Appendix D: Alternatives Analysis

Criteria	Definition	Type of Measure	Symbols*	Data Inputs
Corridor Mobility				
Delay - Intersection LOS*	Level of traffic delay at specific intersection locations	Quantitative score based on overall Level of Service (LOS). LOS is defined as a measure of traffic quality, defined through traffic speed, density, and level of density.	5	Intersection receives mostly A's, B's, and some C's/D's
			3	Intersection receives mostly C's and D's
			1	Intersection receives mostly E's and F's
Delay - Total Vehicle Hours of Delay (Daily)	Measures the hours of delay collectively experienced by users of the intersection in the 3-hour AM peak and the 3-hour PM peak	Quantitative score, but some judgement will be used based on status of existing hours of delay at the location.	5	High delay
			3	Moderate delay
			1	Low delay
Queueing	Length of the traffic queue (measured in feet) of traffic remaining after a green signal cycle.	Determined quantitatively, based on VISSIM traffic modeling outputs. (To determine queueing, analysts took the longest queue on Morrissey). This is also determined at the Corridor level.	5	Very high queue lengths and/or long 95% queues
			3	Moderate queue lengths (consider 95% queues here)
			1	Low queue lengths (dependent on length of 95% queues)
Travel Time	Time (in minutes) required to drive completely along the Corridor (N to S and S to N). (Both directions will be considered if they show significantly different patterns)	Quantitative score (Corridor-wide)	5	High travel time along the Corridor
			3	Moderate travel time along the Corridor
			1	Low travel time along the Corridor
Travel Time Reliability	Travel Time Reliability is measured through the Buffer Index, which is the % of total travel time that most travelers add to their average travel time when planning trips to ensure on-time arrival 95 % of the time. A buffer index of 30 means that travelers are required to add a 30% increase in time to ensure on-time arrival 95% of the time.	Quantitative score (Corridor-wide)	5	Low Buffer Index (Travel is Reliable)
			3	Moderate Buffer Index
			1	High Buffer Index (Travel is not Reliable)
Vehicle Access	This metric assesses how alternatives maintain or improve connections to adjacent properties and resources.	Qualitative	5	Adds vehicle connections
			3	Maintains vehicle connections
			1	Reduces/degrades vehicle connections
Transit Access	This measures an alternative's ability to provide suitable transit access along the corridor and to adjacent properties.	Qualitative (measured relatively, and only can receive 1,2, or 3 (3 categories)	5	Provides high-quality transit access compared with other alternatives
			3	Provides similar access compared with other alternatives
			1	Provides low transit access compared with other alternatives
Pedestrian Crossing Comfort	This measures the safety and comfort experienced by pedestrians crossing the street based on the # of Crash Modification Factors (CMFs). CMFs are infrastructure improvements that have been shown to reduce crash risk by a certain %. (Such measures usually help crossing bicyclists as well).	Quantitative (based on # of CMFs)	5	High pedestrian safety/comfort based on crossing length,signaling, and infrastructure
			3	Moderate pedestrian comfort based on crossing length, signaling, and infrastructure
			1	Low pedestrian comfort based on crossing length, signaling, and infrastructure
Sidewalk Gaps Closed	This identifies the new amount of sidewalk (in square yards) added for each Alternative. All Alternatives upgrade sidewalk width to 8' where it doesn't currently reach this standard.	Quantitative (1 or 2), with some professional judgement used.	5	Closes all gaps within the termini of the alternative
			1	Closes some sidewalk gaps
Pedestrian Delay	This measures delay (in seconds) experienced by the average pedestrian at each intersection.	Quantitative (this was not used in all cases, however). For example, if an intersection is being introduced it doesn't make sense to compare the No-Build delay to an Alternative.	5	High pedestrian delay
			3	Moderate pedestrian delay
			1	Low pedestrian delay
Bicycle Level of Traffic Stress*	Measures the perceived comfort of bicyclists along a Corridor through such factors as traffic speed, volume, and level of traffic separation. More traffic and higher-speed traffic correspond with a higher level of traffic stress (unless more protective measures are used).	Quantitative score based on a four-category LTS score. Instead of 1-5 scoring, 1-4 scoring is used to be consistent with LTS convention.	4	High bicyclist comfort based on roadway traffic speed, volume, and level of protection/separation
			3	Moderate bicyclist comfort based on roadway traffic speed, volume, and level of protection/separation
			2	Low-moderate bicyclist comfort based on roadway traffic speed, volume, and level of protection/separation
			1	Low bicyclist comfort based on roadway traffic speed, volume, and level of protection/separation
Potential Safety Effects	This measures the safety and comfort experienced by all users at a location based on the # of Crash Modification Factors (CMFs). CMFs are infrastructure imp[rovements that have been shown to reduce crash risk by a	Quantitative (based on # of CMFs)	5	High safety / comfort based on # of CMFs
			3	Moderate safety / comfort based on # of CMFs
			1	Low safety / comfort based on # of CMFs
Quality of East-West Connections	This measures the safety and comfort of people crossing the Morrissey Boulevard Corridor, but also captures key destinations that people are accessing.	Qualitative, with corresponding narrative in the report.	5	Increases the quality and/or quantity of east-west connection to a key destination across Morrissey Boulevard
			3	Maintains the quality and/or quantity of east-west connection to a key destination across Morrissey Boulevard
			1	Decreases the quality and/or quantity of east-west connection to a key destination across Morrissey Boulevard
Diversion	NA - Maps shown in report, with explanation	NA - Maps shown in report, with explanation	NA - Maps shown in report, with explanation	NA - Maps shown in report, with explanation
Resiliency & Ecology				
Effects on Environmental Resources*	This metric qualitatively assesses each alternative's expected impacts (+) or (-) to environmental resources such as floodplains, surface geology, protected and recreational open space, ACECs (Areas of Critical Environmental Concern), among others.	Qualitative	5	Generally (+) environmental impacts
			3	Mixed (+) and (-) environmental impacts
			1	High environmental impacts
Air Quality	NA - Scored at the Corridor level			
2070 Coastal Flooding	Flooding associated with rising sea levels, such as that expected from global warming.	Quantitative - Based on the MC-FRM(Massachussetts Coastal Flood Resiliency Model)	5	High risk and/or intensity of 2070 Coastal Flooding
			3	Moderate risk and/or intensity of 2070 Coastal Flooding
			1	Low irsk and/or intensity of 2070 Coastal Flooding
2070 Stormwater Flooding	Flooding associated with a high volume of stormwater falling ina small period of time and overwhelming the flood control	Quantitative - Based on the MC-FRM(Massachussetts Coastal Flood Resiliency Model)	5	High risk and/or intensity of 2070 Coastal Flooding
			3	Moderate risk and/or intensity of 2070 Coastal Flooding
			1	Low risk and/or intensity of 2070 Coastal Flooding
Impervious Surface Area	Impervious surfaces are natural surfaces such as wetlands or native grasses, that soak up water during storms. They can mitigate stormwater flooding by holding water and releasing it more slowly back into the water table.	Quantitative (square yards)	5	Alternative add a significant area of impervious surface
			3	Alternative maintains the amount of impervious surface
			1	Alternative has a lower area of impervious surface.
Plant Migration	Plant migration is the process of plants moving locations/environments to adapt to changing water conditions. For example, if the ground is flatly sloped, plants in theory could move toward higher elevations if sea levels rose (over	Qualitative, but based on mapping	5	Alternative has a high potential to allow plant movement to adapt to changing hydrological conditions.
			3	Alternative has a moderate potential to allow plant movement to adapt to changing hydrological conditions.
			1	Alternative has a low potential to allow plant movement to adapt to changing hydrological conditions.

Note:

*** Most categories on this sheet are ranked on a 5-point scale, but for reasons of presentation, only 1,3,5 are listed here. Scores 2 and 4 are used where further differentiation in the Alternatives is necessary.**

*** Note: Bicycle Level of Traffic Stress is rated on a 4-point scale to align with LTS convention**

*** Environmental Effects is a composite score. The component parts of the "Effects on Environmental Resources" are included in the "Supplementary Environmental Effects Scoring" sheet.**

Wave Mitigation	Wave mitigation is the process of dissipating wave energy through structures or natural features.	Qualitative, but based on mapping	5	Alternative effectively dissipates wave energy, protecting areas inland
			3	Alternative partially dissipates wave energy, partially protecting areas inland
			1	Alternative does not protect areas inland from powerful waves.
Placemaking				
Placemaking/Open Space	This metric assesses an alternative's ability to provide enhance and additional opportunities for placemaking and open	Quantitative	5	High potential for placemaking/open space
			3	Medium potential for placemaking/open space
			1	Low potential for placemaking/open space
Visual Effects	This metric assesses the visual impacts of each alternative.	Qualitative. (Not all locations were assessed and not all locations had a change in elevation that would impact the visual impact).	5	Highly positive visual impacts
			3	Minimal changes in visual impacts
			1	Significant negative visual impacts
Consistency with Plans	This alternative identifies whether an alternative is consistent with previously approved state and local plans, and/or is consistent with DCR and BWSC projects.	Qualitative	5	Highly consistent with local planning, and/or supports BWSC and DCR efforts
			3	Moderately consistent with planning efforts and/or BWSC and DCR efforts
			1	Not consistent with local planning, and/or clashes with certain BWSC and DCR efforts
Disruption to Neighborhoods	This metric qualitatively assesses the impacts each alternative, both during and post-construction, will have on the adjacent neighborhoods. In particular, if an Alternative requires major work completed at a strategic intersection with limited alternative intersections, that would be a major impact.	Qualitative	5	Few/no construction impacts on surrounding neighborhoods
			3	Some construction impacts on surrounding neighborhoods
			1	Major negative impacts to surrounding neighborhoods
Recreational Access	This metric assesses each alternative's ability to enhance connections to existing and proposed recreational facilities.	Qualitative	5	High-quality connections to and synergies with existing and proposed recreational opportunities
			3	Medium potential to connect to existing and proposed recreational opportunities.
			1	Very limited connections to existing and proposed recreational opportunities
Shade Trees	This metric assesses each alternative's ability to provide additional shade trees to mitigate heat island effects. Quantity and cost estimates do offer an estimated number of trees (recommended an average of 25 ft./tree).	Quantitative, based on the amount of new impervious space per Alternative. At the Corridor level, there is an estimated number of new trees.	5	High shade tree potential
			3	Medium shade tree potential
			1	Low shade tree potential
Constructability				
Construction Cost	This metric compares the expected order-of-magnitude construction costs for each alternative.	Quantitative	NA - Scored at the Corridor level	NA - Scored at the Corridor level
Constructability	This measure compares the relative ease of construction complexity between alternatives, accounting for potential risks to cost overruns or schedule overruns.	Qualitative (but impacted by Construction Cost sheet above, along with guidance from Woods Hole)	5	High constructability
			3	Medium constructability
			1	Low constructability, with major identified barriers to construction
Maintenance Issues & Costs	This metric assesses the expected cost and effort to maintain and operate the alternative.	Qualitative	5	Low number/severity of existing or expected maintenance issues
			3	Medium number/severity of existing or expected maintenance issues
			1	Significant number/severity of existing or expected maintenance issues
Environmental Permits/Complexity	This metric assesses the relative complexity and expected difficulty in permitting an alternative.	Qualitative	5	Few/easy permitting issues expected
			3	Medium number/severity permitting issues expected
			1	High number of /complicated permitting issues expected

