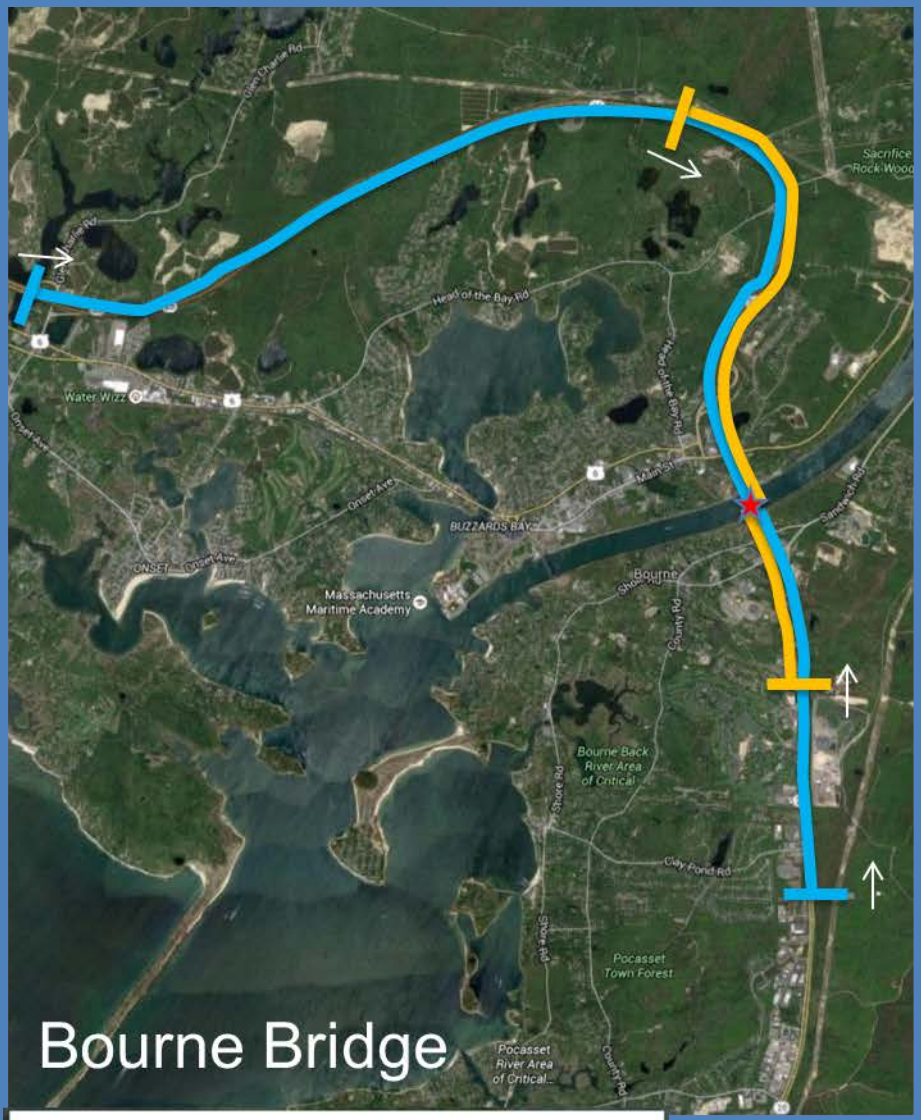
2014 Summer Saturday (10 – 11AM) Cape-Bound Routing.

