



Coastal Rail Resiliency Study Update



Coastal Rail Remediation Efforts

Emergency Rail Projects *past projects*

- **Cyprus Shore** (9/22 – 4/23)
slope secured with ground anchors
- **Casa Romantica** (4/23 – 7/23)
temporary catchment wall built
- **Mariposa Point** (1/24 – 3/24)
temporary catchment wall built
- Remove temporary catchment walls at Casa Romantica and Mariposa Point when appropriate
- Mitigation discussions are ongoing for the Cyprus Shore emergency work

Coastal Rail Stabilization Priority Project *immediate needs*

- Address imminent threats
- Four priority reinforcement areas identified
- Actions include armoring, catchment wall, trail restoration and sand replenishment
- Secured over \$300M in state, federal, and local funds.
- Accomplishments to date include riprap repair, start of trail restoration and catchment wall, and initial placement of sand in North Beach

Coastal Rail Resiliency Study *short- to mid-term solutions*

- Evaluate concepts to protect seven miles of coastal rail infrastructure for up to 30 years
- Scoring and selection of short-listed concepts to be carried forward
- Two to three short-listed concepts per category carried forward for further evaluation

Coastal Rail Long-Term Solutions Study *long-term solutions*

- State-led study
- Develop options for long-term solutions including potential rail line relocation
- Create an action plan for key elements
- Partner with Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency, state, and federal agencies
- Engage key stakeholders

Community Input

Public meetings held:

- July 15, 2025, at San Clemente City Hall
- July 29, 2025, virtual meeting via Zoom
- Shared information and gathered community feedback on draft alternative concepts for the short- to mid-term (30-year) timeframe
- Meeting notifications were distributed via newspaper ads, bilingual flyers, e-blasts, project website updates, social media ads, social media posts, and press releases
- Public participants:
 - 63 (in-person)
 - 87 (virtual)

Community comments on feasible concepts:

- Strong support for sand nourishment
- Emphasized the importance of restoring and preserving safe, continuous access to beaches and coastal trails
- Concerns about shoreline protection structures (i.e., rock revetments, seawalls, and riprap)

Action taken to respond to comments:

- One-time sand nourishment has been added to all shoreline protection structure concepts to help buffer the rail corridor and support community benefits
- A sand-only concept has been evaluated

Alternative Concept Development Process

Ongoing Stakeholder Engagement

Purpose and Need

- Determine the problem to be solved
- Develop evaluation criteria to meet the project needs

Identifying Feasible Concepts by Category and Typical Section

1. Rail concepts
2. Bluffside concepts
3. Beachside concepts

Evaluate Concepts

- Score concepts based on evaluation criteria
- One to three short-listed concepts per category carried forward into further study

