

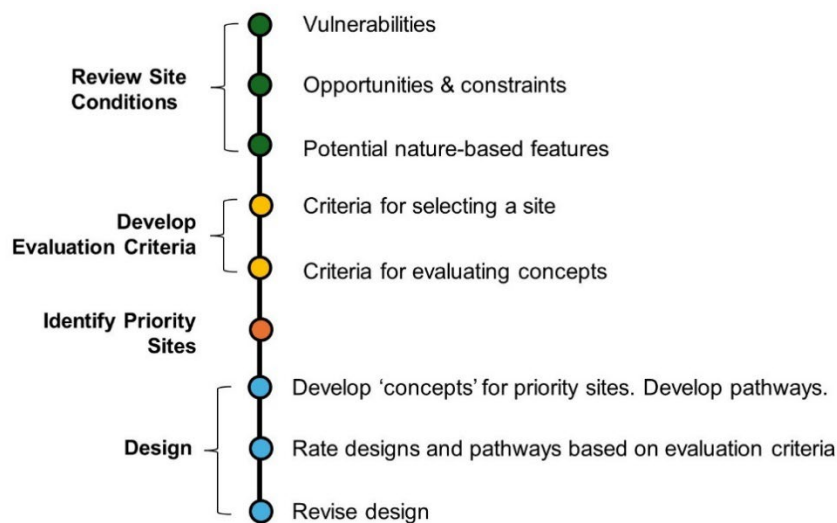
# Proposed Sites and Evaluation Criteria for the Living Shorelines, Nature-Based Solutions, and Sand Management Feasibility Study

City of Santa Cruz | 2024

## Project Background

The City of Santa Cruz, funded by the California Coastal Conservancy, is conducting a feasibility study to identify potential nature-based solutions, while conducting outreach to educate residents and visitors. We aim to engage the public in the use of nature-based solutions to improve coastline protections from erosion and flooding made worse by episodic events and climate change. Nature-based solutions incorporate natural features and processes to protect, conserve, restore, and manage the coastline and its ecosystems. These solutions range from vegetation- and ecosystem-only to concrete constructed human systems with some habitat. Each solution has distinct benefits and tradeoffs. Your feedback on coastal adaptation is important to realize the community's vision for coastal management. The nature-based solutions project will be complete in 2025. The project boundaries are from the East Entrance of Natural Bridges to the San Lorenzo Rivermouth.

## Our Approach



# Evaluating Sites and Adaptation Concepts

The purpose of using evaluation criteria is to assist with transparent decision-making and help the project team and community understand the tradeoffs of adaptation options. We are using two sets of criteria in this project to assess potential sites and then concepts for adaptation to coastal flood hazards.

## Site Selection

The project team identified several recommended sites using a series of site selection criteria. The shoreline was subdivided into 15 segments, and the team reviewed publicly available materials to identify (1) site vulnerability, (2) potential number of nature-based solution (NBS) options, and (3) potential for project success for each. See table below for more information with the criteria. **The preliminary list of recommended sites will be shared at the upcoming Focus Group meeting.**

Site Vulnerability	
<b>Vulnerability to Flood and Erosion</b>	The relative hazard for coastal flooding and coastal erosion were reviewed, for both existing conditions and future conditions with three feet of sea-level rise*.
<b>Relative Exposure</b>	This metric considers the assets vulnerable to flooding or erosion at each portion of the shoreline. Relative scores were higher for areas with vulnerable homes, businesses, State beaches, and historical landmarks.
Number of Viable Options	
<b>Number of Viable NBS Options</b>	Potential locations for the roster of nature-based solutions options were mapped based on engineering feasibility, including spatial dimensions, constructability, and potential for unintended ecological impacts. Sites with a greater number of NBS options receive a higher score, as they have a greater potential for constructable designs that would limit the shoreline vulnerability.
Likelihood for Project Success	
<b>Potential for Economic Benefit</b>	This metric considers the construction and operation costs and long-term economic benefits for shoreline users.
<b>Potential for Reducing Vulnerability</b>	This metric considers the NBS options at each site and identifies the potential for the available measures to appreciably limit flooding or erosion risk.
<b>Relative Likelihood for Near-Term Project Construction</b>	Under this metric, sites were scored based on if they had one or more of (1) a funding source, (2) more than one NBS option with a relatively feasible permitting pathway, and (3) more than one NBS option with nearby implementation examples.

