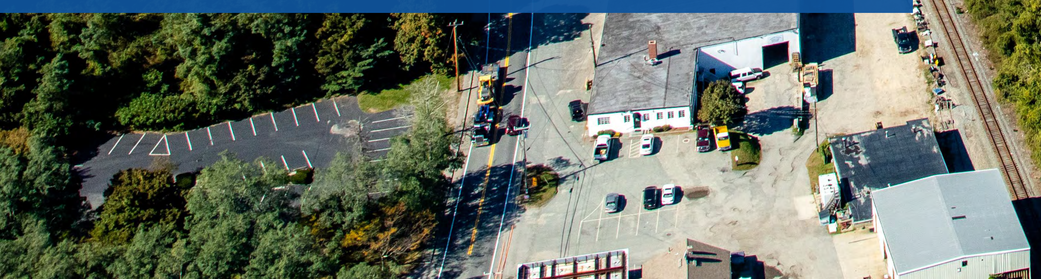
massDOT
Massachusetts Department of Transportation
Leading the Nation in Transportation Excellence

CAPE COD BRIDGES PROGRAM

OPEN HOUSE

Monday, November 18th
12pm-3pm, 5pm-8pm

Translation Services
Servicios de Traducción
Serviços de Tradução
American Sign Language



THIS EVENT IS ACCESSIBLE

Sagamore North

Subsurface Exploration Program

Bridge

Sagamore South

Evaluation Criteria

Build Alternative: Sagamore

Build Alternative: Bourne

Bourne North

Bourne South

Environmental

Sign-in

Information/ Government Relations

Interactive Activities

WELCOME

SIGN IN HERE

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Link: tiny.cc/CCBP_REGISTRATION

COMMENT HERE

PIMA comment form
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CAPE COD BRIDGES PROGRAM

HOW DID MassDOT IDENTIFY THE RECOMMENDED HIGHWAY INTERCHANGE OPTIONS?

MassDOT developed a two-step approach to conduct detailed assessments of ten highway interchange approach options.

STEP 1 REGIONAL TRAFFIC OPERATIONS ASSESSMENT

MassDOT used four different traffic analysis software and simulation models to:

- Identify average vehicle delay,
- Evaluate congestion levels,
- Calculate travel times,
- Measure traffic queue lengths.

Based on the results, MassDOT concluded that one Bourne North option would negatively affect the regional traffic network and dismissed it from further evaluation.

STEP 2 PROGRAM NEEDS AND GOALS ASSESSMENT

MassDOT identified transportation and contextual performance measures (measures of effectiveness) to evaluate the remaining nine interchange options in accordance with its Project Development and Design Guide. The Guide defines transportation performance measures as the means to evaluate how the transportation facility functions and accommodates its users, and it defines contextual performance measures as the means to evaluate how the transportation facility relates to its physical surroundings and community function.

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PROGRAM NEEDS AND GOALS ASSESSMENT

Program Needs

MassDOT identified transportation performance measures related to identified Program needs, in coordination with FHWA and stakeholders.

- **OPERATIONS -** Six evaluation criteria and seven performance measures were used to assess whether the option would improve vehicular traffic operations.
- **GEOMETRICS AND SAFETY -** Seven evaluation criteria and eight performances measures were used to assess whether the option would address the substandard design elements of the bridges and their highway networks.
- **MULTIMODAL ACCOMMODATIONS -** Eight evaluation criteria and 11 performance measures were used to assess whether the option would improve accommodations for pedestrians and bicyclists.
- **STRUCTURAL/MAINTENANCE -** Two evaluation criteria and two performance measures were used to assess whether the option would address the deteriorating structural condition and escalating maintenance demands of the Bourne and Sagamore bridges.

NUMBER OF PERFORMANCE MEASURES EVALUATED **65**

Program Goals and Objectives

MassDOT identified contextual performance measures related to the Program goals and objectives in accordance with the Secretary's Certificate on the Environmental Notification Form and agency and public input.

- **SOCIOECONOMICS -** Eight objectives and 15 performance measures were used to assess whether the option would maintain and improve the socioeconomic fabric of the surrounding community.
- **NATURAL RESOURCE PROTECTION -** Three objectives and three performance measures were used to assess whether the option would preserve and protect natural resources.
- **RESILIENCY AND SUSTAINABILITY -** Four objectives and 14 performance measures were used to assess whether an option would enhance the resiliency and sustainability of the built environment.
- **CONSTRUCTABILITY -** Two objectives and corresponding performance measures were used to assess whether an option would maximize constructability.
- **EMERGENCY RESPONSE -** Two objectives and corresponding performance measures were used to assess whether an option would facilitate emergency response.
- **COST EFFECTIVENESS -** One objective and corresponding performance measure was used to assess whether an option would maximize cost effectiveness.

CAPE COD BRIDGES PROGRAM

EVALUATION SYSTEM

MassDOT developed a scoring system to evaluate the highway interchange approach options based on their quantitative and qualitative performance relative to meeting the Program needs and the Program goals and objectives compared to other options or the No Build Alternative condition.

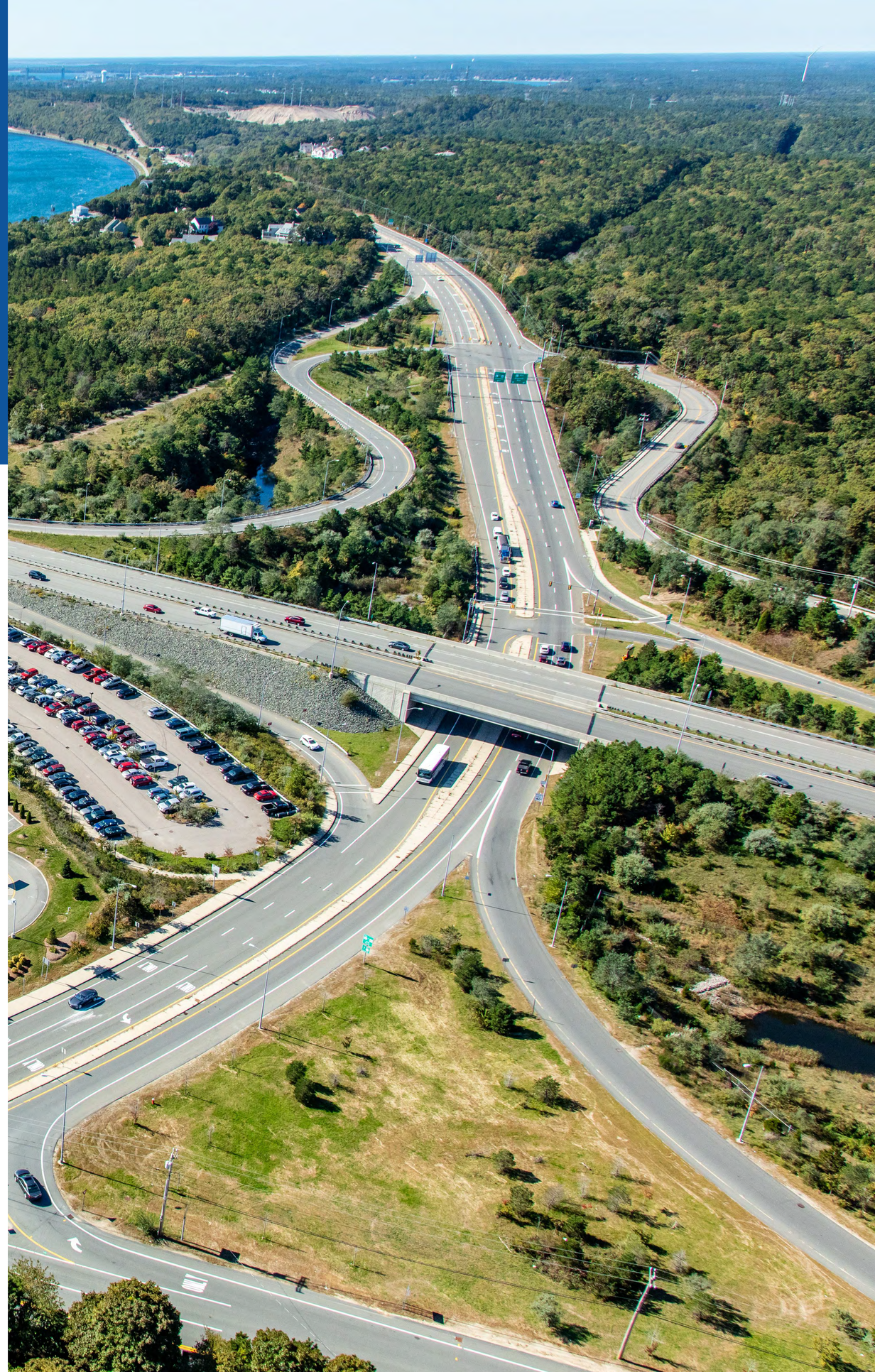
Highway Interchange Detailed Assessment Rating System

ADDRESSING PROGRAM NEEDS	ADDRESSING PROGRAM GOALS AND OBJECTIVES		
The option would provide **Substantial Benefits**.	The option would have **less or the least impacts**.	OR	The option would provide **more or the most** opportunity to exceed Program **objectives**.
The option would provide **Marginal/ Some Benefits**.	The option would have **some impacts**.	OR	The option would provide some opportunity to meet **minimum** Program **objectives**.
The option would provide **Insufficient/ Negligible Benefit**.	The option would have **more or the most impacts**.	OR	The option would provide **less or the least** opportunity to meet Program **objectives**.

HIGHEST ATING

OWER ATING

OWEST ATING



CAPE COD BRIDGES PROGRAM

BOURNE NORTH: OPTION DIFFERENTIATORS (1 of 2)

Program Needs and Evaluation Criteria

		BOURNE NORTH (BN)		
PROGRAM NEED	E AL ATION CRITERIA	BN-13.1: Single Exit Partial Interchange	BN-14.4b Directional Interchange Option *(Recommended)*	COMPARISON OF OPTIONS
Operations	Does the option separate local and regional traffic?	**Marginal Benefit**	**Substantial Benefit**	To separate traffic, BN-14.4b would use flyover ramps, allowing for free-flow traffic); BN-13.1 would use signalized intersections.
Geometrics and Safety	Does the option minimize wrong-way driving risk?	**Marginal Benefit**	**Substantial Benefit**	To minimize risk, BN-14.4b would geometrically restrict wrong-way driving; BN-13.1 would use Wrong-Way Detection Systems.
Multimodal Accommodations	Does the option Improve pedestrian/bicycle access adjacent to local roads?		**Substantial Benefit**	BN-14.4b would meet MassDOT's Healthy Transportation Directive; BN-13.1 would not meet the Directive.
	Does the option improve pedestrian/bicycle access to existing trail facilities?	**Marginal Benefit**	**Substantial Benefit**	BN-14.4b would provide a grade-separated crossing; BN-13.1 would include several at-grade crossings.
	Does the option improve pedestrian/bicycle connections at ramp terminals?	**Marginal Benefit**	**Substantial Benefit**	BN-14.4b would avoid the high-speed ramp through diversion; BN-13.1 would provide signalized control at ramps.
	Does the option enhance the pedestrian/bicycle experience?	**Marginal Benefit**	**Substantial Benefit**	BN-14.4b would require two intersection/ramp crossings; BN-13.1 would require six intersection/ramp crossings.