Results

- Further develop concepts to support implementation



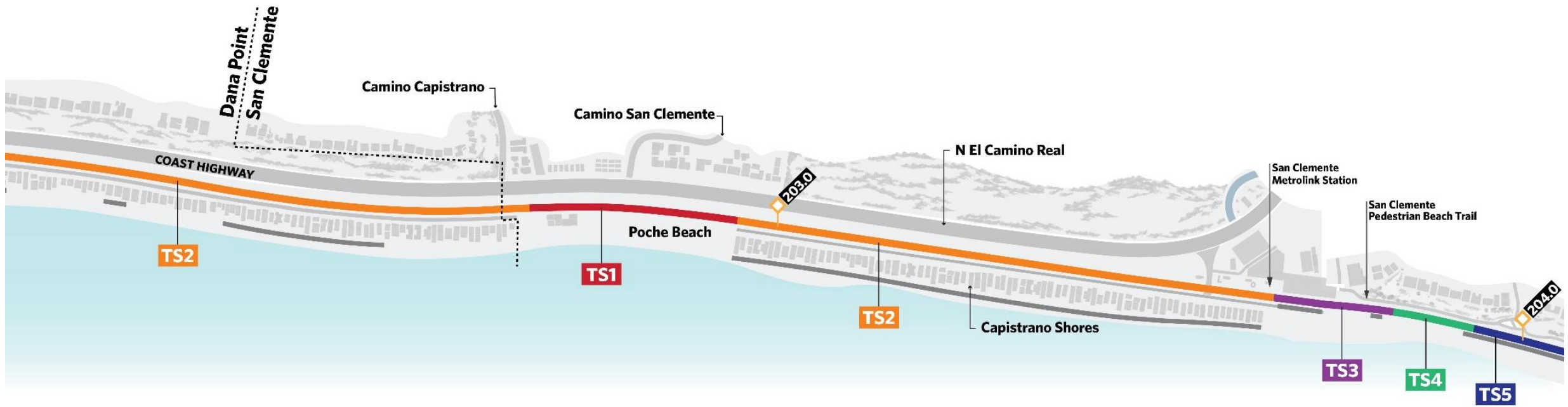
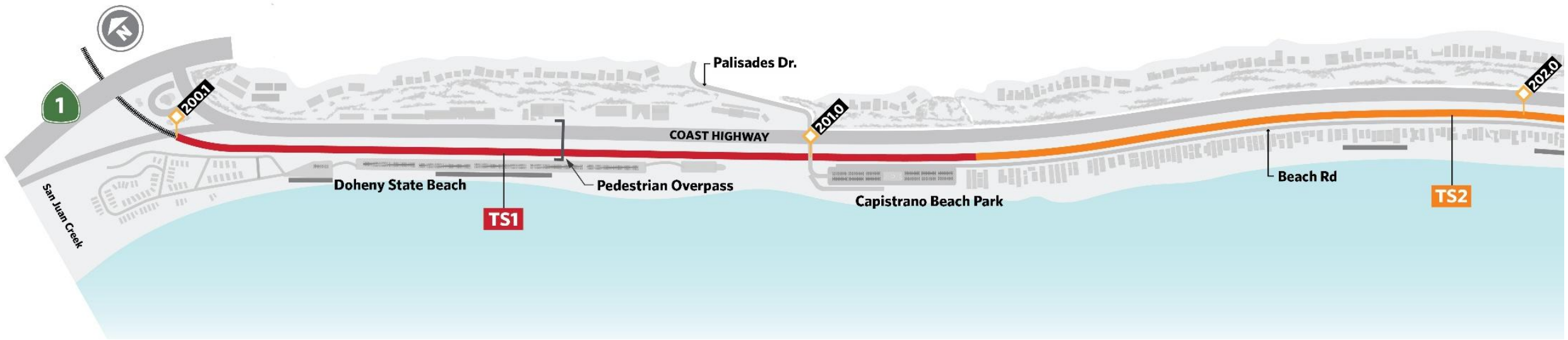
