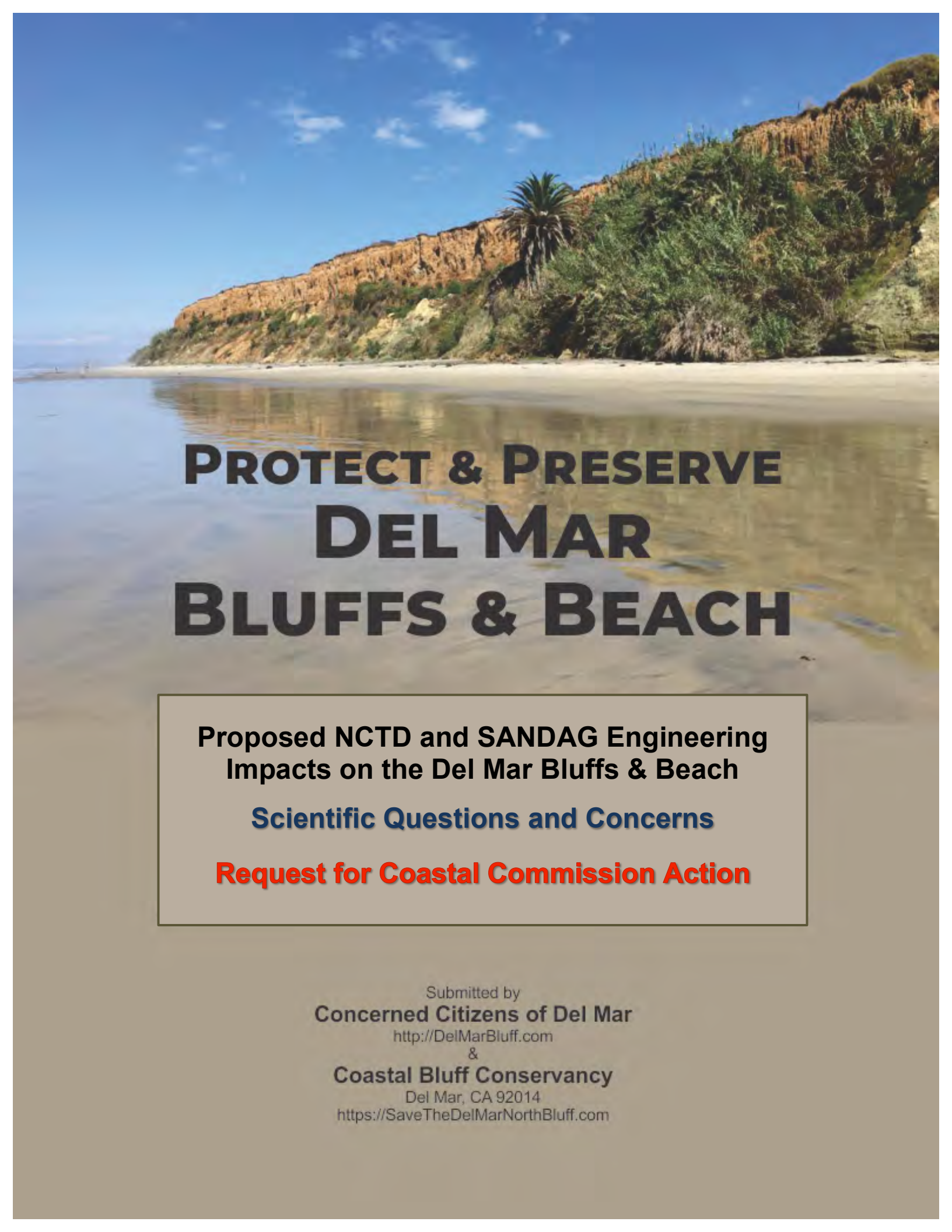




PROTECT & PRESERVE DEL MAR BLUFFS & BEACH

**Proposed NCTD and SANDAG Engineering
Impacts on the Del Mar Bluffs & Beach**

Scientific Questions and Concerns

Request for Coastal Commission Action

Submitted by
Concerned Citizens of Del Mar
<http://DelMarBluff.com>

&
Coastal Bluff Conservancy
Del Mar, CA 92014
<https://SaveTheDelMarNorthBluff.com>

EXECUTIVE SUMMARY

THE PROBLEM

- The San Diego Association of Governments (**SANDAG**) and North County Transit District (**NCTD**) have sweeping engineering projects underway and in planning that will forever destroy **the entire 1.7 mile Del Mar Coastal Bluff and beaches below.**
- The SANDAG/NCTD plans are projected to reinforce railroad tracks on top of the Bluff for 20-30 years in the face of inevitable bluff collapse within this timeframe due to sea level rise.
- Without objective, independent review, the SANDAG/NCTD plans will impose environmentally destructive structures on the Bluff's top, face, and toe, and will bury the beaches below.
- For 20 years, local governments have postponed and ignored the necessary relocation of the railway off the fragile Bluff. This cannot continue.
- The railway must be relocated within 7 to 10 years to avoid further engineering expense and environmental destruction.

IMPACTS

(see page 5 and Appendix A)

- The natural Bluff will be destroyed and replaced by engineering.
- Beaches will be buried behind continuous seawalls.
- Public views and beach experience will be ruined.
- 100-years of public access to the Bluff and beaches will be denied.
- Over time, sea level rise will cause engineering structures to fail and fall onto the beaches.
- The Coastal Commission's legal authority will be undermined if a thorough and independent environment impact review, as required by law, does not happen.

UNANSWERED QUESTIONS

(see page 12 and Appendices B and C)

- Numerous science and engineering questions about the plans remain unaddressed.
- The engineering of the proposed structures is excessive and unproven.
- Objective analysis is lacking and needed, and requires SANDAG/NCTD public response.
- An Environmental Impact Report (EIR) must be done, as required by CEQA and the Coastal Act.

AN ALTERNATIVE

- Do a 10-year project, not 20 to 30-year. The railway relocation must be started now.
- **Don't destroy the Bluff and the beaches. Less destructive engineering is possible.**

To protect and preserve the Bluff, a 10-year timeline for railway relocation must be implemented now with far less destructive interim engineering. The beauty of this last remaining natural coastal Bluff in San Diego's North County demands conservation for future generations.

OVERVIEW

The Del Mar Bluffs are the last remaining stretch of 1.7 miles of natural terrain trails in San Diego North County. The Bluff and beaches have had continuous community access for over a century. The 20 to 30-year engineering plan proposed by the San Diego Association of Governments (**SANDAG**) and the North County Transit District (**NCTD**) will irrevocably damage the Bluff and beach and also deny access to the wide community of the public who have used them for 100 years.

This Report is addressed to the California Coastal Commission and concerned governmental, non-governmental, and citizen groups who have the means to question and challenge the engineering plans and ultimately to protect and preserve the natural Bluffs with the open beaches below for future generations.

The Report raises critical scientific and engineering questions related to the on-going and proposed engineering of the Del Mar Bluffs and beaches. Further, the Report will educate and inform stakeholders who question the engineering plans.

Our Objectives

Protect and Preserve the Del Mar Bluffs & Beach

- Visualize:
 - Simulations of what is planned
 - Engineering underway now
- Raise Unanswered Scientific & Engineering Questions
- Define Critical Issues Ensuring they are Objectively Addressed

We Call on the Coastal Commission to

- Ensure that SANDAG and NCTD Proposed Plans Are Subject to an Environmental Impact Report (EIR) by objective and expert engineers and scientists; and
- Ensure that the California Coastal Commission (CCC) legal mandate to protect the California Coastline is not hampered or superseded by legal maneuvers with the Surface Transportation Board.

Appendices provide expanded material on the questions and issues that need review by Coastal Commission staff and engineers, and by concerned public and private groups.

Urgent Action Required *WITHOUT* Excessive Measures

Del Mar, SANDAG and NCTD have a multi-faceted problem, 20 years in the making. Why should the lack of adequate progress relocating the railroad result in the destruction of the Del Mar Bluff and its beaches in San Diego's North County?

The Bluff is fragile and will continue to erode and collapse. It is understood and accepted that some degree of protection is needed to ensure the safety of the railway line that currently runs the 1.7 miles of the Bluff. Nevertheless, the Bluff offers multiple benefits to the community as one of the San Diego region's last remaining natural, accessible coastal bluff with trails above and beach below. Irreversible changes must be avoided.

The consequences of planned structures will deface the bluffs with armoring and grading, bury beaches and bluff toes behind seawalls, and deplete natural sand replenishment. This Report strongly questions the 20 to 30-year engineering plans as excessive and unproven.

Alternatively:

Relocate now. The railway line runs through Del Mar as a single track on top of the fragile bluff. The need for relocation has been recognized for over twenty years. Sea level rise and climate change have sped up the urgency. The tracks must be moved within the next 7 years without further delay.

Minimize interim engineering. In the interim, the extent of the proposed engineering requires thorough, objective scrutiny by independent engineers and coastal bluff and beach processes scientists to ensure minimal long-term impact on the Bluff with appropriate mitigation.

Requests to all responsible agencies and individuals:

- **Ensure** enforcement of Coastal Commission legal mandates
- **Require** an Environmental Impact Report from SANDAG and NCTD
- **Minimize** engineering to save the natural coastal Bluff, beaches, and access
- **Relocate** railroad tracks no later than 7+ years
- **Commit** funds to reverse the engineering impacts after relocation

WHAT IS PLANNED?

SANDAG leads a project to impose environmentally destructive engineering structures along the entire 1.7-mile coastal Bluff top, face, and toe and the beach below that will:

- **Armor** the entire Bluff with long continuous seawalls on the beach that will eliminate the natural chiseled contours of the Bluff toe and obscure flow of beach sand;
- **Bury** beaches behind the seawalls with in-fill dirt on top of beach sand and Bluff toes;
- **Destroy** bluff faces extensively with grading and compaction that will erase the existing natural bluff geologic features;
- **Construct** long retaining walls at the coastal bluff-top edge, west of tracks; and
- **Decapitate** completely the upper ~25% of the highest west-facing Bluff face.

NCTD leads a separate project to install fencing on the Bluff tops for the full 1.7 miles.

On October 15, 2021, Del Mar Council members and staff walked the entire length of the SANDAG bluff project together with SANDAG and NCTD engineering staff and one NCTD Board member. At that time, SANDAG staff indicated the engineering consultants had been directed to **plan for another 20 years of train operations atop the fragile, sensitive coastal Bluff** (Figure C-3, Appendix C).