CAPE COD BRIDGES PROGRAM

BOURNE NORTH: OPTION DIFFERENTIATORS (2 of 2)

Program Goals and Objectives

		BOURNE NORTH (BN)		
PROGRAM GOAL	PROGRAM OBJECTIVES	BN-13.1: Single Exit Partial Interchange	BN-14.4b Directional Interchange Option *(Recommended)*	COMPARISON OF OPTIONS
Socioeconomics	Does the option improve neighborhood access to community facilities and services, specifically, schools, hospitals, and emergency services (police and fire)?	**Some Opportunity**	**More Opportunity**	Along Scenic Highway, BN-14.4b would add a shared-use path; BN-13.1 would add sidewalks.
	Does the option maintain or improve neighborhood cohesion?	**Some Opportunity**	**More Opportunity**	BN-14.4b would fully remove State Route 28/25 traffic and BN-13.1 would partially remove State Route 28/25 traffic from the local roadway network.
	Does the option avoid and/or minimize effects to parks, open space, and recreational facilities?	**Some Impacts**		BN-13.1 would affect 14.2 acres and BN-14.4b would affect 14.8 acres of Bourne Scenic Park.
Resiliency and Sustainability	Does the option effectively manage stormwater, demonstrated by change in 2-year peak discharge rate?	**Some Opportunity**	**More Opportunity**	BN-14.4b would have a 14% decrease and BN-13.1 would have 4% increase in 2-year peak discharge rate.
Emergency Response	Does the option improve pedestrian/bicycle access to existing trail facilities?	**Some Opportunity**	**More Opportunity**	For westbound departures, BN-14.4b would provide free-flow traffic conditions; BN-13.1 would have a signalized intersection.
Cost Effectiveness	Does the option maximize construction cost effectiveness?	**More Opportunity**	**Some Opportunity**	Approximate costs would be $178 million for BN-13.1 and $211 million for BN-14.4b.

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BOURNE SOUTH: OPTION DIFFERENTIATORS (1 of 1)

Program Needs and Evaluation Criteria

		BOURNE SOUTH (BS)		
PROGRAM NEED	EVALUATION CRITERIA	BS-2: Diamond Interchange Option *(Recommended)*	BS-2.2: Single-Point Interchange	COMPARISON OF OPTIONS
Operations	Does the option improve cross-canal mobility?	**Substantial Benefit**	**Marginal Benefit**	BS-2 would reduce vehicle hours traveled by 20% over BS-2.2.
Geometrics and Safety	Does the option minimize wrong-way driving risk?	**Substantial Benefit**	**Marginal Benefit**	BS-2 would geometrically restrict wrong-way driving; BS-2.2 would have an inherent risk of wrong-way driving.
Multimodal Accommodations	Does the option Improve pedestrian/bicycle connections at ramp terminals?	**Substantial Benefit**	**Marginal Benefit**	BS-2 would provide rapid flashing beacons for crossings; BS-2.2 would provide signalized crossings but would require complicated lane crossings.

CAPE COD BRIDGES PROGRAM

SAGAMORE NORTH: OPTION DIFFERENTIATORS (1 of 2)

Program Needs and Evaluation Criteria

PROGRAM NEED	E AL ATION CRITERIA	SA AMORE NORTH (SN)		COMPARISON OF OPTIONS
		SN-1A: Similar to Existing Configuration	SN-8A: Direct Connection to State Road Option *(Recommended)*	
Operations	Does the option separate local and regional traffic?	**Insufficient Benefit**	**Marginal Benefit**	SN-8A would remove Sagamore Bridge westbound traffic from a local intersection; SN-1A would maintain existing conditions.
Geometrics and Safety	Does the option minimize weaving movements?	**Marginal Benefit**	**Substantial Benefit**	For bridge westbound off-ramp traffic, SN-8A would have one exit, minimizing merge and weave; SN-1A would have two exits, increasing merge and weave.
	Does the option minimize wrong-way driving risk?	**Substantial Benefit**	**Marginal Benefit**	SN-1A would geometrically restrict wrong-way driving; SN-8A would have high potential for wrong-way driving, requiring mitigation.
	Does the option minimize deceleration lane speed variances with the mainline greater than 25 MPH?	**Marginal Benefit**	**Substantial Benefit**	SN-8A would have two mainline locations with higher speed differentials, compared to three mainline locations in SN-1A.
Multimodal Accommodations	Does the option improve pedestrian/bicycle connections at ramp terminals?	**Marginal Benefit**	**Substantial Benefit**	At Scenic Highway ramp crossings, SN-8A would have one SUP crossing; SN-1A would have two SUP crossings.
	Does the option enhance the pedestrian/bicycle experience?	**Marginal Benefit**	**Substantial Benefit**	SN-8A would have four pedestrian/ bicycle crossings on the Scenic Highway east to west movement, versus five crossings in SN-1A.
Maintenance/ Structural	Does the option minimize the risk of disruptive maintenance and/or rehabilitation on the existing bridges?	**Insufficient Benefit**	**Substantial Benefit**	In SN-8A, traffic could be shifted off existing bridge after construction of one main span without ramp closings, versus after construction of two main spans with long duration ramp closings in SN-1A.

CAPE COD BRIDGES PROGRAM

SAGAMORE NORTH: OPTION DIFFERENTIATORS (2 of 2)

Program Goals and Objectives

		SA AMORE NORTH (SN)		
PROGRAM GOAL	PROGRAM OBJECTIVES	SN-1A: Similar to Existing Configuration	SN-8A: Direct Connection to State Road Option *(Recommended)*	COMPARISON OF OPTIONS
Socioeconomics	Does the option minimize construction period effects upon the traveling public?	**Some Impacts**	**Less Impacts**	SN-8A would not require vehicular construction detours; SN-1A would require a long duration, complicated vehicular construction detour.
Constructability	Does the option minimize the construction duration?	**Less Impacts**	**Some Impacts**	In opening of second main span, SN-1A would have a time savings of 12-18 months over SN-8A.
	Does the option maintain existing connections during construction?	**Some Impacts**	**Less Impacts**	SN-8A would maintain existing connections during construction without detours; SN-1A would require extensive construction detour.

CAPE COD BRIDGES PROGRAM

SAGAMORE SOUTH: OPTION DIFFERENTIATORS (1 of 3)

Program Needs and Evaluation Criteria

PROGRAM NEED	E AL ATION CRITERIA	SA AMORE SOUTH (SS SS-1 Similar to Existing Configuration with Cranberry Highway Extension	SS 1.1: Similar to Existing Configuration	SS-3.1A Westbound On-Ramp under Route 6 with Cranberry Highway Extension and Sandwich oad Connector *(Recommended)*	COMPARISON OF OPTIONS
Operations	Does the option reduce local travel times?	**Substantial Benefit**	**Marginal Benefit**	**Substantial Benefit**	Vehicle hours traveled would be approximately 70 in SS-3.1A, 83 in SS-1, and 97 in SS-1.1.
	Does the option improve cross-canal mobility?	**Substantial Benefit**	**Marginal Benefit**	**Substantial Benefit**	Vehicle hours traveled would be comparable in SS-3.1A and SS-1 and over 24% higher in SS-1.1
	Does the option separate local and regional traffic?	**Marginal Benefit**	**Insufficient Benefit**	**Substantial Benefit**	SS-3.1A would remove regional traffic from Cranberry Highway Extension. SS-1 would separate some local and regional traffic. SS-1.1 would maintain existing traffic patterns.
Geometrics and Safety	Does the option minimize weaving movements?	**Marginal Benefit**	**Marginal Benefit**	**Substantial Benefit**	SS-3.1A's design improvements would minimize weaving movements over SS-1 and SS-1.1.
Multimodal Accommodations	Does the option enhance the pedestrian/bicycle experience?	**Marginal Benefit**	**Substantial Benefit**	**Substantial Benefit**	SS-1.1 and SS-3.1A would require one sidewalk crossing. SS-1 would require two sidewalk crossings at ramp terminals.
	Does the option enhance the pedestrian/bicycle experience?	**Marginal Benefit**	**Marginal Benefit**	**Substantial Benefit**	SS-3.1A would provide the highest level of SUP and neighborhood connectivity among the three options.
Maintenance Structural	Does the option minimize the risk of disruptive maintenance and/or rehabilitation on the existing bridges?	**Insufficient Benefit**	**Insufficient Benefit**	**Substantial Benefit**	SS-1 and SS-1.1 would prolong use of the existing bridge. SS-3.1A would accelerate discontinued use of the existing bridge.
	Does the option allow for the most efficient and simplest structural system to accommodate the interchange ramps?	**Insufficient Benefit**	**Insufficient Benefit**	**Substantial Benefit**	SS-3.1A would have a compatible ramp framing and tie-in with the bridge mainline. SS-1 and SS-1.1 would have a complex bridge framing system.

CAPE COD BRIDGES PROGRAM

SAGAMORE SOUTH: OPTION DIFFERENTIATORS (2 of 3)

Program Goals and Objectives

PROGRAM GOAL	PROGRAM OBJECTIVES	SAGAMORE SOUTH (SS-1) Similar to Existing Configuration with Cranberry Highway Extension	SAGAMORE SOUTH (SS 1.1): Similar to Existing Configuration	SAGAMORE SOUTH (SS-3.1A) Westbound On-Ramp under Route 6 with Cranberry Highway Extension and Sandwich Road Connector *(Recommended)*	COMPARISON OF OPTIONS
Socioeconomics	Does the option minimize commercial property effects, regarding the number of easements on occupied parcels?	**Some Impacts**	**Least Impacts**	**Some Impacts**	SS-1 and SS-3.1A would require five and six easements, respectively, on commercial occupied parcels. SS-1.1 would require two easements on commercial occupied parcels.
	Does the option improve access to commercial properties?	**Some Opportunity**	**Least Opportunity**	**Some Opportunity**	SS-1.1 would not improve access. SS-1 and SS-3.1A would improve accessibility to Market Basket and to neighborhoods via Cranberry Highway Extension.
	Does the option maintain or improve neighborhood accessibility to community facilities and services?	**Most Opportunity**	**Some Opportunity**	**Most Opportunity**	SS-1 and SS-3.1A would improve accessibility via the Cranberry Highway Extension, which S-1.1 would not provide.
	Does the option maintain or improve neighborhood cohesion?	**Some Opportunity**	**Least Opportunity**	**Most Opportunity**	SS-1.1 would mimic existing conditions. SS-1 and SS-3.1A would reduce the regional traffic volume on local roads. SS-3.1A would also include the Sandwich Road extension.
	Does the option minimize construction period effects upon the traveling public?	**Some Impacts**	**Some Impacts**	**Least Impacts**	SS-1 and SS-1.1 would require detours for the bridge construction, not required in SS-3.1A.

