

# Why Stabilize the Bluff?

April 29, 2014

# Prior Conditions

- Bluff failure
- Erosion causing severe undermining of sidewalks impacting public access
- Public safety hazard from potential collapse above and below bluff
- Dying and sparse vegetation
- Future seismic activity may hasten slumping and bluff recession

# Prior Conditions



# Prior Conditions



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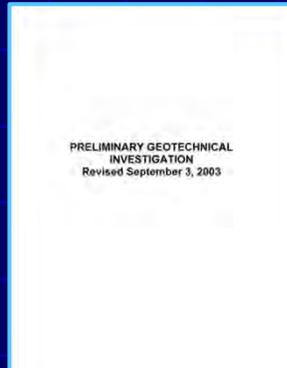
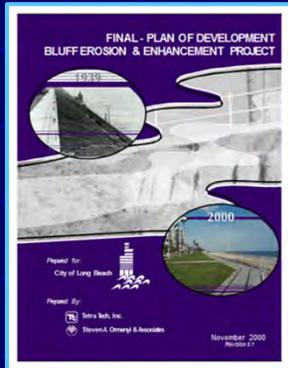
# Prior Conditions



# Prior Conditions

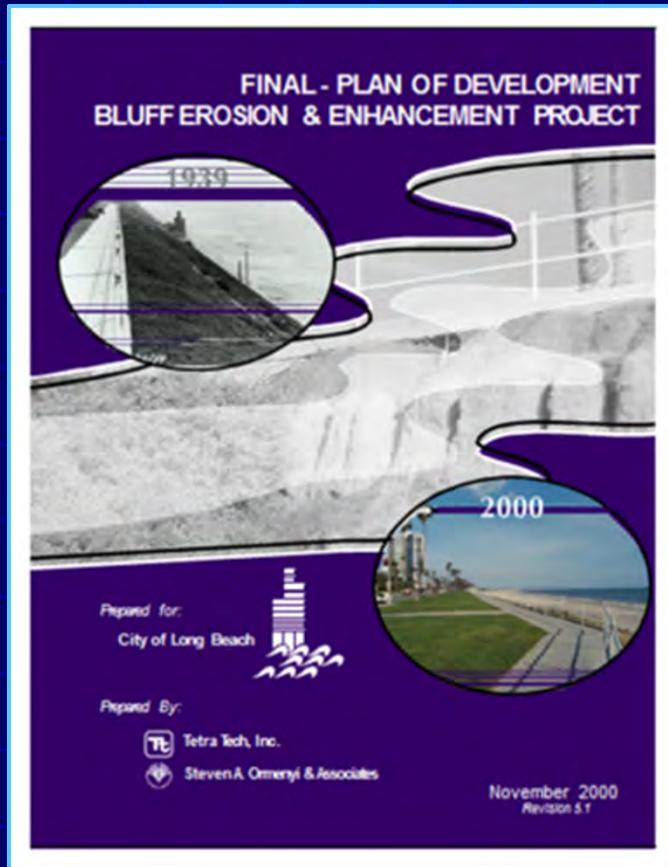


# Geotechnical Studies



- 2000 Final - Plan of Development Bluff Erosion & Enhancement Project
- 2000 and Revised 2003 Preliminary Geotechnical Investigation Proposed Belmont Shore Bluff Restoration
- 2009 Draft Possible Slope Improvement Options for Project Cost Estimating
- 2010 Geotechnical Study Proposed Slope Improvements