COMMUNITY RESPONSE

A Citizens' Petition submitted to the California Coastal Commission, October 13, 2021, clearly states the community's concerns regarding the unique qualities of the Del Mar Bluffs and beaches that draw tens of thousands of visitors to walk, swim, surf, and enjoy **(Appendix D)**. The Petition was uploaded to change.org to collect signatures electronically.

Many environmental impact concerns and questions about the fencing project are addressed in the Petition. Further questions were raised by independent third-party engineering experts from Atlas Technical Consultants, LLC, contracted by the City of Del Mar **(Appendix B)**.

Residents of Del Mar, other San Diego communities, and from afar, have presented objections to the excessive engineering plans of SANDAG and NCTD in public meetings before the Del Mar City Council, the California Coastal Commission (CCC), North County Transit District (NCTD), and the San Diego Association of Governments (SANDAG) (See verbal and written Public Comments at meetings of these bodies during the week of Oct. 18, 2021).

This Report poses critical, unanswered questions to ensure they are objectively addressed now.

OVERSIGHT IS LACKING

The geotechnical stabilization plans offered by SANDAG and NCTD are unproven, excessive, and plan for 20 to 30 more years of bluff top railroad operation. The community demands a shorter timeline in which the railroad tracks go elsewhere, and the natural Bluff beauty remains.

The community realizes that some preventive engineering is required as soon as possible to protect the tracks and trains before they are relocated. However, the community demands that current engineering in process and planned engineering receive the full scrutiny required by the California Coastal Act. **Irreversible changes must be avoided.**

NCTD's approach to fencing the bluffs has disregarded the community and the importance of the natural coastal bluff and beach environment. Their reliance on a cursory geological opinion to justify massive drilling, imposition of concrete and fencing on the Bluff serves as a stark lesson that the Coastal Commission must not rely on the assurances of either NCTD nor SANDAG nor their consultants that their proposed sweeping redesign of the Bluff are **the least most destructive and necessary to accomplish legitimate goals.**

Dramatic, permanent changes are planned and underway without environmental review. They are a blow to the environment, armoring the Bluff with ugly concrete structures and seawalls creating a gauntlet to beach access: a direct violation of the Coastal Commission's legal authority and mandate.

THE BOTTOM LINE

Why do a 20 to 30-year project when the track relocation is expected within 10 years? Why destroy the Bluff and beaches when less destructive engineering is possible to bolster the Bluff until the railway is moved?

The Coastal Commission has the legal
mandate and singular mission to
protect our precious California coast

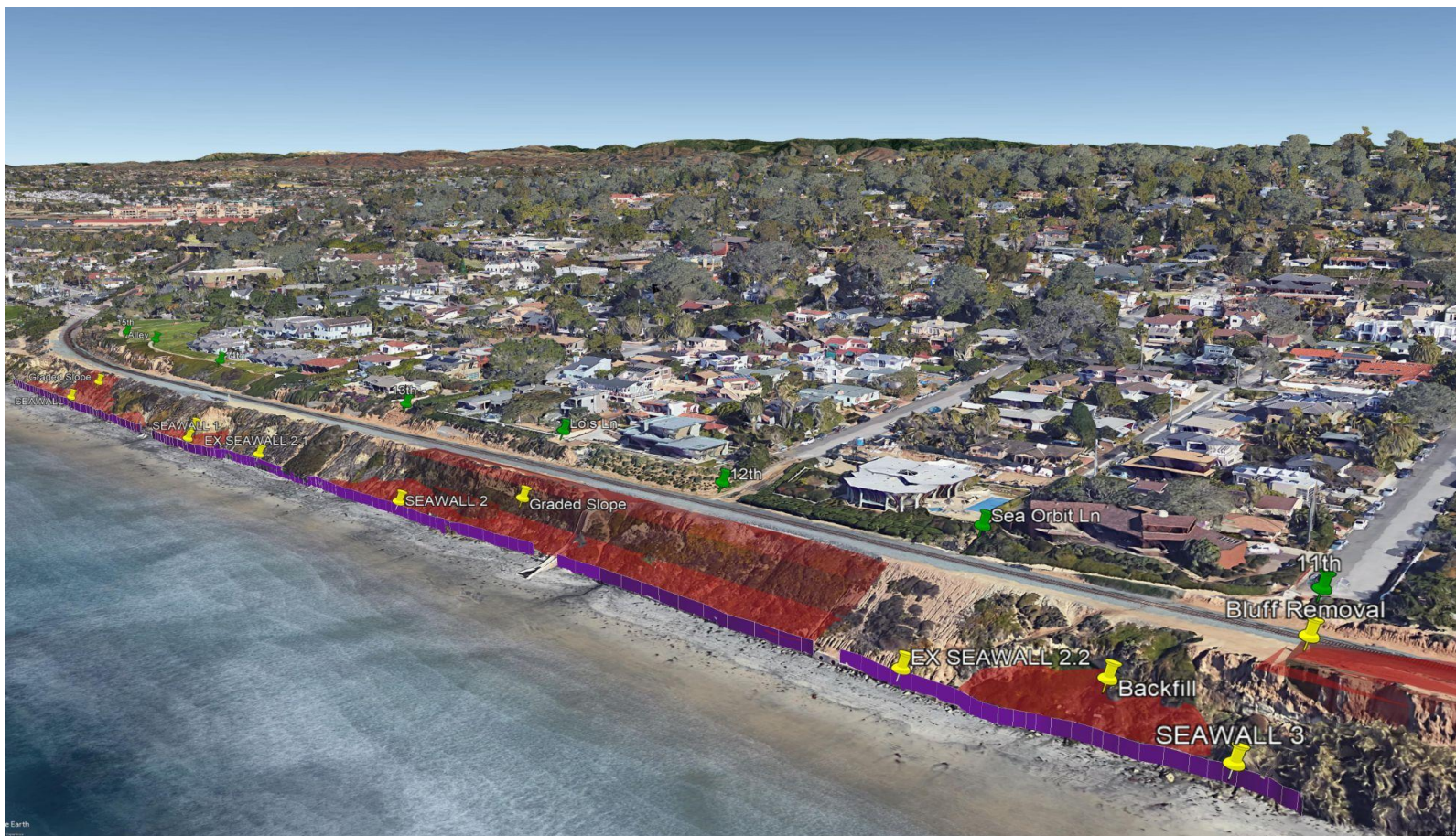
A Brief Visual Tour in Five Images

1. Proposed Engineering Ignores Coastal Protections

Visualization looking north along the Bluff from 11th St north to Coast Blvd.

IMPACTS:

- Grading and terracing will replace natural Bluff contours with industrial faces.
- All red shaded areas will turn into artificial graded slopes.
- High seawalls (purple) will obscure the base of the Bluff along the beach.



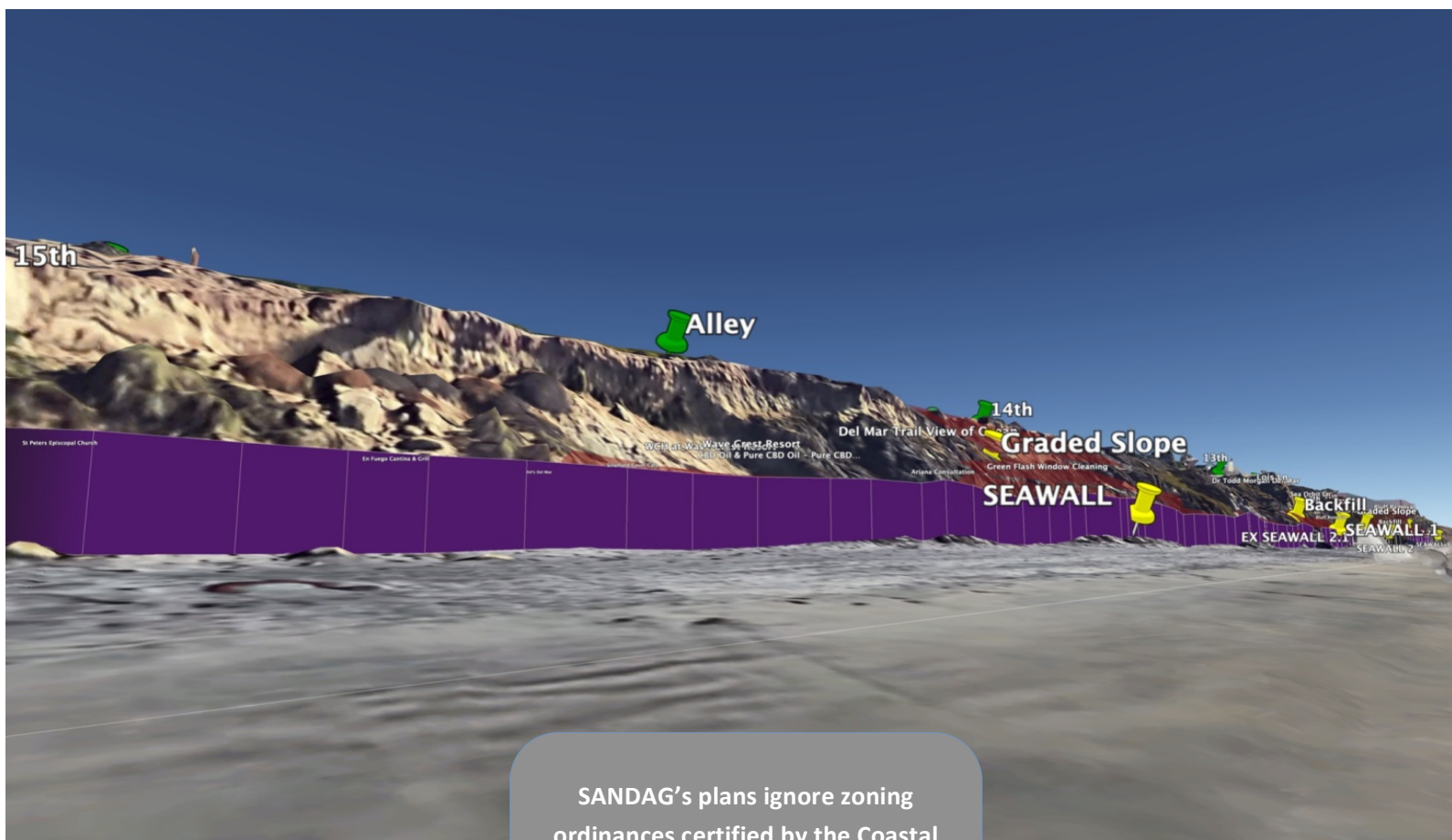
See Appendix A for more visualizations.

2. Continuous Seawalls Restrict Beach Access & Sand Renewal

Visualization looking south between 15th and 11th Streets.