CAPE COD BRIDGES PROGRAM

SAGAMORE SOUTH: OPTION DIFFERENTIATORS (3 of 3)

Program Goals and Objectives

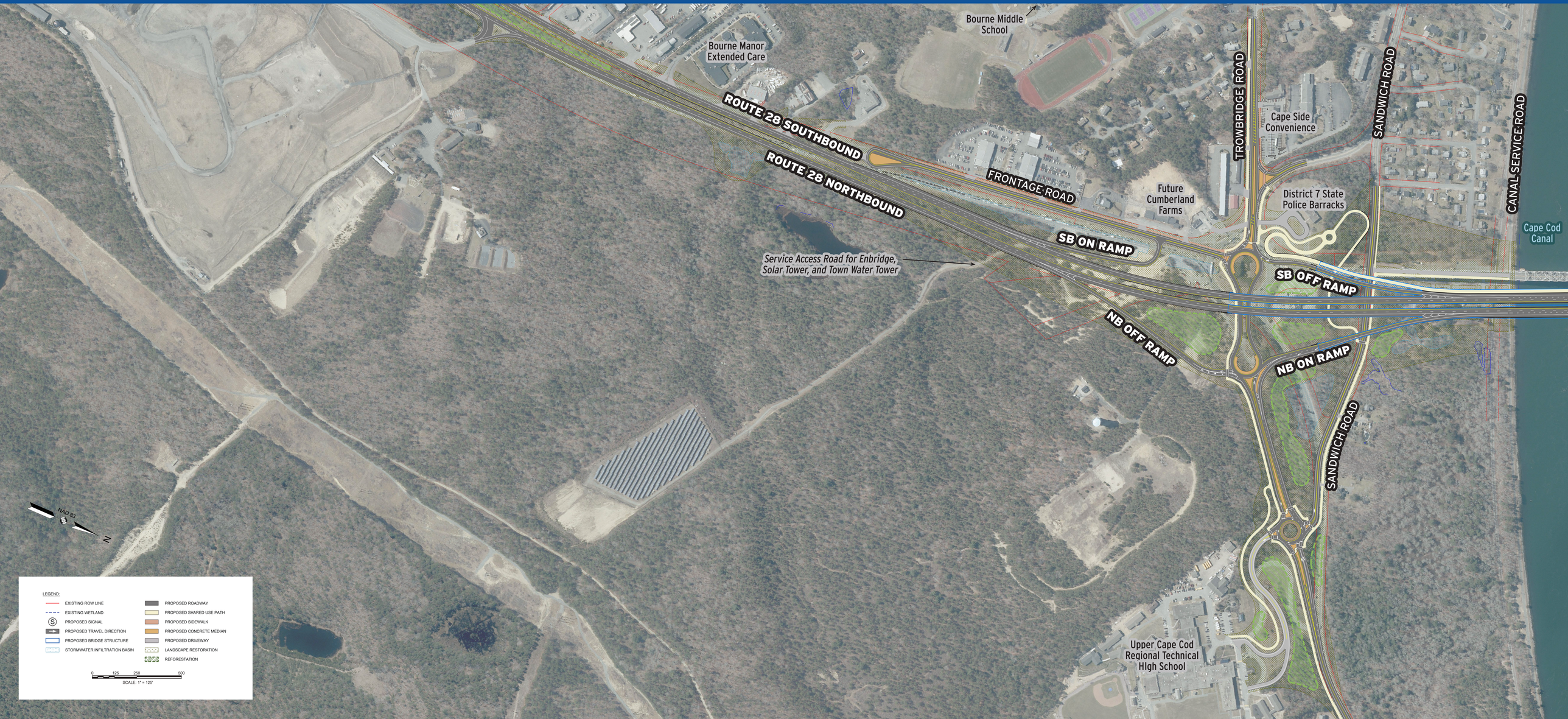
		SAGAMORE SOUTH (SS)			
PROGRAM GOAL	PROGRAM OBJECTIVES	**SS-1:** Similar to Existing Configuration with Cranberry Highway Extension	**SS-1.1:** Similar to Existing Configuration	**SS-3.1A:** Westbound On-Ramp under Route 6 with Cranberry Highway Extension and Sandwich Road Connector *(Recommended)*	COMPARISON OF OPTIONS
Resiliency and Sustainability	Does the option effectively manage stormwater, regarding an increase in impervious area from existing conditions?	**Some Opportunity**	**Most Opportunity**	**Some Opportunity**	SS-1.1 would increase impervious area by 19%. SS-1 and SS-3.1A would increase impervious area by 30%.
Constructability	Does the option minimize the construction duration?	**Most Opportunity**	**Most Opportunity**	**Some Opportunity**	Program completion would be up to 12 months sooner in SS-1 and SS-1.1 than in SS-3.1A.
	Does the option maintain existing connections during construction?	**Some Opportunity**	**Some Opportunity**	**Most Opportunity**	SS-3.1A would maintain connections without detours. SS-1 and SS-1.1 would require detours to maintain existing conditions.
Emergency Response	Does the option improve emergency evacuation capabilities from Cape Cod and the islands to mainland Massachusetts?	**Most Opportunity**	**Some Opportunity**	**Most Opportunity**	SS-1 and SS-3.1A would improve capabilities via the Cranberry Highway Extension. SS-1 would minimally improve capabilities.
	Does the option improve emergency response?	**Most Opportunity**	**Some Opportunity**	**Most Opportunity**	SS-1 and SS-3.1A would improve access to and from Sandwich Road west and the Mid-Cape Connector via the Cranberry Highway Extension. SS-1.1 would maintain the existing configuration.

