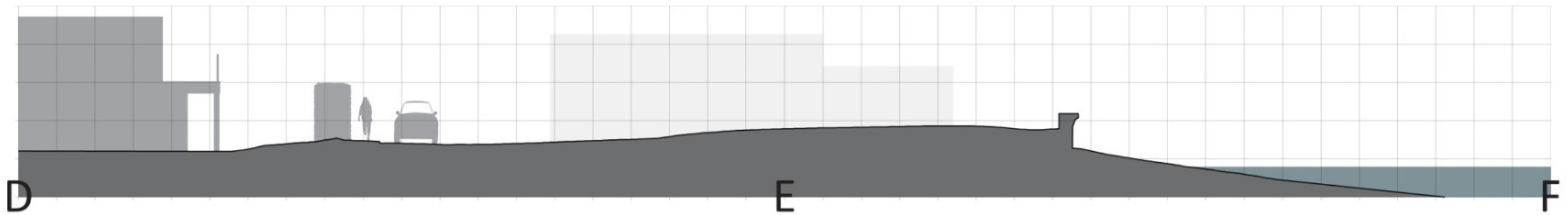
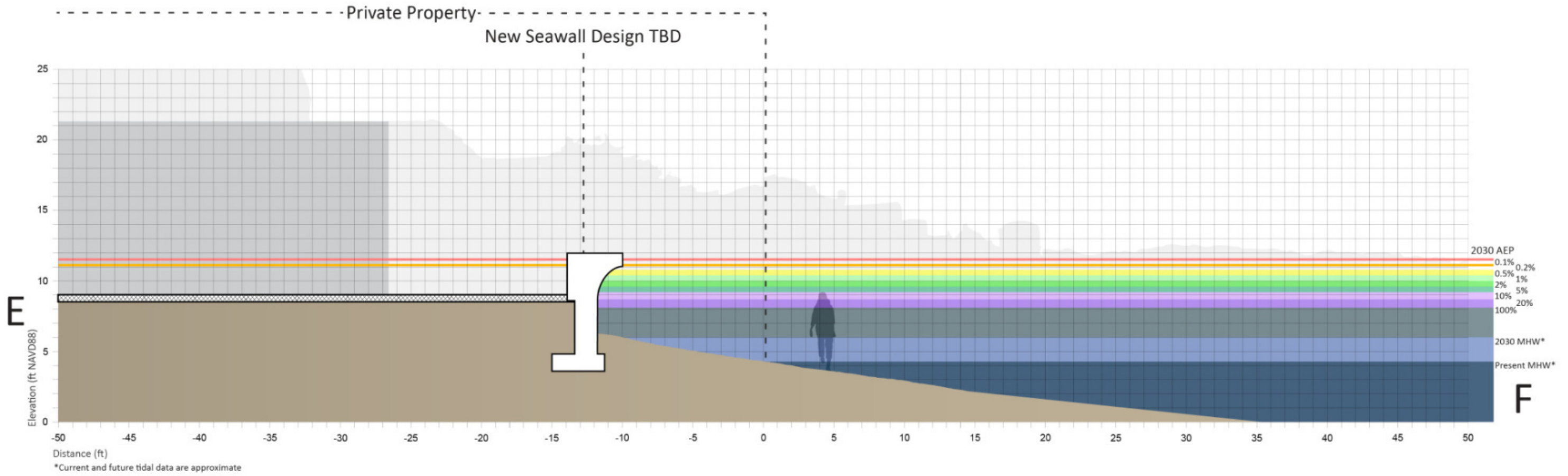