IMPACTS:

- A long high seawall (purple) will block natural coves and bluff/beach features.
- Long seawalls 8 to 10 feet high will separate beachgoers from the Bluff's lively life.
- Bluff environments for small animals, wild plants, sea grasses, nesting birds, native frogs, and their ecosystem will be buried and obstructed.
- A walk along the beach will change completely - the Bluff will be caged behind a vertical wall.



See Appendix A for more visualizations.

3. Natural Beauty Will Be Irreversibly Destroyed

Natural Bluff from 11th to 8th St is slated to be decapitated. (photo, Terry Gaasterland)

IMPACTS:

- SANDAG plans will remove the top 20 to 25 feet of tall natural Bluff.
- Bluff crevices where birds nest and small animals live will be gone forever.
- Bluff material for sand replenishment will be eliminated.



4. Engineering Already Underway

SANDAG's Terracing At South End of Del Mar Woods. (photo, Terry Gaasterland)

With no environmental review or public input whatsoever, SANDAG commenced with a small emergency repair that has grown into an outsized insult on the natural bluff face.



5. Armoring The Coast – Natural Beauty vs. Concrete Hardening

BEFORE: Coastal Bluff Top Trail below Del Mar Woods. (photo, Michael Keenan)



AFTER: Bluff Top Trail - Concrete drainage, natural flora/terrain scraped.
(Photo, Payson R. Stevens)



CRITICAL QUESTIONS

The Coastal Commission needs to require that these critical questions about impacts be answered by SANDAG and NCTD before moving forward. Without an EIR, the consequences of the engineering can never be fully understood and addressed.

1. What is the time horizon for the engineering before the railway is moved as that should determine the degree of armoring needed? What's the difference and impacts between a 20 to 30-year engineering plan versus a 10-year plan?
2. How will grading and in-fill be managed and minimized?
3. Can the project be reframed to place localized seawalls in high-risk locations? The risk of bluff slide and erosion is not the same along the entire Bluff. Collapses are punctuated, local events.
4. How will imminent sea level rise affect the beaches and proposed seawalls?
5. Are funds set aside to remove seawalls after railroad relocation.
6. Does SANDAG have jurisdiction to construct seawalls on the beach and bury coves behind them?
7. Have agencies with jurisdiction over the beach been included in the planning? For example, State Parks, the State Lands Commission, and the City of Del Mar. The southernmost planned seawall is on the Torrey Pines State Beach
8. Has SANDAG studied the impacts of the seawalls on wave energy dissipation patterns and erosion dynamics? How significant will the resulting *active beach erosion* be?
9. What serious and committed efforts are underway to relocate railroad in 7 to 10 years?
10. Will the proposed engineering plans be made consistent with the planned train relocation?

Appendix C provides expanded details for each Critical Question.

At this time no Environmental
Impact Report (EIR) has been
prepared for
either agency's project.

SUMMARY OF SCIENTIFIC QUESTIONS AND ANALYSIS NEEDED

Geotechnical Impacts

Expert analysis of geotechnical impacts of the SANDAG's proposed engineered structures are clearly lacking and must be done. The City of Del Mar contracted an independent review of NCTD's geotechnical report by Leighton Consulting, Inc (2021) on their 1.7 miles of fencing plans. The independent review found multiple, serious deficiencies. Specifically, the critique of the Leighton report by third-party expert consultant Atlas Technical Consulting, LLC, noted analysis, tests, and measurements that were missing from the Leighton report.

The Atlas observations on needed geotechnical analysis pertain not only to the NCTD fencing but more generally to any engineering project on the fragile coastal Bluff. The following needs for analysis of geotechnical impacts apply equally to the SANDAG engineering. See **Appendix B** for these fundamental geotechnical questions that must be answered.

Urgent Analysis is Lacking in Key Scientific Areas:

- **Rain and irrigation subsurface Bluff penetration**
- **Latest technology for assessing Bluff geology**
- **Beach erosion effects from seawall construction along Bluff toe**
- **Sea level rise with wave energy against sea walls**
- **Identification of flora and fauna of Del Mar Bluff and beaches**
- **Vibration effects on coastal Bluff west of tracks**
- **Seismic risks and the Rose Canyon Fault**

Details for the above scientific concerns can be found in **Appendix C**.

Pressing questions and impacts must be addressed and require SANDAG's public response.

REPORT DISTRIBUTION LIST

Coastal Commissioners

Coastal Commission Executive Staff

San Diego County Board of Supervisors

Copied to:

State Assembly Representatives and Senators for San Diego Region

Federal Congress Members for San Diego Region

Council Members, Mayors and City Managers of San Diego Coastal Cities

California Department of Transportation

California Department of Parks and Recreation

Sierra Club

Surfrider Foundation

San Diego Habitat Conservancy

Torrey Pines Conservancy

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REPORT ORGANIZATION

To define what is lacking to date and the elements of this Report, concerned citizens are in ongoing discussions with geologists and scientists who study coastal processes to examine the multiple engineered structures and changes proposed in the two projects.

This Report seeks to present a more accurate visual simulation of the proposed NCTD and SANDAG engineering and pose scientific questions and concerns about environmental impacts. Their details are presented in Appendices A through D.

Appendix A visualizes the issues and problems through simulations and photographs.

Appendix B provides the independent third-party expert (Atlas Technical Consultants, LLC) critique of NCTD’s proposed fencing and relates it to SANDAG.

Appendix C expands on the scientific environmental impact questions not addressed publicly in the planning process to date.

Appendix D summarizes and links to the Citizens Petition to the California Coastal Commission.

APPENDIX A: VISUALIZING ISSUES, IMPACTS, AND PROBLEMS

Included here are our photo simulations that present realistic visualizations from multiple perspectives for the SANDAG-led project. Our visualizations were created using Google Earth and use the locations shown in SANDAG/NCTD engineering plans (as prepared by HNTB, July 2021, SANDAG contract no. 5007812).

These visualizations are general approximations and do not show any specific details of engineering structures planned by SANDAG. They offer bird's eye views showing the full extent of the bluff and beach areas, including closer views of locations with highest concern. Elevations ranged from sea level to 79 feet at the bluff face highest point.

Expected consequences of proposed engineering are listed as IMPACTS beneath each visualization, summarized as follows:

Impacts of Seawalls Along the Bluff Toe and Grading the Bluff Face

- Natural Bluff face will be erased by extensive grading, in-fill behind seawalls, terracing and compaction of bluff material.
- Natural Bluff/beach contours will be buried under in-fill dirt behind seawalls.
- Large swaths of natural beach areas will be buried by in-fill dirt.
- Existing large "cove" beaches will be buried and eliminated.
- Sand loss and beach erosion will be accelerated not slowed down.
- At high tide, beach users will have no space to escape "sneaker waves".
- Natural sand deposition on contoured bluff toes will be eliminated.

Impacts on Public Views and Beach Experience

- Natural public views will be demolished.
- Continuous manmade structures will eliminate beach access from historic bluff-top trails in continuous use for over 100-years.
- Retaining wall at top will diminish view of bluff from beach level.
- Retaining wall will eradicate the natural view of the bluff from the "upper bluff" to the east of the tracks.
- Natural views from Sea Grove Park and paths will be destroyed.
- Natural beach experience will be replaced by cavernous, continuous seawalls with no natural surfaces or contours along the beach.
- A walk along the beach will feel like walking along an industrial corridor with the bluffs caged in behind engineered structures

Impacts of Bluff Top Decapitation

- The current high bluff above the beach provides stunning beauty and geology to the Del Mar South Beach experience from the beach.
- Removal of the bluff top will erase this experience forever.
- Natural high bluff face will be gone entirely.
- Removal of the cliff will lower the bluff edge 10-15 feet.
- Approximately ~620,000 cubic feet of cliff material will be removed (23,000 dump truck loads).
- Removing overburdening will increase the risk of slide by removing buffer material. (Does this offset any decreased risk due to removal of weight?)
- Any removed material should be placed on the beach to prevent erosion.

Figure 1. Visualization of Del Mar Bluff Engineering from 15th to 8th St

Red shaded areas show slopes to be graded. Seawalls with back-fill on the beaches behind and graded slopes above stretch the entire length of the coastal bluff toe. New seawalls at bluff base, 8-foot height. Bluff top, 61-65 feet above sea level. (Note: Green pins mark consistent locations across simulations. Yellow pins mark specific engineered structures.)



Figure 2. Visualization of Del Mar Bluff Engineering, Sea Grove Park south to 7th St.

Continuous seawall (black) along the toe of the bluffs, approximately 8 feet high. Red shaded areas show graded slopes. Bluff top, 61-65 feet above sea level. (Note: Green pins mark consistent locations across simulations. Yellow pins mark specific engineered structures.)



Figure 3. Visualization of Del Mar Bluff Engineering, looking north from 7th St to Sea Grove Park (15th St)

Continuous seawall (black) along the toe of the bluffs, approximately 8 feet high. Red shaded areas show graded slopes. Bluff top, 61-65 feet above sea level. (Note: Green pins mark consistent locations across simulations. Yellow pins mark specific engineered structures.)



Figure 4. Engineering Plans for Del Mar Bluffs and Beaches, Google Earth overlay
Image overlaid with SANDAG Initial Engineering Plans (as prepared by HNTB, July 2021, SANDAG contract no. 5007812), basis for visualizations.