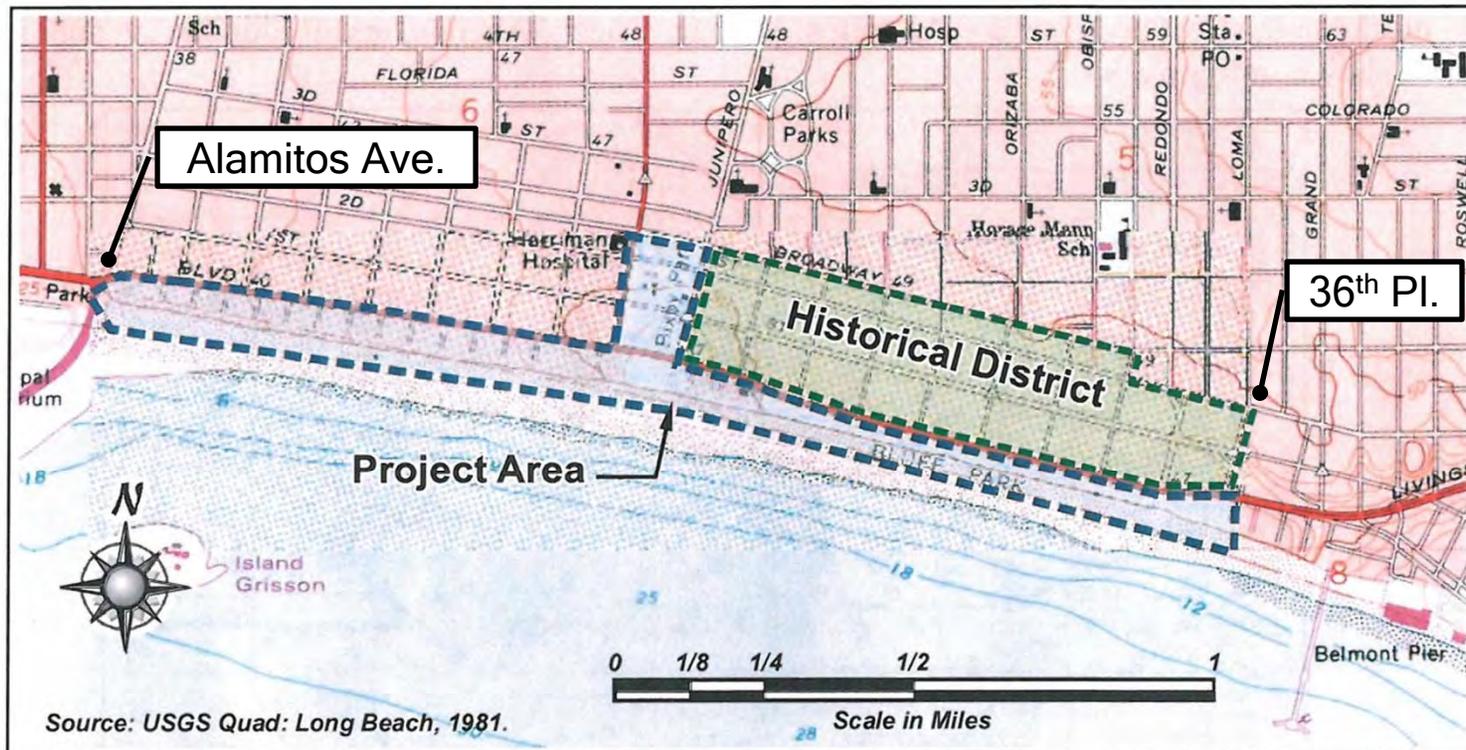
# Community Consultations



- Historical Society of Long Beach
- Long Beach Museum of Art
- Alamitos Beach Association
- Bluff Park Association
- Model Plane Glider Group
- Bluff Park Front Runners
- Bixby Park Users
- Feral Cats Protectors
- Surfrider Foundation

# Project Boundaries

The “Plan of Development – Bluff Erosion and Enhancement Project” focuses on the areas adjacent to and including the bluff and beach areas from Alamitos Avenue to 36<sup>th</sup> Place. The Project is bordered by the downtown Long Beach Marina to the west and the Belmont Pier to the east. The area is delineated in **Figure 9**.