Future No-Build - North & South Alternatives

Criteria	Preble Circle - No Build	First Street - No Build	Bianculli Boulevard - No Build	Victory Road / Freeport Street No-Build	Neponset Ave. - No Build	Notes
Corridor Mobility						
Delay - Intersection LOS	2	NA	1	1	1	
Delay - Total Vehicle Hours of Delay	3	4	1	2	3	
Queueing	3	4	2	1	3	
Travel Time	3	3	3	3	3	One score (Corridor-wide)
Travel Time Reliability	2	2	2	2	2	One score (Corridor-wide)
Vehicle Access	3	3	3	2	3	
Transit Access	3	3	3	3	3	
Pedestrian Crossing Comfort	3	3	3	3	3	
Sidewalk Gaps (North-South)	3	3	3	3	3	
Pedestrian Delay	4	NA	3	3	NA	
Bicycle Level of Traffic Stress	3	1	1	1	1	
Potential Safety Effects	3	3	3	3	3	
Quality of East-West Connections	2	2	2	2	2	
Diversion	NA	NA	NA	NA	NA	
Average by Location	**2.85**	**2.82**	**2.31**	**2.23**	**2.50**	
Average (Transportation Criteria, No-Build, All Locations)	**2.54**					
Resiliency and Ecology						
Effects on Environmental Resources	3	3	3	3	3	
Air Quality	2	2	2	2	2	
2070 Coastal Flooding	1	1	1	1	1	
2070 Stormwater Flooding	1	1	2	2	1	
Impervious Surface	3	2	2	3	3	
Plant Migration	NA	NA	NA	NA	NA	
Wave Mitigation	NA	NA	NA	NA	NA	
Average, by Location	**2.00**	**1.80**	**2.00**	**2.20**	**2.00**	
Average (Resiliency & Ecology Criteria, No-Build, All Locations)	**2.00**					
Placemaking						
Placemaking/Open Space	3	2	2	3	2	
Visual Effects	3	2	2	3	2	
Consistency with Plans	3	1	3	1	3	
Disruption to Neighborhoods	4	3	2	3	2	
Recreational Access	3	3	3	2	3	
Shade Trees	3	3	2	3	4	
Average, by Location	**3.17**	**2.33**	**2.33**	**2.50**	**2.67**	
Average (Placemaking Criteria, No-Build, All Locations)	**2.60**					
Constructability						
Construction Cost	NA	NA	NA	NA	NA	No Construction Cost - Already exists
Constructability	NA	NA	NA	NA	NA	No Construction Cost - Already exists
Maintenance Issues	3	2	1	2	1	
Environmental Permits/Complexity	NA	NA	NA	NA	NA	
Average, by Location	**3.00**	**2.00**	**1.00**	**2.00**	**1.00**	
Average (Constructability Criteria Section, No-Build, All Locations)	**1.80**					
Overall Average Score, by Location	**2.75**	**2.24**	**1.91**	**2.23**	**2.04**	

Overall Future No-Build Average	**2.24**

Future No-Build - Central Section (Malibu Beach Side)

Criteria	Existing Conditions	Notes
NA		
Resiliency and Ecology		
Effects on Environmental Resources	1	
Air Quality	NA	
2070 Coastal Flooding	1	
2070 Stormwater Flooding	1	
Impervious Surface	1	
Plant Migration	1	
Wave Mitigation	1	
Average	**1.00**	
Placemaking		
Placemaking/Open Space	2	
Visual Effects	NA	
Consistency with Plans	1	
Disruption to Neighborhoods	5	
Recreational Access	3	
Shade Trees	2	
Average	**2.60**	
Constructability		
Construction Cost	NA	No Construction Cost - Already Existing
Constructability	NA	No Construction Cost - Already Existing
Maintenance Issues	1	
Environmental Permits/Complexity	NA	
Average	**1.00**	
Overall Average Score	**1.53**	

Future No-Build

Criteria	Existing Conditions	Notes
NA		
Resiliency and Ecology		
Effects on Environmental Resources	3	
Air Quality	NA	
2070 Coastal Flooding	1	
2070 Stormwater Flooding	1	
Impervious Surface	2	
Plant Migration	3	
Wave Mitigation	1	
Average	**1.83**	
Placemaking		
Placemaking/Open Space	1	
Visual Effects	2	
Consistency with Plans	3	
Disruption to Neighborhoods	1	
Recreational Access	2	
Shade Trees	2	
Average	**1.83**	
Constructability		
Construction Cost	NA	No Construction Cost - Already Existing
Constructability	NA	No Construction Cost - Already Existing
Maintenance Issues	1	
Environmental Permits/Complexity	5	
Average	**4.00**	
Overall Average Score	**2.56**	

Alternative 1 - North & South Alternatives

Criteria	Preble Circle Alternative 1 Does Not Change Between Alternatives)	First Street Alternative 1	Bianculli Boulevard Alternative 1 (DCR Modified Design with NB Frontage Ending at the School Driveway; Auxiliary Acceleration & Deceleration Lanes at Old Colony Terrace; Removal of NB Slip Lane	Victory Road / Freeport Street Alternative 1	Neponset Alternative 1 (Does Not Change Between Alternatives)	Notes
Corridor Mobility						
Delay - Intersection LOS	1	3	2	3	1	
Delay - Total Vehicle Hours of Delay	2	3	3	4	2	
Queueing	2	3	3	5	2	
Travel Time	4	4	4	4	4	One score (Corridor-wide)
Travel Time Reliability	3	3	3	3	3	One score (Corridor-wide)
Vehicle Access	4	5	4	3	4	
Transit Access	3	4	4	5	4	
Pedestrian Crossing Comfort	5	5	5	5	4	
Sidewalk Gaps (North-South)	5	5	5	4	4	
Pedestrian Delay	3	NA	4	5	NA	
Bicycle Level of Traffic Stress	5	5	5	5	4	
Potential Safety Effects	5	5	5	5	4	
Quality of East-West Connections	4	5	4	3	4	
Diversion	NA	NA	NA	NA	NA	
Average, by Location	**3.54**	**4.17**	**3.92**	**4.15**	**3.33**	
Average (Transportation Criteria, No-Build, All Locations)	**3.82**					
Resiliency and Ecology						
Effects on Environmental Resources	4	5	4	4	4	
Air Quality	3	3	3	3	3	
2070 Coastal Flooding	5	5	5	5	5	
2070 Stormwater Flooding	5	4	4	5	5	
Impervious Surface	4	5	4	4	4	
Plant Migration	NA	NA	NA	NA	NA	
Wave Mitigation	NA	NA	NA	NA	NA	
Average	**4.20**	**4.75**	**4.25**	**4.5**	**4.5**	
Average (Resiliency & Ecology Criteria, No-Build, All Locations)	**4.44**					
Placemaking						
Placemaking/Open Space	4	5	3	4	5	
Visual Effects	4	5	3	3	4	
Consistency with Plans	3	5	4	4	5	
Disruption to Neighborhoods	3	4	3	2	3	
Recreational Access	5	5	5	4	4	
Shade Trees	5	5	4	4	5	
Average	**4.00**	**4.83**	**3.67**	**3.5**	**4.33**	
Average (Placemaking Criteria, No-Build, All Locations)	**4.07**					
Constructability						
Construction Cost	3	3	3	4	3	
Constructability	4	3	4	4	4	
Maintenance Issues	5	4	5	4	4	
Environmental Permits/Complexity	5	2	4	4	3	
Average	**4.25**	**3.00**	**4.00**	**4.00**	**3.5**	
Average (Constructability Criteria Section, No-Build, All Locations)	**3.75**					
Overall Average Score	**4.00**	**4.19**	**3.96**	**4.04**	**3.92**	

Overall Alternative 1 Average **4.02**

Alternative 1 - Low-Profile, Tide Gate (Roadway Descends, Wall on Bay Side) Central Section, Malibu Beach Side

Criteria	Alternative 1: Low-Profile, Tide Gate	Notes
Corridor Mobility		
NA		
Resiliency and Ecology		
Effects on Environmental Resources	2	
Air Quality	NA	NA
2070 Coastal Flooding	5	
2070 Stormwater Flooding	4	
Impervious Surface	2	
Plant Migration	1	
Wave Mitigation	4	
Average	**3.00**	
Placemaking		
Placemaking/Open Space	3	
Visual Effects	NA	
Consistency with Plans	4	
Disruption to Neighborhoods	4	
Recreational Access	3	
Shade Trees	3	
Average	**3.40**	
Constructability		
Construction Cost	2	Score of approximately $105.4 milllion.
Constructability	2	Receives a score of 3 because tide gate installed, which will introduce complications. Less fill will have to be added as compared to the High-Profile Alternative.
Maintenance Issues	3	
Environmental Permits/Complexity	1	
Average	**2.00**	
Overall Average Score	**2.80**	

Alternative A - Minimalist Revetment on Bay Side of Malibu Beach (Can be Combined with Alternatives 1-3 on Malibu Beach Side)

Criteria	Existing Conditions	Notes
NA		
Resiliency and Ecology		
Effects on Environmental Resources	3	
Air Quality	NA	
2070 Coastal Flooding	NA	
2070 Stormwater Flooding	NA	
Impervious Surface	3	
Plant Migration	2	
Wave Mitigation	4	
Average	**3.00**	
Placemaking		
Placemaking/Open Space	2	
Visual Effects	2	
Consistency with Plans	4	
Disruption to Neighborhoods	4	
Recreational Access	4	
Shade Trees	3	
Average	**3.17**	
Constructability		
Construction Cost	4	
Constructability	4	
Maintenance Issues	5	
Environmental Permits/Complexity	2	
Average	**3.75**	
Overall Average Score	**3.31**	

Alternative 2 - North & South Alternatives

Criteria	Preble Circle Alternative 1 (same in both Alternatives)	First Street Alternative 2	Bianculli Boulevard Alternative 2 (Original DCR Design with NB Frontage Road Extending Northward to First St.* ; Deceleration Lane only at Old Colony Terrace (Replaced with Impervious Surface); Removal of NB Slip Lane	Victory Road / Freeport Street Alternative 2: Quadrant Roadway with Full Intersection at Victory Road: 1.) Remove SB Frontage Road; 2.) Remove both NB and SB left turns at Freeport Street; SB motorists would make a left at Victory Rd., while NB motorists	Neponset Alternative 1 (same in both Alternatives)	Notes
Corridor Mobility						
Delay - Intersection LOS	✗ 1	NA	✗ 1	✓ 4	✗ 1	
Delay - Total Vehicle Hours of Delay	✗ 2	✓ 5	✓ 4	✓ 5	✗ 2	
Queueing	✗ 2	✗ 2	✓ 4	✓ 4	✗ 2	
Travel Time	! 3	! 3	! 3	! 3	! 3	One score (Corridor-wide)
Travel Time Reliability	✓ 4	✓ 4	✓ 4	✓ 4	✓ 4	One score (Corridor-wide)
Vehicle Access	✓ 4	! 3	! 3	✓ 5	✓ 4	
Transit Access	! 3	! 3	✓ 4	✓ 5	✓ 4	
Pedestrian Crossing Comfort	✓ 5	✓ 4	✓ 5	✓ 4	✓ 4	
Sidewalk Gaps (North-South)	✓ 5	✓ 5	✓ 5	✓ 5	✓ 4	
Pedestrian Delay	! 3	NA	✗ 2	! 3	NA	
Bicycle Level of Traffic Stress	✓ 5	✓ 5	✓ 5	✓ 5	✓ 4	
Potential Safety Effects	✓ 5	✓ 4	✓ 4	✓ 4	✓ 4	
Quality of East-West Connections	✓ 4	✗ 2	✓ 4	✓ 4	✓ 4	
Diversion	NA	NA	NA	NA	NA	
Average	! **3.54**	! **3.64**	✓ **3.69**	✓ **4.23**	! **3.33**	
Average (Transportation Criteria, No-Build, All Locations)	✓ **3.69**					
Resiliency and Ecology						
Effects on Environmental Resources	✓ 4	✓ 4	✓ 5	✓ 5	✓ 4	
Air Quality	! 3	! 3	! 3	! 3	! 3	
2070 Coastal Flooding	✓ 5	✓ 5	✓ 5	✓ 5	✓ 5	
2070 Stormwater Flooding	✓ 5	✓ 4	✓ 4	✓ 5	✓ 5	
Impervious Surface	✓ 4	✓ 4	✓ 5	✓ 5	✓ 4	
Plant Migration	NA	NA	NA	NA	NA	
Wave Mitigation	NA	NA	NA	NA	NA	
Average	✓ **4.20**	✓ **4.25**	✓ **4.75**	✓ **5**	✓ **4.5**	
Average (Resiliency & Ecology Criteria, No-Build, All Locations)	✓ **4.54**					
Placemaking						
Placemaking/Open Space	✓ 4	! 3	✓ 4	✓ 5	✓ 5	
Visual Effects	✓ 4	! 3	✓ 4	✓ 4	✓ 4	
Consistency with Plans	! 3	! 3	✓ 5	✓ 5	✓ 5	
Disruption to Neighborhoods	! 3	✓ 4	! 3	✗ 2	! 3	
Recreational Access	✓ 5	✓ 4	✓ 5	✓ 5	✓ 4	
Shade Trees	✓ 5	✓ 4	✓ 4	✓ 4	✓ 5	
Average	✓ **4.00**	! **3.5**	✓ **4.17**	✓ **4.17**	✓ **4.33**	
Average (Placemaking Criteria, No-Build, All Locations)	✓ **4.03**					
Constructability						
Construction Cost	! 3	✓ 4	! 3	! 3	! 3	
Constructability	✓ 4	✓ 4	✓ 4	! 3	✓ 4	
Maintenance Issues	✓ 5	✓ 4	✓ 5	✓ 5	✓ 4	
Environmental Permits/Complexity	✓ 5	✓ 5	✓ 4	✓ 4	! 3	
Average	✓ **4.25**	✓ **4.25**	✓ **4**	✓ **3.75**	! **3.5**	
Average (Constructability Criteria Section, No-Build, All Locations)	✓ **3.95**					
Overall Average Score	✓ **4.00**	✓ **3.91**	✓ **4.15**	✓ **4.29**	✓ **3.92**	