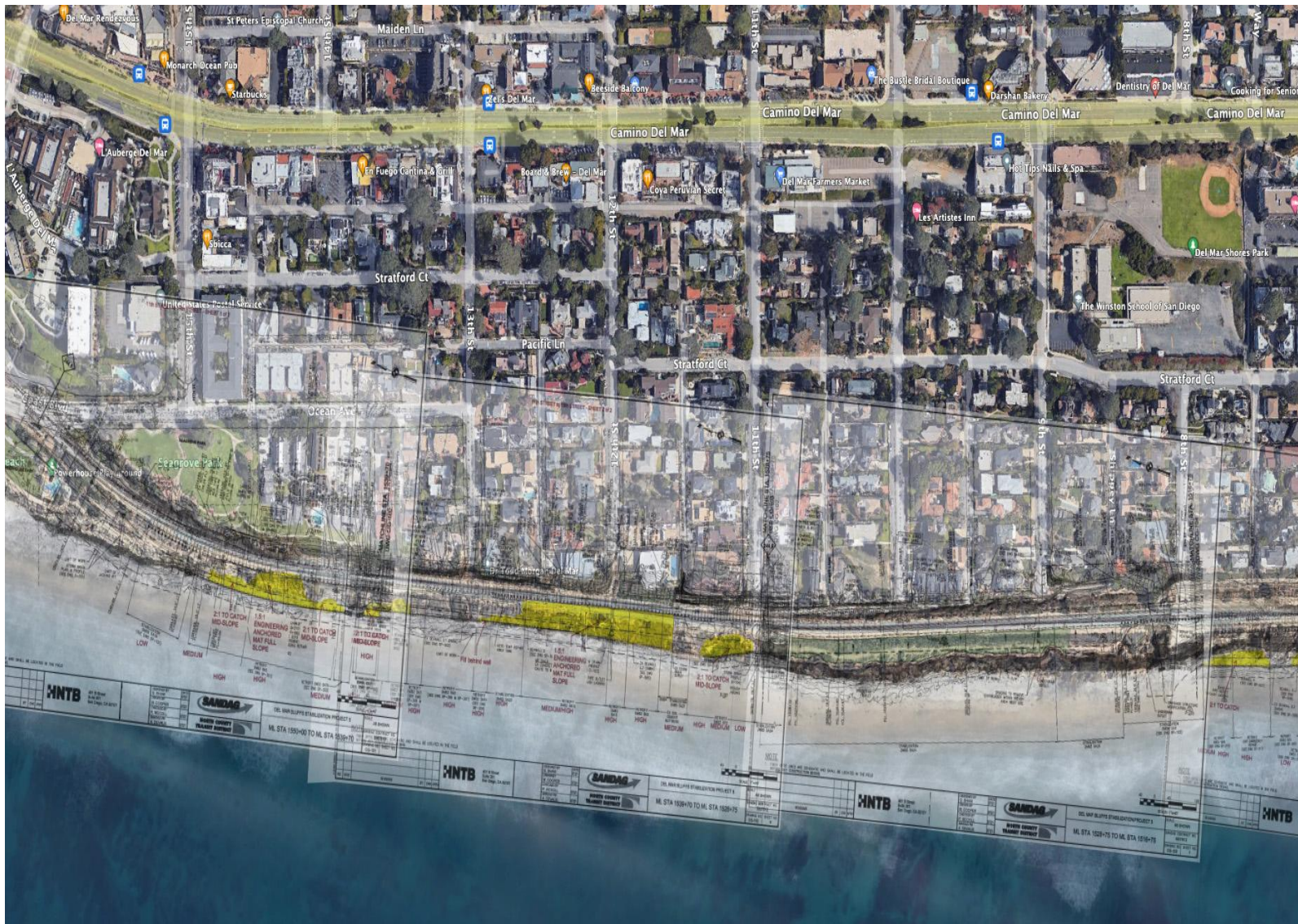
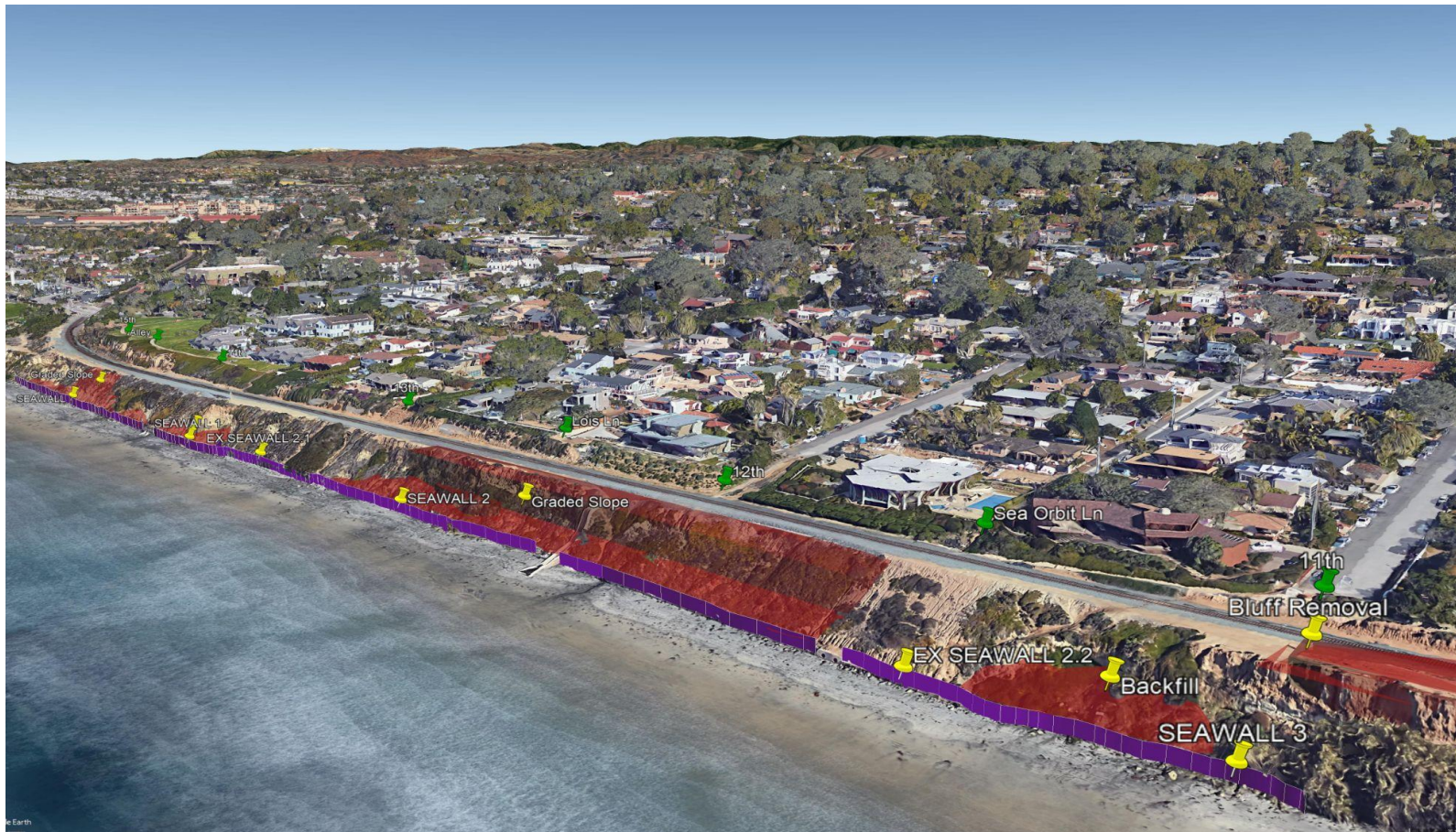


Figure 5. Del Mar Bluff Engineering, 15th St to 11th St

Continuous seawall (purple) along the toe of the bluffs, 8-foot height. Red shaded areas show graded slopes. Yellow pins mark each engineering region with its seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level. **(Note:** Green pins mark consistent locations across simulations. Yellow pins mark specific engineered structures.)



IMPACTS:

- Natural beach contours will be destroyed by new in-fill dirt behind the seawalls.
- Natural bluff face will be erased by extensive grading and compaction.
- Natural public views will be demolished.
- Continuous manmade structures will eliminate beach access from historic bluff-top trails in continuous use for over 100-years.

Figure 6. Del Mar Bluff Engineering, 15th St to 12th St

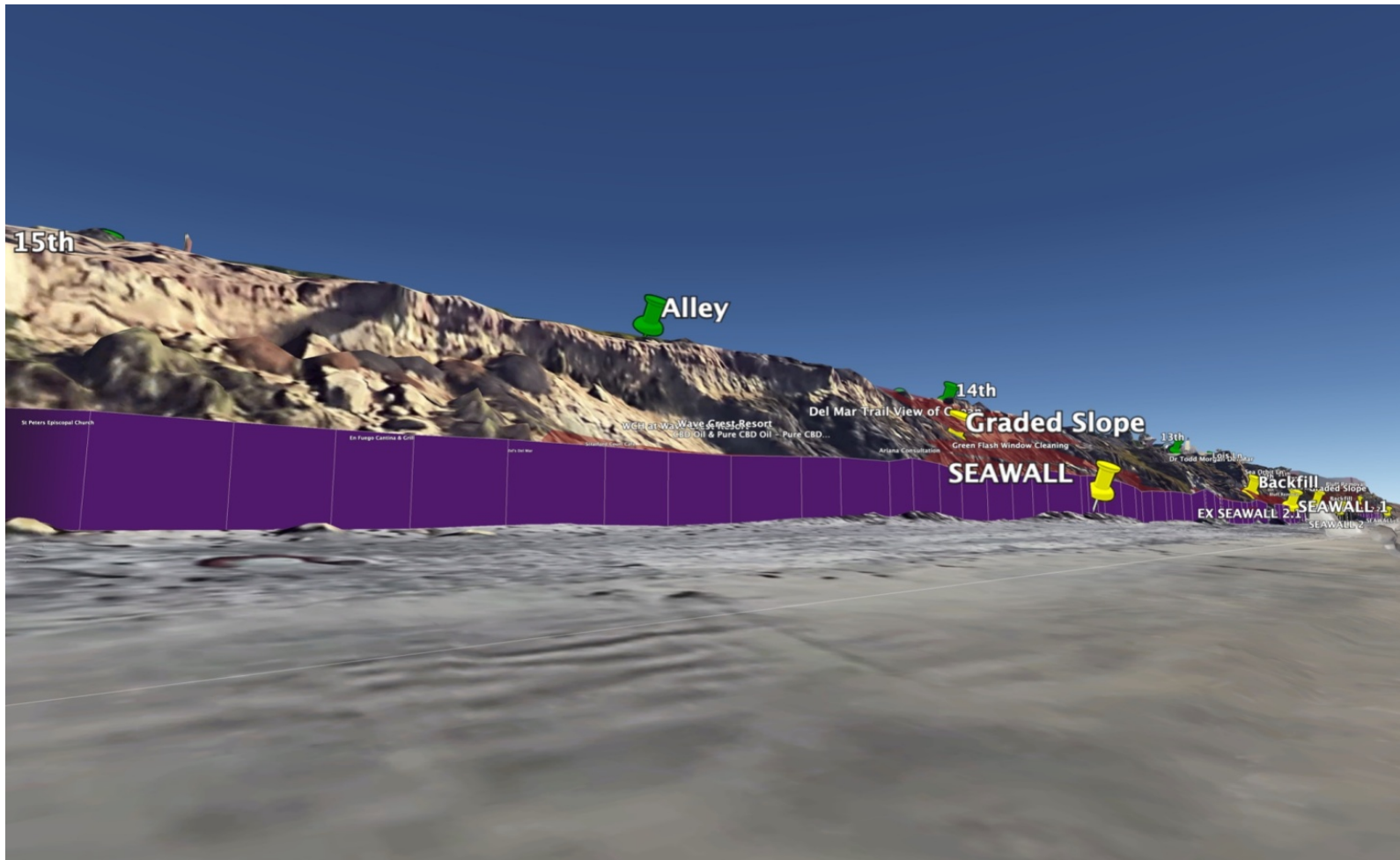
Continuous seawall (black) along the toe of the bluffs, 8 foot height. Red shaded areas show graded slopes. Yellow pins mark specific engineered structures, including seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level.



