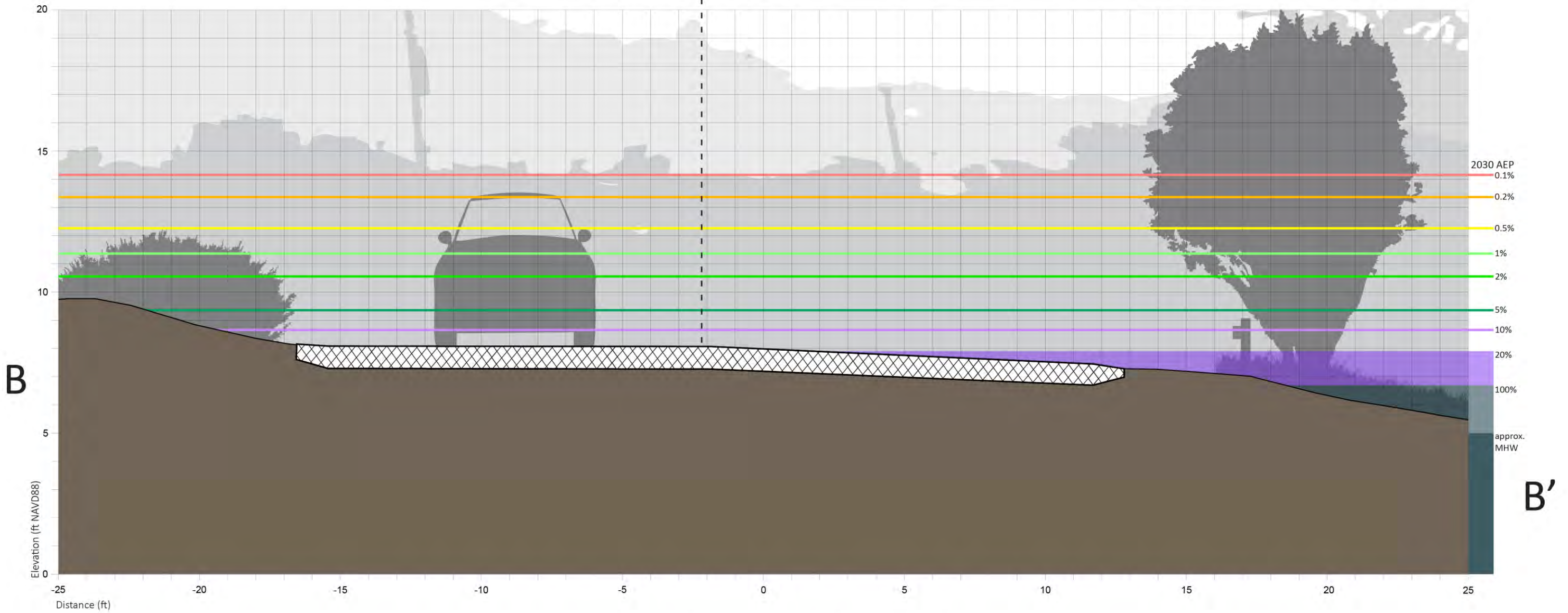


## EXISTING CONDITIONS

Route 28 at Bay Road, Harwich

Existing Road  
Elevation: +8.1' NAVD88



B

B'