Bourne North Crossing: Directional Interchange Option

Bourne South Crossing: Diamond Interchange Option

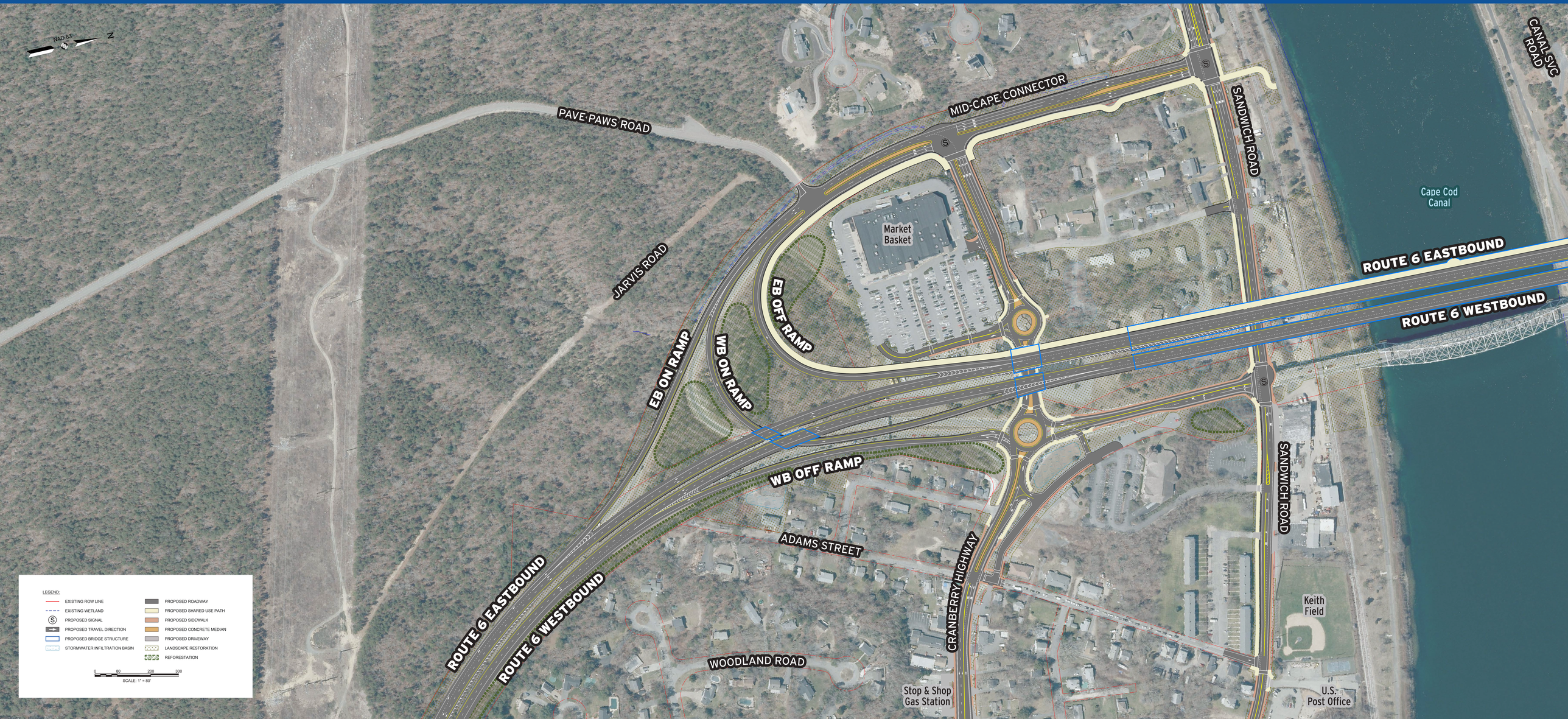
Recommended Bourne North Crossing

Recommended Bourne South Crossing

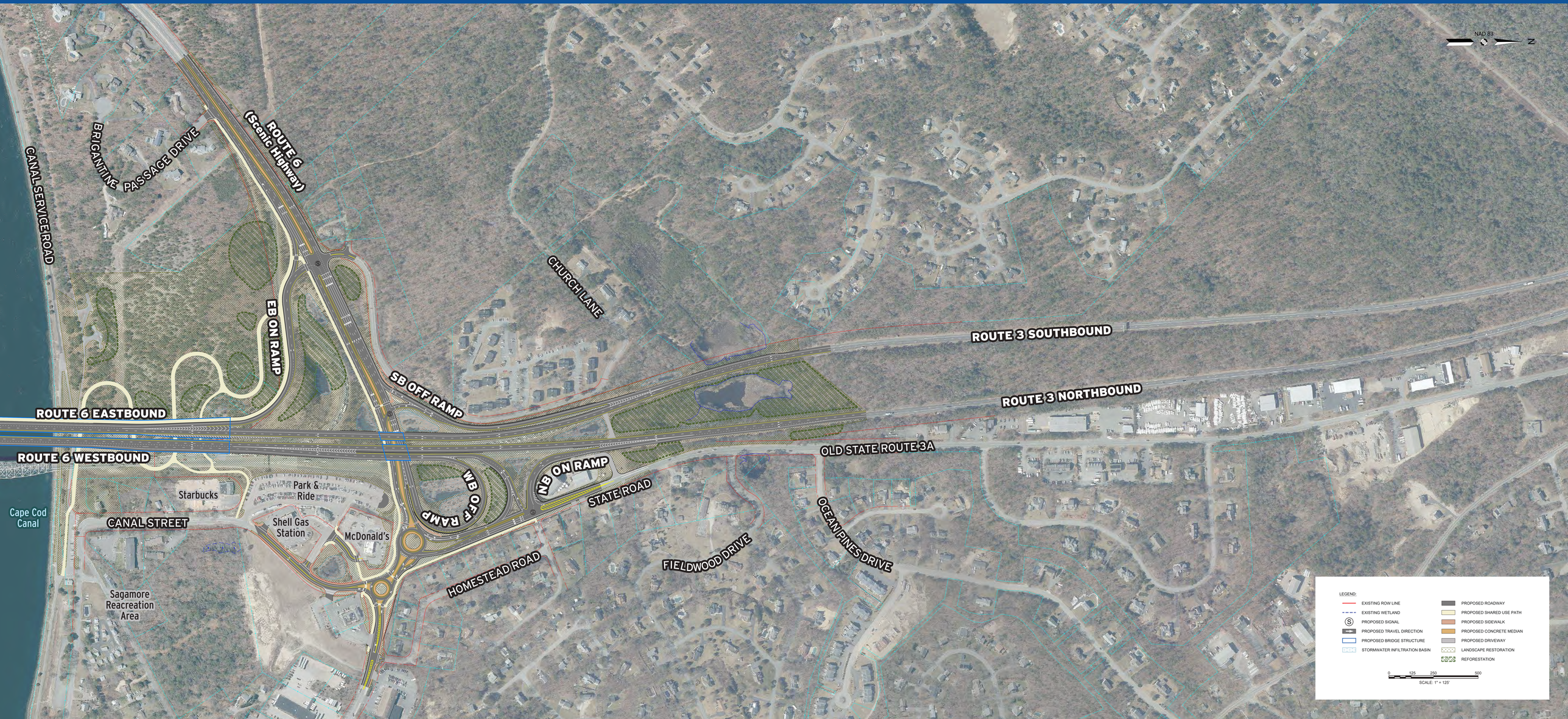


Sagamore North Crossing: Direct Connection to State Road Option

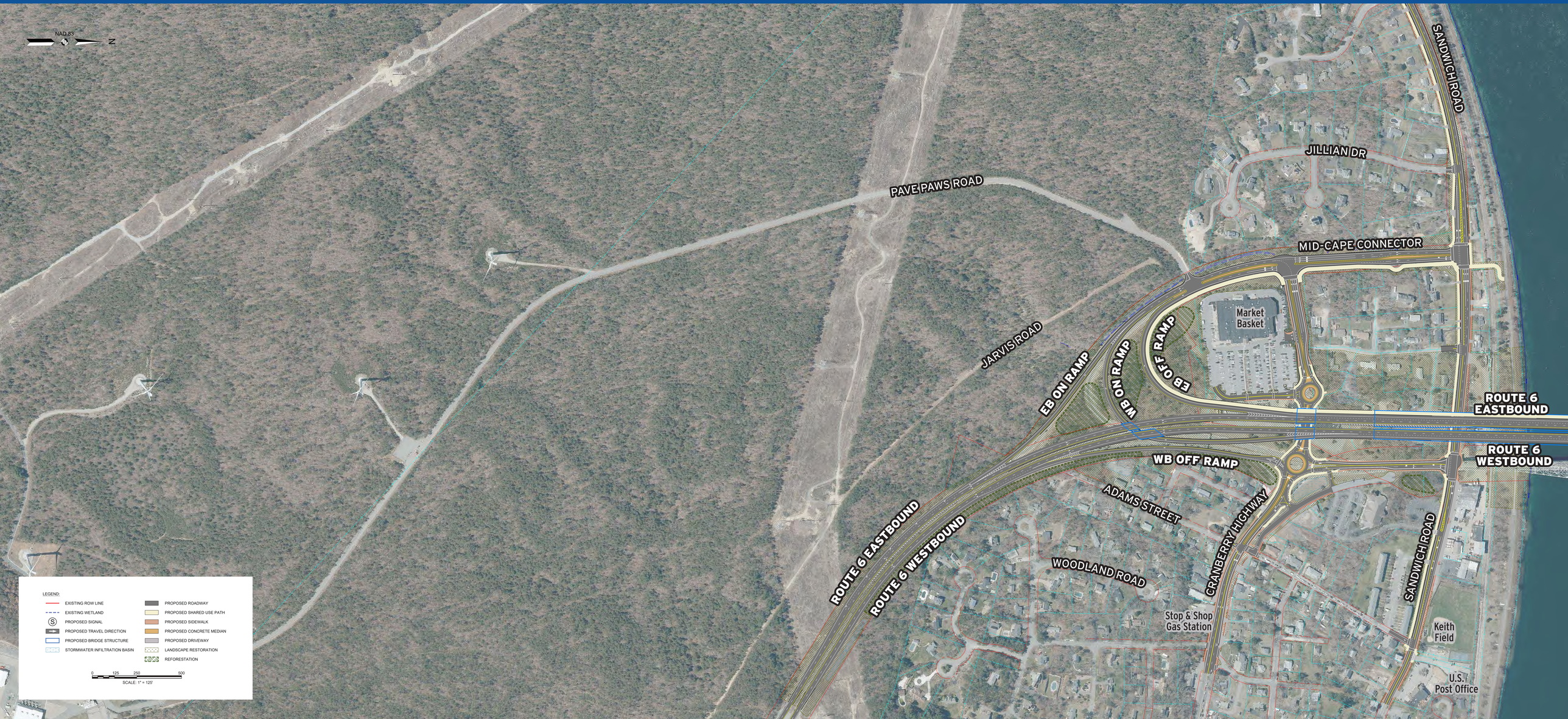
Sagamore South Crossing: Westbound On-Ramp under Route 6 with Cranberry Highway Extension and Sandwich Road Connector



Recommended Sagamore North Crossing



Recommended Sagamore South Crossing



CAPE COD BRIDGES PROGRAM

NEPA/MEPA PROCESS

The Cape Cod Bridges Program requires review under the National Environmental Policy Act (NEPA) and the Massachusetts Environmental Policy Act (MEPA).

MassDOT will be advancing a single Build Alternative to be evaluated against the No Build Alternative in the combined Draft Environmental Impact Statement (DEIS)/Draft Environmental Impact Report (DEIR). This approach was described in the Notice of Intent (NOI) to Prepare an EIS in February 2024. The recommended interchange options presented during this November 2024 Open House will be combined with previous design recommendations to finalize the single Build Alternative.

Following this Open House, MassDOT will advance detailed assessment of impacts associated with the Build Alternative. A DEIS Notice of Availably is expected to be published in the Federal Register in Spring 2025. The DEIS/DEIR will identify a Preferred Alternative and will include responses to comments received during the NOI scoping period and MEPA Environmental Notification Form review period. Any comments received specific to content presented during this Open House will be considered as part of the DEIS/DEIR.

The public will have opportunity to comment on all content and recommendations included in the DEIS/DEIR prior to MassDOT advancing to the Final EIS/EIR. The NEPA and MEPA processes are expected to be complete in the winter of 2026.

Subsurface Exploration Program for Sagamore Bridge Crossing

WHY DO WE NEED BORINGS?

They provide important information about the subsurface conditions, such as the composition and strength of the soil, and are used to design foundations and determine the best course of action for design and construction.

WHERE ARE BORINGS REQUIRED?

Borings are required at proposed bridge abutments, piers, walls, detention ponds, travel lanes etc. These locations are located within the following property types, which require permits from the relevant agencies, including MassDOT Right-of-Way, United States Army Corps of Engineers, United States Government, Town of Bourne, and Private Property.

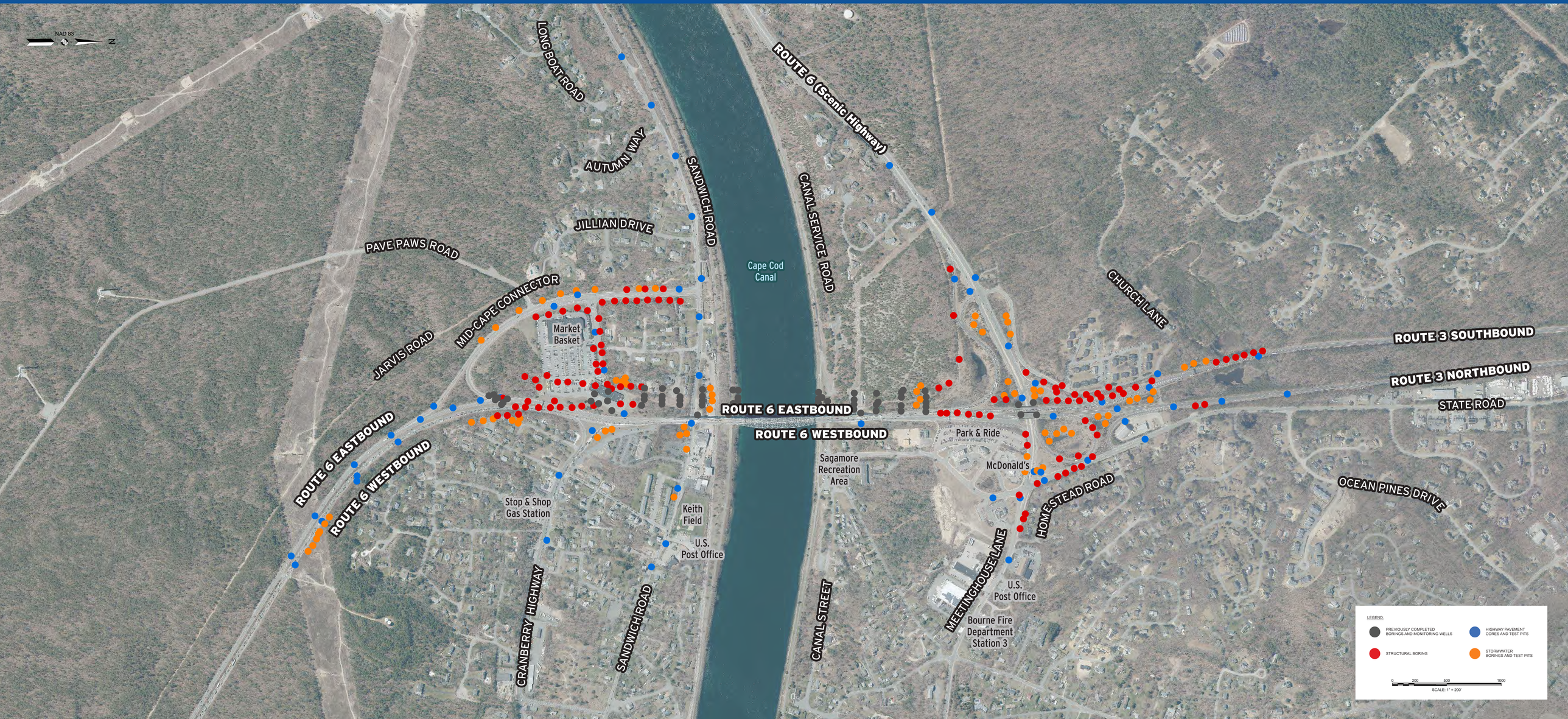
HOW DO WE OBTAIN BORINGS?

An engineer will mark boring locations with spray paint. A drill rig is required to obtain ground samples at various depths. Safety is our priority so drilling areas are marked with signs, cones, and barriers; and traffic may be rerouted.

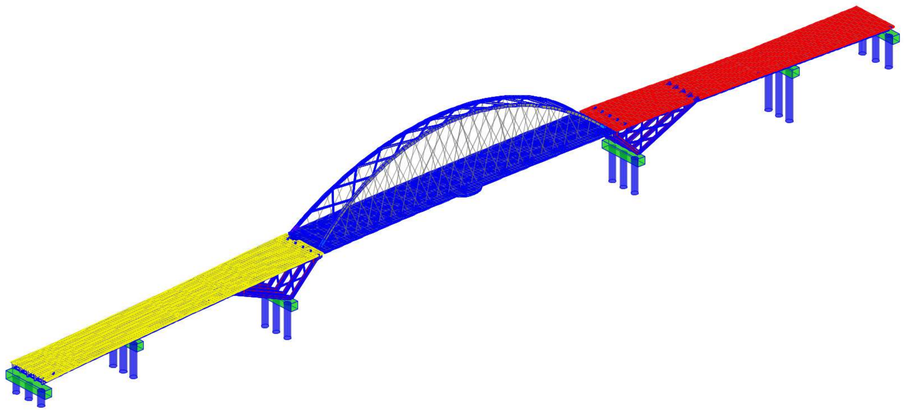
WHEN WILL BORINGS BE TAKEN?