IMPACTS:

- Note extensive grading and in-fill behind seawalls
- Natural views from Sea Grove Park and paths will be destroyed.
- Terracing on graded slopes will eliminate natural bluff face contours.
- Bluff/beach contours will be buried under in-fill.

Figure 7. Del Mar Bluff Engineering, Seawall at Beach Level below 15th St to 11th St
Continuous seawall (purple) along the toe of the bluffs, 8-foot height. Red shaded areas show graded slopes. Yellow pins mark specific engineered structures, including seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level.

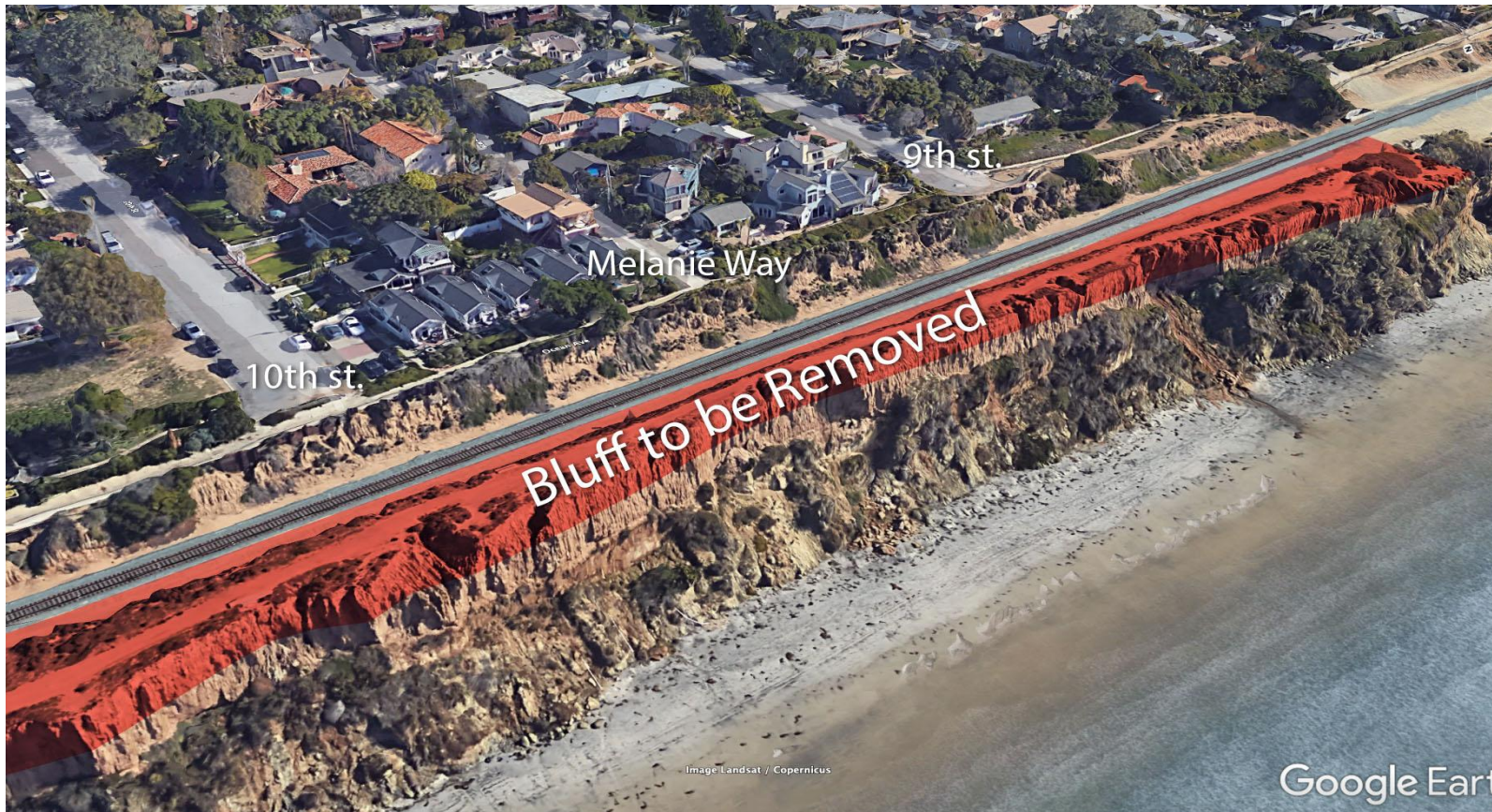


IMPACTS:

- Natural beach experience will be replaced by cavernous, continuous seawalls with no natural surfaces or contours along the beach.
- A walk along the beach will feel like walking along an industrial corridor with the bluffs caged in behind engineered structures.
- Natural sand deposition on contoured bluff toes will be eliminated.
- Large swaths of natural beach areas will be buried by in-fill dirt.

Figure 8: Removal of High Coastal Bluff Top, 11th St to 8th St

Red shaded area - to be removed. Current high bluff top, over 80-feet above sea level.



IMPACTS:

- The current high bluff above the beach provides stunning beauty and geology to the Del Mar South Beach experience from the beach.
- Removal of the bluff top will erase this experience forever.

NOTE: Trails along this stretch have already been blocked with demarcation fencing and extensive signage which should be maintained and expanded to protect the bluffs and citizens.

Figure 9: Removal of high coastal bluff top, 11th St to 8th St - Detailed View

Gray rectangles indicate bluff berm level after removal. Red shaded areas show bluff to be removed. Yellow pin marks northern boundary of engineering region. High bluff top, over 80-feet above sea level. Railroad tracks, 61-65 feet above sea level.



IMPACTS:

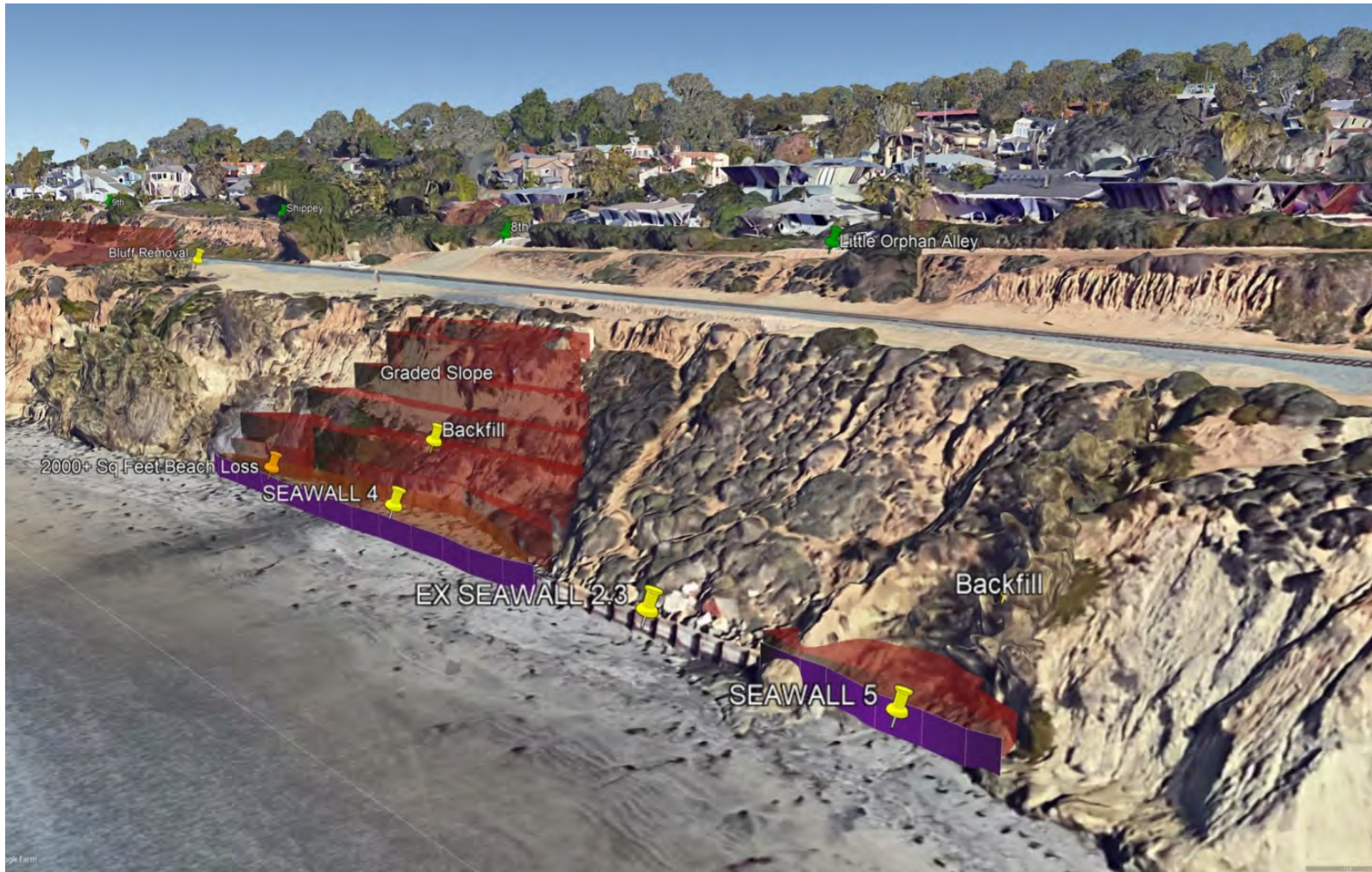
- Natural high bluff face will be gone entirely.
- Substantial amounts of bluff material will no longer be available to expand the width of the bluff after a slide and thus fight bluff erosion.
- Bluff material will no longer be available to replenish beach sand.
- Removing overburdening will increase the risk of slide by removing buffer material. More critically, it will undermine the cliff and tracks without any geology assessment/survey.

IMPACTS (Figure 9 continued)

- SANDAG reports risk of bluff slide will reduce by a mere predicted 10% based on models and projections. Have the models been critiqued or validated?
- Note the difference between the straight-line seawall (purple) and the natural bluff-toe contours.
- Removal of the cliff will lower the bluff edge 10-15 feet.
- Approximately ~620,000 cubic feet of cliff material will be removed (23,000 dump truck loads).
- Any removed material should be placed on the beach to prevent erosion.