# EXISTING CONDITIONS

Route 28 at Bay Road, Harwich

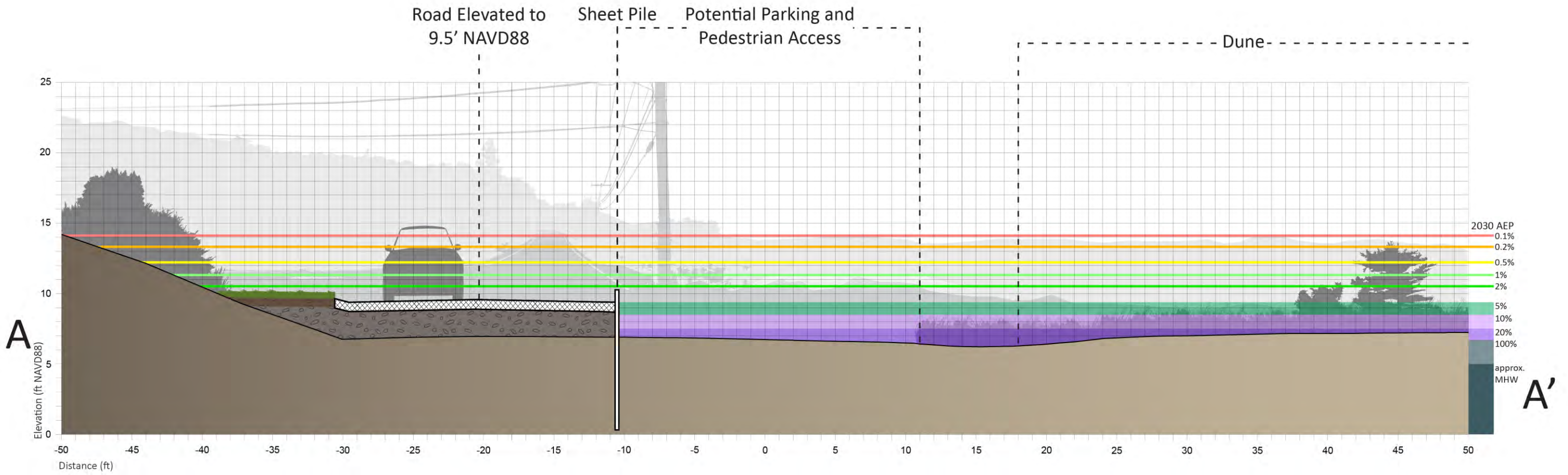


Note: Project overlap with wetland areas, rights of way and property lines is approximate and needs confirmation with a site survey



#### ALTERNATIVE 1: GRAY

577 linear feet of state-owned road are elevated to 9.5' NAVD88 using 4:1 traditionally vegetated side slopes and sheet pile. There is the possibility to maintain existing parking and access via ramps. The road is raised by 2.9' at its original low point, which is located near section A-A'.