ALTERNATIVE 1: GRAY

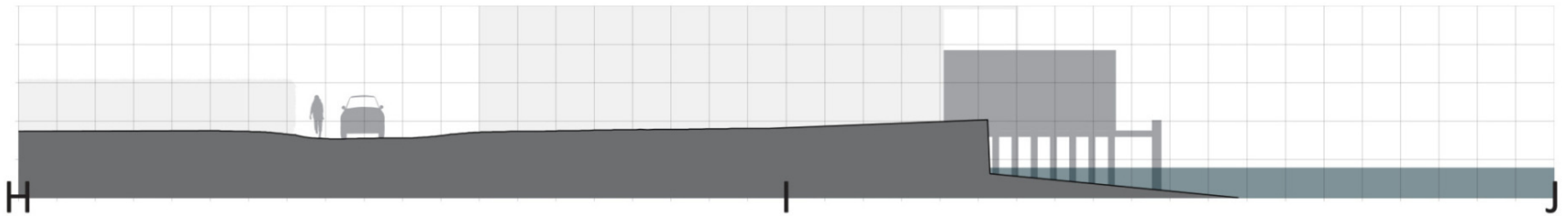
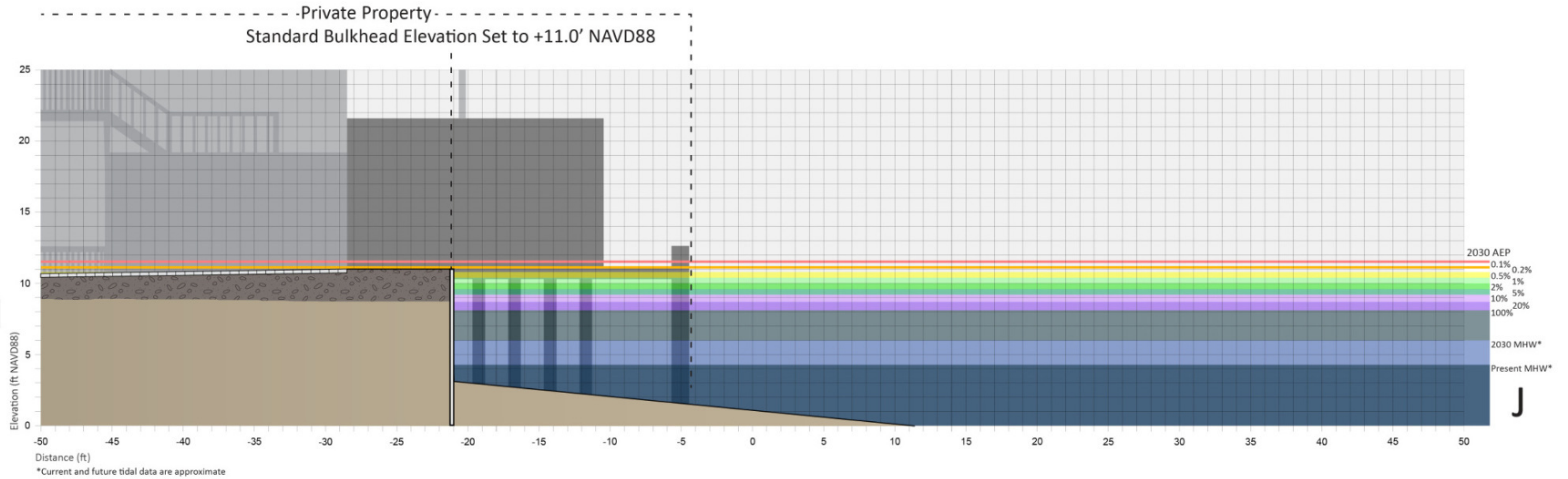
The seawalls at the Icehouse Condominiums and St. Mary of the Harbor are raised and modified to prevent overtopping. A stormwater retention tank is constructed under Bradford Street to mitigate rainwater flooding. Over time, the Town works with property owners to eliminate flood pathways while preserving water access, and a new minimum bulkhead elevation of +11.0' NAVD88 is set. This sets the standard that all repairs or bulkhead raisings must meet that minimum elevation.

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

*Element not included in costing, permitting, or flood reduction considerations.