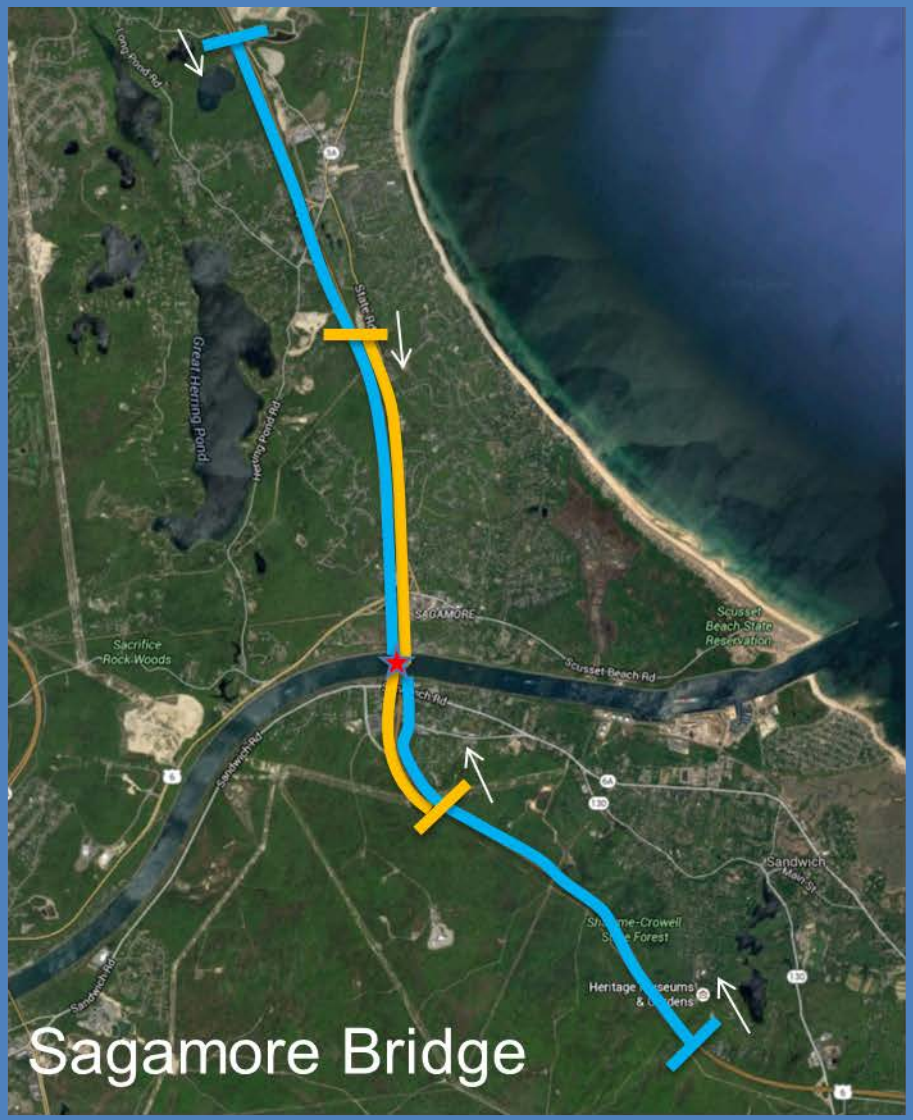


2014 Summer Sunday (12 -1PM) Off-Cape Routing.

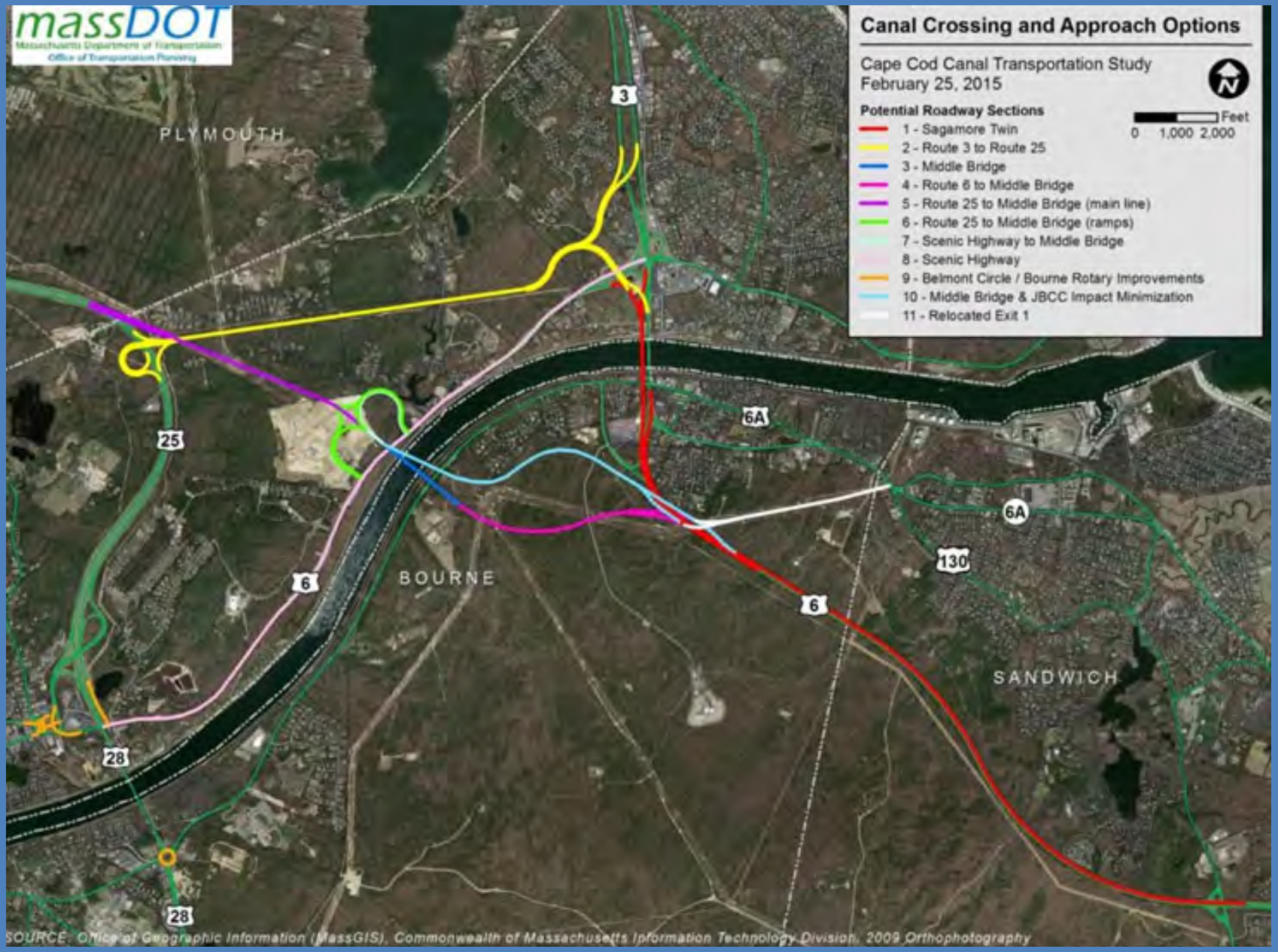


2040 Saturday Peak Hour (10 – 11 AM)
Typical (95th percentile) Queues from Bridges

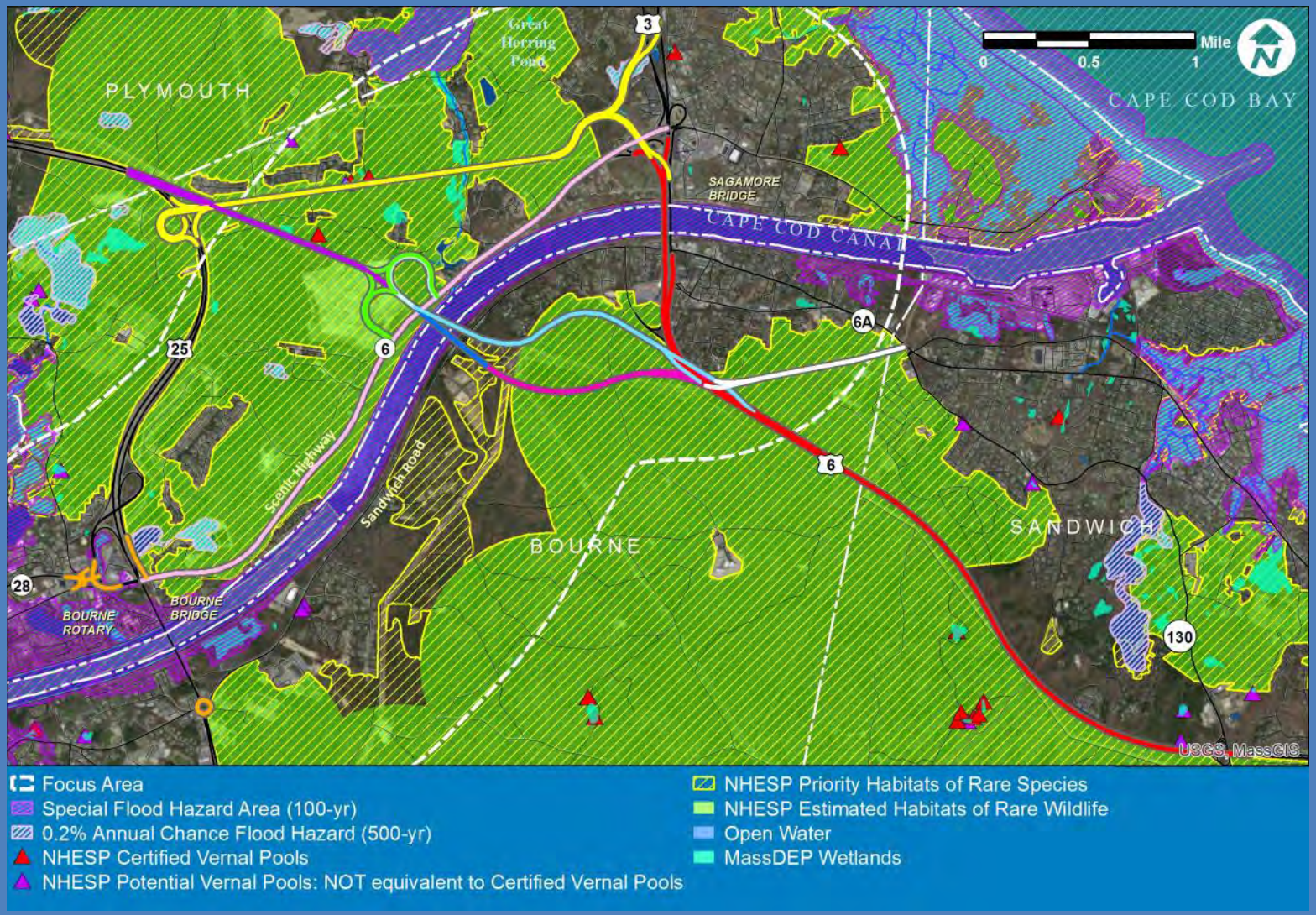




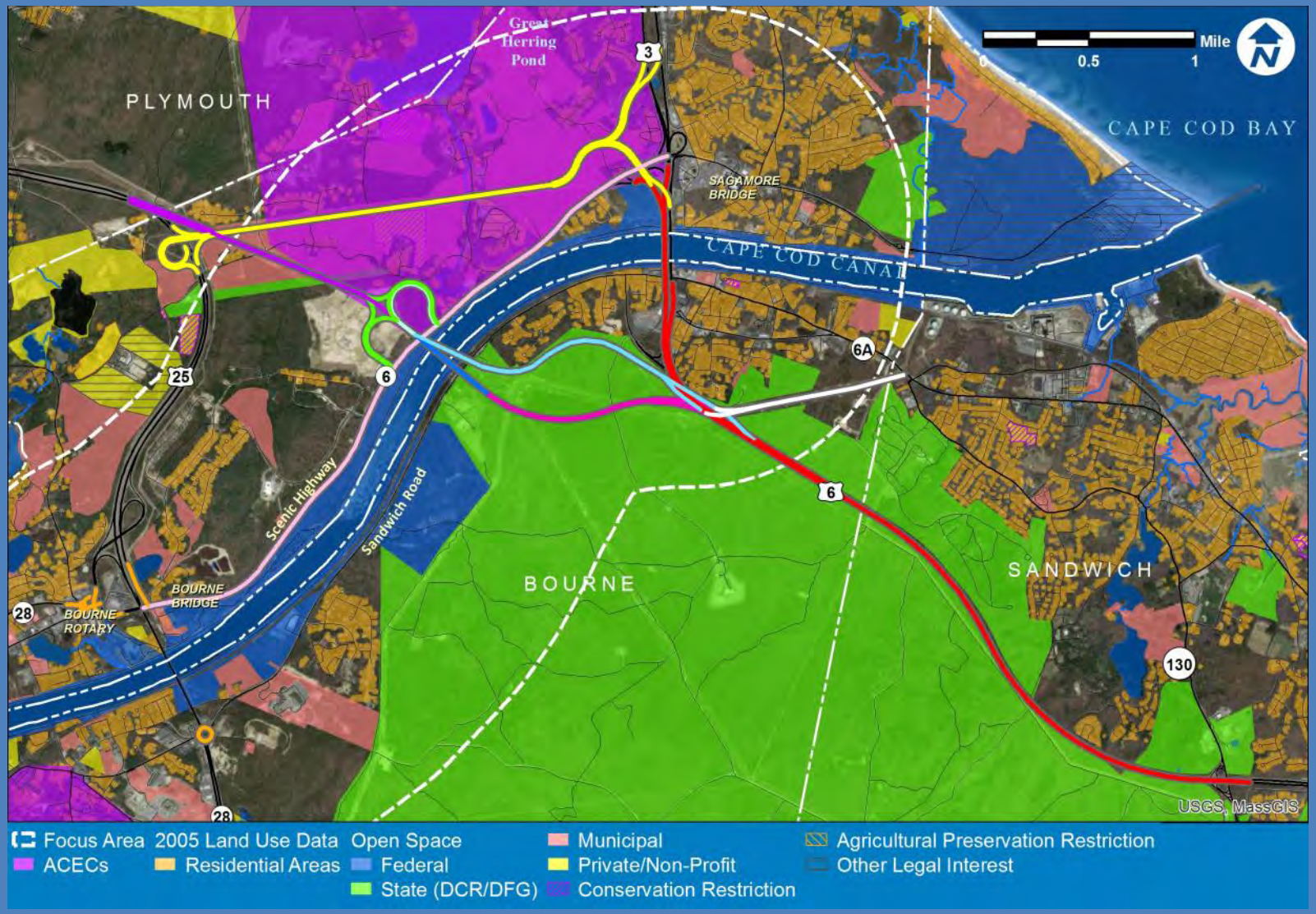
Review of MassDOT P3 Preliminary Alternatives