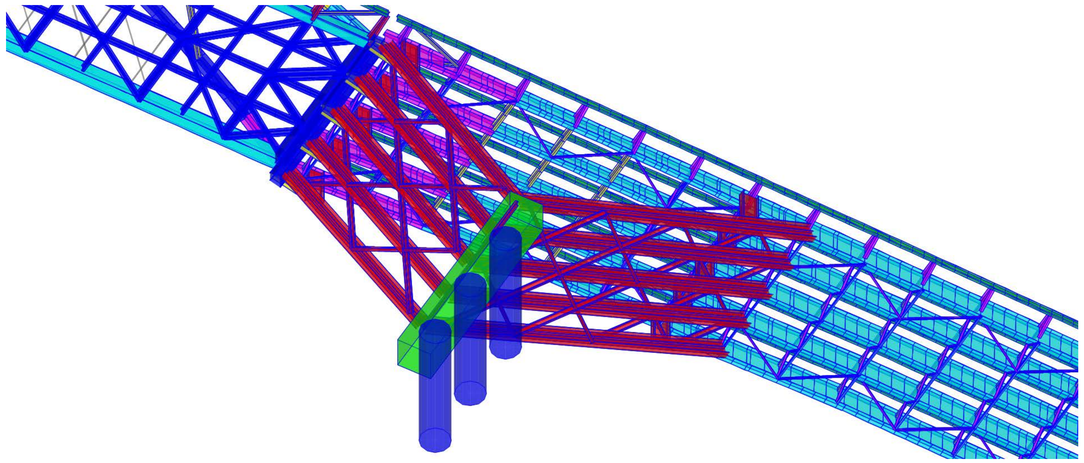
Due to the size of the program, the borings will be taken in phases over several years. Abutting property owners will be notified prior to commencement of work.

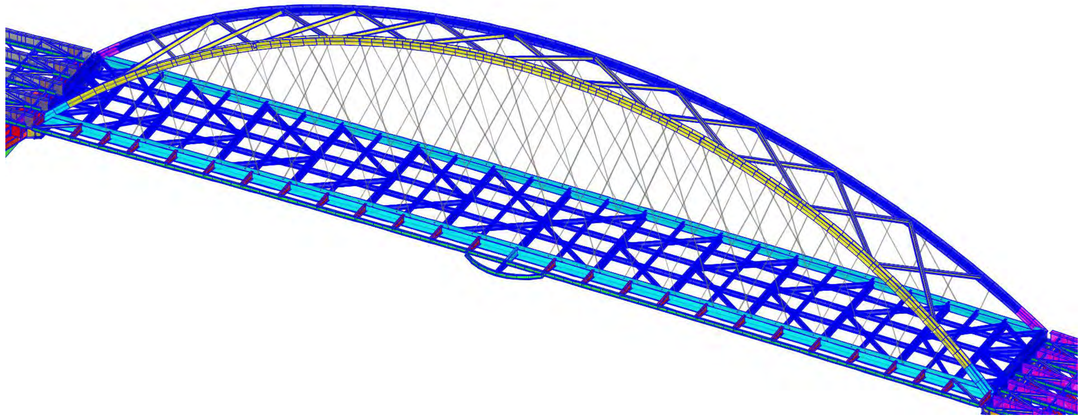
Recommended Sagamore Crossing: Geotechnical Boring Plan

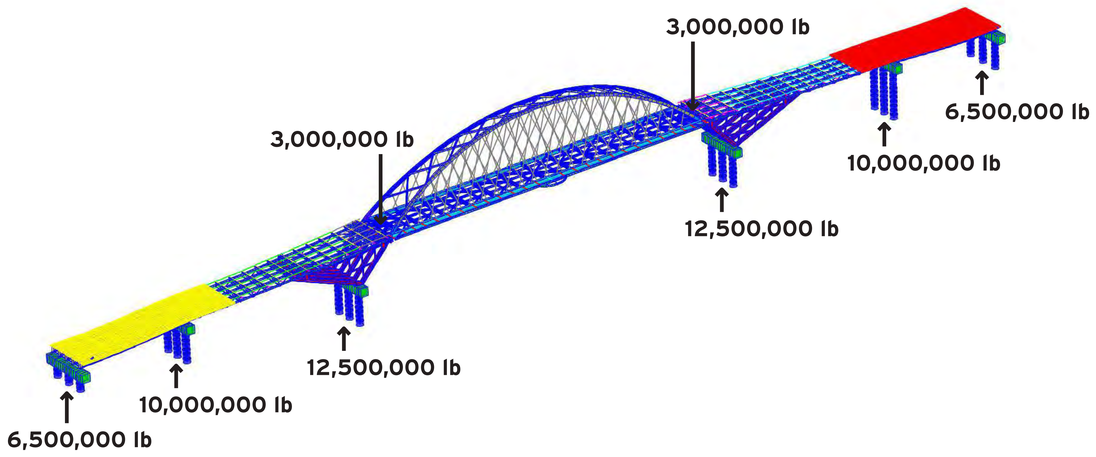


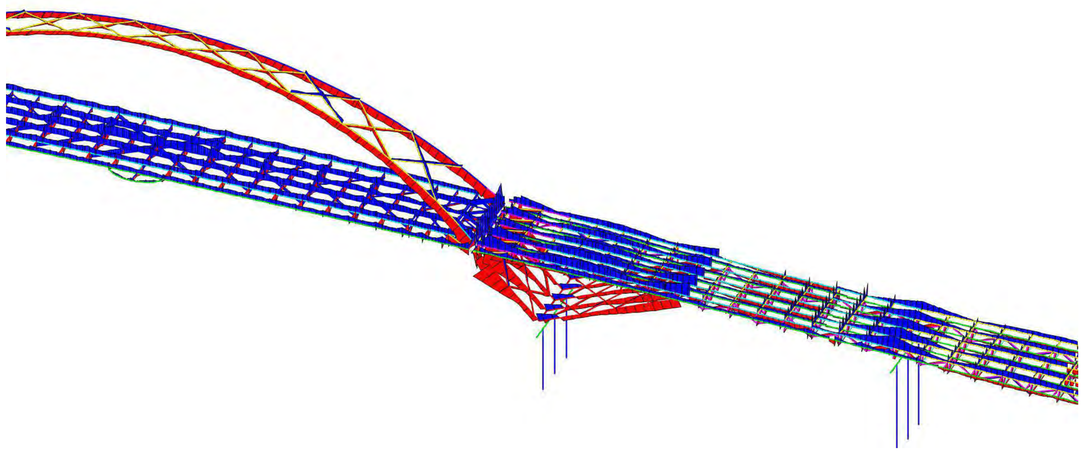
Bridge Analysis and Design









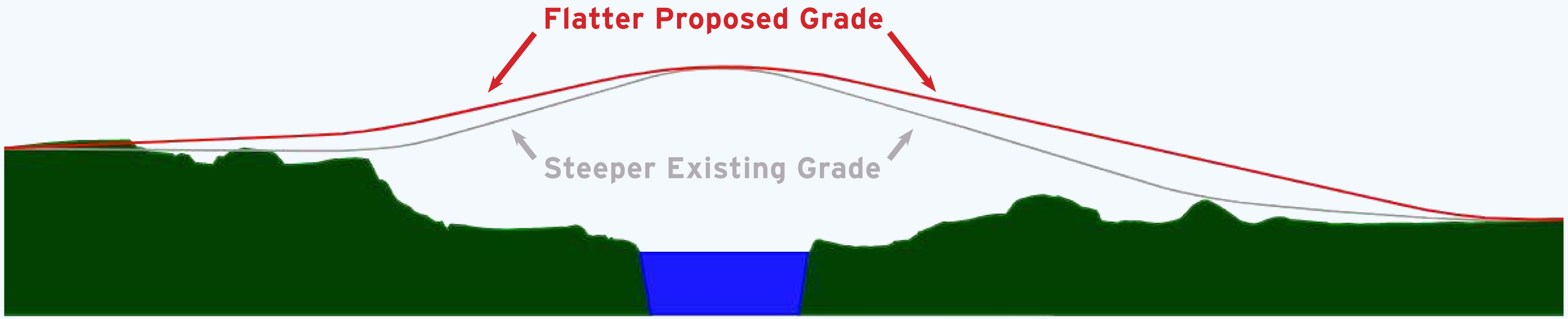


Recommended Bridge Type: Twin Arch Canal View

Potential Pedestrian Amenities

Recommended Bridge Type: Twin Arch Driver View

Roadway Grades Existing and Proposed



Bourne South Crossing: Diamond Interchange Option

Bourne North Crossing: Single Exit Partial Interchange Option

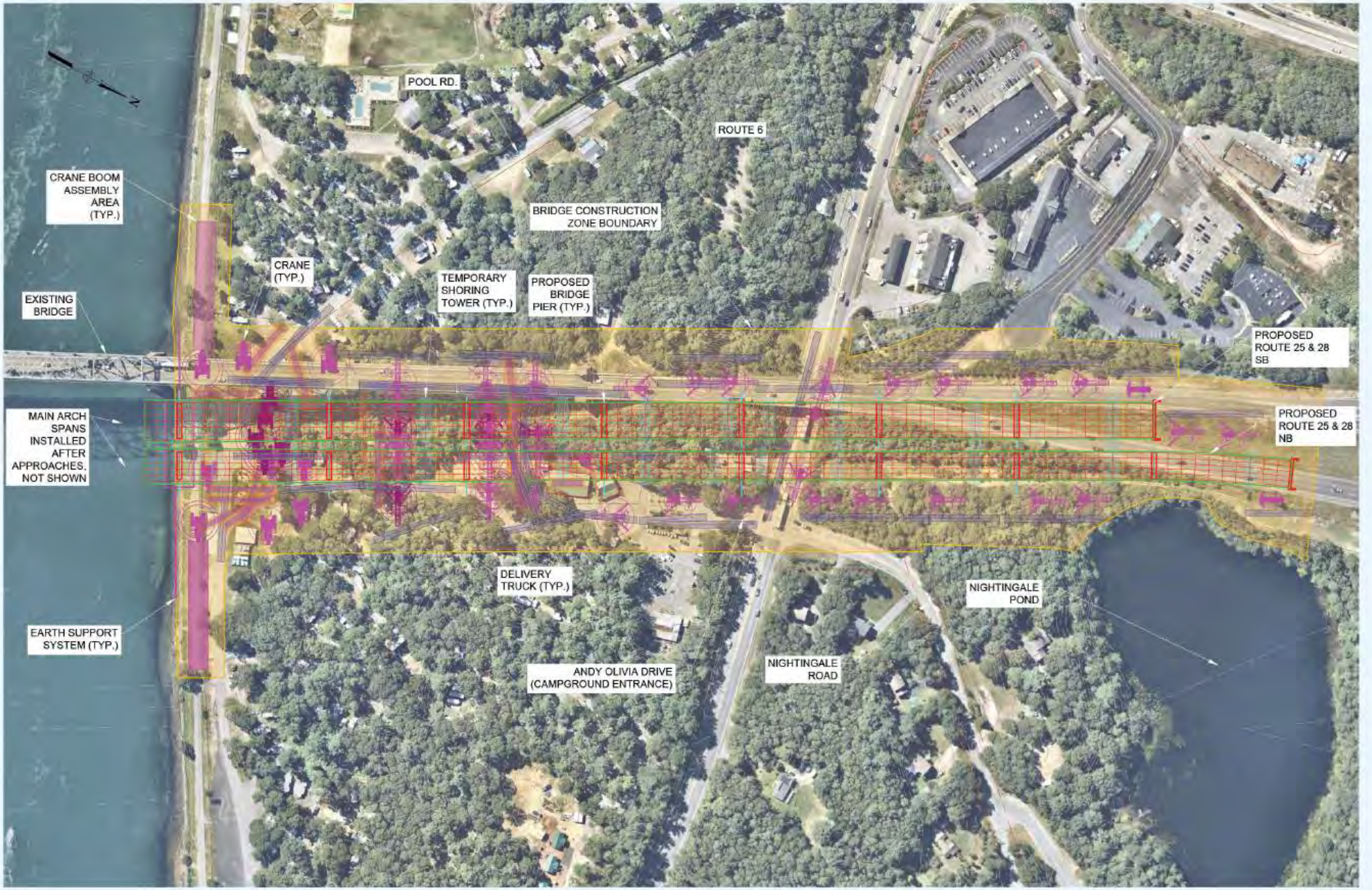
Bourne North Crossing: Northbound On-Ramp Option