Road Elevated to  
9.5' NAVD88

Sheet Pile

Potential Parking and  
Pedestrian Access

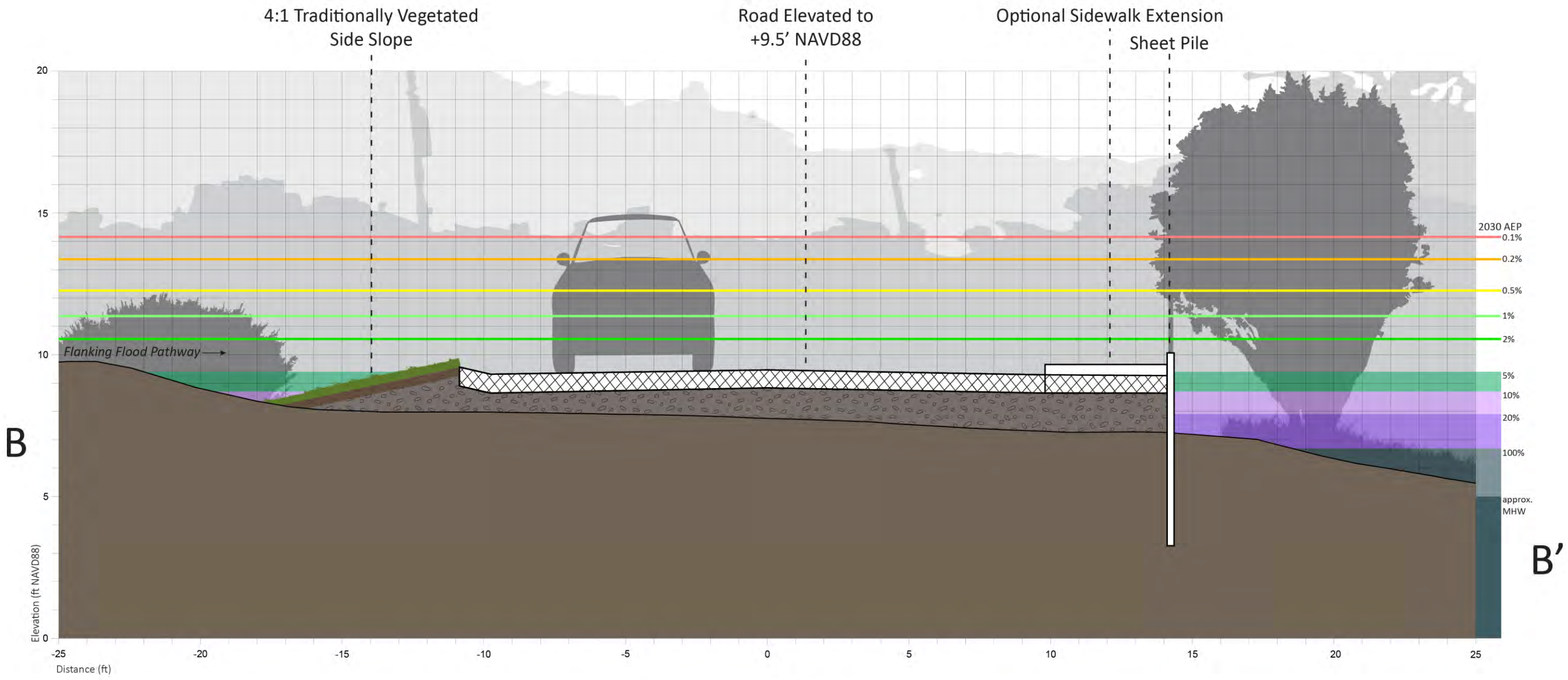
Dune

- 2030 AEP
- 0.1%
- 0.2%
- 0.5%
- 1%
- 2%
- 5%
- 10%
- 20%
- 100%

approx.  
MHW

# ALTERNATIVE 1: GRAY

Route 28 at Bay Road, Harwich



**ALTERNATIVE 1: GRAY**  
Route 28 at Bay Road, Harwich

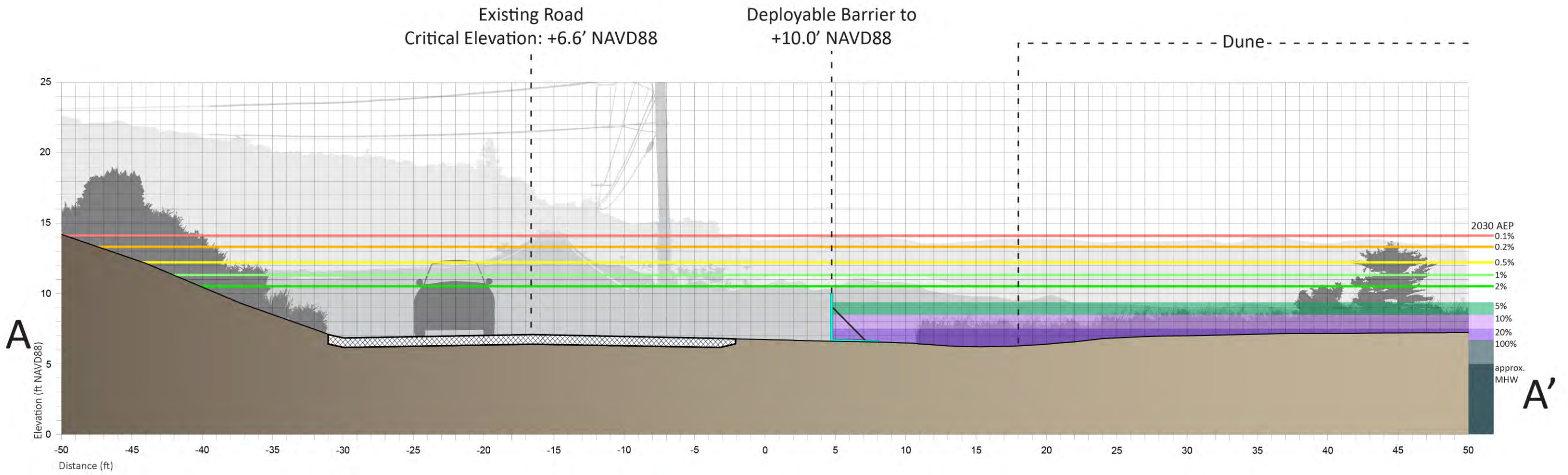


Note: Project overlap with wetland areas, rights of way and property lines is approximate and needs confirmation with a site survey