massDOT
Massachusetts Department of Transportation
Office of Transportation Planning
Canal Crossing and Approach Options
Cape Cod Canal Transportation Study
February 25, 2015
Potential Roadway Sections
1 - Sagamore Twin
2 - Route 3 to Route 25
3 - Middle Bridge
4 - Route 6 to Middle Bridge
5 - Route 25 to Middle Bridge (main line)
6 - Route 25 to Middle Bridge (ramps)
7 - Scenic Highway to Middle Bridge
8 - Scenic Highway
9 - Belmont Circle / Bourne Rotary Improvements
10 - Middle Bridge & JBCC Impact Minimization
11 - Relocated Exit 1
Feet
0 1,000 2,000
PLYMOUTH
BOURNE
SANDWICH
3
25
6
6A
6A
130
6
28
28
SOURCE: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts Information Technology Division, 2009 Orthophotography

Constraints and Considerations – Water/Rare Species Resources



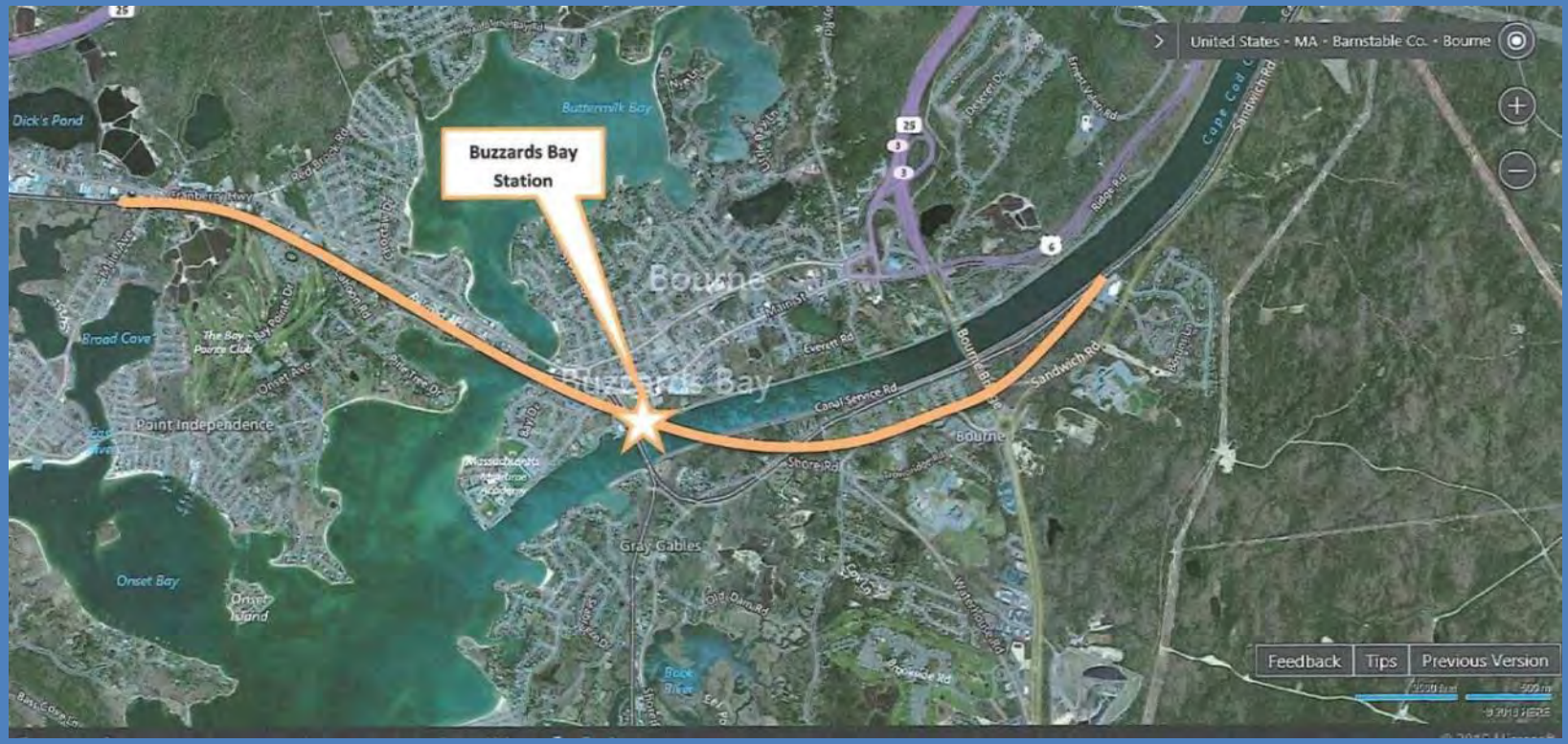
Constraints and Considerations – Land Resources