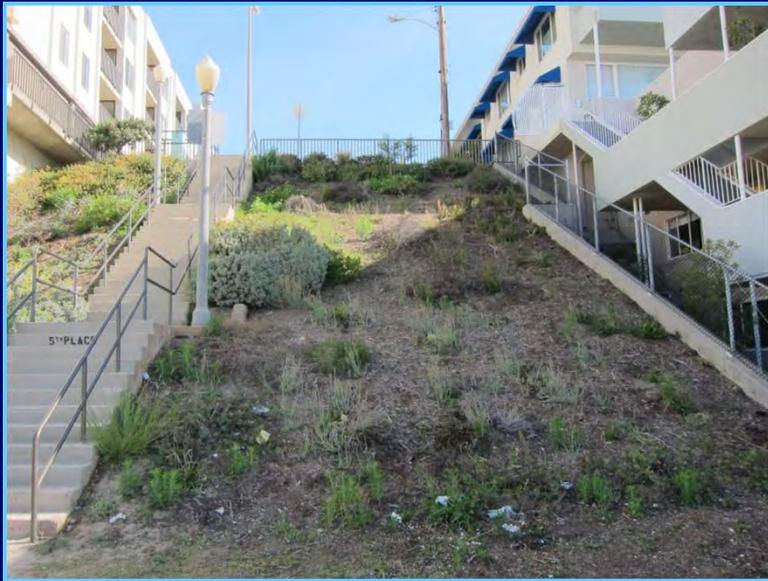


**Figure 9. Bluff Erosion and Enhancement Study – Project area.**

# Stabilization Options

- Re-grading
- New Vegetation
  - Irrigation
  - Drainage
  - Netting
- Slope Reinforcement
  - Retaining Walls
  - Gabions (No Longer Recommended)
  - Soil Nailing
  - Shotcrete