Figure 10: Seawall from 8th St to 7th St with in-fill and grading - View A

Seawalls (purple) along the toe of the bluffs, 8-foot height. Red shaded areas show graded slopes. Yellow pins mark each engineering region with its seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level. (Note: Green pins mark consistent locations across Views A-D)



Note: cliff slope back fill, and elimination of existing “cove” beach behind SEAWALL 4

IMPACTS:

- Existing 2000 sq ft large “cove” beach behind SEAWALL 4 will be buried and eliminated.
- Smaller “cove” beach behind SEAWALL 5 will also be buried and eliminated.
- Natural contours of bluff toe along beach will be eliminated.
- At high tide, beach users will have no space to escape “sneaker waves”.

Figure 11: Seawall on Beach from 8th St to 7th St with in-fill and grading – View B
Seawalls (purple) along the toe of the bluffs, 8-foot height. Red shaded areas show graded slopes. Yellow pins mark each engineering region with its seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level.



IMPACTS:

- See Figure 9 and 10 impacts.
- Retaining wall at top will diminish view of bluff from beach level.

Figure 12: Seawall from 8th St to 7th St with in-fill and grading - View C

Seawalls (white dashed line) along the toe of the bluffs, 8-foot height. Concrete retaining wall (black dashed line) along top of bluff. Red shaded areas show graded slopes. Yellow pins mark each engineering region with its seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level.



IMPACTS:

- See Figure 9 impacts.
- Retaining wall will eradicate the natural view of the bluff from the “upper bluff” to the east of the tracks.
- Natural contours will be demolished at the top and bottom of the bluff.

Figure 13: Seawall at Beach Level from 8th to 7th St with in-fill and grading - View D

Seawalls (purple rectangles) along the toe of the bluffs, 8-foot height. Red shaded areas show graded slopes. Yellow pins mark each engineering region with its seawalls, back-fill, and graded slopes. Bluff top, 61-65 feet above sea level.



IMPACTS:

- See Figure 9 and Figure 12 impacts.
- Sand loss and beach erosion will be accelerated not slowed down.

Figure 14: SANDAG Rendering of Seawall at Anderson Canyon extending north to 4th St with in-fill and grading on bluff face.

Seawall along toe of the bluffs, 8-foot height. Bluff top, 61-65 feet above sea level.

** SANDAG rendering presented to Del Mar City Council 9/20/21*



SANDAG **TransNet**

**NORTH COUNTY
TRANSIT DISTRICT**

September 20, 2021

IMPACTS:

- Natural beach experience will be blocked by continuous seawalls.
- A walk along the beach will feel like walking along a cage.
- Natural sand deposition on contoured bluff toes will be eliminated.
- Natural beach areas will be buried by in-fill dirt.

PHOTOS: Engineering Impacts-underway or planned

This section presents photographs of existing bluff conditions, including emergency repair engineering underway (**Figures 15-18**) and shows current conditions where engineered structures are proposed (**Figures 19-24**).

The photos shown were shared by Del Mar's community of bluff and beach visitors. Many come from near and far to marvel at the vistas, absorb the every-changing sunrises and sunsets, walk the trails, descend the bluffs to swim, surf, jog, walk or just peacefully sit in the splendor of Nature on the Del Mar Bluffs where the edge of North America meets the Pacific. To deny them the potential loss of this century-old access is not only violation of their historical rights but those enshrined legally by the California Coastal Commission.

Figure 15: UNDERWAY: SANDAG's Terracing At South End of Del Mar Woods.

(Sept. 5, 2021; photo, T. Gaasterland)



Figure 16: SANDAG's Interim Drainage Engineering South of Del Mar Woods.

(Sept. 5, 2021; photo, T. Gaasterland)

Note water drainage of 5 gallons per minute pouring out of the bluff from yet unknown sources.



Figure 17. Seawall construction below Del Mar Woods south of 4th St.

(Photo, Udo Wahn)



Figure 18. Seawall construction below Del Mar Woods south of 4th St.

(Photo, Udo Wahn)



Figure 19. Natural Bluff Today Without Engineering, area to be decapitated

(September, 2021; photo, T. Gaasterland).



Figure 20. Natural Beach Today at 7th St to 8th St (known as Mango Reef), area to be buried behind extended seawall (October, 2021; photo, T. Gaasterland).

This beach shown at a high high-tide will be lost behind the seawall planned below 7th St to 8th St. No beach will remain at this location at high tide.



Figure 21. Bluff Avian Visitors

Blue Heron, 11th Street (Photo, Al Tarkington)



Peregrine Falcon (Photo, Udo Wahn)

Figure 22. Natural Beauty (Photos: Payson R. Stevens: top, bottom left; Karl Willet: bottom right)

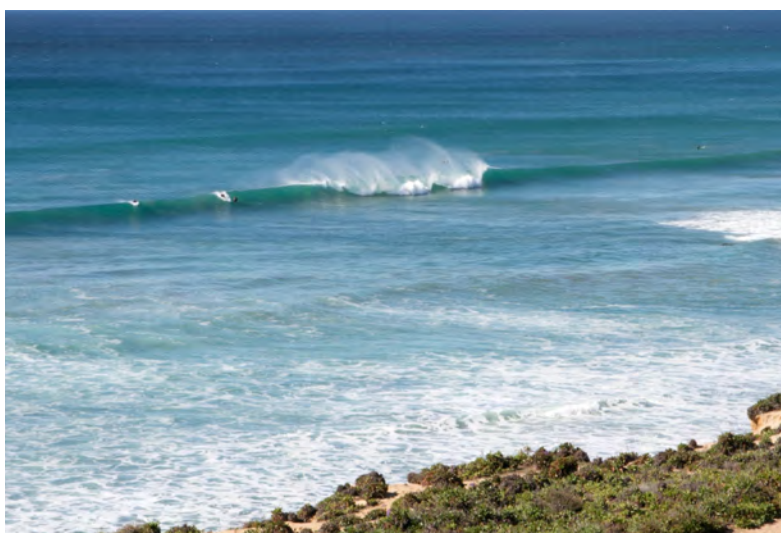
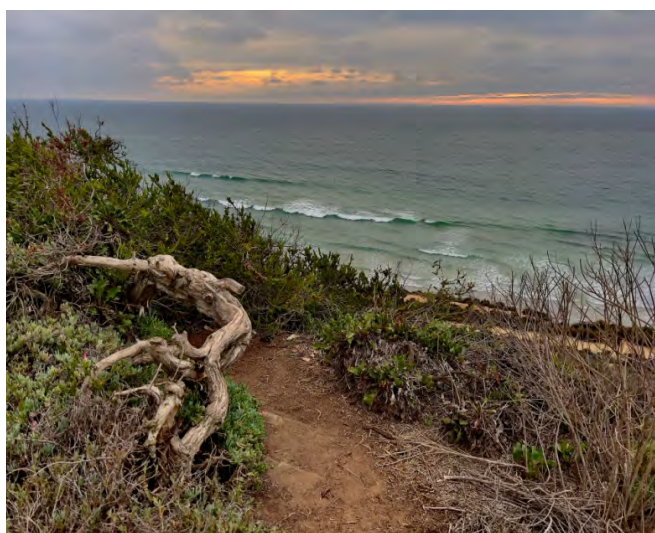


Figure 23. Natural Erosion vs Concrete Armor (Photos: Payson R. Stevens)

Upper Bluff: Natural Chiseled Features



Upper Bluff: Concrete Terracing



Figure 24. Natural Beauty vs. Concrete Armor

BEFORE: Coastal Bluff Top Trail at South End of Del Mar Woods.

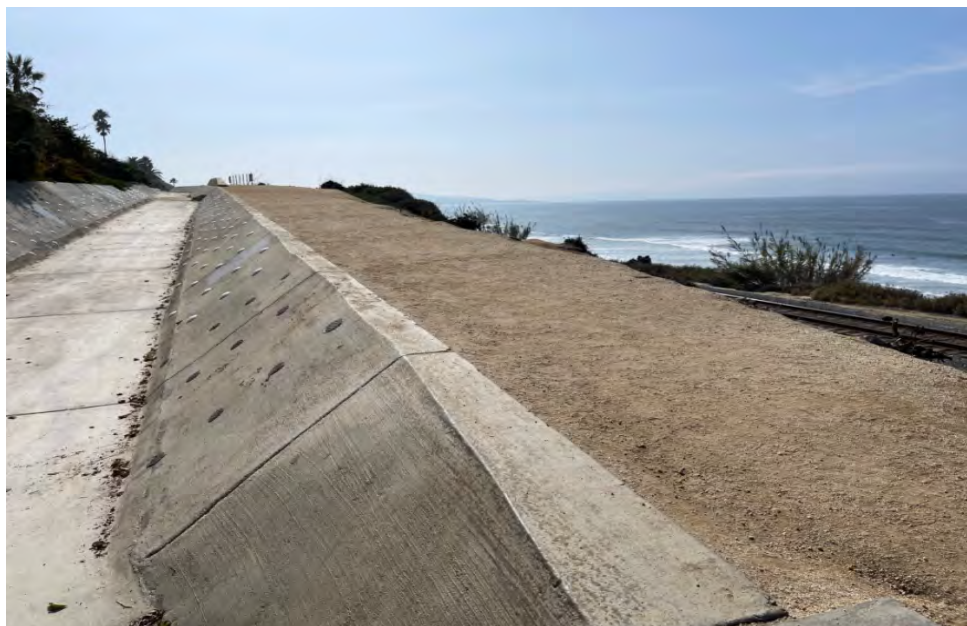
The trail has already been scraped by the emergency terracing.

(Photo, Spring, 2017, Michael Keenan)



AFTER: Upper Bluff: Concrete drainage, natural flora and terrain scraped.