Preliminary Design Ideas from Members of the Public

Preliminary Design Ideas from Members of the Public – Tom Baron

Preliminary Design Ideas from Members of the Public – Tom Baron



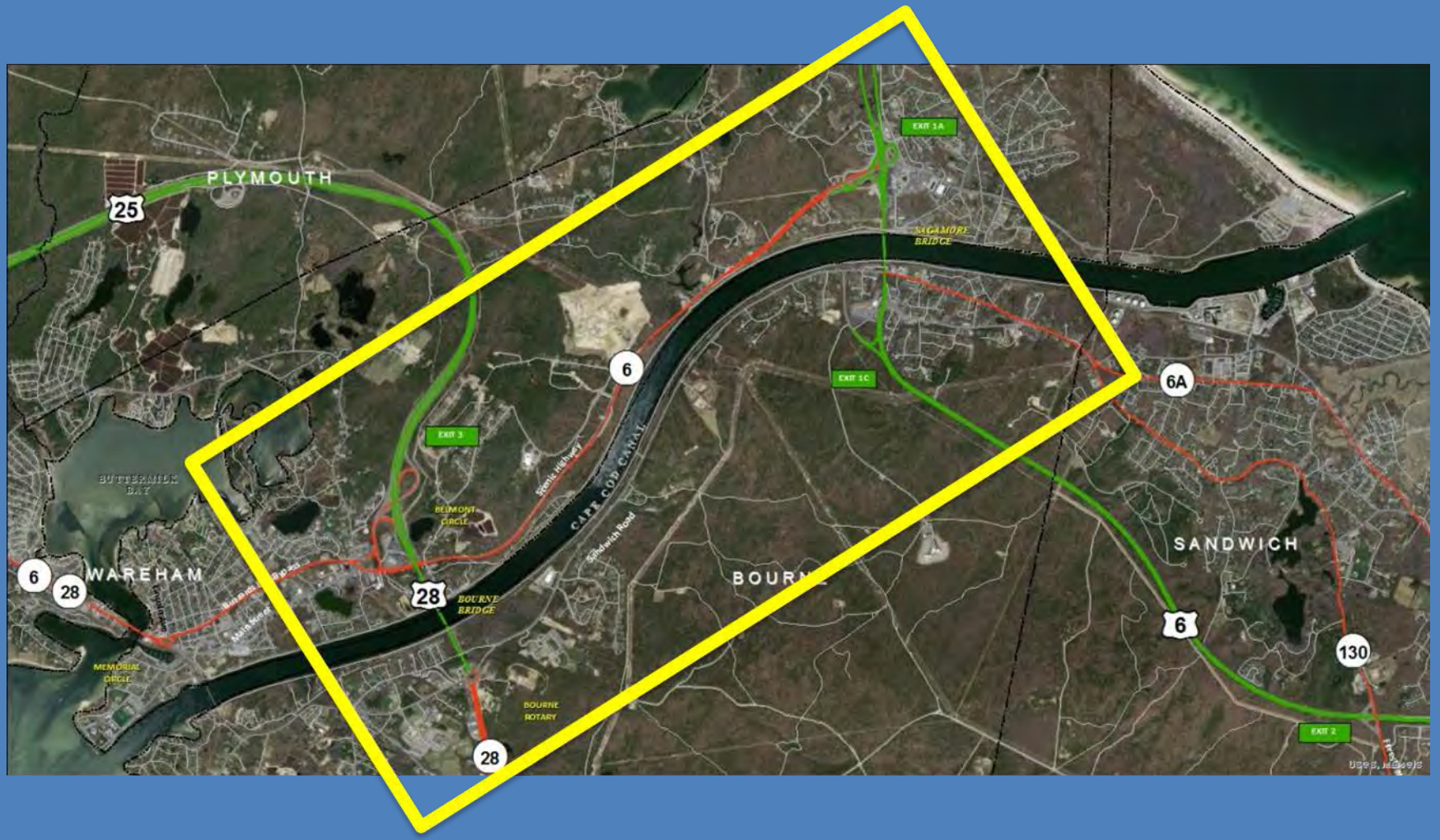
Preliminary Design Ideas from Members of the Public – Tom Baron

Summary of Public Ideas

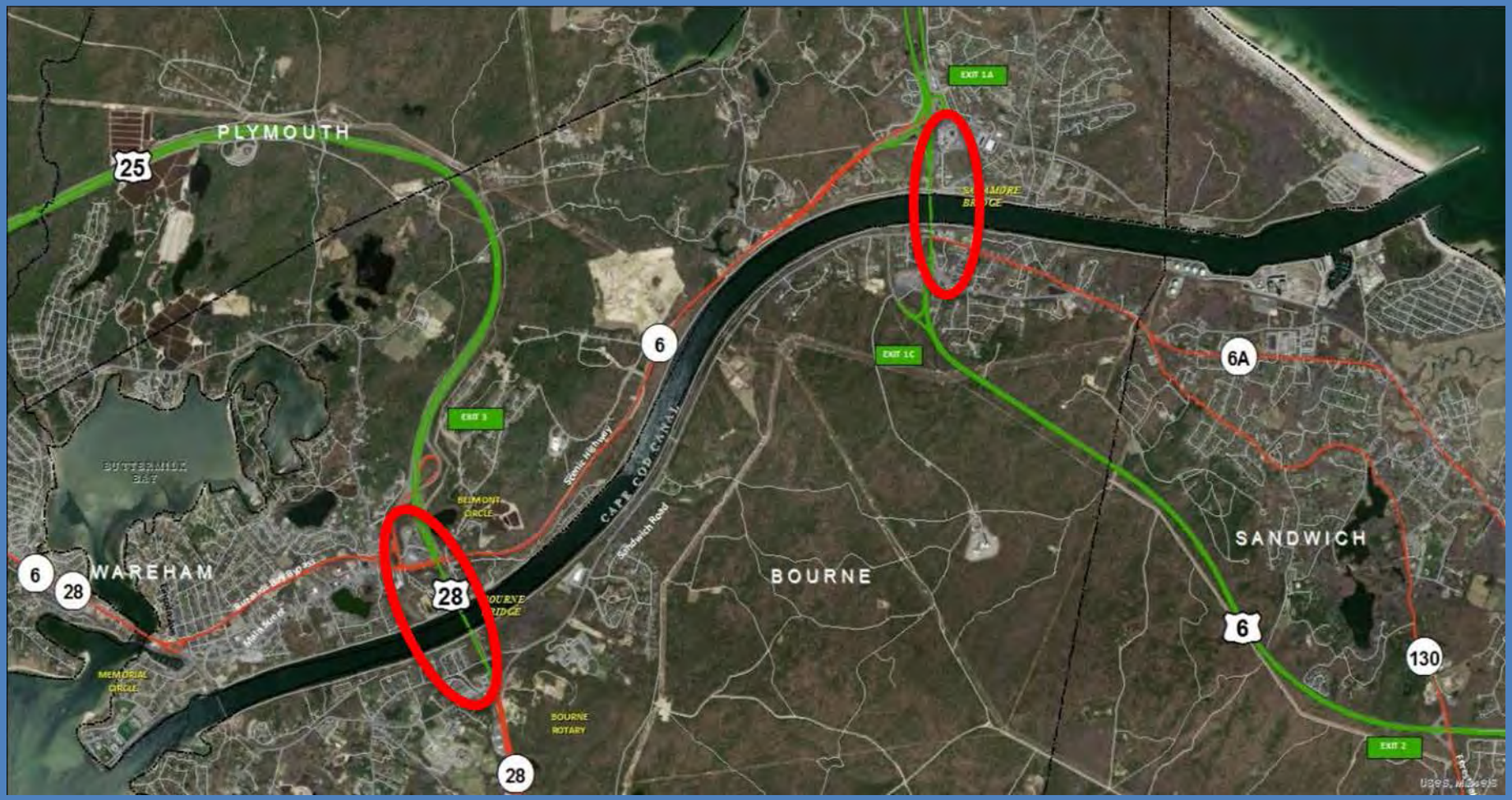
- Mid-Canal Crossing – Tom Baron
- Tunnel under Buzzards Bay between Marion and North Falmouth – Tom Baron and Mr. Voluckas
- Rail Road Tunnel under Canal – Tom Baron
- Airport at Joint Base Cape Cod
- Multimodal Centers, Ferry Service – David Oakley
- Route 6 Exit 2 Interchange Improvements - Tom Baron
- Bourne Rotary Improvement – Burton Pearlstein