Sagamore North Crossing: Similar to Existing Configuration Option

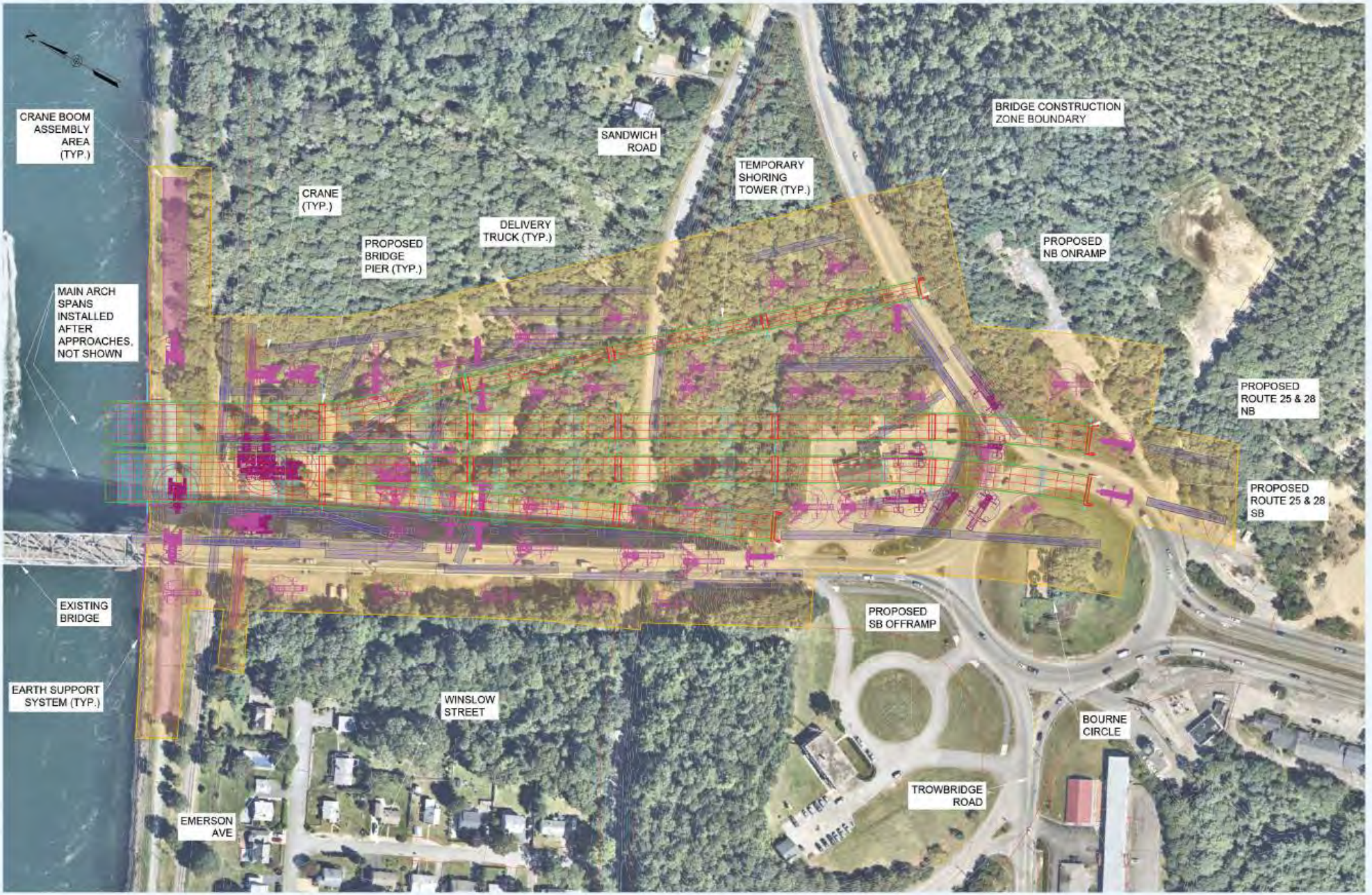
Sagamore South Crossing: Similar to Existing Configuration Option

Sagamore South Crossing: Similar to Existing Configuration with Cranberry Highway Extension Option