# Non-Soil Nailing Examples

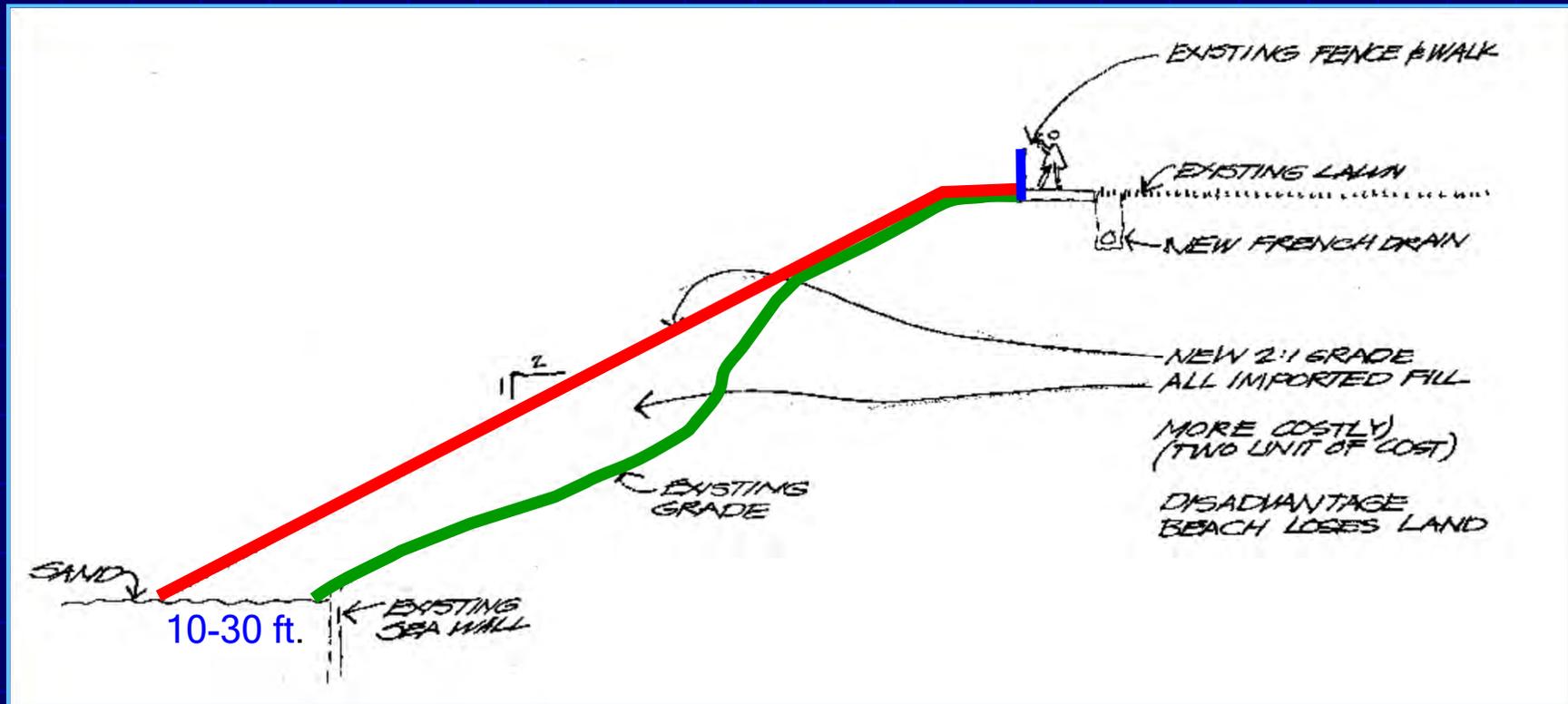


5<sup>th</sup> Place



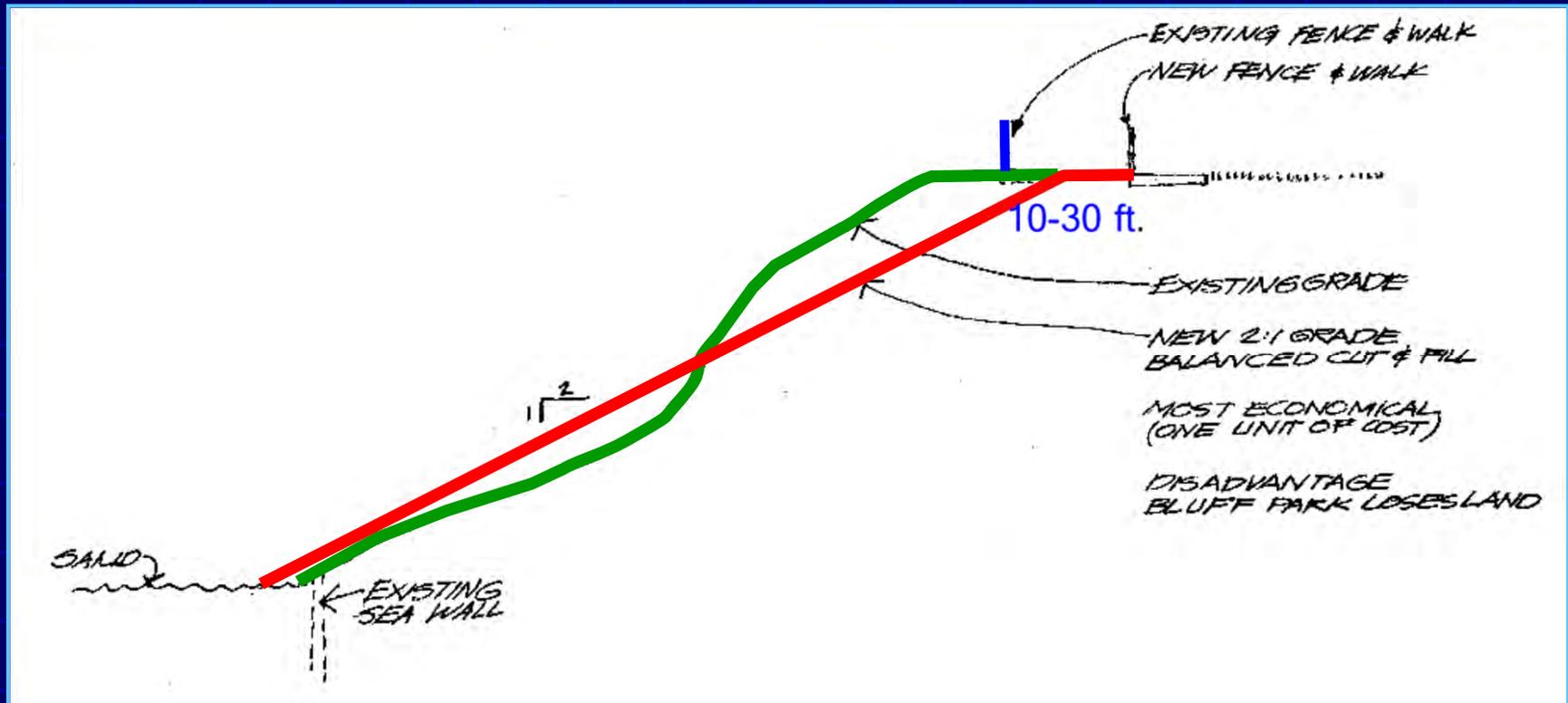
12<sup>th</sup> Place

# Options Evaluated for Bluff Park



Fill into the Beach

# Options Evaluated for Bluff Park



Cutting the Park Back

# Adopted Solution



- Soil Nails
- Shotcrete
- Landscaping

# Council Action

- |               |   |
|---------------|---|
| Sept. 4, 2007 | Specs Adopted for 12 <sup>th</sup> Place Erosion Control  |
| Nov. 16, 2010 | Specs Adopted for Phase 1 of Bluff Erosion and Enhancement Project (Redondo Ave. to 36 <sup>th</sup> Place) |