ALTERNATIVE 1: GRAY
 Commercial Street in the East End, Provincetown



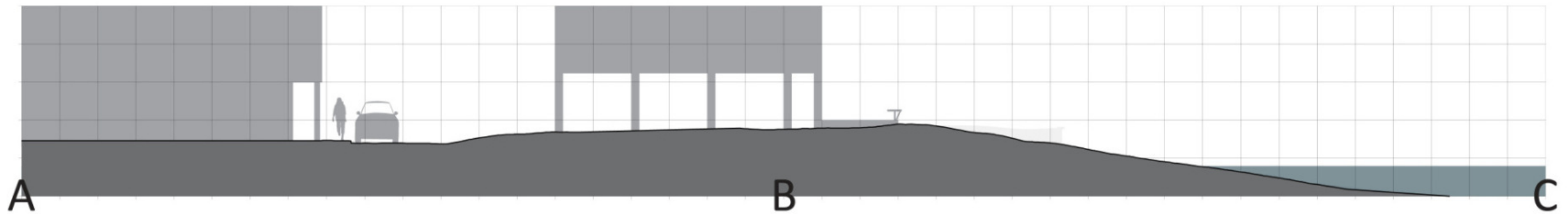
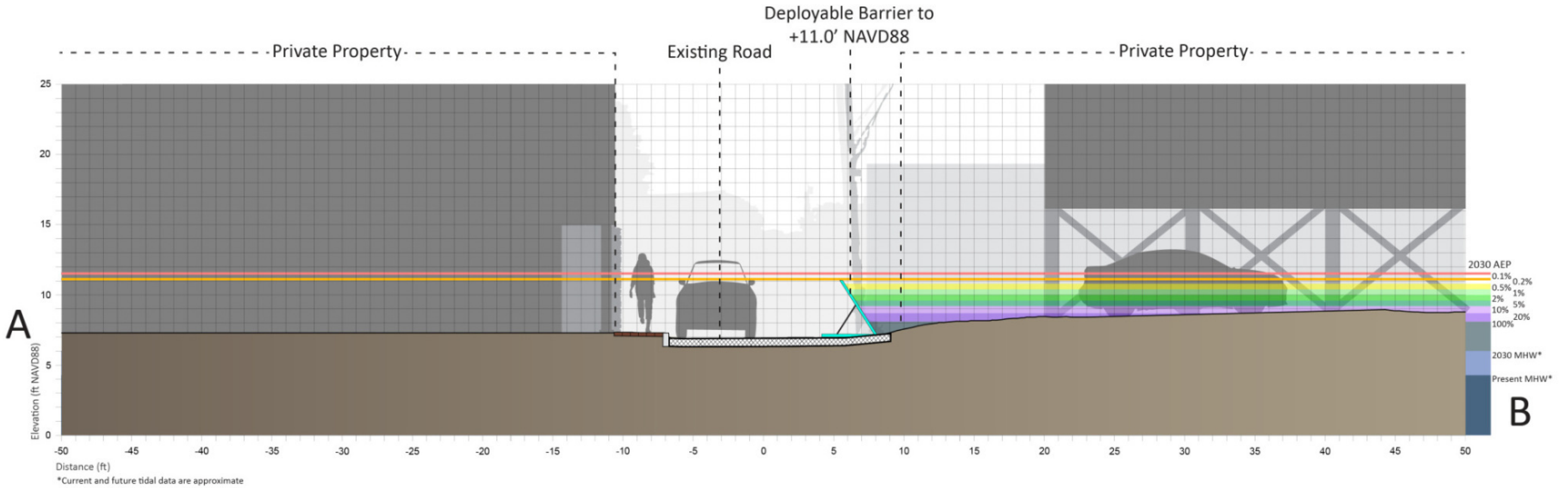
ALTERNATIVE 1: GRAY
Commercial Street in the East End, Provincetown