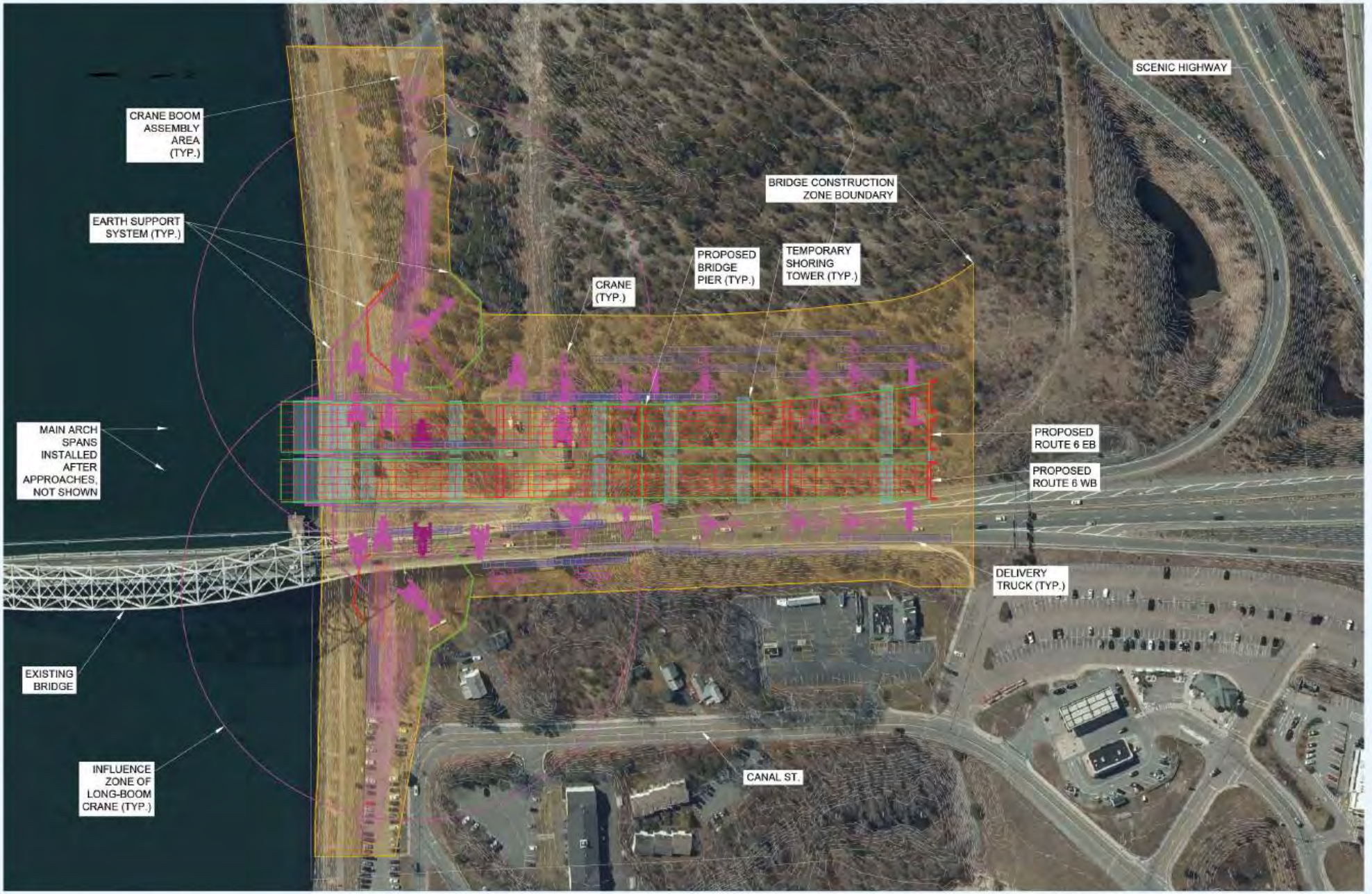
Construction Concept Plan: Bourne North



Construction Concept Plan: Bourne South

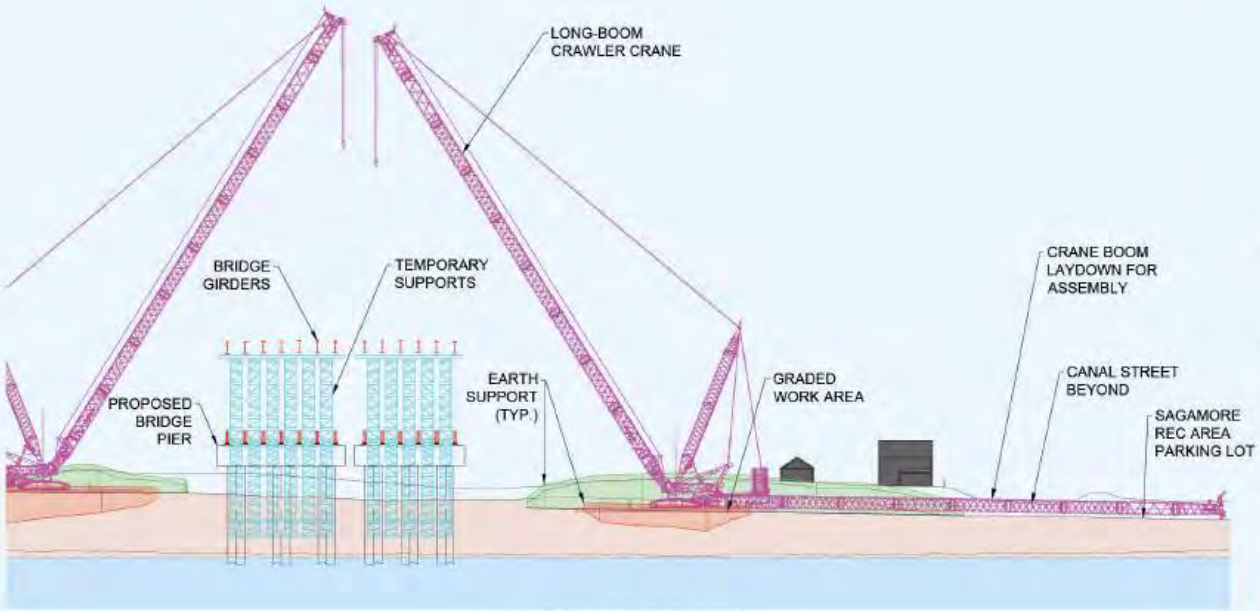


Construction Concept Plan: Sagamore North

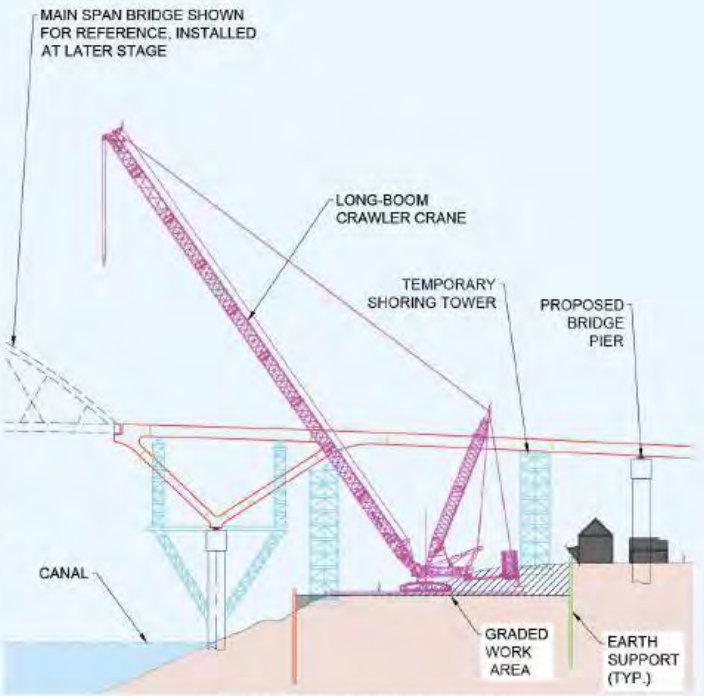


Construction Concept Plan: Sagamore South

Construction Illustration: Sagamore North

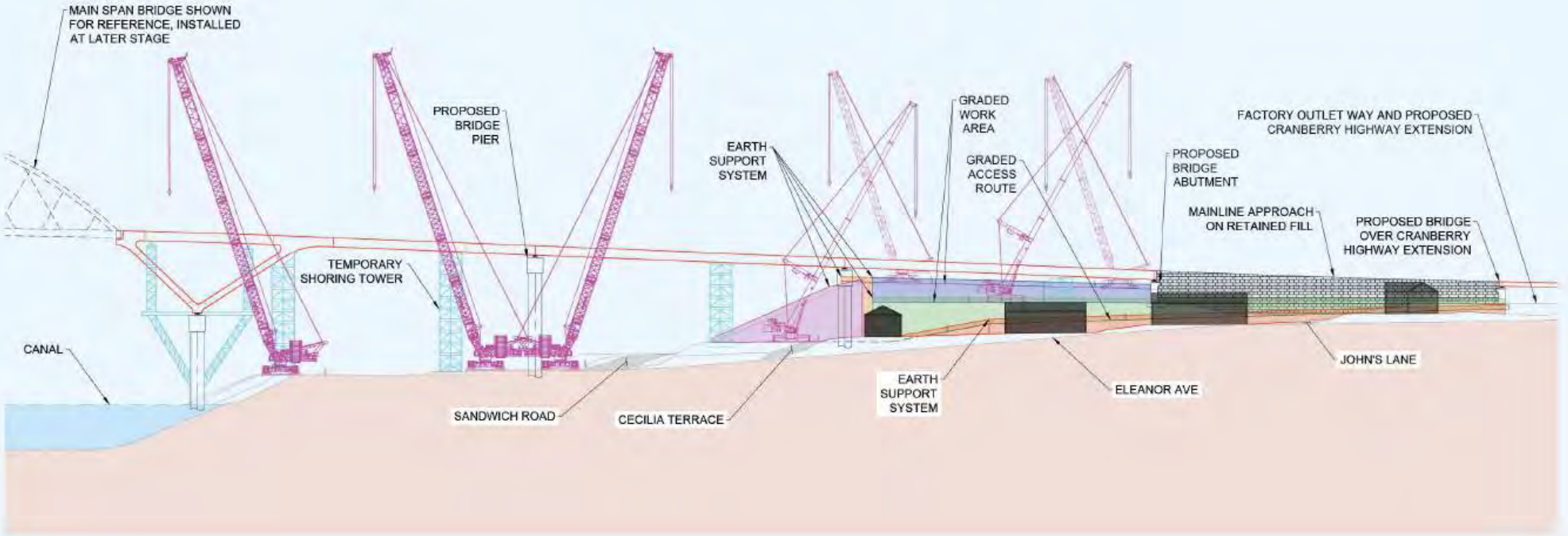


VIEW LOOKING NORTH FROM WATER

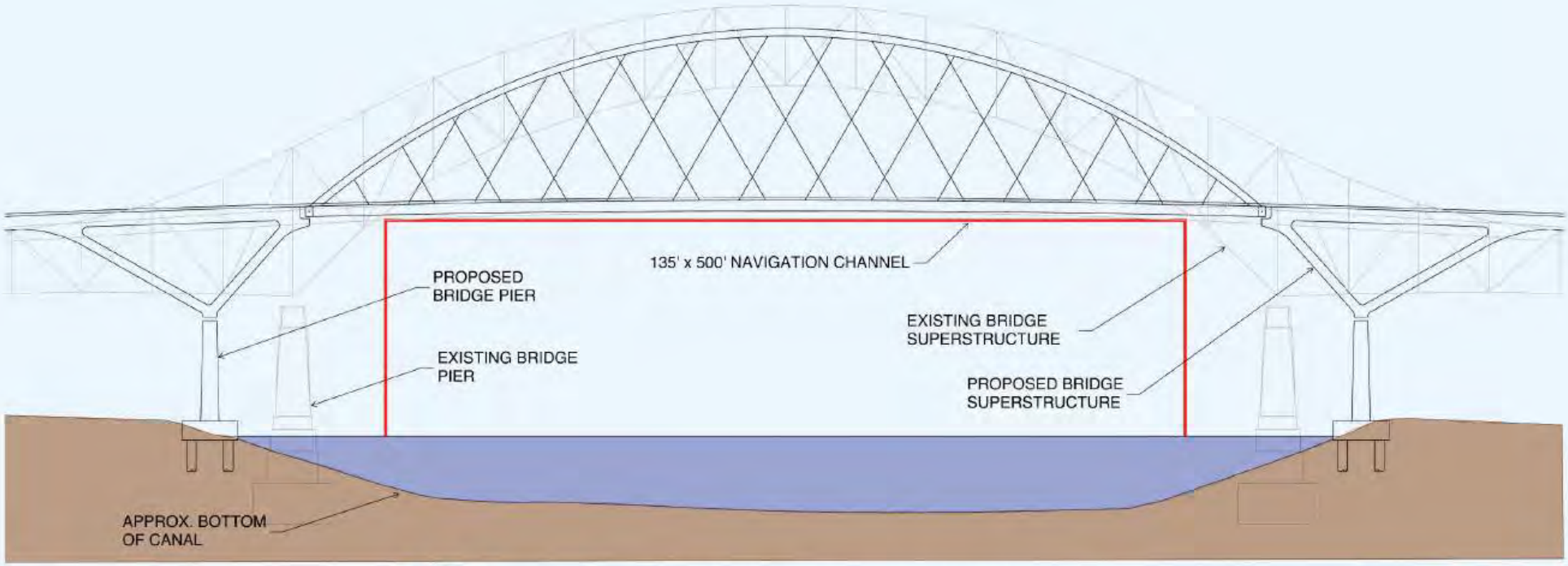


VIEW LOOKING EAST FROM CANAL STREET

Construction Illustration: Sagamore South



Vessel Impact Risk Mitigation

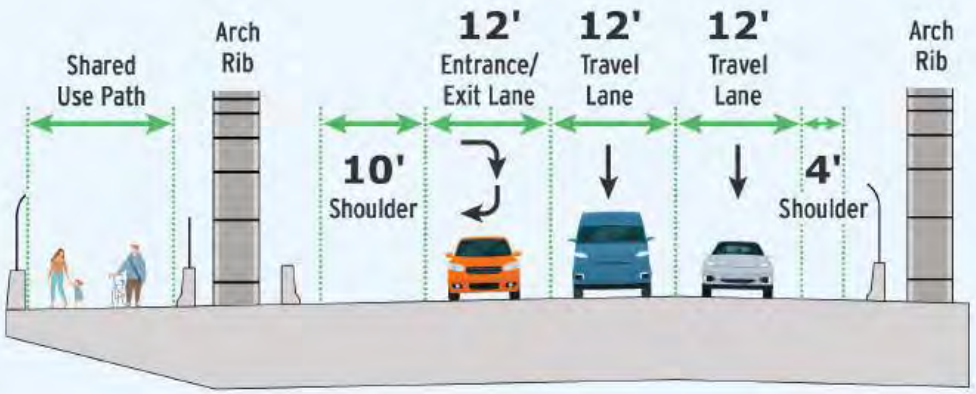


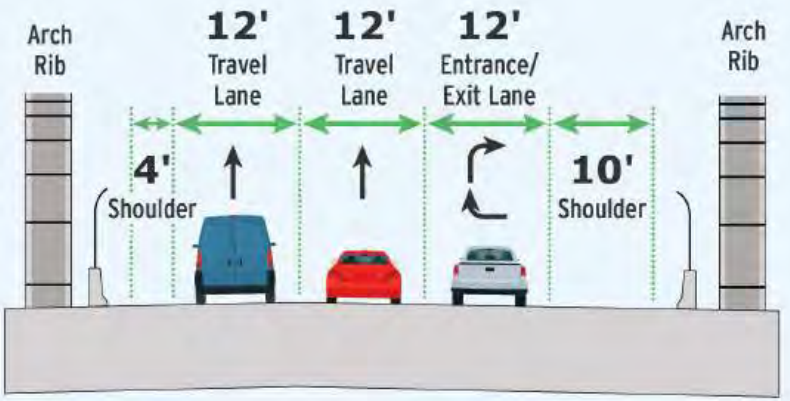
Proposed Cape Cod Canal Pier

- To reduce risk of vessel collision, the proposed bridge piers and superstructure were located further outside the navigation channel than existing piers
- Proposed piers are located along shoreline, so that large vessels (having a draft of 20ft or greater) would run aground before directly striking the proposed pier
- The bridge piers and superstructure will be designed to meet the current AASHTO provisions for appropriate vessel impact loads. These code provisions were not in place at the time the Baltimore bridge was designed and constructed.