Overall Alternative 2 Average ✓ **4.05**

Alternative 2 - High Profile: No Tide Gate, Raising Malibu Beach Interior, Keeping Morrissey Boulevard at a Higher Location (Morrissey Blvd. on Top of an Embankment) - Significant Fill

Criteria	Alternative 2: High-Profile, No Tide Gate	Notes
Corridor Mobility		
NA		
Resiliency and Ecology		
Effects on Environmental Resources	3	
Air Quality	NA	NA
2070 Coastal Flooding	5	
2070 Stormwater Flooding	2	
Impervious Surface	4	
Plant Migration	4	
Wave Mitigation	4	
Average	**3.67**	
Placemaking		
Placemaking/Open Space	4	
Visual Effects	NA	
Consistency with Plans	2	
Disruption to Neighborhoods	4	
Recreational Access	4	
Shade Trees	3	
Average	**3.4**	
Constructability		
Construction Cost	4	Score of ~$47.3 million
Constructability	4	More fill required in this Alternative but adding fill is likely more straightforward compared to a tide gate
Maintenance Issues	5	
Environmental Permits/Complexity	3	
Average	**4.00**	
Overall Average Score	**3.69**	

Alternative B - Living Shoreline on Bay Side of Malibu Beach (Can be Combined with Alternatives 1-3 on Malibu Beach Side)

Criteria	Existing Conditions	Notes
NA		
Resiliency and Ecology		
Effects on Environmental Resources	4	
Air Quality	NA	
2070 Coastal Flooding	NA	
2070 Stormwater Flooding	NA	
Impervious Surface	4	
Plant Migration	5	
Wave Mitigation	4	
Average	**4.25**	
Placemaking		
Placemaking/Open Space	4	
Visual Effects	5	
Consistency with Plans	5	
Disruption to Neighborhoods	4	
Recreational Access	5	
Shade Trees	4	
Average	**4.50**	
Constructability		
Construction Cost	3	
Constructability	3	
Maintenance Issues	4	
Environmental Permits/Complexity	3	
Average	**3.25**	
Overall Average Score	**4.00**	

Alternative 3 - Hybrid Alternative (Tide Gate Opening Less Often Some Lesser Elevation Increase on Malibu Beach Side)

Criteria	Alternative 3: Hybrid Alternative	Notes
Corridor Mobility		
NA		
Resiliency and Ecology		
Effects on Environmental Resources	2	
Air Quality	NA	NA
2070 Coastal Flooding	5	
2070 Stormwater Flooding	5	
Impervious Surface	5	
Plant Migration	5	
Wave Mitigation	5	
Average	**4.50**	
Placemaking		
Placemaking/Open Space	4	
Visual Effects	NA	
Consistency with Plans	5	
Disruption to Neighborhoods	4	
Recreational Access	2	
Shade Trees	4	
Average	**3.8**	
Constructability		
Construction Cost	4	
Constructability	2	
Maintenance Issues	4	
Environmental Permits/Complexity	1	
Average	**2.75**	
Overall Average Score	**3.68**	

Scoring Justification North and South Section

Criteria	Preble Circle Alternatives	First Street Alternatives	Bianculli Boulevard Alternatives	Victory Road / Freeport Street Alternatives	Neponset Alternative 1
Corridor Mobility					
Delay - Intersection LOS	Future No-Build Alternative scores higher than the proposed Alternative 1 because the former receives an average LOS of "E" while the latter receives an average LOS of "F."	As there is no intersection in the No-Build option, and in the Right-In/Right-Out Alternative, it doesn't make sense to score this location. (Alternative 1 would receive a score of 2, but this is not reported.	Bianculli (Future No Build) received a Synchro LOS of "F." Alternative 1 recieved AM and PM scores of "F" and "E" respectively (with an overall LOS of "F"), while Alternative 2 received AM and PM scores of "F" and "F." Therefore, Alternative 1 received a slightly higher score than Alternative 2, which ranked the same as the No-Build (NB).	No-Build Alternative receives a score of 1 because it has an average LOS of F. Alternative 1 receives a score of 3 because it has an average LOS of D. Alternative 2 receives a score of 4 because it has an average LOS of C.	Future No-Build receives a Synchro score of 3 (LOS scores are generally at the "C" or the "D" level at intersection components). In Alternative 1 (the Modified DCR Alternative), the intersection receives scores of A, E, C, and B (a somewhat higher average), receiving a score of 4.
Delay - Total Vehicle Hours of Delay	Future No Build reports a total of 103.8 vehicle hours of delay. Alternative 1 reports a total of 134.3 vehicle hours of delay. Alternative 1, therefore, leads to slightly worse delay.	Future No-Build reports118.9 hrs. of delay. Almost all of this delay, however, is in the AM, with the PM having no delay. Alternative 1 is 17.8 (AM & PM). However, in this case, the PM Alternative comprises essentially all the delay. Alternative 2 has 140.4 vehicle hours of delay. Adding an intersection at this location will significantly increase congestion--albeit from a low level--by adding new roads.	Future No-Build has 371 hrs. (AM & PM); Alternative 1 has 184 hrs. (AM & PM); Alternative 2 has171 hrs. (AM & PM). Alt. 2 scores the highest as a result.	Future No-Build has a total of 341.1 total vehicle hours of delay. Alternative 1 has 130.1 vehicle hours of delay. Alternative 2 has a total of 91.2 vehicle hours of delay. Alternative 1 and 2 both report significantly less total delay than the EC.	Future No-Build vehicle hours of delay is 443 hrs. (AM & PM). Alternative 1 reports 724.8 hours of total delay.Therefore, Future No-Build scores higher than Alternative 1
Queuing	Note: This metric was scored based on the longest Old Colony Ave. queue for the dominant direction (NB in the morning and SB in the PM). All figures are in ft. Future No-Build: Longest AM Peak Hour average queue at Preble Circle on Old Colony Ave. (NB L and T) is 47 ft. The longest PM SB queue on Old Colony Ave. is 622 ft. (SB U, L, T, and R). Alternative 1: Longest AM (NB) Peak Hour queue at Preble Circle is 189.8 ft. (Old Colony Ave. NB L and T); Longest Average PM (Peak Hour) queue on Old Colony Ave. at Preble Circle is 636.7 ft. Therefore, Alternative 1 receives a slightly lower score.	Scored based on the longest of the Average Queue metric in the dominant direction on Morrissey Boulevard: In the AM, the shortest queueing is in Alternative 1, then 2, then Future No-Build. In the PM, the EC has the shortest queue, followed by Alternative 2, followed by Alternative 1. Overall, the Future No-Build has the lowest delay, followed slightly by Alternative 2; Alternative 1 is significantly longer.	Scored based on the longest of the Average Queue metric in the dominant direction. As a takeaway, average AM NB queues fall in the dominant direction from the Future No-Build to Alternative 1 to Alternative 2, with the latter being the lowest.	Scored based on the longest combined queue on Morrissey (All figures in feet). This was rated based on summing up the longest combined delay (for Freeport and Victory) in the dominant direction (NB in the morning and SB in the PM). Future No-Build : The longest combined AM NB queue is 400 ft. In the PM (SB) direction, the longest average queue is 2,273 ft. (SB U, L, and T). The longest PM SB queue for Victory is 0 (because there is no control now). Alternative 1: The sum of the longest AM queue is 102 ft. In the PM (SB) direction, the SB peak combined queue is 130 ft. Alternative 2: The combined AM (NB) queue is 138 ft. The sum of the longest PM	Scored based on the most intense queuing (the NB Gallivan approach), as well as the Neponset Ave. westbound right turn. Alternative 1 appears to increase the delay at these locations.
Travel Time	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level
Travel Time Reliability	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level	NA - To be completed at the Corridor level
Vehicle Access	Vehicle access does not change significantly. Alternative 1 does, however, receive a slightly higher score because it will allow certain movements to be conducted in an easier manner (avoiding some potential weaving movements, for example)	Alternative 1 does not measurably improve vehicle access as compared to the Future No-Build. The First Street full intersection (Alternative 2) dramatically increases access of surrounding land uses among drivers. Therefore, it receives a 5.	Vehicular access is broadly similar among all three Alternatives, with Alternative 1 receiving a 4 instead of 3 because of the new SB acceleration lane at Old Colony Terrace. The NB slip lane is removed in both alternatives. (The slip lane, however, does not meaningfully degrade vehicular access so it has little impact on scoring.) Any changes to slip lane to the north are captured in the First St. scoring.	For Victory, Alternative 1 has advantages compared to Future No-Build in vehicle access because it allows a NB- to SB- U-turn for drivers. This movement is currently not allowed at Victory (because there is no opening). So, it allows 1 new movement without any loss in access. Alternative 2, substantially improves vehicular access. It allows a thru movement on Victory, dramatically boosting vehicular access. It also allows left turns from Victory onto Morrissey SB, which is not in the Future No-Build, or in Alternative 1.	Alternative 1 does improve vehicle access, mainly by making a key section of the intersection (Neponset Ave.) two-way. It improves vehicule accessibility (and directness) here.
Transit Access	Alternative 1 has very little impact on transit access. There are two bus stops in the vicinity of the intersection and the proposed Alternative wouldnot impact access to those bus stops. Access to Andrew MBTA Red Line station would also be unaffected. There is the potential for some modest transit operational efficiencies relating to the curb extension allowing in-street stopping. The Alternative receives the same scores as Future No-Build.	The new intersections across all marked legs would dramatically boost access to the MBTA Red Line Station at the JFK/Umass Station. In general, though there is an aerial crossing nearby, the new intersection will allow easier linkages between the transit station and the new developments of Dorchester Bay City. Therefore the new intersection receives the highest score.	Small moderate impact on transit access (mainly due to pedestrian access improvements). Both ROWs would likely increase crossing comfort to one of the two MBTA Red Line Stations, but no connections to bus routes.	Both Alternative 1 and 2 receive scores of 5 because they both improve east-west access to the MBTA Bus Line 201 bus stop at the driveway to the Puritan Mall Driveway (while also improving east-west access to the bus stops on Neponset Avenue slightly to the west)	Alternative allows a modest improvement in pedestrian access to a bus stop immediately south of Minot St.
Pedestrian Crossing Comfort	Pedestrian crossing comfort scores defined as CMFs relevant to bike/ped crossings. There is 1 bike/ped CMFs for Alternative 1, and there are 2 CMFs that would improve safety for all users (pedestrians and bicyclists included). Alternative 1 therefore receives a score of 5.	There are 5 total countermeasures:1 related to bike/ped only, and 2 relevant to all modes in the full intersection option. When looking just at CMFs, the other Alternative (the Right-In/Right-Out Alternatives) receives a lower number of CMFs. Critically, the Intersection Alt. also slows down drivers on a potentially dangerous straight-away. Therefore, it receives a higher score.	Modified DCR Alternative (DCR #1) initially had the slip lane removed; however, in subsequent versions, this was extended to both alternatives. Both received a 5.	CMFs for both Alternatives were added up. Alternative 1 received 10 CMF (4 related t bike ped). Alternative 2 received the same, but also received - 1 point because of possible additional interactions with NB drivers making a right turn at Victory. Alternative 1 receives a 5 and Alternative 2 receives a 4.	There are 4 total countermeasures: 2 related to bike/ped only, 1 relevant to drivers, and 1 relevant to all modes in Alternative 1. There are expected to be moderate increases in pedestrian crossing comfort.
Sidewalk Gaps (North-South)	Alternative 1 proposes widening the existing sidewalk in all locations around Preble Circle (from 5' to 8'). Scoring was done on the segment level only. In the segment, there is 4,310 new square yards of sidewalk north of K Circle. Therefore, this location receives a score of 5.	In both alternatives, wide 8' sidewalks are provided (from the base of ~5'). Therefore, both receives scores of 5.	Both Alternatives offer an identical amount of new sidewalk (4,870 new square yards of sidewalks). All areas around the intersection already have sidewalks, but the recommendation is to widen these to a width of 8.'	Alternative 1 proposes 5,000 square yards of new sidewalk, compared to Alternative 2, which proposes 4,110 new square yards of sidewalk. Therefore, while both Alternatives improve the amount of available sidewalks, Alternative 1 scores higher than 2 (5 rather than 4).	In Alternative 1, there is an increase in square yards of sidewalk (an increase of 2,320 square yards at Neponset Circle). Therefore, sidewalk gaps are closed.
Pedestrian Delay	Pedestrian delay increases from 5.1 seconds in the AM and 6.3 seconds in the PM to 40 seconds in the AM peak (and 0 seconds in the PM peak). While delay increases here, this is a result of new signal control. Additionally, the increase is modest and is likely counteracted by a more pleasant and secure-feeling crossing experience. As a result, the scoring only decreased slightly, from 4 to 3.	NA placed for all alternatives because there is not a crossing there previously (therefore no delay).	Pedestrian demand was added together for AM and PM. For Bianculli, the total for the Future No-Build is 524; the total for Alternative 1 is 466, while the sum for Alternative 2 is 797.9 seconds. Future No-Build was scored as as a 3, while Alt. 1 received a 4 and Alt. 2 received a 2	A direct comparison is impossible with the current condition (Victory Rd. has no current crossing of Morrissey Blvd.) One can sum up pedestrian delay for Freeport alone and the EC has 327.5, only slightly lower than Alternative 2. Alternative 1 has delay of only 167 seconds. When looking only at Victory, delay is lower in Alternative 1 than in 2. Therefore, scoring is conducted solely based on Freeport. Alternative 1 scores higher than Future No-Build or Alt. 2	NA - Direct comparison difficult because most pedestrian crossigs are unsignalized.
Bicycle Level of Traffic Stress	Bicycle Level of Traffic Stress on Columbia Road shows a change from "Moderately Stressful" into the "Least Stressful categories." The roadway approach currently has a buffered bike lane, but a protected bike lane would improve this significantly (going from a score of 3 to a 5).	Future No-Build is the highest level of stress (there are no on-street accommodations and the road here is functioning as a highway. New protected facilities would bump these both up to a 5.	Existing Condition is Bicycle LTS of 4 (with the SB frontage road technically being a 3 and the mainline being a 4). With the proposed improvements in both alternatives, bicyclists will experience conditions of LTS 1 (receiving a 5 in our scoring system)	Bicycle Level of Traffic Stress shows an increase from the "Most Stressful" categories to the "Least Stressful categories." Both Alternatives would score 5.	Future No-Build condition is the highest level of stress (there are no on-street accommodations and the road here is functioning as a highway). New protected facilities would bump these both up to a 4 (there are bike facilities in the northern part of the circle on both sides, but only on one side on the east side).
Potential Safety Effects	CMFs were added together and added together. Overall, Alternative 1 has 5 CMFs above the Future No-Build (1 of those applies only to bicycles/pedestrians, 2 are vehicular-based, and 2 are relevant to all modes).	The full intersection contains 5 CMFs (all user types). The frontage road alternative only receives 3.	Alternative 1 receives a slightly higher safety score, as it involves 7 safety improvements / CMFs, while the initial DCR design receives only 5. Consequently, the latter alternative only receives a score of 4 (however, it is still a significant improvement over the Future No-Build)	Overall, both Alternatives were broadly similar. Alternative 1 received 10 relevant CMFs, which was the same number received by Alternative 2. However, Alternative 2 has the potential drawback of exposing pedestrians and bicyclists to slightly more crash exposure at Victory Road because of the Quadrant Roadway. Therefore, 1 point was deducted. (See CMF Backup Sheet for more information).	There are 3 total countermeasures in Alternative 1.