| Dec. 14, 2010 | Specs Adopted for 5 <sup>th</sup> Place and 7 <sup>th</sup> Place Erosion Control                           |
| Jul. 9, 2013  | Specs Adopted for Phase 2 of Bluff Erosion and Enhancement Project (20 <sup>th</sup> Place to Redondo Ave.) |

# Bluff Park Area



# Phase 1

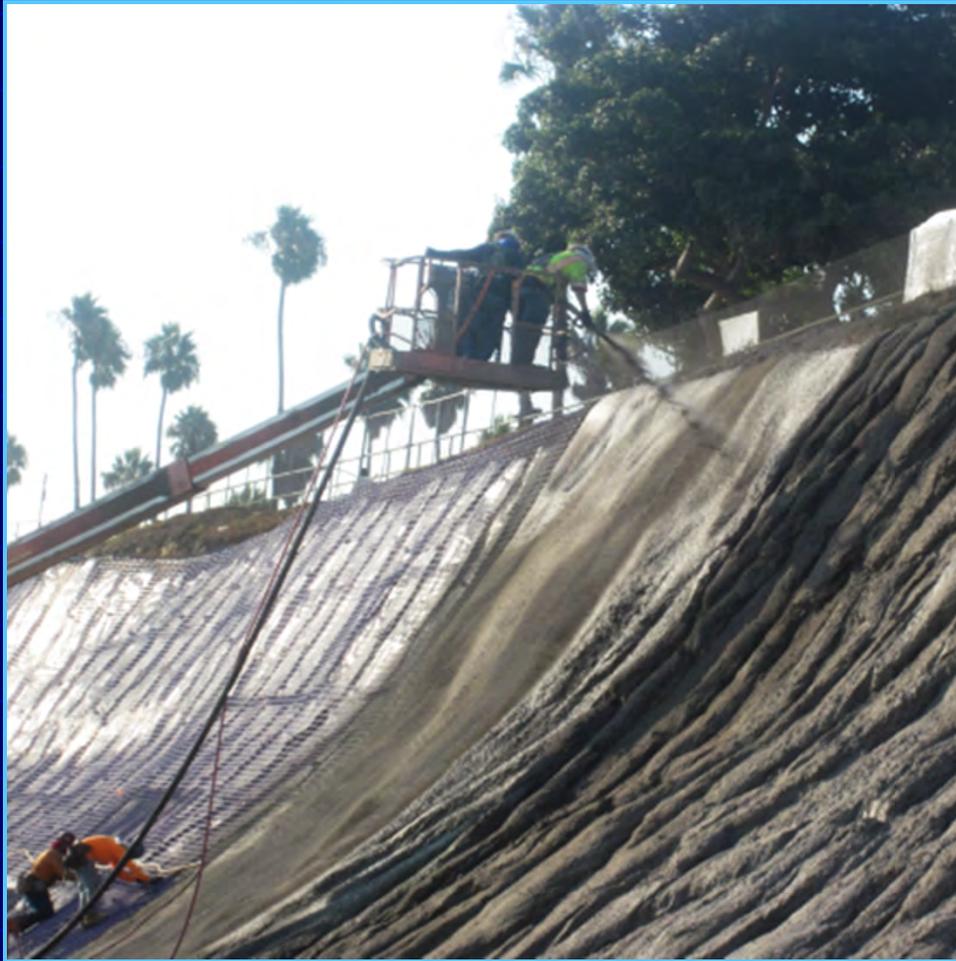
- Redondo Ave. to 36<sup>th</sup> Pl.
- Council approval November 16, 2010
- Work begins December 2010
- Work completed December 2011
- Irrigation and landscaping determined to be inadequate