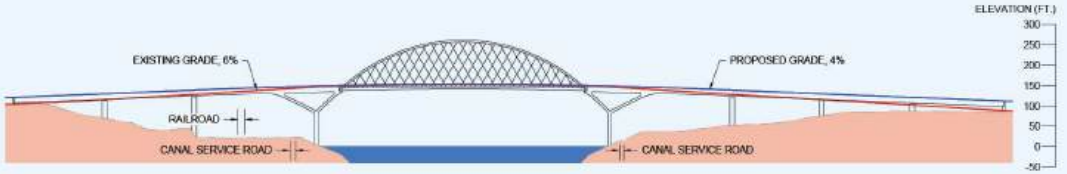
Francis Scott Key Bridge, Baltimore, MD

Lane Configuration: Twin Bridges

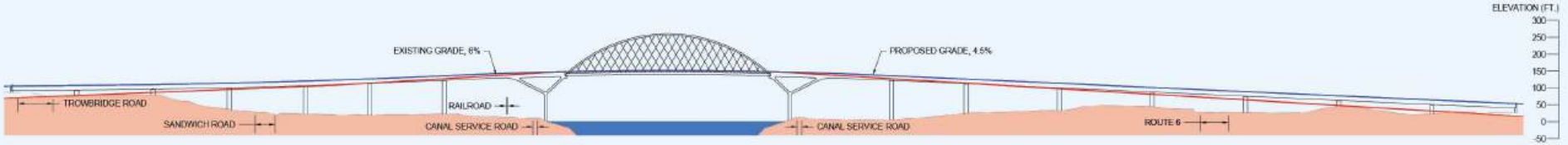




Roadway Grades: Existing and Proposed



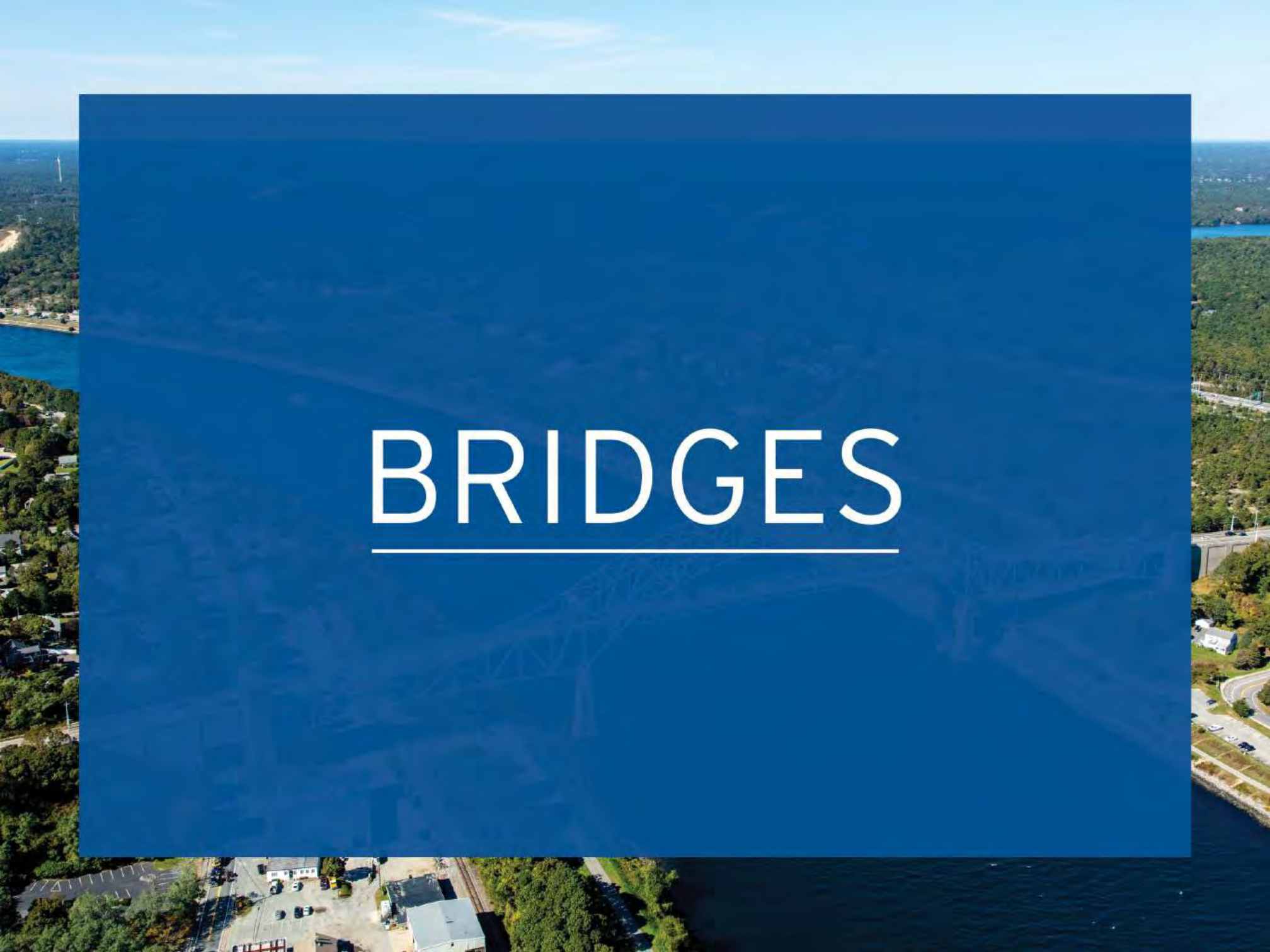
SAGAMORE BRIDGE
SCALE: 1" = 140'



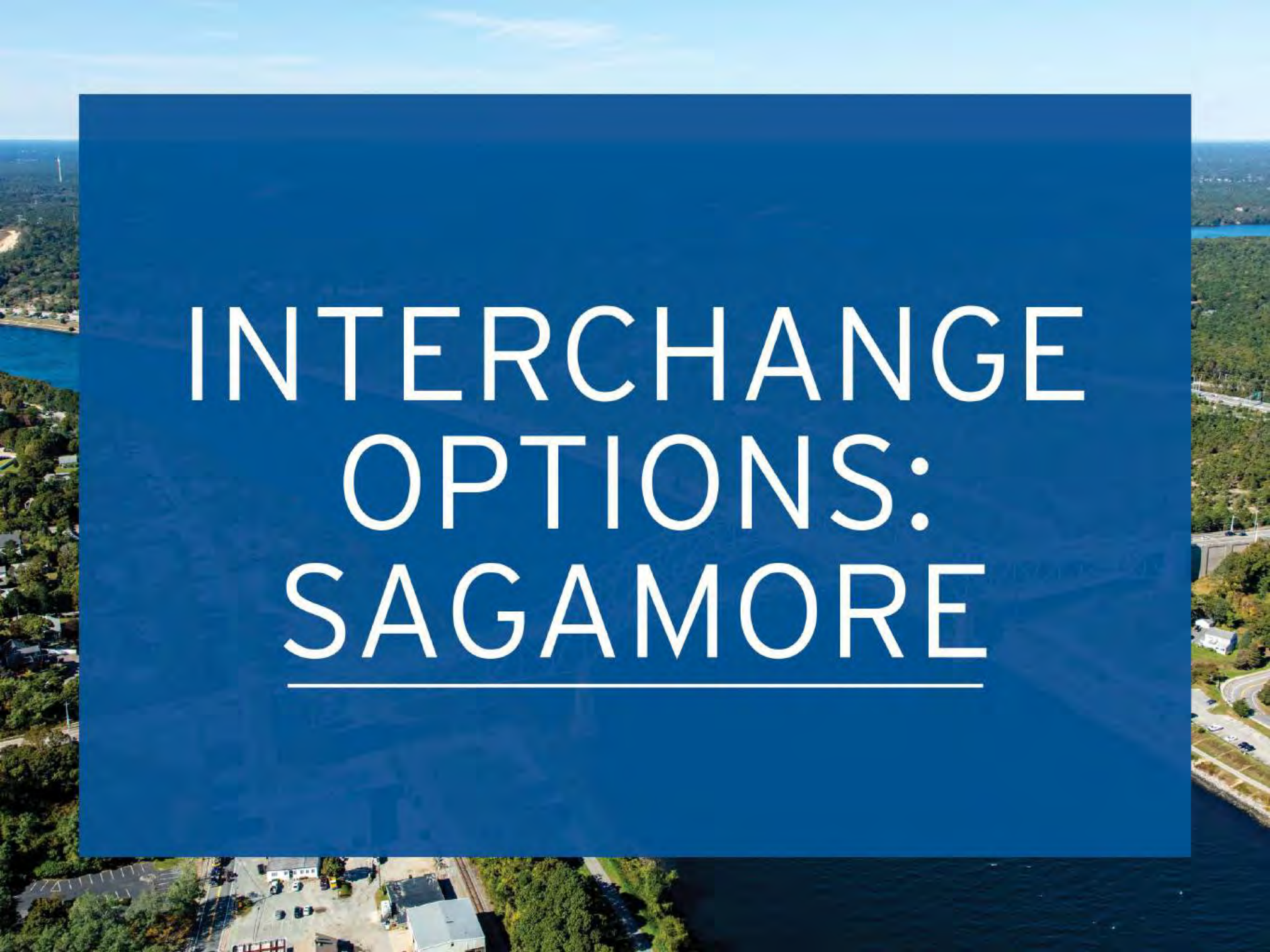
BOURNE BRIDGE
SCALE: 1" = 140'

TRANSLATION SERVICES

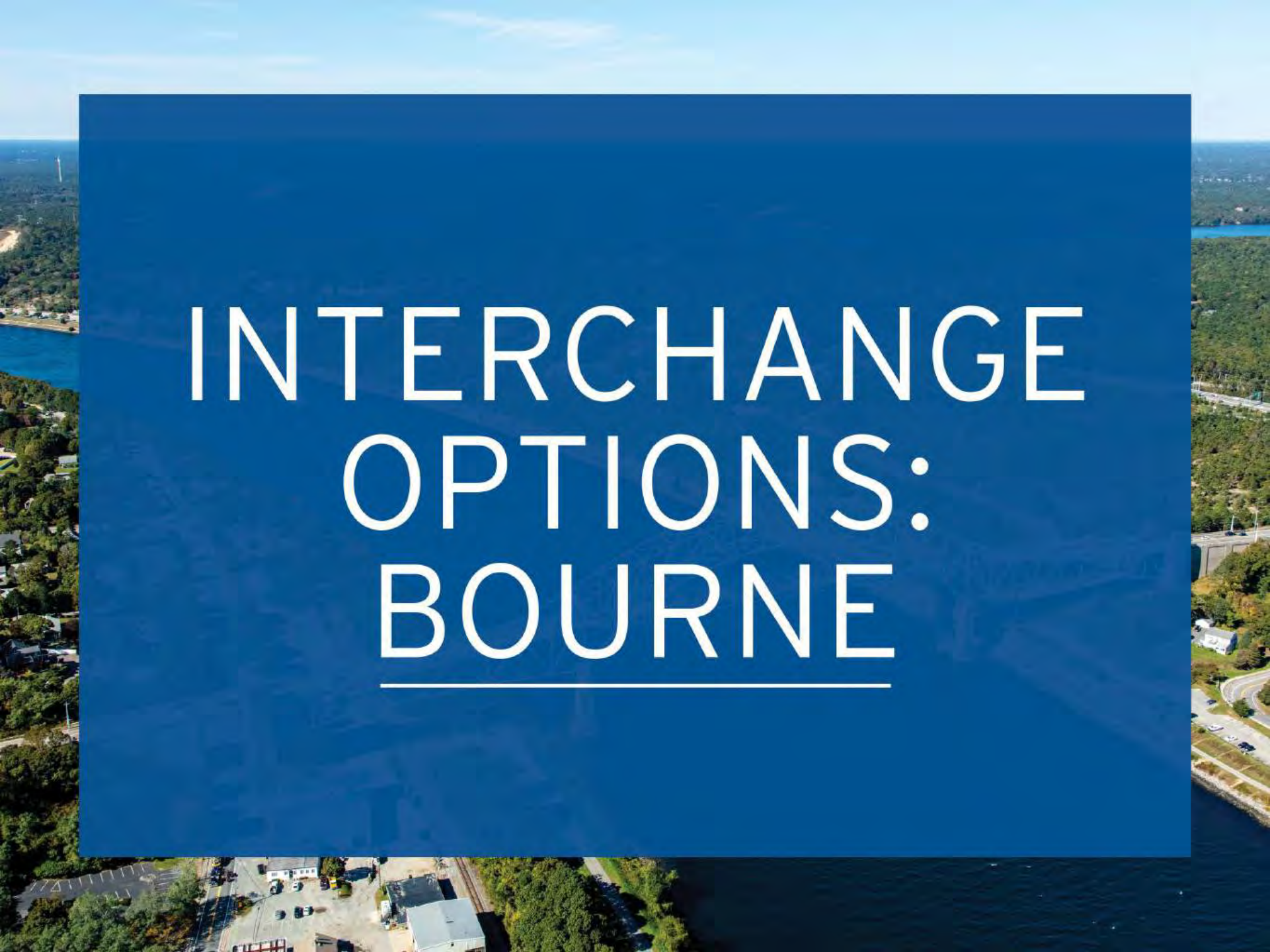
Servicios de Traducción
Serviços de Tradução
American Sign Language



BRIDGES



INTERCHANGE OPTIONS: SAGAMORE



INTERCHANGE OPTIONS: BOURNE

INFORMATION/ GOVERNMENT RELATIONS

ENVIRONMENTAL