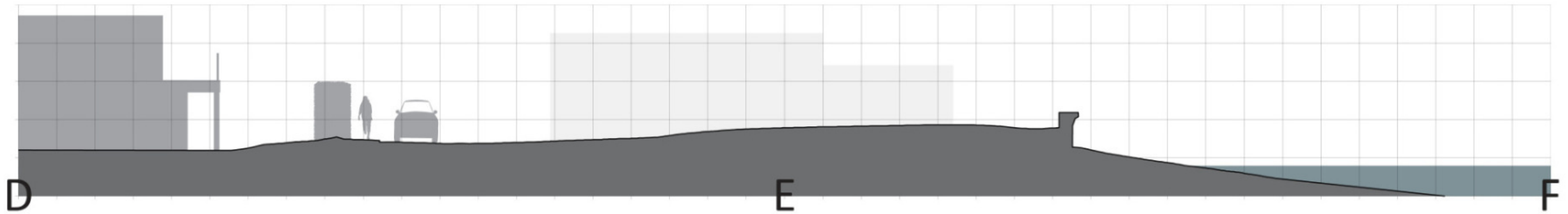
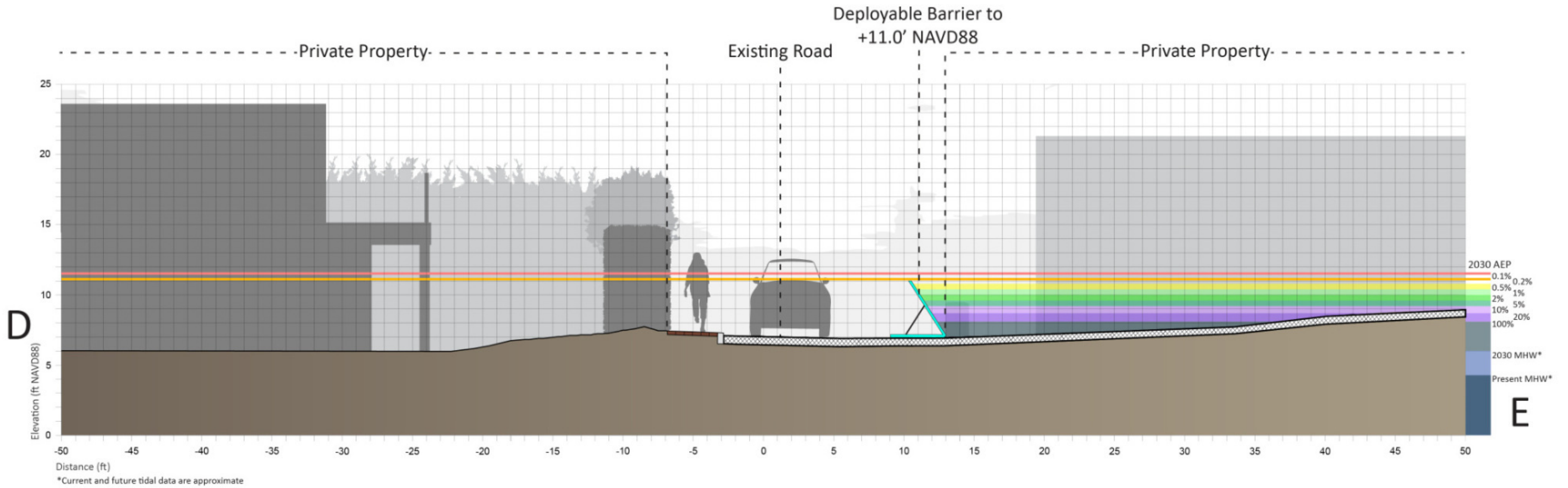
ALTERNATIVE 2: DEPLOYABLE

1100 linear feet of 48" tall deployable barriers protect the road to an elevation of +10.6' NAVD88. Parking is restricted during storm events in order to maintain a full travel lane while accomodating the barriers. In the long-term, segments of fixed wall and permanent gates reduce the amount of time and effort required to deploy barriers before storms.

Note: Project overlap with wetland areas, rights of way and property lines is approximate and needs confirmation with a site survey
 *Element not included in costing, permitting, or flood reduction considerations.