# Phase 1



Prior Condition

# Phase 1



Shotcrete Application

# Phase 1



Shotcrete Before Staining

# Phase 1



Shotcrete After Staining

## Phase 2

- 20<sup>th</sup> Pl. to 36<sup>th</sup> Pl.
- Council approval July 9, 2013
- Work begins October 21, 2013
- Major construction complete May 31, 2014
- Landscaping complete Fall/Winter 2014

## Phase 2



Prior Condition

## Phase 2



Soil Nailing

## Phase 2



Rebar and  
Landscape Wells

## Phase 2



Shotcrete Before Staining

# Phase 2

## Section 1 - Park View



# Phase 2

## Section 1 - Beach View



# Phase 2

## Section 2 - Park View



# Phase 2

## Section 2 - Beach View



# Phase 2

## Section 3 - Park View



# Phase 2

## Section 3 - Beach View





# Bixby Park Annex (Cherry Park)



Prior Condition



Current

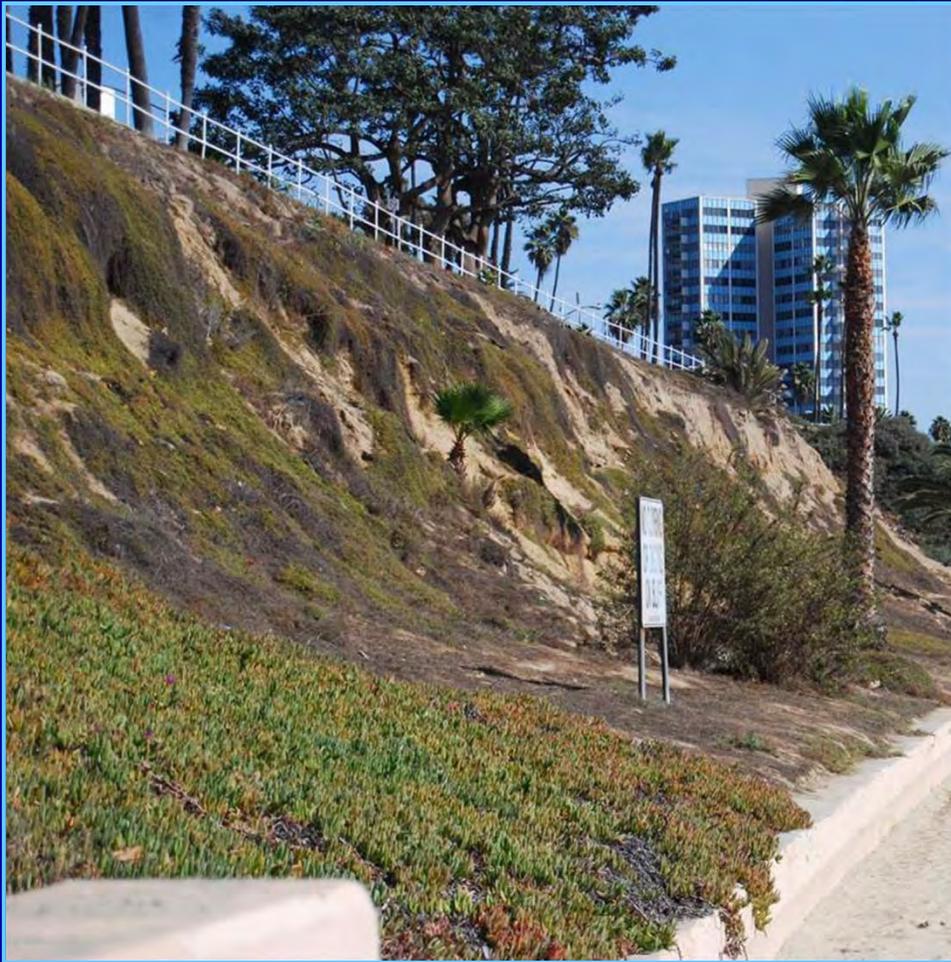
# Future Stabilization

- Museum of Art slope revegetation
- Gabion wall revegetation
- Rebuild historic access pathways and install new landscaping



# Impacts of Delayed Construction

- Push completion into busy summer months
- Potential demobilization of contractor
- Potential re-engineering and/or new specifications
- Additional project costs



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