Community input received

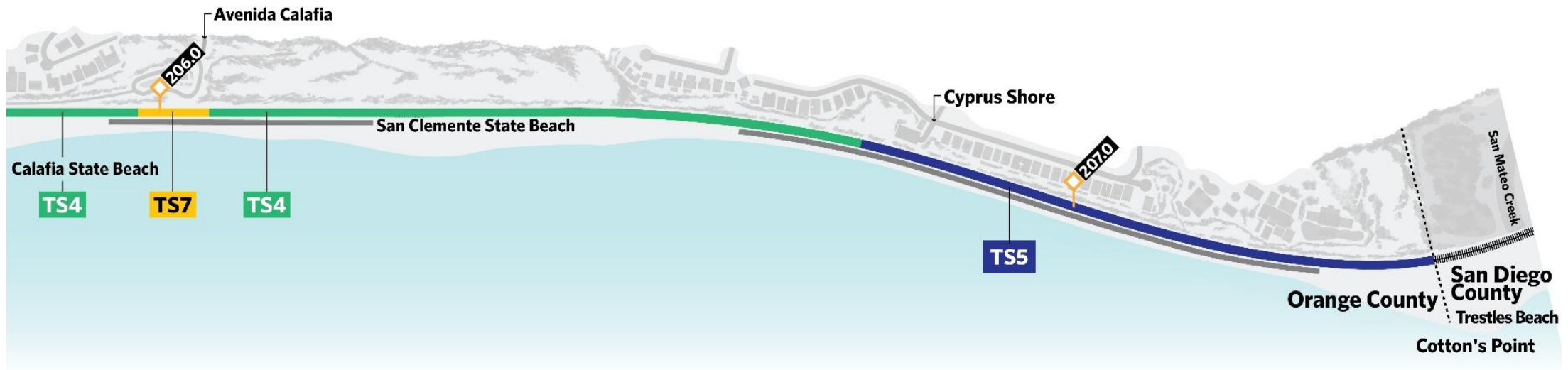
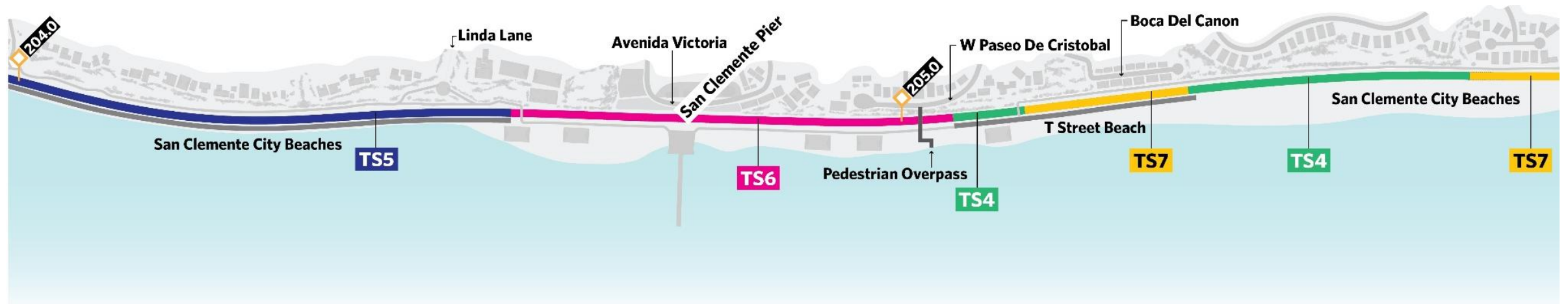