Preliminary Alternatives Based on Army Corps Update

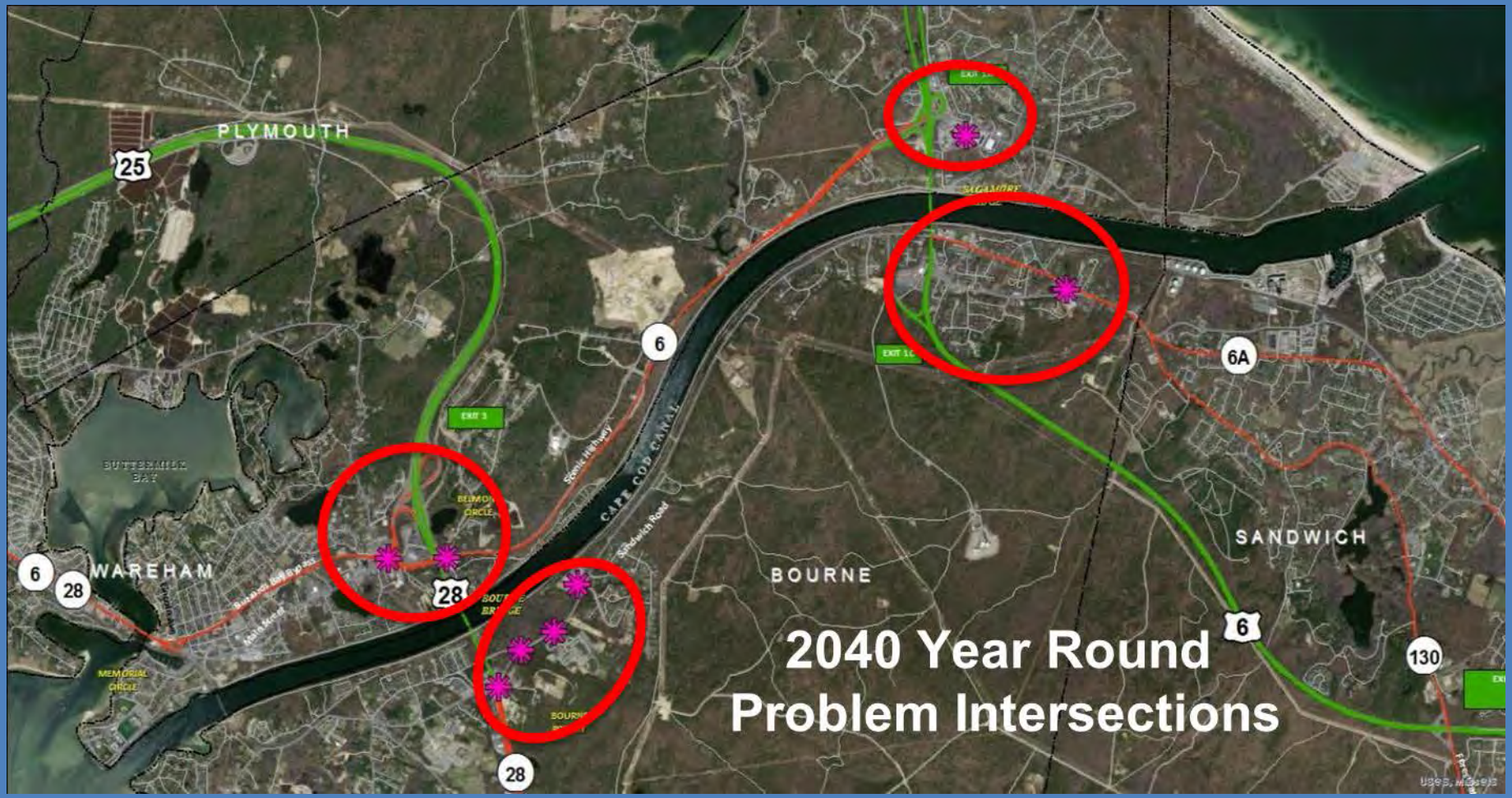
Preliminary Alternatives - Goal is to Improve the Transportation System's Mobility and Safety