Quality of East-West Connections	"Squaring up" this intersection and improving the east-west crossings will have a big benefit of linking South Boston on the northeast to Dorchester to the southwest. This is also a key connection point to Joe Moakley Park and the waterfront bordering the park on the east. Joe Moakley Park is slated to be upgraded with improvements in particular focused on linking neighborhoods to the waterfront. Additionally, improving these east-west linkages is critical to link South Boston to Andrew MBTA Red Line Station only slightly to the west.	The full intersection alternative would increase intersection safety and east-west bicycle/pedestrian crossings dramatically in a section of the corridor that is redeveloping. Critically, it could connect the residential areas to the west to the shore and also to Dorchester Bay City. The frontage road alternative does not have that advantage. Therefore, the full intersection scores higher.	There is no measurable difference between the two different alternatives regarding east-west connections for pedestrians/bicyclists. Both alternatives, however, increase the safety of making the east-west connection at Bianculli--and linking UMass-Boston to the Savin Hill area and the Savin Hill MBTA Station	Alternative 1 has the benefit of creating a new east-west pedestrian/bicyclist connection at Victory Road (signalized), as compared to the Existing Conditions. Alternative 2 offers vehicular thru-connnections on Victory Road. (The signalized intersection also has the advantage of narrowing the crossing at Freeport St. by removing the left turns there). Overall, both Alternatives will significantly improve linkages to Dorchester Shores Reservation and the planned Neponset Greenway northern extension.	The full intersection alternative would increase intersection safety and east-west bicycle/pedestrian crossings between Joseph Finnegan Park on the east and the Neponset River on the south, to central Dorchester.
Diversion	N/A - Scored Corridor-wide	N/A - Scored Corridor-wide	N/A - Scored Corridor-wide	N/A - Scored Corridor-wide	N/A - Scored Corridor-wide
Resiliency & Ecology					
Effects on Environmental Resources	There are more positive scores in the Alternative 1 column than in the No-Build Alternative because of the fact that the former would likely have positive air quality, greenhouse gas (GHG) and noise effects, while doing more to cool the urban environment. Therefore, the proposed Alternative receives a 4 score.	Traffic reductions from both Alternatives would have positive impacts on GHG emissions and noise. Alternative 1 also has the greatest potential to reduce the heat island impacts through the provision of more green space through the elimination of the frontage roads that remain in Alternative 2. Therefore, NB receives a 3, Alternative 1 receives a 5, and Alternative 2 receives a 4. (Alternative 2 still receives a higher point total than the NB because the frontage roads are narrowed).	The main difference in the Environmental realm is the slight decrease in pavement space (and related increase in green space) between Alternatives 1 and 2. Alternative 2 therefore receives a higher score.	Both Alternatives offer significant improvements over the NB Alternative. However, Alternative 2 scores the highest for Environmental Effects because it would have the greatest reduction in GHGs and noise. The elimination of the SB frontage road in Alternative 2 also decreases green space more than Alternative 1 (~1,000 square yards greater). Therefore, Alternative 1 receives 4 points and Alternative 2 receives 5 points.	Overall Scoring Conclusion for Environmental Effects:Overall, the Alternative offers benefits for the Environment through a reduction in traffic volume, new green space and the corresponding reduction of impervious surface. The NB is ranked at a 3 with Alternative 1 ranked as a 4.
2070 Coastal Flooding	The EC is a 1 because of the flood pathway coming west from Moakley Park. This Alternative doesn't directly help prevent floading but other surrounding projects on Columbia Point associated with Dorchester Bay City are anticipated to protect the area.	Future No-Build is a 1 because it suffers from a flood pathway coming from the south and inundating the intersection under 3-5 ft. in a 2070 Sea Level Rise condition. The Alternatives receive a 5 with the caveat that the road is raised to the DFE and that flood control improvements near Pattens Cove and along the Harbor Walk are implemented.	Coastal Flooding EC receives a 1, according to the MCFRM . This location will be protected by the elevation of the selected treatments south of this location (part of this project). Protection coming from Columbia Point will be provided from the elevated Harbor Walk. Therefore, both Alternatives receive a score of 5. Raising the Harbor Walk to the east may be necessary.	EC is rated a 1 because the area is expected to receive significant flooding in the 2070 100-year flood. Both Alternatives receive a 5 because they would benefit through other surrounding improvements. There is no flooding difference between the two Alternatives.	Future No-Build is rated a 1 because the area is expected to receive significant flooding in the 2070 100-year flood.However, there are a variety of improvements that are expected to decrease this risk. So Alternative 1 receives a 5.
2070 Stormwater Flooding	Future No-Build scores a 1 because this area is vulnerable to stormwater flooding in 2070--and even earlier. However, the Alternative receives a 5 because of the smaller amount of impervious surfaces, and the new retention opportunities. Additionally, stormwater flooding will be improved because of the new underground water storage facility.	Future No-Build would score as a 1 because this area is vulnerable even in earlier years with modest SLR (stormwater flooding would occur here in 2030 even assuming 2030 SLR levels). Alternatives are scored as 4 because of the greater potential for green space/flood control caused by the narrowing of roadway.	Before 2070, there is expected to be some stormwater flooding (although at a smaller scale than from sea-level rise). Therefore, the Future No-Build receives a score of 2. Both Alternatives, however, would fare well if there is coastal protection. Additionally, stormwater nature-based solutions are recommended in the center of Morrissey Blvd., taking advantage of the narrower roadway width to install anti-stormwater measures.	Future No-Build is a 2 because under some storm conditions by 2070, the area would likely be inundated by stormwater. Other improvements in surrounding areas--namely the BWSC improvements to the north at the Basin, would likely ameliorate the issue. The Alternatives receive a 5.	This area is vulnerable to stormwater flooding in 2070--and even earlier. The Alternative receives a 5 because of the smaller amount of impervious surfaces, and the new retention opportunities. Additionally, stormwater flooding will be improved because of the new underground water storage facility.
Impervious Surface Area	Alternative actually increases green space (removing it in the center but adding it in the curb extensions).	Both Alternatives remove pavement, although the full intersection likely has a greater amount of pavement removed because it is associated with the removal of the rontage road.	Alternative 1 decreases the amount of impervious surface area because of the narrowing of the SB roadway, thus earning a slightly higher score of 5. Both Alternatives, however, significantly decrease the amount of impervious surface because of the narrowing of the NB frontage road, and the elimination of one lane (with the corresponding widening of the medians, which would be used for grasses).	Alternative 2 has less pavement and more green space. Therefore, it receives a 5 while Alternative 1 receives a 4 (still better than EC)	Future NB is scored a 3 while the proposed design receives a 4 because of the additional green space.
Plant Migration	NA	NA	NA	NA	NA
Wave Mitigation	NA	NA	NA	NA	NA
Placemaking/Open Space					
Placemaking/Open Space	There is an increase in total space (and the increase because the new space is largely on the park side of the street). Therefore, it certainly improves the amount of usable open/green space and receives a higher score.	Future No-Build is a 2 because there is not a lot of green/open space (or more accurately, there is a large green space on the east side of the roadway, but that appears largely under-utilized. The new two-way bike acility and wide sidewalks will boost the opportunities for placemaking (for example by extending the planted areas into the space where the roadway is now. The Intersection receives a 5 therefore, while the other option only receives a 3.	Future No-Build is a 2, because of the wide roadway and limited greenspace. Both Alternatives would likely increase Placemaking/Open Space, by using the extra space in the center of the roadway for new green space and a possible water retetion area. Alternative 2 further narrows the roadway, which means it receives a slightly higher score than Alternative 1.	Compared to Future No-Build, Alternative 1 somewhat improves open space by creating a wider sidewalk, new bike facilities, and some more green space. Alternative 2 further increases the open space by removing the frontage road (it receives a 5).	Placemaking/open space is fairly minimal in the Future No-Build. The Alternative adds bike and ped facilities and also creates new open spaces/placemaking opportunities. Therefore, this Alternative receives a 5.
Visual Effects	Alternative 1 has better integration with the park, and more of a potential to narrow the roadway as compared to the Existing Condition. It receives a higher score.	Removing the frontage roads would likely have a positive visual impact on the roadway. Therefore, the full intersection scores higher on this.	Narrowing the roadway and creating more green space would likely have a postive effect on the visuals of the area for either Alt. Alternative 2 scores slightly higher because of the additional green space.	Alternative 2 removes the frontage road and therefore has a more positive visual impact than 1 (although both score higher than the Future No-Build)	Positive impacts due to the narrowing of the highway
Consistency with Plans	Both Alternatives are broadly consistent with Joe Moakley Park Plans and indeed could be effectively coordinated with that plan's outcomes.	The Intersection alternative is the most consistent with the Columbia Pt. Master Plan (that Plan explicitly calls for this intersection). This is also the most consistent with the goal of breaking up long roadway stretches and slowing traffic down. It also best interacts with the NB frontage road south of this location ending at the school driveway. The Intersection therefore receives a 5. The other Alternative only receives a 3.	Climate Ready Dorchester envisions a possible tide gate at Pattens Hill Cove along with a protective berm around Pattens Cove to guard directly adjoining residential properties on the southwest. Both Alternatives are consistent with those steps. The Columbia Point Master Plan also envisions a more permeable streets grid with a fulll intersection, at Bianculli and at First Street to the north (which would support ending the removal of the NB frontage road, which is rated in the First Street section). The intersection is also marked as a "problem intersection" within the Columbia Point Master Plan. Alternative 2 may slow down vehicles more than Alternative 1 and so receives a score of 5.	Both Alternatives are largely conssistent with Plans. Alternative 2 receives a higher score in that it more completely supports past plans which indicate the preference for more intersections.	Consistent with DCR Plan
Disruption to Neighborhoods	Construction would likely lead to moderate disruption to neighborhoods (Dochester Avenue can be used instead of this intersection if it needs to be closed). Therefore, a score of 3 was given. Future No-Build was a score of 4 because while construction would not occur in the 2070 No-Build, the area could face flooding and increased inundation.	Future No-Build receives a 3 because this location is not surrounded by residential areas, nor would flooding be quite as intense as at Bianculli, at least coastal flooding. The construction would be fairly straightforward and could proceed more quickly because it is not in a residential neighborhood. Both Alternatives would be rated as a 3.	Future No-Build is scored a 2; if surrounding improvements aren't made this intersection could see worse and more common flooding incidents. Construction could have significant impacts however, because of the limited connection points between Columbia Point and Savin Hill. Therefore, Alternatives receive a 3.	Creating the full intersection at Victory may cause increased disruption to neighborhoods, as compared with Alternative 1.	Future No-Build flooding could cause some major disruptions to this intersection, which serves as a key east-west and north-south link. Additionally, the intersection currently serves as a major barrier to the neighborhood. Construction could cause some serious disruption to existing neighborhoods, so it is rated 3. Long term, however, reconstruction impacts would be less than the impacts enabled by the Future No-Build.
Recreational Access	Recreational access in the proposed Alternative is expected to be improved, compared to the Future No-Build. The crossing will be substantially shortened for crossing pedestrians, while bicyclists and pedestrians will also benefit from widened sidewalks and a protected bike lane at the northbound approach and better linkahes to the bicycle facility on Day Boulevard, which will allow improved access to South Boston.	Recreational access improves dramatically by creating the bicycle and pedestrian infrastructure. The intersection dramatically improves connections east-west, allowing people on the west side of Morrissey Boulevard to access the seashore and Columbia Point sports facilities. Therefore, the intersection Alternative receives a 5.	Current access is limited (Future NB has a score of 2), with the slip lane and a long crossing. Additionally, public areas on the east and west sides of the street aren't well-linked. Both Alternatives, however, strengthen connetions between green spaces on the corridor. Both Alternatives receive a score of 4.	Both alternatives improve on Future No-Build. However, the full intersection option allows all users better access to Dorchester Bay. Therefore, it receives a 5.	Future No-Build scores a 3 and the additional east-west crossing safety improvements, as well as the new bicycle facilities and possible new green space, increases the score to 4.
Shade Trees	Likely an increase in useable shade trees, considering that there will be more green space on the eastern (park) side. In this sense, the cooling properties of the trees here will be more impactful (as compared to if they were in the center of the traffic circle, where few pedestrians would benefit). As a result, Alternative 1 scores highly.	The Intersection creates more green space on the east side, thus boosting the area that can be used for green space. That Alternative receives a 5, while the right-in/right-out receives a 4 because it boosts that possible area by a smaller amount.	Both Alternatives receive a 4 because of the additional green space proposed	Future No-Build is 3. Both Alternatives improve on this, with an estimated 240 trees.	Additional green space supports more possible shade trees.
Constructability					
Construction Cost	NA - Cost differences are largely beiing driven by the Central Segment.	NA - Cost differences are beiing driven by the Central Segment	NA - Cost differences are beiing driven by the Central Segment	NA - Cost differences are being driven by the Central Segment	NA - Cost differences are beiing driven by the Central Segment.