Future community input opportunities



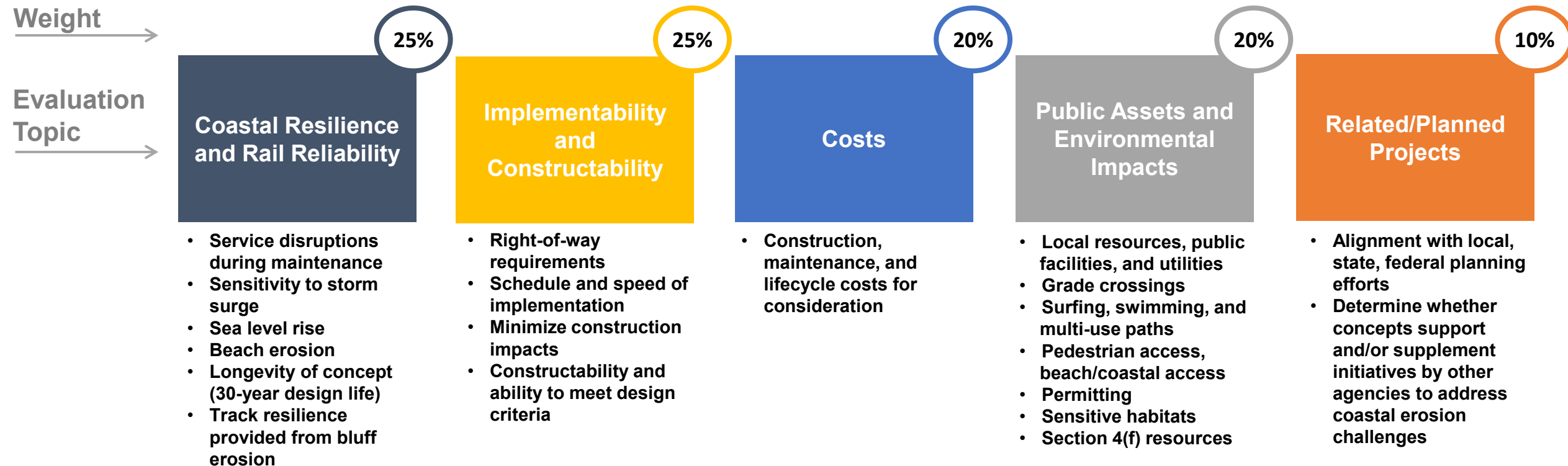
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📍 Mile Post
— Existing rip-rap
— Typical Section 1
— Typical Section 2
— Typical Section 3
— Typical Section 4
— Typical Section 5
— Typical Section 6
— Typical Section 7