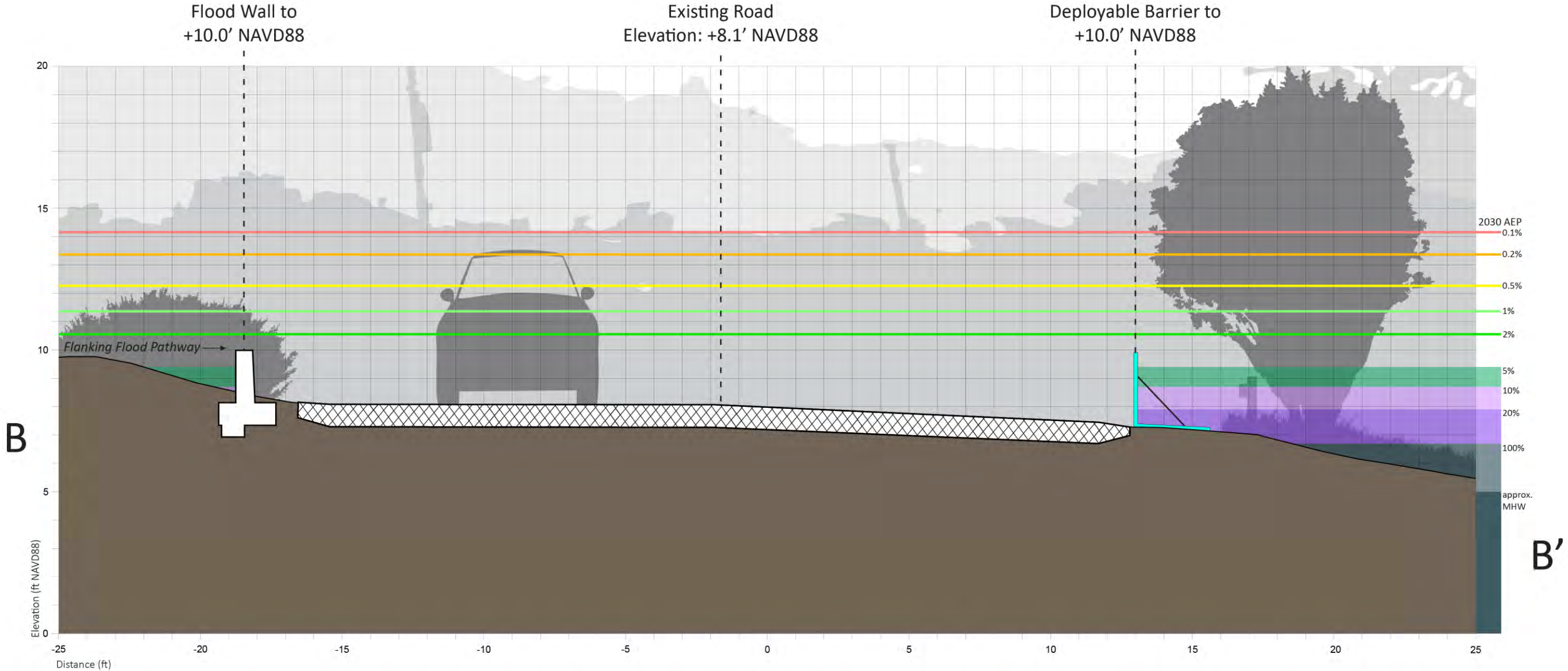
**ALTERNATIVE 2: DEPLOYABLE**

Approximately 600 linear feet of 48” temporary barriers are deployed on the bay side of the road before storms, protecting the road to 10.0’ NAVD88. A small flood wall to 10.0’ NAVD88 cuts off a flanking flood pathway from Muddy Creek.