Constructability	Future No-Build is NA. Alternatives scores highly for 4 for Constructability.	Future No-Build is NA. Full Intersection (Alt. 1) would likely involve more difficulties in construction. Alternative 2 would be somewhat easier and so receives a higher score.	Future No-Build is NA. Both Alternatives at Bianciulli are highly constructable (scoring 4). The slight difference in the Alternatives would make little difference.	Future No-Build is NA. The quadrant roadway with the full intersection would be more difficult to construct.	Future No-Build is NA. Constructability would score highly.
Maintenance Issues	Future No-Build scores a 3. By eliminating pavement in the Alternative, this scores higher (fewer costs down the road).	Future No-Build scores a 2 (because of the high amount of pavement). The signalized Intersection has the smallest footprint but the signal itself and the new road would need some maintenance. The Right-In/Right-Out would have a wider footprint on Morrissey but would involve a new road. Therefore, both Alternatives score a 4.	Future No-Build scores a 2 because of significant flooding risk. Both Alternatives would improve this maintenane risk.	Future No-Build scores poorly as it could experience flooding, although less than other intersections. A new intersection would fix this problem and require less maintenance than the frontage roads (therefore the full Intersection option, although it requires more pavement at that local intersection, would overall have a maintenance benefit).	Future No-Build scores poorly because of the large footprint of the intersection. The Alternative scores more highly.
Environmental Permits/Complexity	Future No-Build is NA. Limited concerns in the Alternative.	Future No-Build is NA. Adding a new street could require permits and be highly complex.	Future No-Build is NA.Limited concerns in the Alternative.	Future No-Build is NA.Limited concerns in the Alternative.	Future No-Build is NA. Some permits required due to the large scale and proximity to the coastline.

Scoring Justification Central Section (Malibu Beach Side)