Alternative Concept Evaluation Process – Screening Criteria



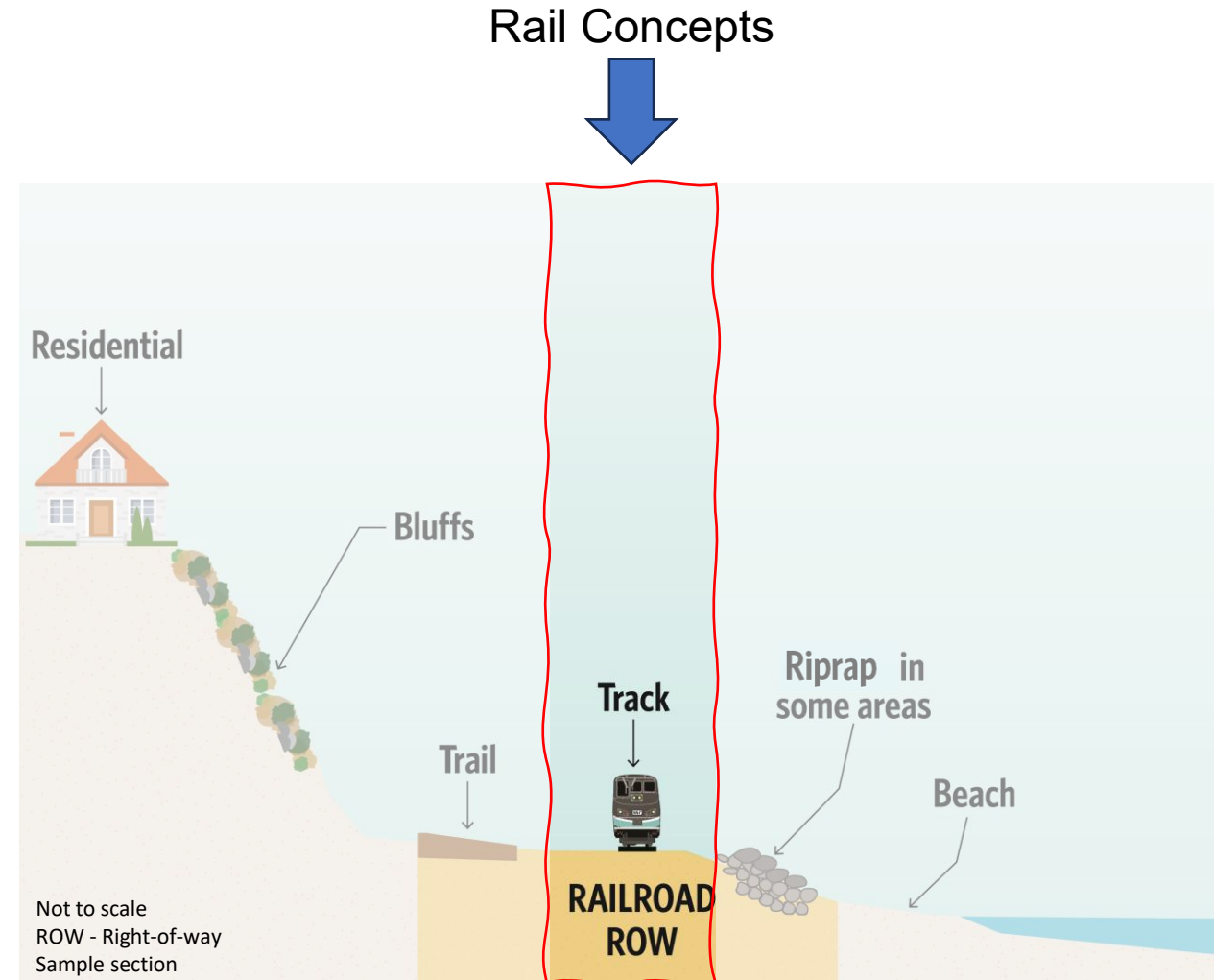
Scoring Results – Rail Concepts

Concept Name	Resilience (weighted)	Implement (weighted)	Public Access (weighted)	Cost (weighted)	Related Planned Projects (weighted)	Weighted Total
1 - Raised Track Embankment	16.5	9.6	14.4	11.2	12.0	64
2 - Alternative materials for critical railroad infrastructure to reduce lifecycle costs	25.5	30.0	24.0	17.6	12.0	109
3 - Ground improvement (track-bed stabilization)	30.0	21.6	17.3	20.8	12.0	102

**Total maximum score is 120*

Evaluation Results – Rail Concepts

Rail Concept	Carry Forward	Mile Post
Raised Track Embankment	No	
Alternative materials for critical railroad infrastructure to reduce lifecycle costs	Yes	200.2 - 207.0 (All typical sections)
Ground improvement (track-bed stabilization)	Yes	203.72 – 203.92 204.42 – 204.54 205.16 – 205.22 206.02 – 206.66 (Typical section 4)