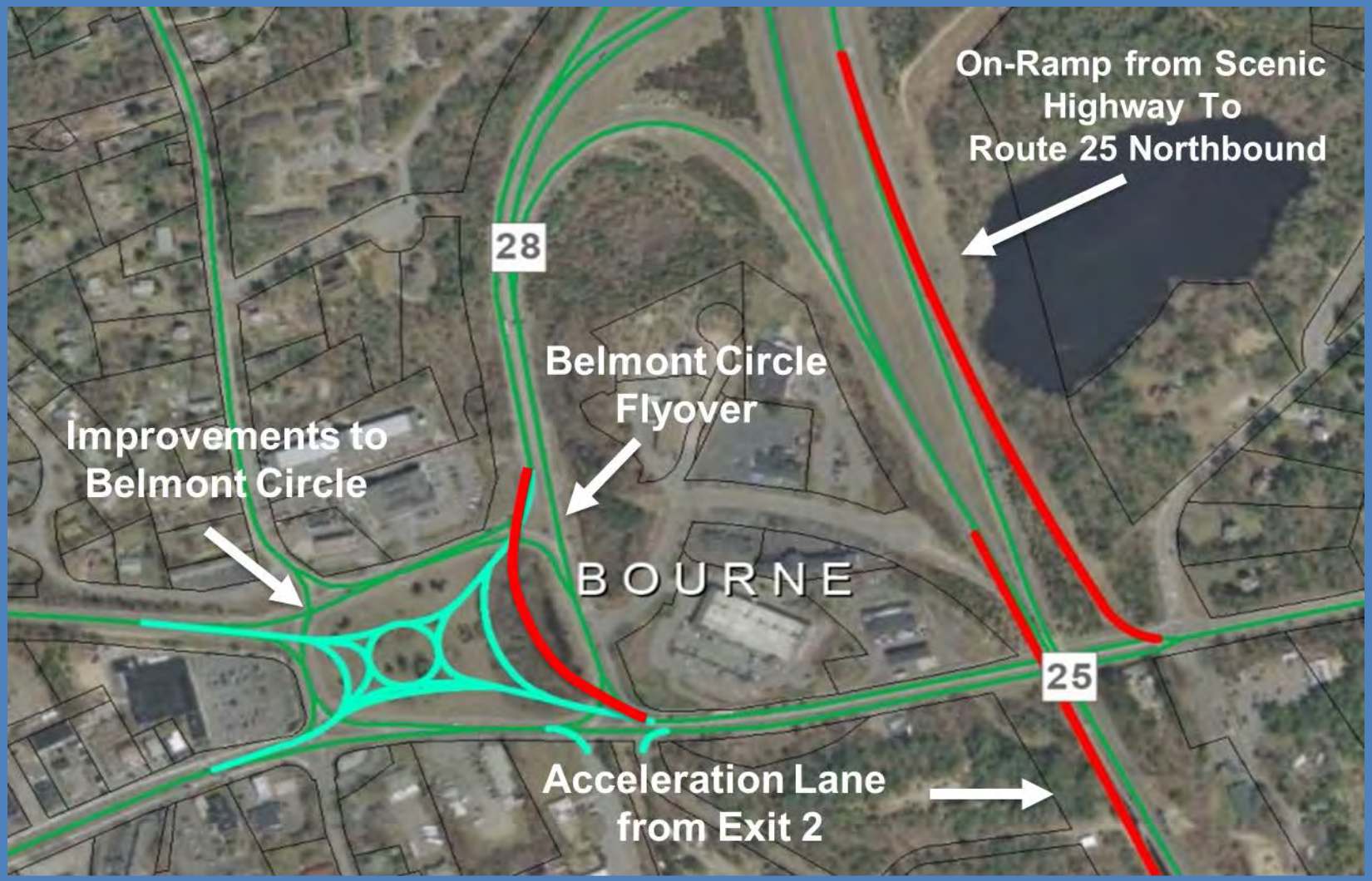
Focus Areas – Canal Bridges



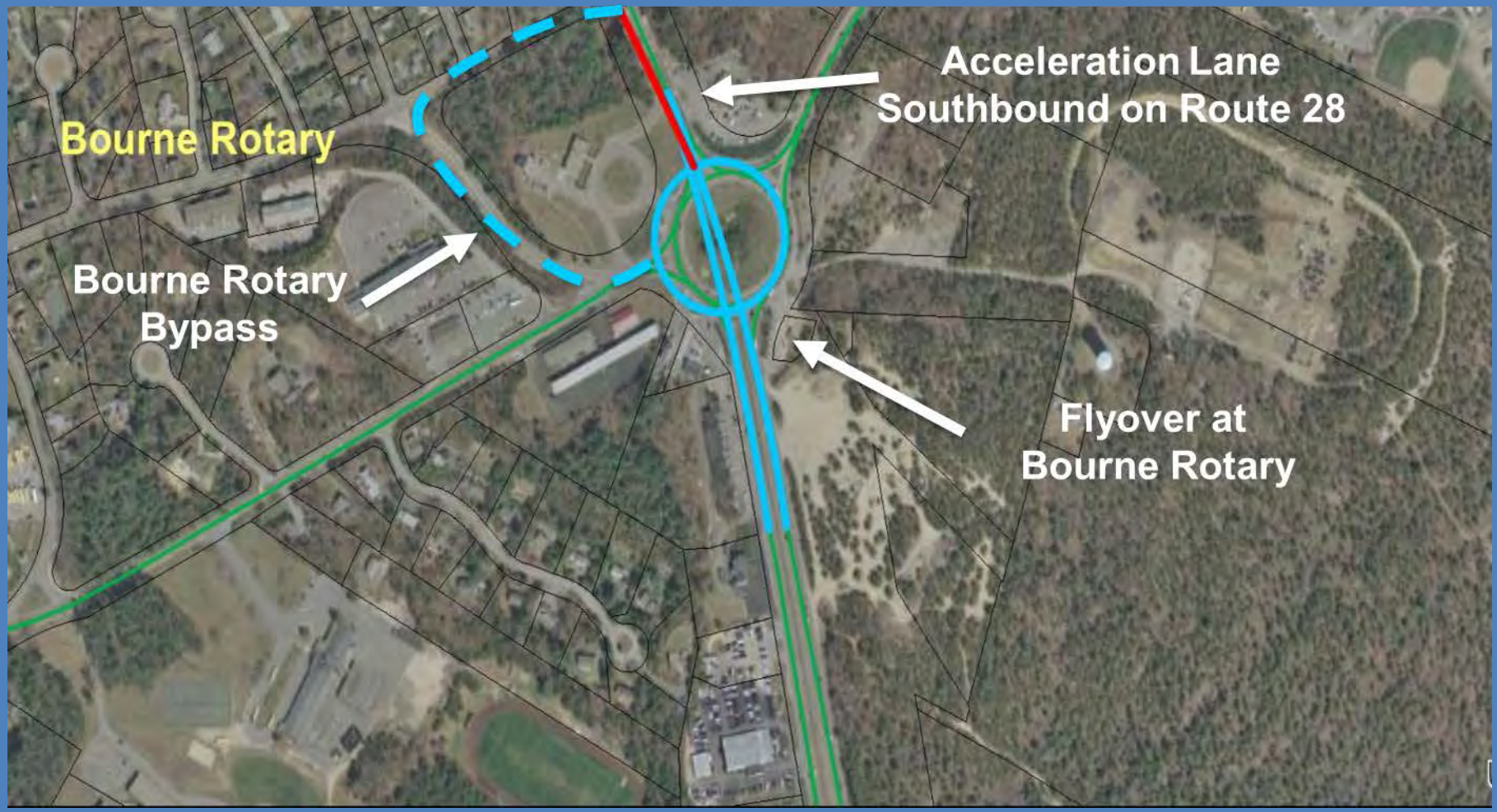
Focus Area - Canal Area Intersections



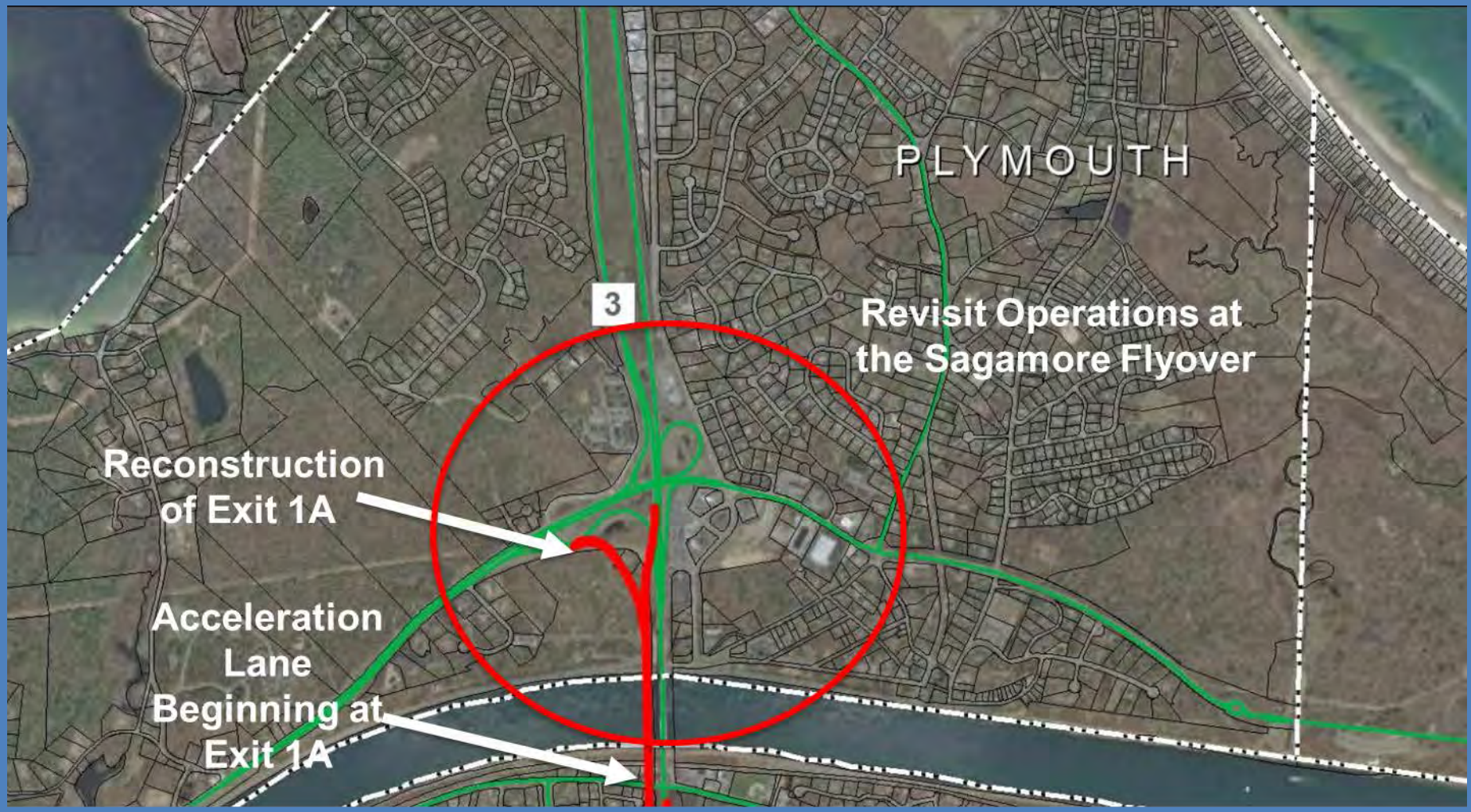
North of Bourne Bridge Preliminary Improvements



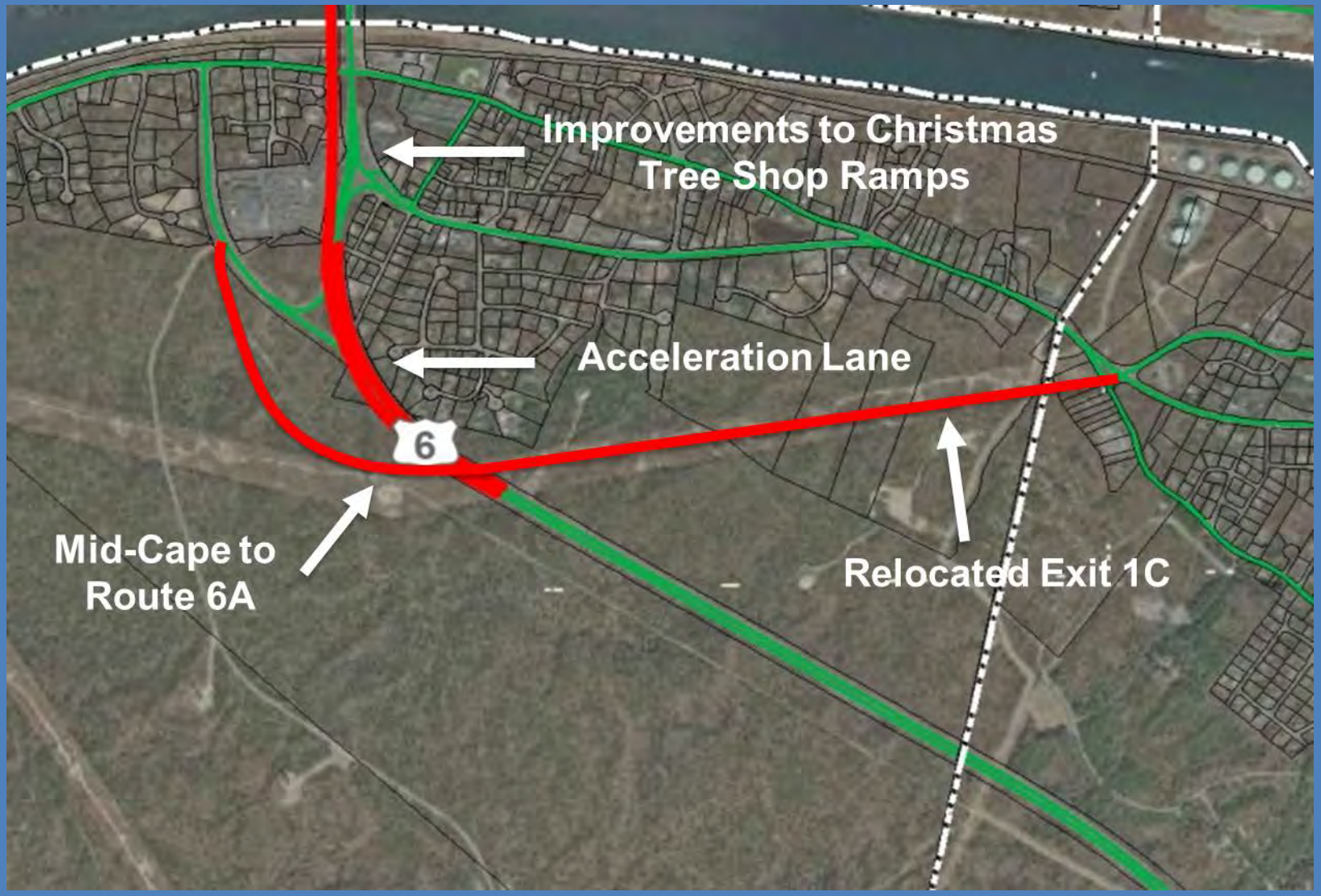
South of Bourne Bridge Preliminary Improvements