(Photo, P.R. Stevens)



APPENDIX B: THIRD-PARTY GEOTECHNICAL ANALYSIS NEEDED

Expert analysis of geotechnical impacts of the SANDAG's proposed engineered structures are lacking and must be done. The City of Del Mar contracted an independent review of NCTD's brief geotechnical statement from Leighton Consulting, Inc (2021) on the impacts of fencing structures along 1.7 miles of fragile coastal bluff. **The independent review found multiple, serious deficiencies. Specifically, the critique of the Leighton report by third-party expert consultant Atlas Technical Consulting, LLC, noted analysis, tests, and measurements that were missing from the Leighton report.**

The Atlas observations on needed geotechnical analysis pertain generally to any engineering project on the fragile coastal bluff, not only to the NCTD fencing project. The following needs for analysis of geotechnical impacts apply equally to the SANDAG engineering:

- Needs discussion of geologic hazards, slope stability, and landslide potential. Drilling and other engineering proposed (piers, fencing, etc) in sensitive bluff segments could weaken bluffs.
- Needs discussion or anticipation of subsurface rock with distinct characteristics (e.g. geologic units) affecting bluff stability.
- Needs customary practice of descriptive survey and sampling of bluff geology (e.g. mapping, hand augers, geophysics, or other invasive or non-invasive exploratory geologic methods).
- Needs geologic descriptions and geologic cross-sections along the bluff top, geologic unit thickness, bedding, structure, groundwater, and other critical geologic conditions relevant to the site conditions.
- Needs description regarding lateral support, confinement and /or bearing support of the planned engineering.
 - Needs stated expert opinion regarding bluff-top stability and the potential for reducing the factor of safety for global and surficial stability of the bluffs where planned improvements will be located and may surcharge the bluffs.
 - Needs discussion of iron oxidation and impact of corrosion on engineering foundations.

These required analyses are needed not only for the NCTD fencing but also for the SANDAG Bluff Stabilization Structures.

Atlas provided the following two-page critique with unanswered questions:



6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

WORK PRODUCT

September 30, 2021

Atlas No. 190320P5.6
Report No. 1

MR. BILL PATE
CITY OF DEL MAR
2240 JIMMY DURANTE BOULEVARD
DEL MAR, CALIFORNIA 92014

Subject: Third Party Geotechnical Review
Proposed Security Fencing – Del Mar Bluffs, Del Mar, California

Reference: Leighton Consulting, Inc. (2021), *Geotechnical Review of Proposed Security Fencing – Del Mar Bluffs, Del Mar, California*, February 5.

Dear Mr. Pate:

In accordance with your request, Atlas has reviewed the referenced geotechnical review prepared by Leighton Consulting, Inc. (2021) and have the following questions and comments.

1. The geotechnical consultant provides an opinion stating that “the proposed security fence with small diameter foundations backfilled with PCC will not impact the stability of the bluffs or the trackbed support, nor promote additional erosion/bluff retreat.” The consultant does not discuss the potential impact that the construction aspect of the project, including site access/egress, vehicular traffic, and construction equipment vibrations may have on the stability of the bluffs, trackbed support, and whether or not the construction aspect of the project may promote additional erosion/bluff retreat.
2. The consultant does not discuss geologic hazards, including slope stability and the potential presence of landslides. The sensitive segments of the bluff could be affected by drilling a large number of piers, creating a weakened plane.
3. The consultant does not discuss anticipated subsurface conditions (i.e. geologic units).
4. The consultant does not recommend a minimum horizontal distance to daylight from the proposed western fence alignment post foundations towards the face of nearby slope/bluff.
5. The local geology should be more descriptive and supplemented with mapping, hand augers, geophysics, or other invasive or non-invasive exploratory geologic methods which are customary and part of local practice. Provide localized geology descriptions and geologic cross-sections along the bluff top presenting the thicknesses of geologic units, bedding, structure, groundwater, and other geologic information pertinent to the site conditions.
6. Provide a narrative regarding lateral support, confinement and /or bearing support of the planned improvements.
7. Provide an explicit opinion regarding bluff-top stability and the potential for reducing the factor of safety for global and surficial stability of the bluffs where planned improvements will be located and may surcharge the bluffs.
8. Provide corrosion criteria related to ferrous metals and concrete regarding foundations.



WORK PRODUCT

9. The design engineer should provide a constructability exercise with equipment and method requirements to reduce the assumptions made during initial design and support those conclusions and recommendations with field surveys and geotechnical data.
10. Foundation design should also address particular challenging segments of the alignment that have ongoing stability issues, sensitive habitat, or existing improvements. Recommendations in those areas should offer foundation design recommendations and provide sufficient engineering guidance to facilitate installation.
11. All surcharges existing and planned should be addressed in the design. Operational and construction vibrations on the planned foundations should also be addressed.
12. Bioturbation and biotechnical slope protection should be addressed in the design.

In our opinion, the referenced geotechnical documents should not be accepted until the questions and comments above are satisfactorily addressed. If you have any questions, please call us at (619) 280-4321.

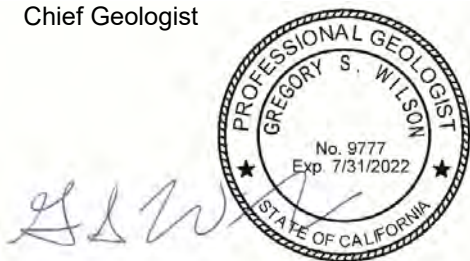
Respectfully submitted,
Atlas Technical Consultants LLC



Andrew K. Neuhaus, CEG 2591
Chief Geologist



Andrew T. Guatelli, PE, GE 2320
Principal Engineer



Greg Wilson, PG 9777
Project Geologist

GW:ATG:AKN:ds

Distribution: wpate@dpmclaw.com; jbride@delmar.ca.us

Appendix C: Critical Scientific Questions & Impacts Not Addressed

Critical Science Questions of Concern Needing SANDAG Response

- **Rain and Irrigation Impacts (Figure C-1)**
 - What are the impacts of surface water penetrating to deeper groundwater?
 - Where is the impervious layer and how will it impact bluff slide?
 - What is the probability of increased risk of bluff slides?
 - Where is the data?
 - How are they being studied and addressed?
 - French drains on the east side at 11th St have helped to reduce risk. Can they go deeper?

Figure C-1. Bluff Erosion. Groundwater from multiple sources moves through pervious material, saturates cliff edge soil, and increases landslide risk.

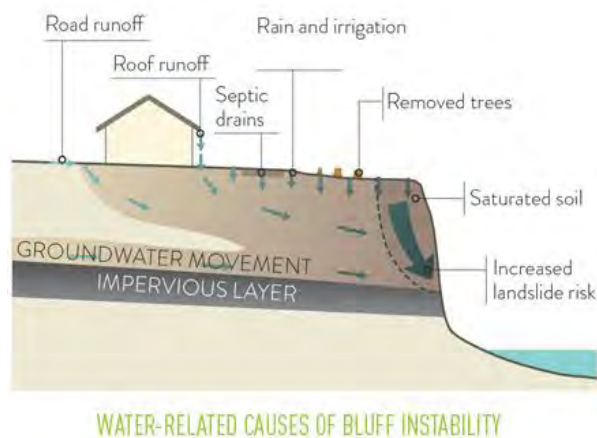


Figure Courtesy: Shore Friendly, <http://www.shorefriendly.org/your-erosion-risk/on-bluffs/>

- **Use of Latest Technology to Assess Bluff Geology Impacts**
 - How is the latest coastal bluff geologic technology being used to assess the bluffs critically vulnerable regions?
 - SANDAG assessment can take advantage of LIDAR studies
 - SANDAG assessment can use strainmeters (optical-fiber equipment) at key locations along the cliffs, capable of measuring earth movements at the scale of microns.
 - SANDAG assessment can use tiltmeters, which measure minute changes in bluff masses potentially providing predictive capability to monitor slope stability.

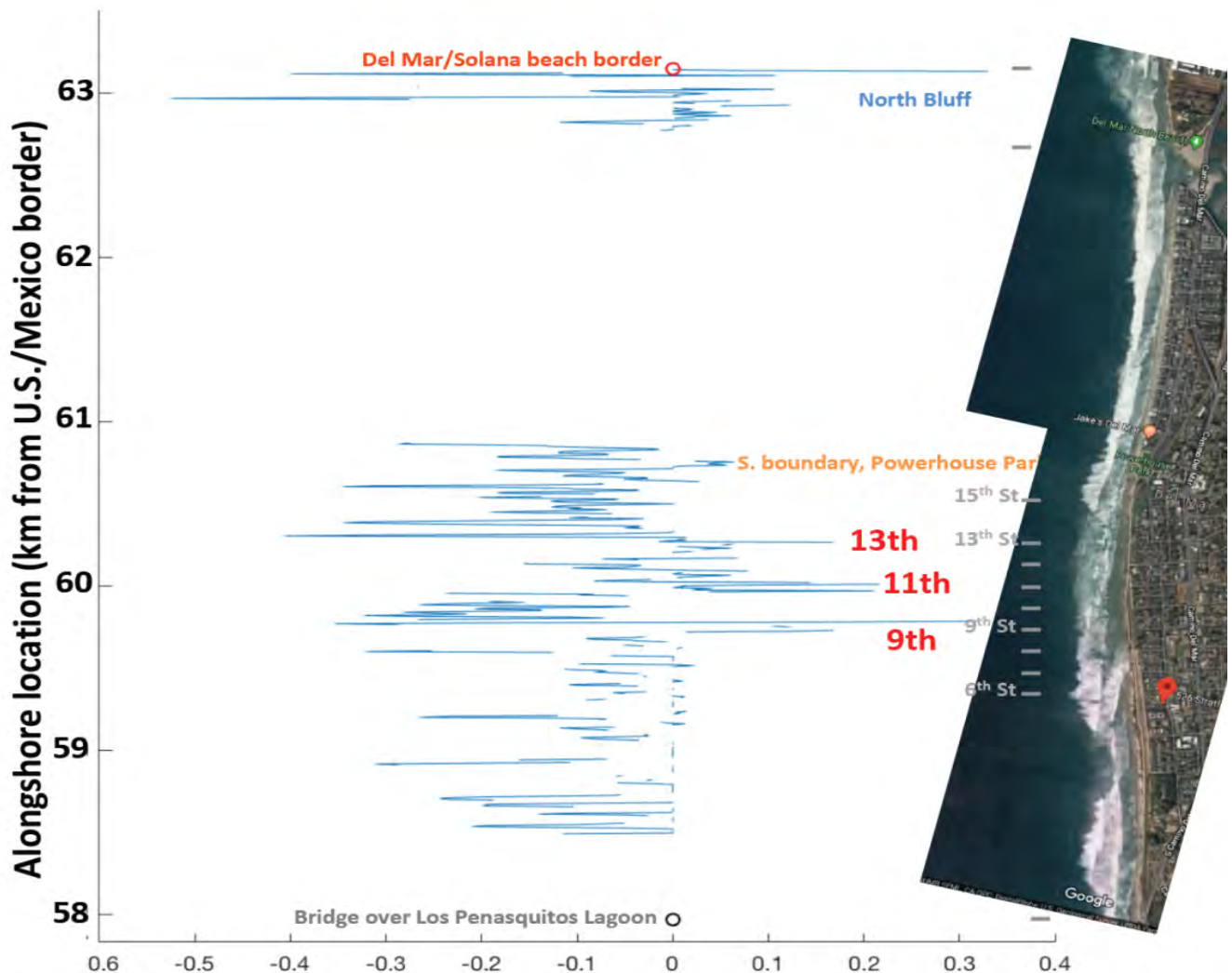
Reference: <https://scripps.ucsd.edu/news/scripps-receives-25-million-lead-new-coastal-cliff-research>