Scoring Results – Bluffside Concepts

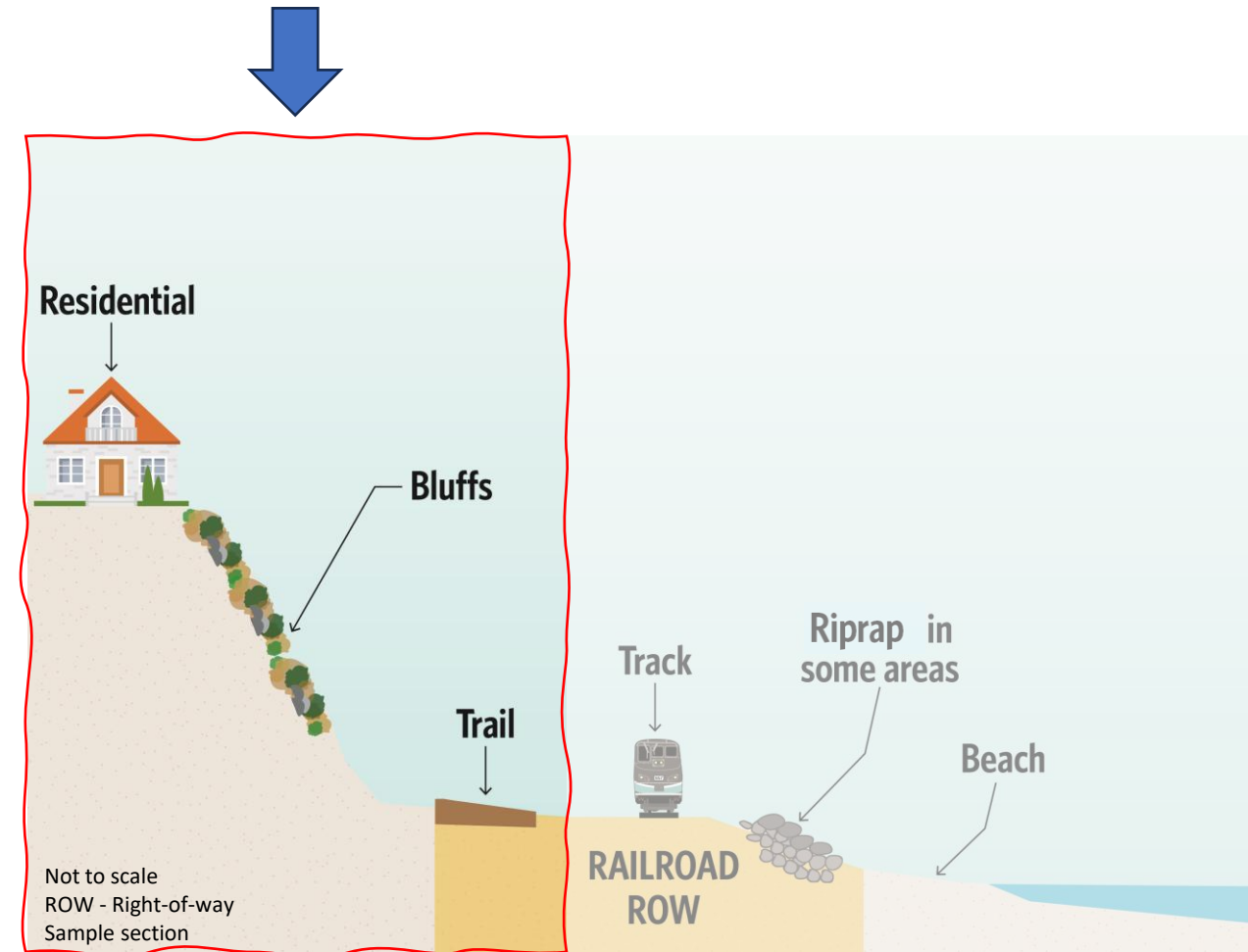
Concept Name	Resilience (weighted)	Implement (weighted)	Public Access (weighted)	Cost (weighted)	Related Planned Projects (weighted)	Weighted Total
1 - Catchment walls (block slide debris)	30.0	26.4	18.7	17.6	9.6	102
2 - Stabilization grading (buttress slide toe)	30.0	18.0	14.9	14.4	7.2	84
3 - Tieback / soil nail / pin-pile walls (mitigate larger slides)	30.0	18.0	20.6	20.8	12.0	101
4 - Ground improvement (bluff stabilization)	22.5	19.2	19.2	20.8	12.0	94
5 - Surface matting & deep-rooted vegetation planting (reduce sediment erosion)	21.0	22.8	21.6	17.6	12.0	95
6 - Drainage improvement via grading / detention basins / undertrack outlets	19.5	24.0	16.8	24.0	7.2	92
7 - Deflection walls in tributaries (reduce flood and sedimentation flow rates)	16.5	21.6	18.7	17.6	9.6	84
8 - Up-gradient cut-off drains (reduce source of water)	18.0	21.6	18.7	24.0	12.0	94
9 - Hydraulugs (lower hydraulic pressure and slide potential)	27.0	14.4	16.3	20.8	4.8	83

**Total maximum score is 120*

Evaluation Results – Bluffside Concepts

Bluffside Concept	Carry Forward	Mile Post
Catchment walls	Yes	203.72 – 207.25 (<i>Typical sections 4 - 6</i>)
Stabilization grading	No	
Tieback / soil nail / pin-pile walls	Yes	203.72 – 204.54 205.16 – 205.22 206.02 – 207.25 (<i>Typical sections 4 & 5</i>)
Ground improvement (bluff stabilization)	No	
Surface matting and deep-rooted vegetation planting	No	
Drainage improvement via grading/detention basins/undertrack outlets	No	
Deflection walls in tributaries	No	
Up-gradient cut-off drains	No	
Hydraugers	No	