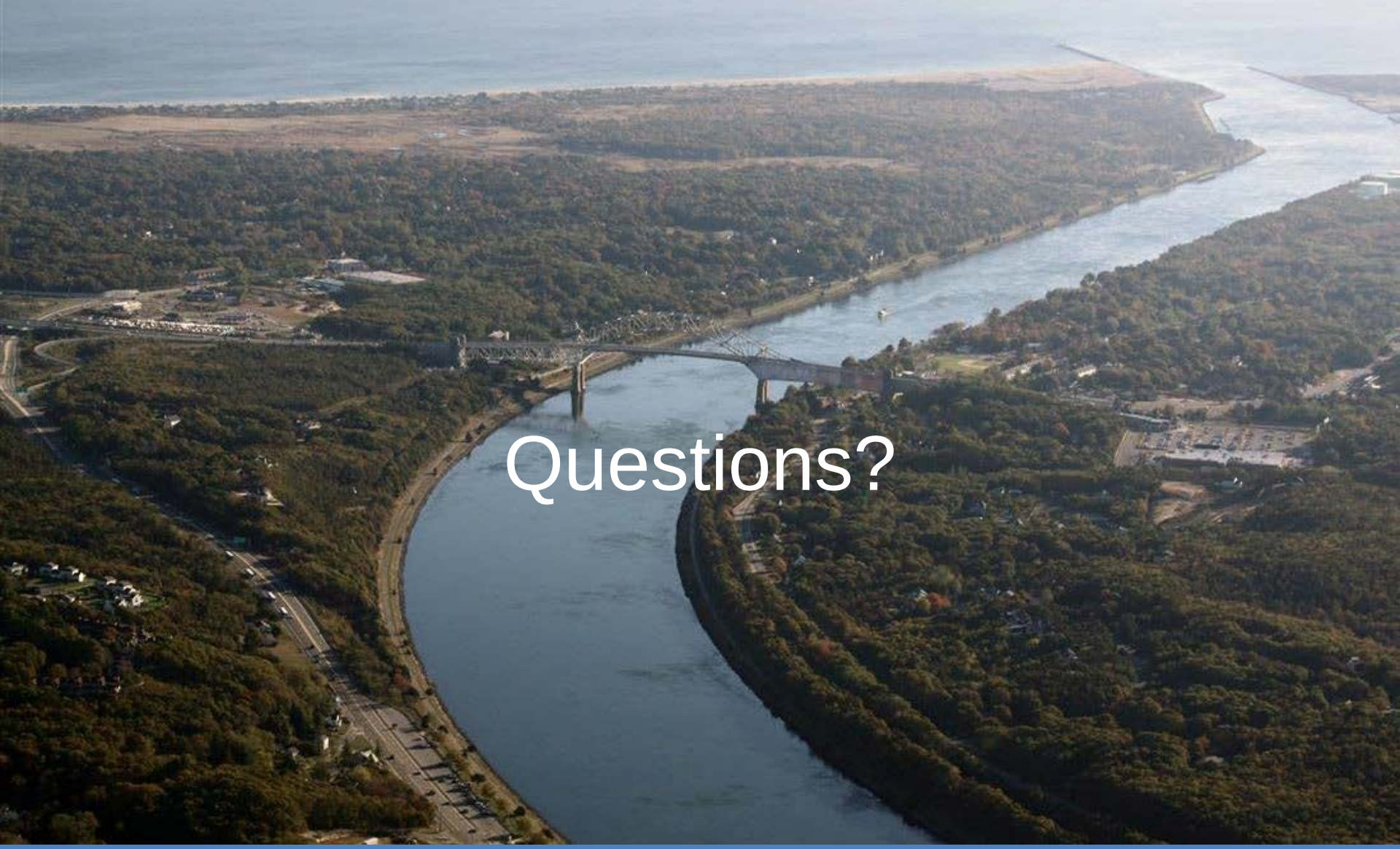
North of Sagamore Bridge Preliminary Improvements