Criteria	Existing Conditions	Alternative 1 - Low Profile, Tide Gate (Roadway Descends, Wall on Bay Side) - Less Fill	Alternative 2 - High Profile: No Tide Gate, Raising Malibu Beach Interior, Keeping Morrissey Boulevard at a Higher Location (Morrissey Blvd. on Top of an Embankment) - Significant Fill	Alternative 3 - Hybrid (Tide Gate Opening Less Often Some Lesser Elevation Increase on Malibu Beach Side)	General Rating Notes
Resiliency and Ecology					
Effects on Environmental Resources	See Supplementary Scoring Sheet				
Coastal Flooding	With no action, 2070 coastal flooding will be much worse than	Low Profile - The tide gate, along with other actions south of the bridge, and the flood barrier north of the bridge on the bay side ("barrier needed" from profiles shown in public meeting), would mitigate coastal flooding up to the 2070 DFE. (Score of 5)	High Profile - Raising the basin side beach/dune/berm, along with other actions south of the bridge, and the flood barrier north of the bridge on the bay side ("barrier needed" from profiles shown in public meeting), would mitigate coastal flooding up to the 2070 DFE. (Score of 5)	Hybrid Profile - The tide gate, along with raising the basin side beach/dune/berm to some lesser elevation, and other actions south of the bridge, and the flood barrier north of the bridge on the bay side ("barrier needed" from profiles shown in public meeting), would mitigate coastal flooding up to the 2070 DFE. (Score of 5)	
2070 Stormwater Flooding	With no action, 2070 stormwater flooding will be much worse than in existing conditions (present day) based on BWSC projections which include sea level rise consistent with MC-FRM. This is somewhat moot for the Central section given that low areas would be inundated at high tide with no action. (Score of 1)	Low Profile/Tide Gate - Assuming that this alternative includes BWSC's proposed addition of stormwater infrastructure (new outfall and pumping station), this alternative provides very good mitigation of long term stormwater flooding in the North section of the corridor. However, with the "low profile", 2070 stormwater flooding may still be a signifcant problem in the Central section, as there would be limited gravity to discharge stormwater at high tide. (Score of 4)	High Profile - Raising the basin side beach/dune/berm, along with other actions south of the bridge, and the flood barrier north of the bridge on the bay side ("barrier needed" from profiles shown in public meeting), would mitigate coastal flooding up to the 2070 DFE. (Score of 5)	Hybrid Profile - The tide gate, along with raising the basin side beach/dune/berm to some lesser elevation, and other actions south of the bridge, and the flood barrier north of the bridge on the bay side ("barrier needed" from profiles shown in public meeting), would mitigate coastal flooding up to the 2070 DFE. (Score of 5)	
Impervious Surface Area	Impervious surface would be improved in all 3 alternatives because of the road narrowing. Impervious surface would also be impacted by the amount of salt marsh maintained (which would be 1 in Future No-Build)	Low-Profile would receive a 2	The High-Profile Option would receive a 4 (receiving 4 points from the High-Profile option, but not getting anoher point from the additional green space so as to maintain differentiation with the Hybrid Option)	The Hybrid option appears to provide the greatest opportunity to provide green space because it allows for greater migration and the flatter slopes as Compared to the full High Profile option would allow greater impervious (non-sand) surfaces.	
Plant Migration	Future No-Build: With no action, there will be significantly less salt marsh on Malibu Beach (basin and bay side) in 2070.	Low Profile/Tide Gate: The tide gate will not improve the potential for plant migration in response to sea level rise, relative to no action. However, the gate could be designed to be adapted in the future to manage tidal flow and water levels inside the basin in a way that optimizes for salt marsh survival. This is not proposed, as it would impact navigation and could exacerbate water quality impairment. (Score = 1)	High Profile with No Tide Gate: This alternative can be designed with optimized basin-side grading to allow for salt marsh migration up-grade over time in response to sea level rise. However, the higher height of the basin side dune/berm may create steeper slopes vs Alt 3, making it less conducive to marsh migration than Alt 3. This alternative can also add dune vegetation where presently none exists. (Score =4)	Hybrid: This alternative can be designed with optimized basin-side grading to allow for salt marsh migration up-grade over time in response to sea level rise. The lower height of the basin side dune/berm allows for gentler slopes vs Alt 1, making it more conducive to marsh migration than Alt 1. This alternative can also add dune vegetation where presently none exists. (Score = 5)	
Wave Mitigation	Future No-Build: Wave mitigation benefits provided by the existing beach, dunes, and salt marsh will significantly diminish in the long term. With no action, there will be almost no dry beach at high tide and significantly less beach at low tide on Malibu Beach (bay side) in 2070. Score = 1	Low Profile/Tide Gate:When the gate is closed, it will mitigate waves that would otherwise propogate under Beade's Bridge and impact the west shore of the basin (I-95 embankment). The basin side of Malibu Beach may still be impacted by smaller waves depending on wind direction, however, wave reflection off the west shore would be decreased when the gate is closed. When closed during minor and major storms, the tide gate may cause wave reflection on the bay side and increase beach scour in areas north or south of the bridge. **The score provided does not relate to the more significant wave exposure on the bay side of Malibu Beach. It is specific to the interior side. Score = 4	High Profile with No Tide Gate: The raised beach/dune/berm on the basin side of Malibu Beach would mitigate the limited exposure to waves that could impact this shoreline. However, it will not mitigate waves that propogate under Beade's Bridge and impact the west shore of the basin (I-93 embankment). **The score provided does not relate to the more significant wave exposure on the bay side of Malibu Beach. It is specific to the interior side. Score = 4	When the gate is closed, it will mitigate waves that would otherwise propogate under Beade's Bridge and impact the west shore of the basin (I-95 embankment). The raised beach/dune/berm on the basin side of Malibu Beach would mitigate the limited exposure to waves that could impact this shoreline. **The score provided does not relate to the more significant wave exposure on the bay side of Malibu Beach. It is specific to the interior side. Score = 5	
Placemaking					
Placemaking/Open Space	Very limited potential placemaking potential	Scores lowest because of wall.	Scores highest because of no wall.	Scores highest because of no wall.	
Visual Effects	Currently a view of the ocean here but users on the beach see a highway	No scoring	No scoring	No scoring	
Consistency with Plans	NA	Assuming that this alternative includes BWSC's proposed addition of stormwater infrastructure (new outfall and pumping station), this alternative provides very good mitigation of long term stormwater flooding in the North section of the corridor. However, with the "low profile", 2070 stormwater flooding may still be a signifcant problem in the Central section, as there would be limited gravity to discharge stormwater at high tide (Score = 4)	Keeping the road at a high profile provides the best opportunity for the Central section of the corridor to drain stormwater by gravity without requiring pumping. However, the North section's high vulnerability to stormwater flooding would not be mitigated because this option excludes the tide gate that is part of BWSC's proposed solution for that problem. (Score = 2)	Assuming that this alternative includes BWSC's proposed addition of stormwater infrastructure (new outfall and pumping station), this alternative provides very good mitigation of long term stormwater flooding in the North section of the corridor. With the "hybrid profile", 2070 stormwater flooding may be a minor/modest problem in the Central sectionas there would be a bit more gravity to discharge stormwater at high tide. Drainage modeling would be needed to evaluate whether pumping infrastructure is needed for this alternative. (Score = 5)	
Disruption to Neighborhoods	No major impacts anticipated because of the nature of the work (All scored a 4).	No major impacts anticipated because of the nature of the work (All scored a 4).	No major impacts anticipated because of the nature of the work (All scored a 4).	No major impacts anticipated because of the nature of the work (All scored a 4).	No major impacts anticipated because of the nature of the work (All scored a 4).
Recreational Access	All Alternatives significantly improve recreational access in this area. Access improved through the new bike paths and wider sidewalks, along with new east-west crossings. The High-Profile and Hybrid options would likely have better east-west connectivity for those on foot.	All Alternatives significantly improve recreational access in this area. Access improved through the new bike paths and wider sidewalks, along with new east-west crossings. The High-Profile and Hybrid options would likely have better east-west connectivity for those on foot.	All Alternatives significantly improve recreational access in this area. Access improved through the new bike paths and wider sidewalks, along with new east-west crossings. The High-Profile and Hybrid options would likely have better east-west connectivity for those on foot.	All Alternatives significantly improve recreational access in this area. Access improved through the new bike paths and wider sidewalks, along with new east-west crossings. The High-Profile and Hybrid options would likely have better east-west connectivity for those on foot.	All Alternatives significantly improve recreational access in this area. Access improved through the new bike paths and wider sidewalks, along with new east-west crossings. The High-Profile and Hybrid options would likely have better east-west connectivity for those on foot.
Shade Trees	Shade trees proposed in all Alternatives. The flatter Slope of the Hybrid option across the entire profile may allow more trees to be sustainably planted.	Shade trees proposed in all Alternatives. The flatter Slope of the Hybrid option across the entire profile may allow more trees to be sustainably planted.	Shade trees proposed in all Alternatives. The flatter Slope of the Hybrid option across the entire profile may allow more trees to be sustainably planted.	Shade trees proposed in all Alternatives. The flatter Slope of the Hybrid option across the entire profile may allow more trees to be sustainably planted.	Shade trees proposed in all Alternatives. The flatter Slope of the Hybrid option across the entire profile may allow more trees to be sustainably planted.
Constructability					
Construction Cost	Cost assumed to be highest for the tide gate, follwed by the high-profile option (which would require more fill, but that is assumed to be cheaper). The hybrid option lies between the two.				
Constructability	Constructability is heavily impacted by the presence of a tide gate. Adding more fill--the High Profile Option--is comparatively cheaper so would score better on constructability.				
Maintenance Issues	Maintenance of existing conditions will be much worse in the long-term due to sea level rise, storm surge, and wave impacts that will increase damage on the infrastructure if no action is taken. Not sure whether the time horizon for evaluating this criteria is near-term or long-term. (Score = 1)	Low Profile/Tide Gate: Given how frequently the gate would be closing in Alt 2 (versus Alt 3), wear and tear on the gate would result in higher maintenance costs. (Score = 3)	High Profile: The raised beach/dune/berm on the basin side should be relatively low maintenance given the limited exposure of that shoreline to waves that would cause significant erosion. However, if sediments do migrate into the basin it could marginally increase the need for navigational dredging. (Score = 5)	Hybrid Option: Despite less wear and tear from less frequent gate closing (versus Alt 2), maintenance costs for the gate are assumed to be very high. Maintenance costs associated with the raised beach/dune/berm should be relatively low. (Score = 4)	

Environmental Permits/Complexity	NA	Low Profile/Tide Gate: Environmental permitting complexity would be highest for this alternative given the lack of precedents for permitting these types of structures under the modern state regulatory system, potential water quality impacts, and the inclusion of fill (tide gates) within USACE jurisdiction. Regulators would require significant modeling analyses and other studies as part of permitting reviews, and, if approved, may require post-construction monitoring/reporting. (Score = 1)	High Profile: Raising the basin side of Malibu Beach is less complex to permit than alternatives involving the tide gate. It would still be complex due to proposed alterations to existing coastal wetlands (LSCSF, coastal beach, coastal bank, etc.). A key issue will be on how the raised beach/dune/berm would impact existing salt marsh resources, which is unclear at the conceptual stage of design.(Score = 3)	Low score is driven by inclusion of the tide gate in this alternative. Given the reduced frequency of closures compared to Alt 1, the score is 1, as this could be seen by regulators as an impact minimization measure. However, with this alternative, regulators would also be focused on impacts of the raised beach/dune/berm on existing salt marsh. If nourishment below the high tide line is proposed, USACE permitting and MassDEP water quality certification will be required. (Score = 1)	

Scoring Justification Central Section (Seaward Side)

Criteria	Existing Conditions	Alternative 1 -Simple Wall/Revetment	Alternative 2 - Living Shoreline		
Resiliency and Ecology					
Effects on Environmental Resources	See Supplementary Scoring Sheet				
Coastal Flooding	NA	NA - Revetment itself is not provding the primary flood barrier for stillwater flooding	The living shoreline itself is not the primary flood barrier that is providing the stillwater flood mitigation benefits, so this criteria is not applicable.		
2070 Stormwater Flooding	With no action, 2070 stormwater flooding will be much worse than in existing conditions (present day) based on BWSC projections which include sea level rise consistent with MC-FRM. This is somewhat moot for the Central section given that low areas would be inundated at high tide with no action. (Score of 1)	The revetment itself has no effect, positive or negative on stormwater flooding.	The revetment itself has no effect, positive or negative on stormwater flooding.		
Impervious Surface Area	NA	The Wall would provide some limited opportunities for impervious surface area (plantings)	The Living Shoreline would likely provide more impervious surface area, depending on the percentage of plants near and within the water.		
Plant Migration	With no action, there will be very limited, if any, salt marsh on the bay side of Malibu Beach in 2070 based on CZM SLAMM projections, which include sea level rise consistent with MC-FRM, assuming that existing infrastructure and development remains in place (e.g., Morrissey Blvd, revetments).	Revetments would offer few opportunities for plants to migrate.	This alternative can be designed with optimized bay-side grading, sediment, and plantings to create new salt marsh and dune vegetation and allow for migration up-grade over time in response to sea level rise.		
Wave Mitigation	NA	The revetment's primary role is to protect the road or berm embankment or flood wall toe from wave erosion/damage. A revetment located seaward of a vertical barrier (e.g. flood wall/seawall) can reduce wave overtopping of the vertical barrier by effectively raising the toe elevation of the vertical structure. In either case, the DFE for the primary flood barrier was set high enough to provide reasonably high wave overtopping mitigation.	The living shoreline would include beach nourishment and dune creation/enhancement which, depending on their scale, will reduce wave heights reaching the primary flood barrier, thereby reducing wave runup and overtopping compared to no action. However, it may not provide the same robustness of wave erosion/damage protection to the road/berm/flood wall embankment as a revetment.		
Placemaking					
Placemaking/Open Space	Very limited potential placemaking potential	Scores lowest because a simple wall would offer limited benefits (although a more sloping wall could potentially have some benefits).	Receives highest score by creating a new destination at the shoreline.		
Visual Effects	Receives a 2 because of limited view from the beach (although there is a view from the highway).	Scores poorly because this would block ocean views.	This scores the highest because it inroduces a seashore environment		
Consistency with Plans	NA	Generally consistent with plans. The wall would tie into other flood control efforts along the shoreline.	This Alternative receives a 5 because it is the most consistent with surrounding environmental efforts.		
Disruption to Neighborhoods	Future No-Build would disrupt the neighborhood by allowing increasing flooding across the road and into the basin.	Both Alternatives would have a limited impact on neighborhoods. The wall would be located	Both Alternatives would have a limited impact on neighborhoods. The wall would be located		
Recreational Access	Receives a 2 because of how the waterside is cut off from the Basin and from neighborhoods to the west.	Alternative would offer a new walking path along the shore and would boost recreational access significantly.	This Alternative would see the greatest possible benefit for access.		
Shade Trees	Future No-Build offers relatively few opportunities for additional shade trees.	The revetment may support some additional shade trees, depending on its slope; therefore, it receives a 4.			
Constructability					
Construction Cost	Cost assumed to be highest for the tide gate, follwed by the high-profile option (which would require more fill, but that is assumed to be cheaper). The hybrid option lies between the two.				
Constructability	Constructability is heavily impacted by the presence of a tide gate. Adding more fill--the High Profile Option--is comparatively cheaper so would score better on constructability.				
Maintenance Issues	The roadway may see more frequent flooding if no changes are taken.	Revetment would require very little maintenance.	The living shoreline itself will be subject to erosion, as it absorbs and redistributes the energy of waves that impact it during major storms. Periodic renourishment and replanting will be required. The frequency of renourishment and replanting will need to be evaluated during design.		
Environmental Permits/Complexity	No permits needed.	In early discussions with MassDOT, state regulators identified portions of Morrissey Blvd as a "barrier beach". These portions of Morrissey Blvd have not previously been mapped, delineated, or regulated as barrier beach. This interpretation, if it stands, would be consequential in that new revetments would be very difficult to permit, likely requiring a variance if at all possible. Modification of an existing revetment on a barrier beach may be allowed. If this interpretation does not stand, the permitting feasibility will depend on outcomes of updated wetlands delineation and analyis. A new revetment may be allowed to protect an eroding coastal bank that fronts a beach or on LSCSF. However, a new revetment on a coastal beach that does not protect an eroding bank or on a coastal dune is unlikely to be permitted without a variance.	A living shoreline on the bay side is less complex to permit than a revetment, especially if portions of Morrissey Blvd are determined to be barrier beach. It would still be complex due to proposed alterations to existing coastal wetlands (LSCSF, coastal beach, coastal bank, etc.). A key issue will be on how the raised beach/dune/berm would impact existing salt marsh resources, which is unclear at the conceptual stage of design. However, there are no previously identified eelgrass, rocky intertidal shores, or NHESP habitats, reducing some complexities of beach nourishment.		