Bluffside Concepts



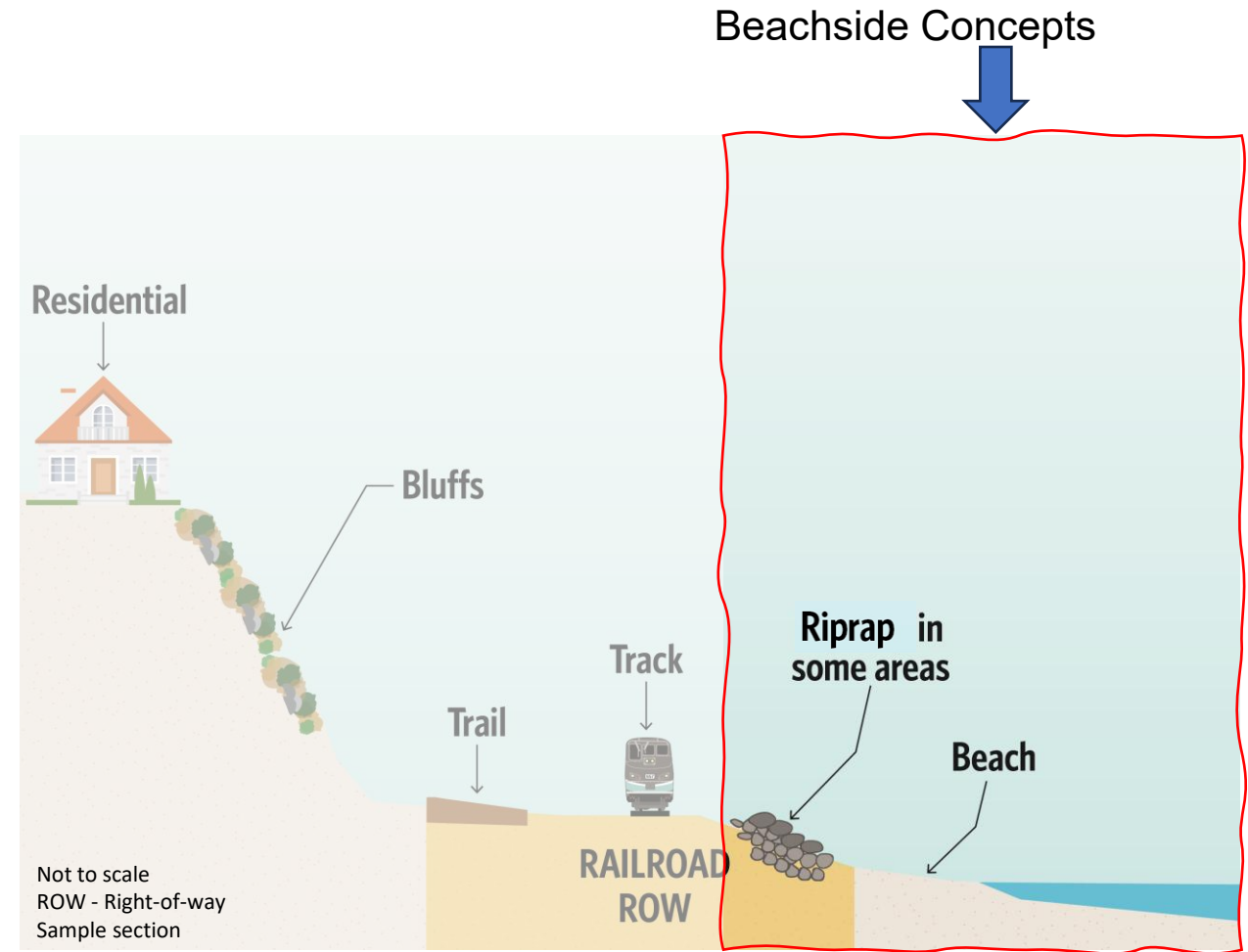
Scoring Results – Beachside Concepts

Concept Name	Resilience (weighted)	Implement (weighted)	Public Access (weighted)	Cost (weighted)	Related Planned Projects (weighted)	Weighted Total
1 - Beach nourishment with NO shoreline protection structure	9.0	12.0	17.8	4.8	12.0	56
2.1 - Beach nourishment with shoreline protection structure (1 - riprap)	21.0	15.6	14.4	9.6	7.2	68
2.2 - Beach nourishment with shoreline protection structure (2 - Engineered rock revetement)	21.0	9.6	14.9	11.2	7.2	64
2.3 - Beach nourishment with shoreline protection structure (3 - vertical seawall)	22.5	13.2	14.9	11.2	7.2	69
2.4 - Beach nourishment with shoreline protection structure (4 - combination of seawall and rock)	24.0	13.2	15.4	9.6	7.2	69
3 - Beach Nourishment with sand retention measures (artificial reefs, breakwaters, jetties) & NO shoreline protection structure	15.0	8.4	16.3	6.4	7.2	53
4.1 - Beach Nourishment with sand retention measures (artificial reefs, breakwaters, jetties) & shoreline protection structure (1 - riprap)	21.0	6.0	15.4	3.2	7.2	53
4.2 - Beach Nourishment with sand retention measures (artificial reefs, breakwaters, jetties) & shoreline protection structure (2 - engineered rock revetement)	24.0	7.2	15.4	3.2	7.2	57
4.3 - Beach Nourishment with sand retention measures (artificial reefs, breakwaters, jetties) & shoreline protection structure (3 - vertical seawall)	22.5	6.0	14.9	3.2	7.2	54
4.4 - Beach Nourishment with sand retention measures (artificial reefs, breakwaters, jetties) & shoreline protection structure (4 - combination of seawall and rock)	25.5	7.2	15.4	3.2	7.2	58
5 - Watershed modifications to increase beach sand supply (implemented by others)	7.5	7.2	12.5	19.2	12.0	58

**Total maximum score is 120*

Evaluation Results – Beachside Concepts

Beachside Concept	Carry Forward	Mile Post
Beach nourishment with planned replenishment (by others)	No	
Beach nourishment with riprap	Yes	203.62 – 203.92 204.42 – 204.54 205.16 – 205.22 206.02 – 206.66 (Typical sections 3 –5)
Beach nourishment with engineered rock revetment	No	
Beach nourishment with seawall	Yes	203.62 – 203.92 204.42 – 204.54 205.16 – 205.22 206.02 – 206.66 (Typical sections 3 –5)
Beach nourishment with combination of seawall and rock shoreline protection structure	Yes	203.62 – 203.92 204.42 – 204.54 205.16 – 205.22 206.02 – 206.66 (Typical sections 3 –5)
Beach nourishment with sand retention and no shoreline protection	No	
Beach nourishment with sand retention measures and riprap shoreline protection structure	No	
Beach nourishment with sand retention measures and engineered rock revetment	No	
Beach nourishment with sand retention measures and seawall	No	
Beach nourishment with sand retention measures and combination of seawall and rock	No	
Watershed modification	No	



Recommended Short-listed Concepts to Advance

Two Rail Concepts carried forward:

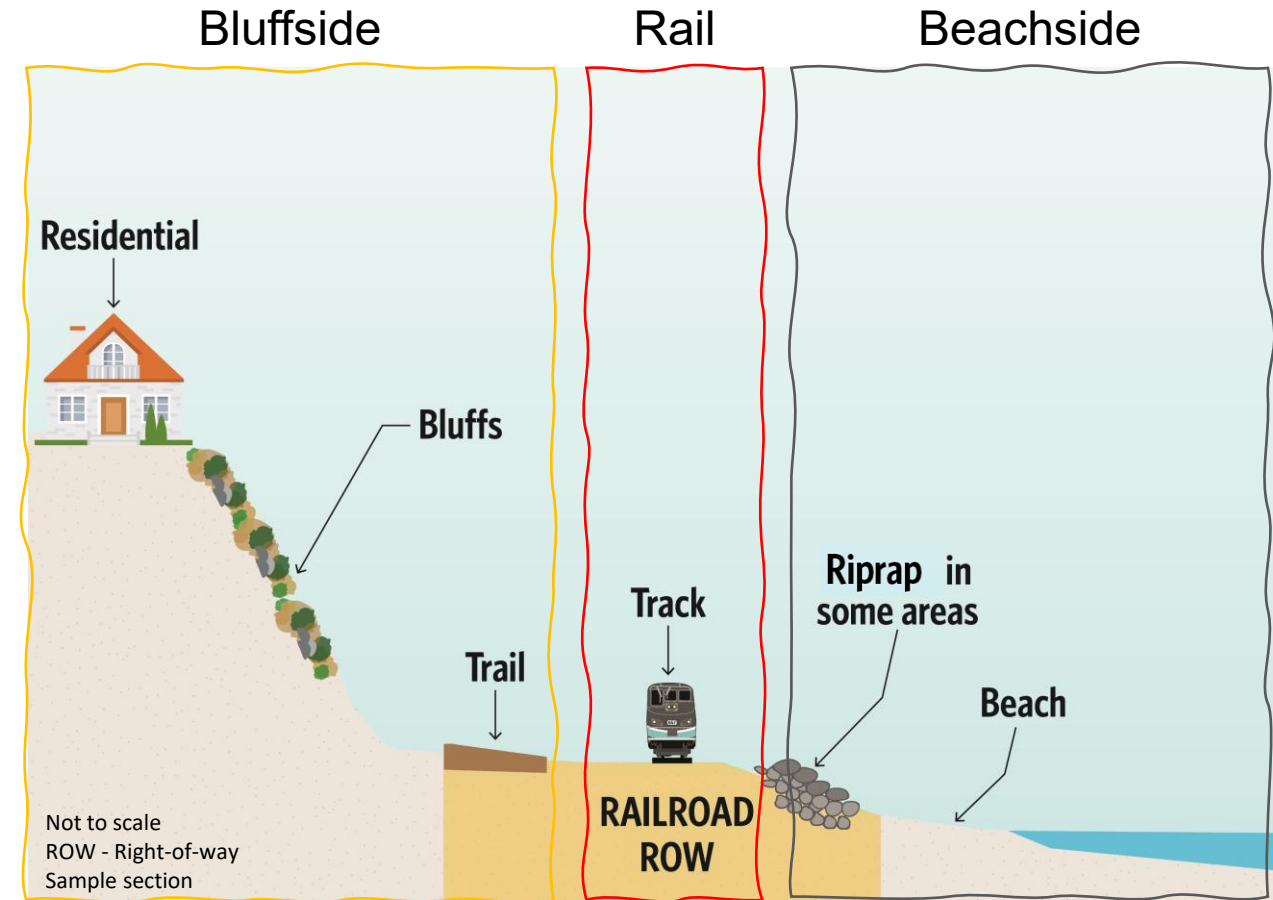
- Alternative materials for critical railroad infrastructure to reduce lifecycle costs
- Ground improvement (track-bed stabilization)

Two Bluffside Concepts carried forward:

- Catchment walls
- Tieback/soil nail/pin-pile walls

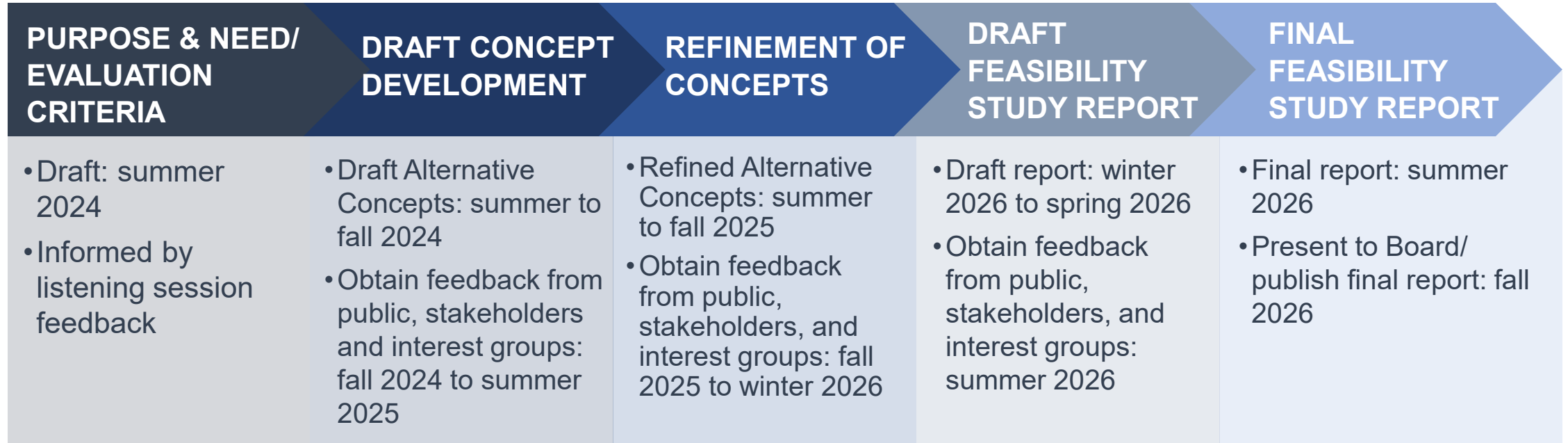
Three Beachside Concepts carried forward:

- Beach nourishment with riprap shoreline protection structure
- Beach nourishment with seawall shoreline protection structure
- Beach nourishment with combination of seawall and rock shoreline protection structure



*No order of preference

Next Steps



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Board: Board of Directors