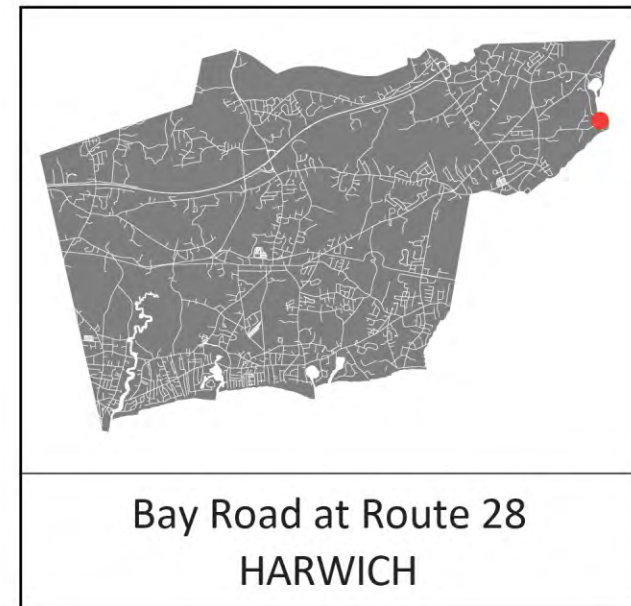
## ALTERNATIVE 2: DEPLOYABLE

Route 28 at Bay Road, Harwich



**ALTERNATIVE 2: DEPLOYABLE**  
 Route 28 at Bay Road, Harwich

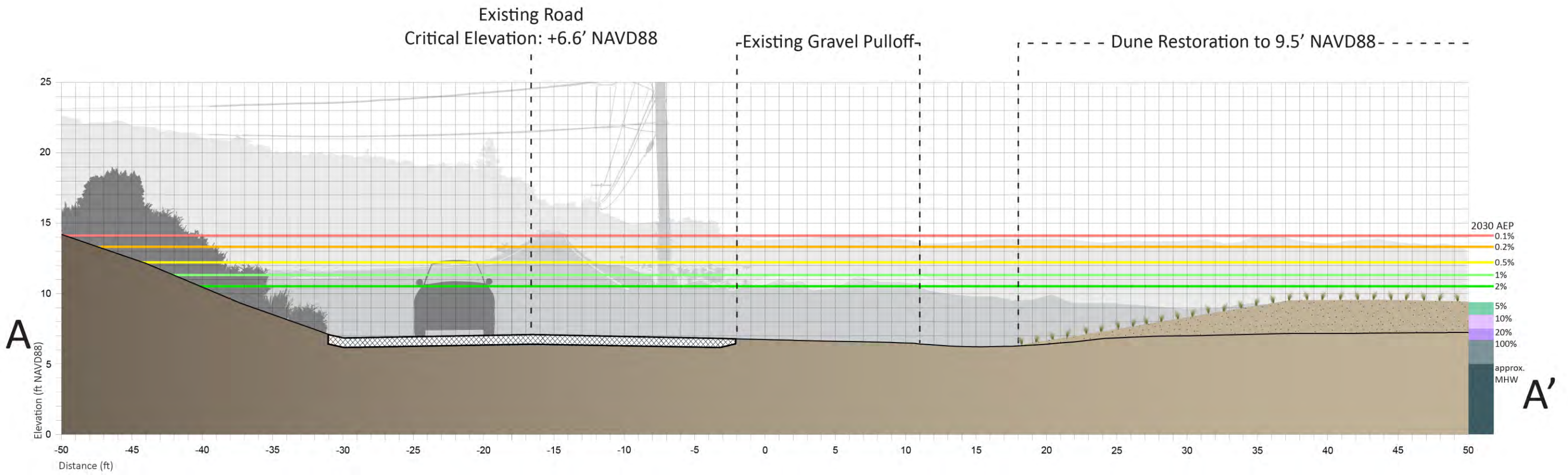




**ALTERNATIVE 3: GREEN**

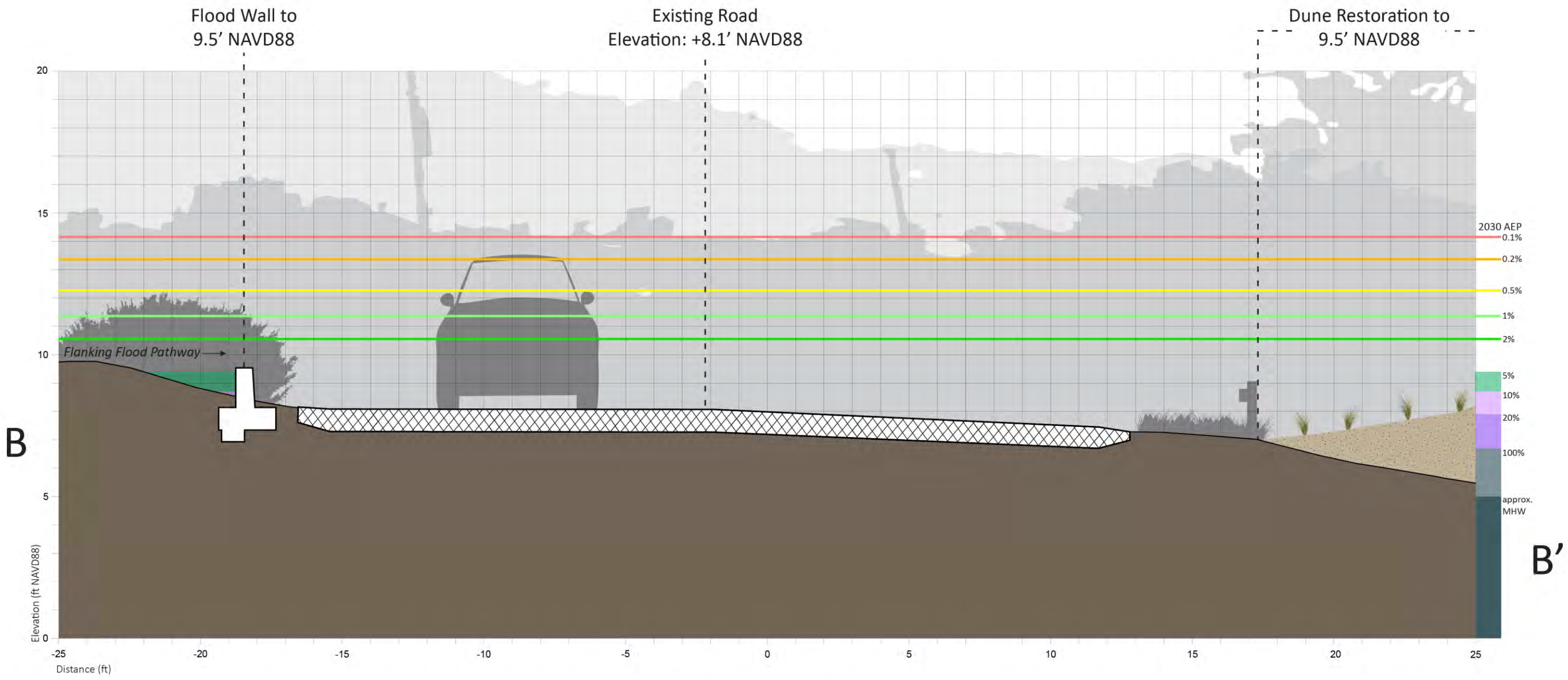
A dune restoration to 9.5' NAVD88 protects the road from bayside flooding. Mobi-mats are placed to prevent dune erosion and improve accessibility. A small flood wall and berm to 9.5' NAVD88 prevents flanking flooding from Muddy River. An artificial reef array in Pleasant Bay could be investigated to mitigate wave damage and erosion.

Note: Project overlap with wetland areas, rights of way and property lines is approximate and needs confirmation with a site survey



# ALTERNATIVE 3: GREEN

Route 28 at Bay Road, Harwich



# ALTERNATIVE 3: GREEN

Route 28 at Bay Road, Harwich

# BAY ROAD at ROUTE 28, HARWICH

Summary of alternatives

	Description	Critical Elevation (NAVD88)	Annual Exceedance Probability			Vulnerable to Tidal Flooding†	Permitability Concerns	Impacts to Private Property	Estimated Cost*
			2030	2050	2070				
<b>EXISTING</b>	The intersection of state Route 28 and town-owned Bay Road.	6.6 feet	100%	100%	100%	2070	N/A	N/A	N/A