South of Sagamore Bridge Preliminary Improvements



Study Background & Purpose

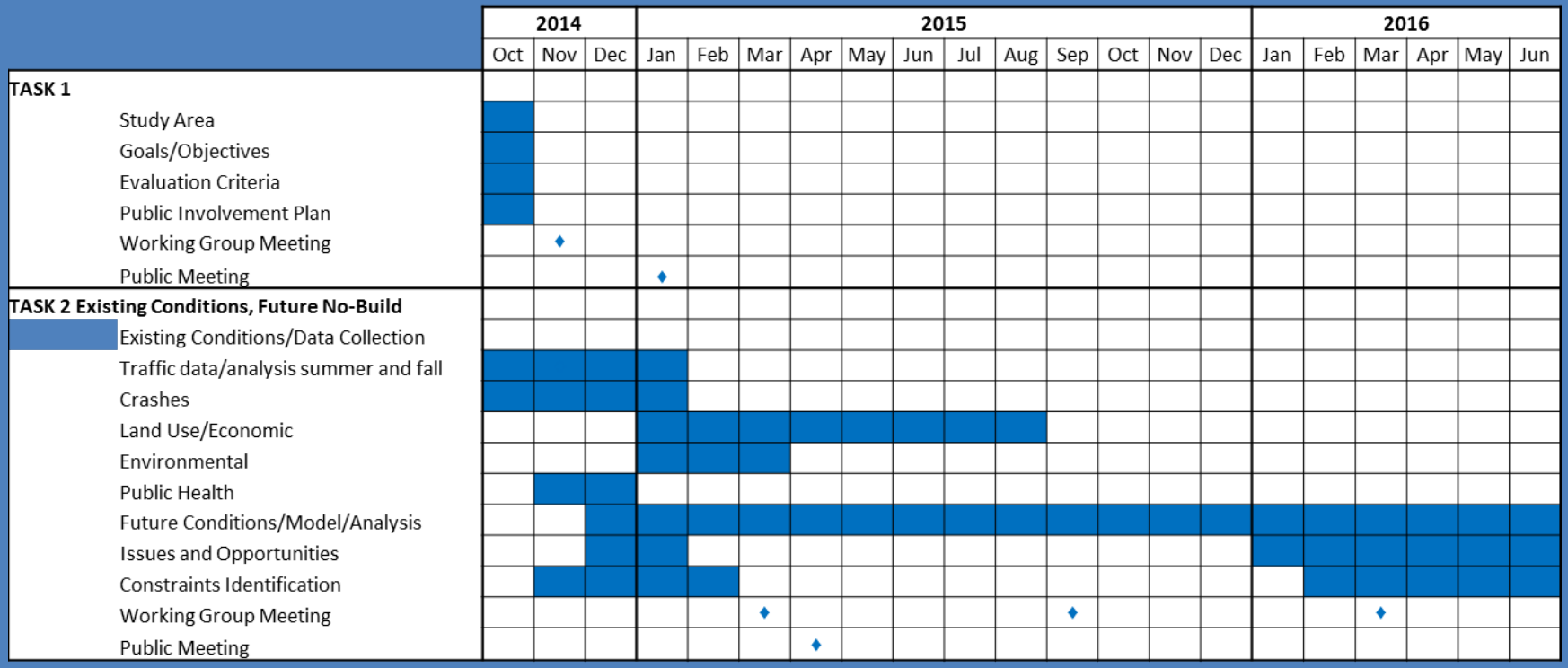


Comments and feedback can be emailed to

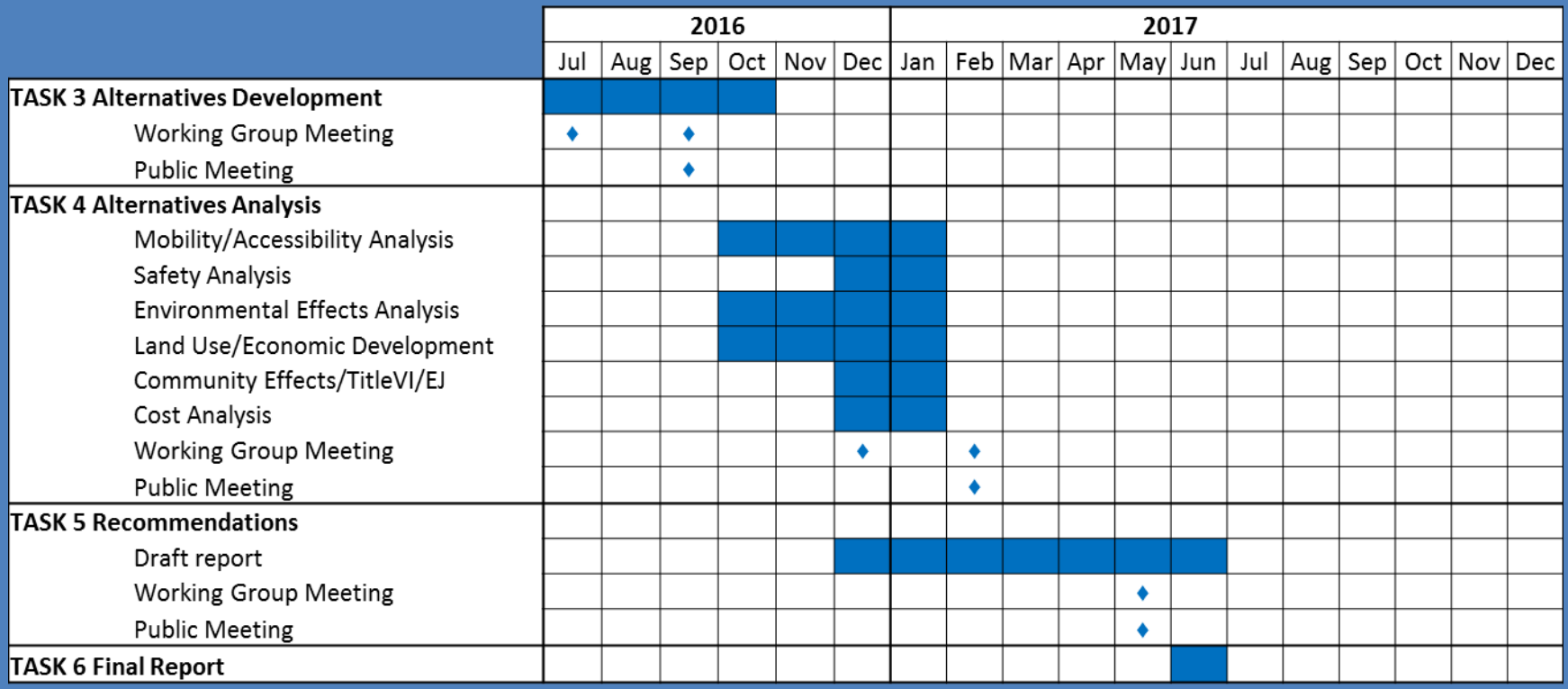
Ethan Britland - ethan.britland@state.ma.us

Schedule and Next Steps

Study Schedule.

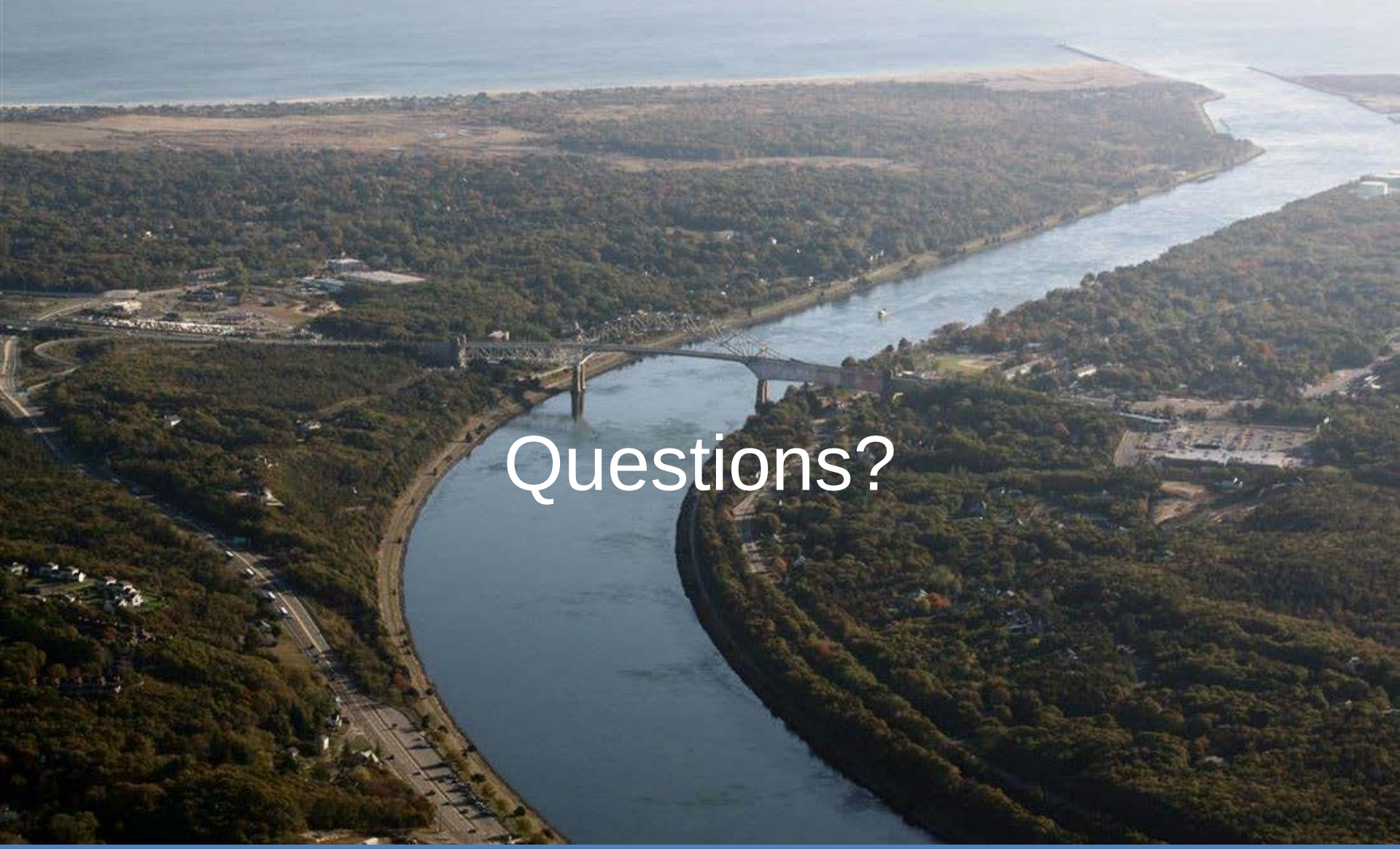


Study Schedule.



Next Steps.

- Potential Short-, Mid-, & Long-Term Improvement Alternatives
- Evaluation Matrix
- Working Group Feedback



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