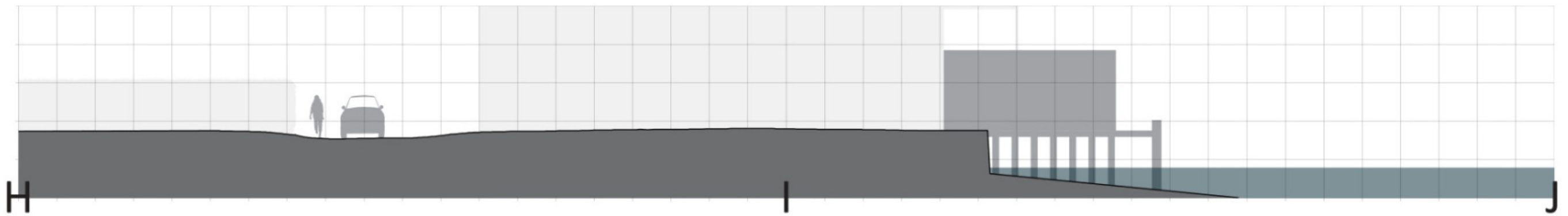
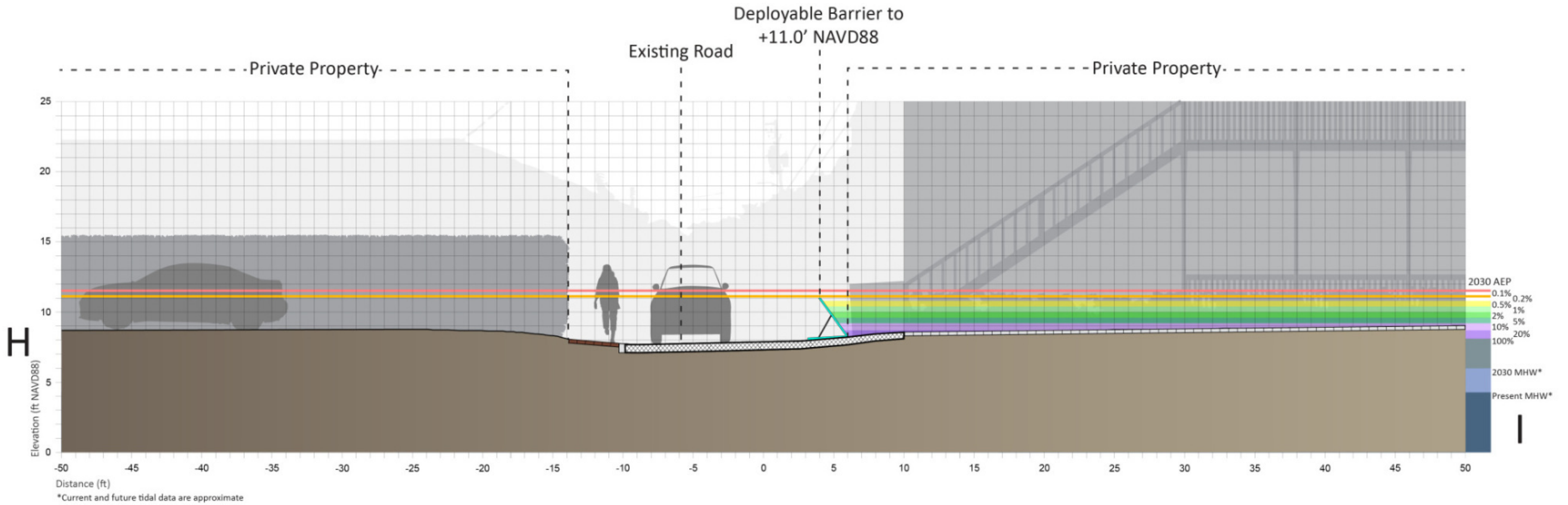