Note: This sheet provides backup information for the overall "Environmental Effects" score.

Preble Circle

Rating Schema for Environmental Effects	Preble Street Signalized Intersection
Climate Change Mitigation & Adaptation	Possible small impact*
Wetlands	No
Floodplains	No
Surface Geology	No
Protected and Recreational Open Space	No**
ACECs	No
Hazardous Materials Sites	No
Greenhouse Gas (GHS) Impacts	Probable (+) Impacts***
Noise	Probable (+) Impacts***
Cultural, Historical, & Archaeological Resources	No
Other Constraints	No
Health/Heat Impacts (Heat Islands, etc.)	Probable (+) Impact ****

* Adding green space onto the park may help cool the area, mitigate heat, and absorb more stormwater (at the margins).

** The overall amount of green space slightly increases by over 600 square yards (in spite of the removal of the green areas in the middle of the traffic circle). Adding green space to the park (and to other corners) via curb extensions will improve crossing comfort and improve the value and access of the park for residents living to the west.

*** This area is adjacent to areas with very high rates of asthma (especially to the east, on Columbia Pt.). Traffic volume is expected to decrease, however, in Alternative 1 (from 6,326 in the NB to 6,053), so GHG emissions and noise impacts may be slightly improved.

**** The signalized intersection on net increases green space (it removes the central green space in the center of the rotary, but adds green space on the southeast, northeast, and southwest edges of the intersection, thereby modestly counteracting this loss. Additionally, this new space may be qualitatively better for people because it is closer to where people actually travel (especially the park), rather than being in the middle of a rotary. The amount of pavement therefore increases slightly compared to tthe NB.

Overall Scoring Conclusion for Environmental Effects: Overall, the signalized Intersection provides more green space and environmental benefits than does the No-Build (NB) Alternative. Therefore, Alternative 1 receives a 4, while the NB Alternative receives a 3.

First Street

Rating Schema for Environmental Effects	Alternative 1: First Street w/ Signalized Intersection and No Frontage Roads	Alternative 2: First Street with Service Roads (Right in, Right Out)
Climate Change Mitigation & Adaptation	Probable (+) Impacts	Probable (+) Impacts
Wetlands	No	No
Floodplains	No	No
Surface Geology	No	No
Protected and Recreational Open Space	No	No
ACECs	No	No
Hazardous Materials Sites	No	No
Greenhouse Gas (GHS) Impacts	Larger (+) Impacts* compard to Alternative 2	Probable (+) Impacts*
Noise	Larger (+) Impacts* compard to Alternative 2	Probable (+) Impacts*
Cultural, Historical, & Archaeological Resources	No	No
Other Constraints	No	No
Health/Heat Impacts (Heat Islands, etc.)	Probable (+) Impact**	Less (+) Impact (compared to Alternative 1) **

* Both Alternatives are slated to receive (+) scores in these related categories because they add green space by removing lanes.

** **This area of the corridor--and points slightly north--reports higher average heat. Consequently, both Alternatives likely decrease heat in this area. However, the Signalized Intersection Alternative likely provides more green space (not necessarily at the intersection itself, but because it necessitates removal of frontage roads. Therefore, the full intersection option scores higher in this case.

Overall Scoring Conclusion for Environmental Effects: Overall, both Alternatives offer significant improvements over the NB Alternative. For example, traffic volumes are expected to decrease in both Alternatives (decreasing from 8,195 in the NB to 5,771 in Alternative 1, and to 6,764 in Alternative 2). These traffic reductions would have positive impacts on GHG emissions and noise. Alternative 1 also has the greatest potential to reduce the heat island impacts through the provision of more green space through the elimination of the frontage roads that remain in Alternative 2. Therefore,NB receives a 3, Alternative 1 receives a 5, and Alternative 2 receives a 4. (Alternative 2 still receives a higher point total than the NB because the frontage roads are narrowed).

Bianculli Boulevard

Rating Schema for Environmental Effects	1: DCR Modified Design with NB Frontage Ending at the School Driveway*; Narrowing of NB Frontage Road fom 2 lanes to 1; Auxiliary Acceleration & Deceleration Lanes at Old Colony Terrace; Removal of NB Slip Lane	2: Original DCR Design with NB Frontage Road Extending Northward to First St.*; Deceleration Lane only at Old Colony Terrace with Acceleration Lane used for Green Space; Removal of NB Slip Lane
Climate Change Mitigation & Adaptation	NA	NA
Wetlands	Probable (+) Impacts (Pattens Cove wetlands immediately to the south).**	Probable (+) Impacts (Pattens Cove wetlands immediately to the south)**
Floodplains	No	No
Surface Geology	No	No
Protected and Recreational Open Space	Probable (+) Impacts (referring to the additional green space freed up by the removal of the SB frontage road)	Probable (+) Impacts (referring to the additional green space freed up by the removal of the SB frontage road).
ACECs	No	No
Hazardous Materials Sites	No	No
Greenhouse Gas (GHS) Impacts	Probable (+) Impacts***	Probable (+) Impacts***
Noise	Probable (+) Impacts***	Probable (+) Impacts***
Cultural, Historical, & Archaeological Resources	No	No
Other Constraints	No	No
Health/Heat Impacts (Heat Islands, etc.)	Positive (+) impacts****	More positive impacts compared to Alt. 1 (Scoring for the extension of the NB frontage road is not included here, but is ranked in First St.)****

* The extension of the Frontage Road is not considered in the rankings here, instead being ranked in the First Street Alternative sheet. Nonetheless, the extension of the frontage road is only consistent with the Right-In/Right-Out Frontage Road Alternative at First Street.

** There are likely some positive impacts of narrowing the roadway here (relevant to both Alternatives). It seems unlikely that new wetland area could be created to the southwest now by taking the roadway space, but with rising sea levels, that is a possibility. Alternatively, a green buffer zone could be placed to help protected the wetland areas (depending on the geology)

*** Traffic volume in both Alternatives is 6,469 (lower than the NB amount of 8,531). This drop in traffic volume would likely be beneficial for GHG emissions and for noise reductions (less cars).

**** Alternative 2 scores higher than Alternative 1 here because of the extra green space near Old Colony Terrace. It is important to note that the shortening of the NB frontage road north of the intersection is considered in another scoring section (First Street). As such, the additional green space there is not included here so as not to be double-counted.

Overall Scoring Conclusion for Environmental Effects: Overall, both Alternatives offer significant improvements over the NB Alternative. However, Alternative 2 scores the highest for Environmental Effects because it provides extra green space in this area.

Victory Road/Freeport Street

Rating Schema for Environmental Effects	Alternative 1 / Modified DCR Alternative: 1.) Maintain SB frontage road; 2.) Relocate SB lefts from Freeport to Victory but maintain NB left turns at Freeport St; 4.) Create a NB U-Turn at Victory St.; 5.) E-W pedestrian/bike connections only	Alternative 2 / Quadrant Roadway with Full Intersection at Victory Road: 1.) Remove SB Frontage Road; 2.) Remove both NB and SB left turns at Freeport Street; SB motorists would make a left at Victory Rd., while NB motorists would make a right at Victory
Climate Change Mitigation & Adaptation	No	No
Wetlands	No	No
Floodplains	No	No
Surface Geology	No	No
Protected and Recreational Open Space	No	No
ACECs	No	No
Hazardous Materials Sites	No	No
Greenhouse Gas (GHS) Impacts	Probable Impacts (+)*	Probable Impacts (+)* - Larger decrease in traffic volume than Alternative 1
Noise	Possible Impacts (+)	Possible Impacts (+)
Cultural, Historical, & Archaeological Resources	No**	No**
Other Constraints	No	No
Health/Heat Impacts (Heat Islands, etc.)	Possible Impacts (+)***	Possible Impacts (+)***

* * Both Alternatives reduce demand on the road network (and have very similar AADTs compared the No-Build (NB) Alternative. For example, the NB Alternative reports average traffic volume (combined AM and PM peak) of 15,170 (compared to 11,468 for Alternative 1 and 11.089 for Alternative 2\).

** There are many properties on the National Register of Historic Places in Savin Hill, but the project itself would be unlikely to have any impacts on these.

*** The removal of the frontage road is the main factor in making Alternative 2 likely more effective at cooling the neighborhood.

Overall Scoring Conclusion for Environmental Effects: Overall, both Alternatives offer significant improvements over the NB Alternative. However, Alternative 2 scores the highest for Environmental Effects because it reduces traffic the most, which would have the greatest reduction in GHGs and noise. The elimination of the SB frontage road also decreases green space more than Alternative 1 (~1,000 square yards greater). Therefore, Alternative 1 receives 4 points and Alternative 2 receives 5 points.

Neponset Circle

Rating Schema for Environmental Effect	Alternative 1
Climate Change Mitigation & Adaptation	Probable (+) impacts at Neponset Circle.*
Wetlands	No
Floodplains	No
Surface Geology	Yes
Protected and Recreational Open Space	No**
ACECs	No***
Hazardous Materials Sites	No
Greenhouse Gas (GHS) Impacts	Possible (+) Impacts****
Noise	Possible (+) Impacts****
Cultural, Historical, & Archaeological Resources	No
Other Constraints	No
Health/Heat Impacts (Heat Islands, etc.)	Possible (+) Impacts*****

* This Alternative provides increased green space through road configuration. This could partially mitigate flooding

** This intersection is close to the Devine Rink and the Garvey Playground, but changes from the Alternative shouldn't impact those locations.