*\*For existing conditions, erosion hazard is based on the percent of shoreline experiencing erosion during the winter of 2023, and flood hazard is based on the estimated total water level (TWL) during the January 2023 event. For future conditions with sea-level rise, erosion is based on predictions from the USGS CoSMoS model and future TWL values using a FEMA-type approach and assumptions about shoreline change.*



## Concept Evaluation

The project team will use a separate set of criteria to evaluate the concepts for the shortlist of potential sites. The concepts will be developed once we have finalized the pilot sites. The evaluation criteria are organized into six categories: Coastal Management and Resources, Coastal Access and Recreation, Sense of Place and Cultural Identity, Ecosystems and Habitats, and Feasibility. For consistency these categories align where possible with the Goals section of the West Cliff Drive Adaptation and Management Plan 2021. Feasibility has three subcategories, Administrative, Technical, and Costs. Each criterion will be scored using defined ranges – with a negative / neutral / positive scale. For some criteria there are neutral and positive scores only. Please see the full list of criteria in the table below.

Coastal Management and Resources		Scoring Ranges:
<b>Flood</b>	How does the strategy protect against flooding during the baseline storm event?	Protects against 1-year event only; 10-year event; 100-year event
<b>Erosion</b>	How does the strategy address erosion?	May speed up erosion; no effect on erosion; protects against erosion
<b>Underserved Communities</b>	How does the strategy protect underserved communities?	No impact on underserved communities; protects underserved communities
Coastal Access and Recreation		
<b>Public Safety</b>	How does the strategy affect safe coastal access, including for those with disabilities, the elderly, and the youth?	Makes safe access to coastal areas worse; no change; Improves safe access to coastal areas
<b>Public Access</b>	How does the strategy affect public access via bike trails?	Access will get worse; no change; access improved including for those with disabilities, the elderly and youth.
	How does the strategy affect public access with pedestrian paths?	Access will get worse; no change; access improved including for those with disabilities, the elderly and youth.
<b>Recreation</b>	How does the strategy affect beaches for visitor and community use?	Beach width likely to decrease; beach width is maintained; beach width may increase
	How does the strategy affect surf conditions?	Surf conditions worsened; no impact; surf conditions improved
Sense of Place and Cultural Identity		
<b>Tribal Knowledge/Identity</b>	<i>TBD pending input</i>	

<b>Fisher Identity</b>	How does the strategy uphold access for the fishing community?	Access for fishers decreased; no impact; access for fishers improved
<b>Waterfront Character</b>	How does the strategy align with the existing waterfront character?	Does not align; maintains status quo; actively improves waterfront character

**Ecosystems and Habitats**

<b>Terrestrial</b>	How does the strategy affect terrestrial ecosystem connectivity and native habitats?	Ecosystem connectivity and habitat lost; ecosystem and habitat maintained; ecosystem connectivity and habitat improved
	How does the strategy affect terrestrial biological and species diversity?	Biological and species diversity lost; biological and species diversity maintained; biological and species diversity improved;
<b>Marine</b>	How does the strategy affect marine ecosystem connectivity and native habitats?	Ecosystem connectivity and habitat lost; ecosystem and habitat maintained; ecosystem connectivity and habitat improved
	How does the strategy affect marine biological and species diversity?	Biological and species diversity lost; biological and species diversity maintained; biological and species diversity improved;

**Feasibility**

**Administrative**

<b>Existing Governance</b>	How does the strategy align with all existing governance structures?	Aligns with none; some; all governance structures.
<b>Policy Alignment</b>	Does the strategy align with all current policies?	Aligns with none; some; all policies
<b>Regulation and Permitting</b>	Does the strategy align with all regulations and permitting conditions?	Aligns with none; some; all regulations

**Technical**

<b>Constructability</b>	How does the strategy disrupt marine life and habitat during construction?	Significant potential disruption to habitat and marine life during construction; moderate potential disruption to habitat and marine life during construction; Little potential disruption to habitat and marine life during construction
<b>Material Sourcing</b>	How available are the materials needed to construct the project?	Materials will need to be sourced from far away; available with impacts to supply; readily available and locally sourced
<b>Expected Project Life</b>	What is the expected project life of the strategy?	Less than 10 years; 10-20 years; 20 or more years ( <i>Ranges will likely be updated</i> )

<b>Adaptability</b>	How does the strategy adapt to higher levels of sea level rise and water levels during flood events?	Not adaptable; adaptable beyond the baseline level
<b>Cost</b>		
<b>Capital Costs</b>	What are the capital costs required with this strategy?	TBD
<b>Operations and Maintenance Costs</b>	What are the operations and maintenance costs required with this strategy?	TBD

**We are looking for input on these criteria in the upcoming focus group:**

- Are these the right criteria? Are there any missing?
- What are the criteria most important to you? What are the least important?
- Review scoring definition scale, how could scoring be different?

This input will help refine the evaluation criteria in advance of the broader community meeting on October 21<sup>st</sup>.