ALTERNATIVE 2: DEPLOYABLE
 Commercial Street in the East End, Provincetown



ALTERNATIVE 2: DEPLOYABLE

Commercial Street in the East End, Provincetown



ALTERNATIVE 2: DEPLOYABLE
Commercial Street in the East End, Provincetown

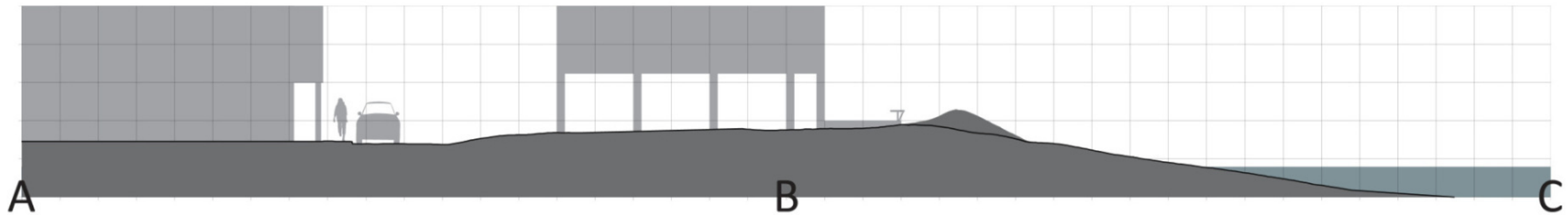
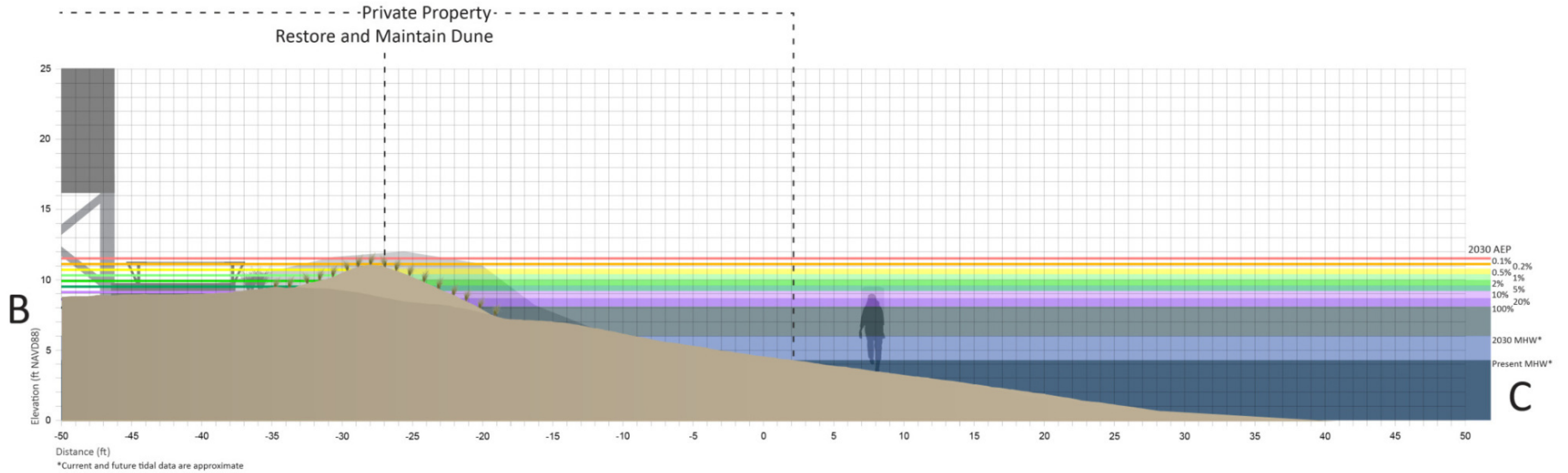


Note: Project overlap with wetland areas, rights of way and property lines is approximate and needs confirmation with a site survey
 *Element not included in costing, permitting, or flood reduction considerations.



ALTERNATIVE 3: GREEN

Bioretention areas are constructed around the Bradford Street intersection to help mitigate stormwater flooding. This strategy is most effective if additional private or public property can be identified for bioretention. In the long term, 14 waterfront properties are acquired to allow a dune to be restored to +11.0' NAVD88. In the interim, the existing dune is restored to an elevation of +8.7' NAVD88. Offshore wave attenuation structures could help prevent dune erosion.



ALTERNATIVE 3: GREEN
 Commercial Street in the East End, Provincetown

COMMERCIAL STREET IN THE EAST END, PROVINCETOWN

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				
EXISTING	Mixed use stretch of Commercial Street in the East End.	6.6 feet	100%	100%	100%	2050	N/A	N/A	N/A
ALTERNATIVE 1: GRAY	The seawalls are raised and modified to prevent overtopping. A stormwater retention tank is constructed under Bradford Street to mitigate flooding. Over time, the Town works with property owners to eliminate flood pathways, and set a new minimum bulkhead elevation of +11.0' NAVD88.	11.0 feet	0.2%	5%	100%	No (assuming adequate stormwater storage and backflow prevention)	N/A	Moderate	\$1,100,000
ALTERNATIVE 2: DEPLOYABLE	1100 linear feet of 48" tall deployable barriers protect the road to an elevation of +10.6' NAVD88. In the long-term, segments of fixed wall and permanent gates reduce the amount of time required to deploy barriers.	10.6 feet	0.5%	10%	100%	2050	N/A	Temporary	\$448,000
ALTERNATIVE 3: GREEN	Bioretention areas are constructed around the Bradford Street intersection to help mitigate stormwater flooding. In the long term, 14 waterfront properties are acquired to allow a dune to be restored to +11.0' NAVD88. In the interim, the existing dune is restored to +8.7' NAVD88.	8.7 feet	20%	100%	100%	2050	Resource area restoration	Moderate	\$53,000+ (cost of maintenance not included)
		11.0 feet	0.2%	5%	100%	2050	Resource area restoration, buyouts	Severe	\$274,000+ (cost of buyouts not included)

*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.