*** This area is close to ACECs, however, which are located to the south.

**** Traffic volume is expected to decline at Neponset Circle under Alternative 1 (from 11,609 trips combined AM and PM peak in the No-Build to 8,504 trips combined AM and PM peak. This will decrease GHG emissions and likely decrease noise impacts.

***** This Alternative may decrease heat through new green space and the decrease in the amount of pacement.

Overall Scoring Conclusion for Environmental Effects: Overall, the Alternative offers benefits for the Environment through a reduction in traffic volume, new green space and the corresponding reduction of impervious surface.

Malibu Beach/Basin Alternatives

Rating Schema for Environmental Effect	Alternative 1 - Low Profile, Tide Gate (Roadway Descends, Wall on Bay Side) - Less Fill	Alternative 2 - No Tide Gate - Raising Malibu Beach Interior, Keeping Morrissey Boulevard at a Higher Location (Morrissey Blvd. on Top of an Embankment) - Significant Fill	Alternative 3 - Hybrid (Tide Gate Opening Less Often Some Lesser Elevation Increase on Malibu Beach Side)
Climate Change Mitigation & Adaptation	Probable (+) Impacts	Probable (+) Impacts	Probable (+) Impacts
Wetlands	Probable (-) Impacts	Probable (+) Impacts	Most (+) Impacts
Floodplains	No	No	No
Surface Geology	Probable Impacts (more detail required)	Probable Impacts (more detail required)	Probable Impacts (more detail required)
Protected and Recreational Open Space	Probable Impacts (State lands)	Probable Impacts (State lands)	Probable Impacts (State lands)
ACECs	No	No	No
Hazardous Materials Sites	No	No	No
Greenhouse Gas (GHS) Impacts	Less Impacts (Construction-Related)*	Most (-) Impacts (Construction-related)*	Medium Impacts*
Noise	No	No	No
Cultural, Historical, & Archaeological Resources	No	No	No
Other Constraints - Water Quality	Probable Major Impact (-) **	No	Probable (-) Impact (Smaller - than Alt. 1) ***
Health/Heat Impacts (Heat Islands, etc.)	No	No	No

* Related to construction. Alternative 2 requires the least fill and so may have have construction benefits in GHG emissions compared to other alternatives.

** The tide gate will restrict tidal flow in/out of Dorchester Bay Basin when it is closed, potentially increasing, on a temporary basis, the residence time of stormwater pollutants in the basin. If the tide gate opening is more narrow than the existing channel under Beade's Bridge, this may cause permanent impacts, regardless of whether it is open or closed. Assuming that BWSC's proposal to discharge stormwater into the basin via proposed new outfall during extreme events is implied as part of this alternative, the amount of stormwater pollution discharged to the basin in such events will also increase with this alternative.

*** See Alternative 2 notes. Given the reduced frequency of closures, the score could be 1.5 or 2, as this would reduce the temporary impacts of restricting tidal flow during extreme events.

Overall Scoring Conclusion for Environmental Effects: Overall, Environmental Resources score is heavily influenced by the Water Quality differences considering that that is the main factor that differs. Consequently, Alternative 2 receives a higher score even though the amount of fill would otherwise be a disadvantage. NB receives a 1, Alternative 1 receives a 2, Alternative 2 receives a 3, and Alternative 3 receives a 2.

Coastal Side (Seaward)

Rating Schema for Environmental Effect	Alternative 1 - Revetment	Alternative 2 - Living Shoreline
Climate Change Mitigation & Adaptation	NA*	NA*
Wetlands	No	Probable (+) Impacts
Floodplains	No	No
Surface Geology	Probable Impacts (unknown whether + or -)	Minimally influenced by geology (except when initially planting) (Unsure whether + or -)
Protected and Recreational Open Space	Probable (-) Impacts (State and possibly City lands)	Probable (+) Impacts (State and possibly City lands)
ACECs	No	No
Hazardous Materials Sites	No	No
Greenhouse Gas (GHS) Impacts	Probable Impacts (-)	Possible Impacts (+)
Noise	NA	NA
Cultural, Historical, & Archaeological Resources	NA	NA
Other Constraints	NA	NA
Health/Heat Impacts (Heat Islands, etc.)	NA	Probable (+) Impacts **

* The revetment itself is not the primary flood barrier that is providing the stillwater flood mitigation benefits, so this criteria is not applicable.

** The living shoreline itself is not the primary flood barrier that is providing the stillwater flood mitigation benefits, so this criteria is not applicable.
The degree of benefit is likely influenced by the percentage of the "Living shoreline" that is above water-level.

Overall Scoring Conclusion for Environmental Effects: The Living Shoreline likely has slightly more positive Environmental Effects on the area, so it receives a 4. (The revetment receives a 3).

Summary Scoring - North & South Sections

North and South Sections Criteria	Alternative Name / #	Preble Circle	First Street	Bianculli Boulevard	Victory Road / Freeport Street	Neponset Avenue	Average Score
Corridor Mobility	Future No-Build	✗	✗	✗	✗	✗	✗
	Alternative 1	!	✓	!	✓	!	!
	Alternative 2	!	!	!	✓	!	!
Resiliency & Ecology	Future No-Build	✗	✗	✗	✗	✗	✗
	Alternative 1	✓	✓	✓	✓	✓	✓
	Alternative 2	✓	✓	✓	✓	✓	✓
Corridor Mobility	Future No-Build	!	✗	✗	✗	✗	✗
	Alternative 1	✓	✓	!	!	✓	✓
	Alternative 2	✓	!	✓	✓	✓	✓
Corridor Mobility	Future No-Build	!	✗	✗	!	✗	✗
	Alternative 1	✓	!	✓	✓	!	!
	Alternative 2	✓	✓	✓	!	!	!

North and South Sections, Overall Scoring

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	✓
Alternative 2	✓

Icons Only

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	✓
Alternative 2	✓

Summary Scoring - Central Sections, Dorchester Bay Basin Side

Definitions

Alternative 1: Low-Profile, Tide Gate (Roadway Descends, Wall on Bay Side) Central Section, Malibu Beach Side

Alternative 2: High Profile: No Tide Gate, Raising Malibu Beach Interior, Keeping Morrissey Boulevard at a Higher Location (Morrissey Blvd. on Top of an Embankment)

Alternative 3: Hybrid Alternative (Tide Gate Opening Less Often Some Lesser Elevation Increase on Malibu Beach Side)

Central Section Criteria	Alternative Name / #	Overall Score
Corridor Mobility	Future No-Build	NA
	Alternative 1	NA
	Alternative 2	NA
	Alternative 3	NA
Resiliency & Ecology	Future No-Build	✗
	Alternative 1	!
	Alternative 2	!
	Alternative 3	✓
Corridor Mobility	Future No-Build	✗
	Alternative 1	!
	Alternative 2	!
	Alternative 3	!
Corridor Mobility	Future No-Build	✗
	Alternative 1	✗
	Alternative 2	✓
	Alternative 3	✗

Central Section, Overall Scoring

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	✗
Alternative 2	!
Alternative 3	!

Icons Only

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	✗
Alternative 2	!
Alternative 3	!

Summary Scoring - Central Sections, Dorchester Bay Side

Definitions
Alternative 1: Simple Revetment
Alternative 2: Naturalistic (Living

Central Section Criteria	Alternative Name / #	Overall Score
Corridor Mobility	Future No-Build	NA
	Alternative 1	NA
	Alternative 2	NA
Resiliency & Ecology	Future No-Build	✗
	Alternative 1	!
	Alternative 2	✓
Corridor Mobility	Future No-Build	✗
	Alternative 1	!
	Alternative 2	✓
Corridor Mobility	Future No-Build	✓
	Alternative 1	!
	Alternative 2	!

Central Section, Overall Scoring

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	!
Alternative 2	✓

Icons Only

Alternative	Average Score (All Criteria)
Future No-Build	✗
Alternative 1	!
Alternative 2	✓

Travel Time

Travel Time was scored based on the information below. As can be seen, compared to the base, Alternative 1 reports more consistently positive outcomes. Alternative 2 decreases NB AM travel and SB AM travel, while worsening NB PM travel, and SB (peak direction) PM travel. Consequently, Alternative 1 received a higher score than the Future NB, while Alternative 2 recieved the same score as the Future No-Build.

Travel Time Reliability

Travel Time Reliability outcomes are shown below. Travel time reliability improves in the AM peak hour in both directions under both alternatives, worsens northbound in the PM for both alternatives, and worsens under Alt 1 and improves under Alt 2 southbound in the PM. Therefore, Future No-Build received a 2, Alternative 1 received a 3, and Alternative 2 receives a 4.

Air Quality

Air quality did not duffer between Alternatives, because both Alternatives rely on road reconfiguration. Future No-Build I put at 2, with Alts. 1 and 2 receiving 3.

Travel Time

Segment Travel Times (seconds)	**No-Build**	**Alt 1**	**Alt 2**	**No-Build**	**Alt 1**	**Alt 2**	**AM Alt 1**	**PM Alt 1**	**AM Alt 2**	**PM Alt 2**
Northbound										
Neponset Ave WB to Freeport St	440	390	397	264	360	366	-0.8	+1.6	-0.7	+1.7
Neponset Ave WB to I-93 NB	720	832	834	305	295	669	+1.9	-0.2	+1.9	+6.1
Gallivan Blvd to Freeport St	464	458	465	209	176	433	-0.1	-0.6	0.0	+3.7
Freeport St to Bianculli Blvd	454	229	293	444	212	227	-3.8	-3.9	-2.7	-3.6
Bianculli Blvd to Preble Circle	759	338	545	306	399	750	-7.0	+1.6	-3.6	+7.4
Southbound										
Preble Circle to Bianculli	455	347	357	441	557	1025	-1.8	+1.9	-1.6	+9.7
Bianculli Blvd to Freeport St	145	158	160	508	179	190	+0.2	-5.5	+0.3	-5.3
Freeport St to Gallivan Blvd	174	220	375	135	147	164	+0.8	+0.2	+3.4	+0.5
Freeport St to Neponset Ave EB	316	299	430	171	199	217	-0.3	+0.5	+1.9	+0.8
Corridor Travel Times (minutes)										
Northbound Corridor - Gallivan to Pr	28.0	17.1	21.7	16.0	13.1	23.5	-10.9	-2.9	-6.2	+7.5
Northbound Corridor - Neponset WE	27.6	16.0	20.6	16.9	16.2	22.4	-11.6	-0.7	-7.0	+5.5
Southbound Corridor - Preble to Gal	12.7	5.6	9.1	5.1	6.7	12.5	-7.0	+1.6	-3.6	+7.4
Southbound Corridor - Preble to Ne	7.6	5.8	6.0	7.4	9.3	17.1	-1.8	+1.9	-1.6	+9.7

Travel Time Reliabilty
Buffer Index (%)

	AM		PM	
	NB	SB	NB	SB
No-Build	14.406	35.417	6.214	16.674
Alternative 1	13.686	19.240	21.585	31.61
Alternative 2	12.942	10.488	29.038	14.885

The buffer index represents the extra buffer time (or time cushion) that most travelers add to their average travel time when planning trips to ensure on-time arrival.

This extra time is added to accoun for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse.

For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveler should budget an additional 8 minutes (20 minutes x 40 percent = 8 minutes) to ensure on-time arrival most of the time.

In this example, the extra 8 minutes is called the buffer time.

The buffer index is computed as the difference between the 95th percentile travel time and average travel time, divided by the average travel time.

This formulation of the buffer index uses a 95th percentile travel time to represent a near-worst case travel time. Whether expressed as a percentage or in minutes, it represents the extra time a traveler should allow to arrive on-time for 95 percent of all trips. A simple analogy is that a commuter or driver who uses a 95 percent reliability indicator would be late only one weekday per month.