<b>ALTERNATIVE 1: GRAY</b>	577 linear feet of state-owned road are elevated to 9.5' NAVD88 using 4:1 traditionally vegetated side slopes and sheet pile. There is the possibility to maintain existing parking and access via ramps. The road is raised by 2.9' at its original low point.	9.5 feet	2%	10%	20%	No	Located in an ACEC, no direct wetland impacts	Minimal	\$1,140,000
<b>ALTERNATIVE 2: DEPLOYABLE</b>	Approximately 600 linear feet of 48" temporary barriers are deployed on the bay side of the road before storms, protecting the road to 10.0' NAVD88. A small flood wall to 10.0' NAVD88 cuts off a flanking flood pathway from Muddy Creek.	10.0 feet	2%	5%	20%	No	Located in an ACEC, no direct wetland impacts	Minimal	\$320,000
<b>ALTERNATIVE 3: GREEN</b>	A dune restoration to 9.5' NAVD88 protects the road from bayside flooding. Mobi-mats are placed to prevent dune erosion and improve accessibility. A small flood wall and berm to 9.5' NAVD88 prevents flanking flooding from Muddy River.	9.5 feet	2%	10%	20%	No	Located in an ACEC, resource area restoration	Minimal	\$378,000

\*2023 installed material cost +40% escalation (through 2029) and 15% contingency. Excludes design, permitting, mobilization, stormwater and wastewater infrastructure, and site controls. Costs based on experienced contractor opinion and MassDOT costing data.

†Future tidal data are approximate.