- **Excessive Seawall Engineering**

- Research at Scripps Institution of Oceanography (SIO), using LIDAR, has shown there are bluff regions that are more vulnerable than others along the Del Mar beach.
- SANDAG estimates of cliff erosion rates of six inches per year, are averages over the entire length of the bluff. They are not specific to those areas of the Del Mar Bluffs that are more or less susceptible to wave erosion.
- **SIO research used LIDAR sensors to measure bluff surface distances to mean high tide line. The measurements yielded a bluff steepening index all along Del Mar's shoreline. The index showed with accuracy and precision that west of 13th, 11th and 9th Streets the coastal Del Mar bluff was most vulnerable to wave erosion based on measurements made during 1998 to 2009 (Figure C-2).**
- The difference between average rate and punctuated erosion events must be explored before the wholesale construction of too many 8 to 10-foot seawalls that are not needed, will reduce sand deposition, and block beach access.
- To protect the environment and preserve the natural bluff and beach coastline contours, any engineered structures need to use temporary/removable erosion protection methods. Further, increased monitoring to detect railway threats can enable a phased plan, and thus postpone and avoid irreversible measures.
- These are complicated issues when important infrastructure is involved. Unfortunately these issues will only become more common as sea level rises.

Figure C-2. Localized Bluff Steepening Index Calculated from 1998-2009 Measurements Along Del Mar From North (top) to South (bottom).

Graph of bluff steepening data as reported in A. Young (2020) side by side with satellite Google map of Del Mar coastline. South of 15th St, many of the punctuated high-risk zones at 13th St, 11th St, and 9th St have had slides. This index based on data through 2009 was predictive. The index could be used in the current planning. These data show bluff retreat is punctuated and specific, with measurable prior risk, not averaged across broad ranges.

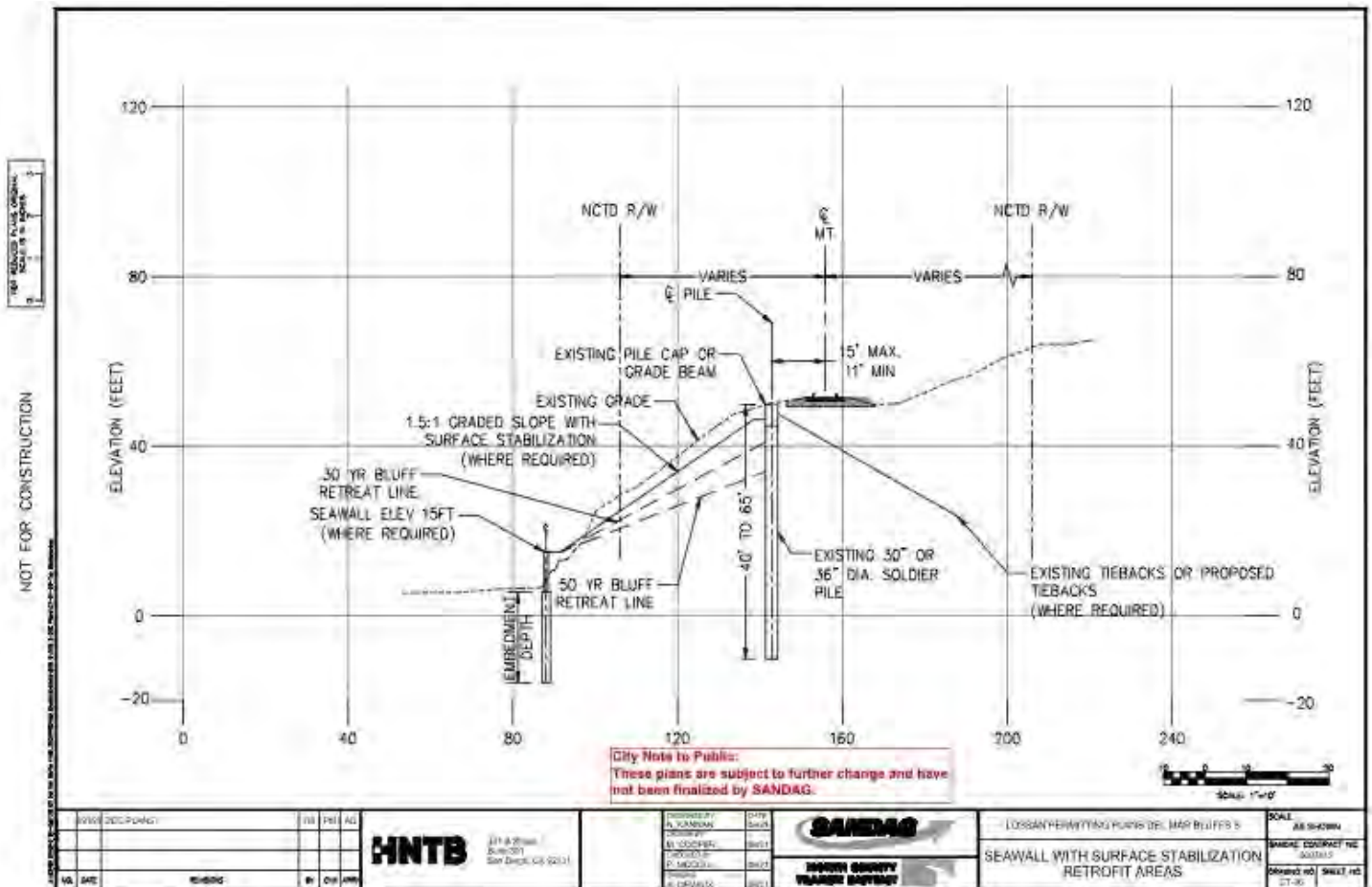


Reference: Young et al: Three years of weekly observations of coastal cliff erosion by waves and rainfall , November 2020
 Geomorphology 375(10):10754 [10.1016/j.geomorph.2020.107545](https://doi.org/10.1016/j.geomorph.2020.107545)

https://www.researchgate.net/publication/347224570_Three_years_of_weekly_observations_of_coastal_cliff_erosion_by_waves_and_rainfall

Figure C-3: SANDAG Draft Design for Seawalls, Typical East-West Slice, with in-fill and grading specifications (2021 design).

Design notes indicate 30-year and 50-year bluff retreat lines; NCTD right of way (R/W) line is ~two-thirds down the bluff face (~30-50 east-west linear feet from middle of track [MT]); soldier piles up to 65' deep; 10 to 15-foot high seawalls with embedment to -17 feet below sea level (0 feet on y-axis Elevation); graded slope with 1.5:1 ratio (horizontal:vertical ratio).



- **Questions about Draft Design for Seawalls (Figure C-3)**
 - What are the following metrics based on?
 - 30 year bluff retreat line
 - NCTD R/W midway down bluff face, ~30-50 feet west of soldier piles
 - 40-65 foot depth for soldier piles
 - What will be the impact on the bluff to drive in soldier piles that are as deep as the bluff?
 - How many 3-foot diameter soldier piles are planned and at what distance apart?
 - Have they calculated separate local bluff retreat projections at each engineering location? Bluff retreat is punctuated, not averaged over the entire bluff face.
 - What is the source to establish mean-tide-line (x-axis)?
 - What review will happen to assess consistency with shoreline protections in the City of Del Mar? This design violates private easements between 10th and 11th Streets and also the Shoreline Protection Act (SPA) line in Del Mar's zoning, certified by the Coastal Commission, which prohibits protective structures west of the middle of the tracks (MT).

- **Sand Deposition Impacts**

- Seawalls along natural coastal bluffs result in loss of sandy, recreational beaches. Armored bluffs in Solana Beach and Encinitas have shown beach loss over time.
- **How much sand nourishment will be lost due to continuous bluff-toe seawalls?** Appendix B of the City of Del Mar's Sea Level Rise Adaptation Plan provides an analysis of coastal processes and sand movement along the Del Mar shoreline and presented the following observation that must be followed up to inform this question: *In Del Mar, approximately 75% of sediments in the sea cliffs are large enough grain size to contribute to the beaches.*
- **Instead of seawalls, can soldier piles accomplish the goal of interim bluff stabilization with lesser environmental impact?** The Plan notes, [NCTD] *determined that installing soldier piles was the least environmentally damaging feasible alternative for an interim approach to track bed stabilization.*
- **How much will soldier piles increase instability by driving 36-inch diameter piles 50-60 feet down into the cliff?** How close will they be to each other?
- **Instead of seawalls or soldier piles, can other technologies be used?** Will they provide better protection? The Plan discusses Detached Breakwaters and Reefs, Groins, and Dunes as alternatives to protect against bluff erosion.
- During 2014-2018, the City of Del Mar studied impacts of sea level rise on the Del Mar Coastal Bluffs (Chapter 7, **SLR Coastal Adaptation Plan**, adopted by Council into the Community (General) Plan, October 1, 2018).¹ The Plan's Chapter 7 assessed the Del Mar Bluffs, built upon a Vulnerability and Risk Assessment², and provided the following summary observations about vulnerability:

Vulnerability assessment:

With 1-foot of sea-level rise, the current localized vulnerability of the LOSSAN railroad to bluff erosion will increase and extend along almost the entire southern bluffs. The railroad would need to be moved inland or other adaptation measures, for example with underpinnings, caissons, or soldier piles, would be required to reduce the risk of the railroad collapsing.

- If a seawall is constructed to protect the railroad, it will cause the beach to narrow and over time little to no beach will exist along the southern bluffs.
- Del Mar's Sea Level Rise Adaptation Plan recommends the following Bluff adaptation options: Beach nourishment and retention; Railroad relocation; Public infrastructure relocation

Sources:

1. <https://www.delmar.ca.us/DocumentCenter/View/3580/Revised-Adaptation-Plan-?bidId=>
2. <https://www.sandiego.gov/sites/default/files/sea-level-rise-vulnerability-assessment.pdf>

- **Biota: Flora and Fauna Impacts**

- The Del Mar Bluff is a 1.7 mile narrow stretch of non-human colonized land between the two protected lagoons of Los Penasquitos and San Dieguito. Many protected fauna and flora inhabit both of those lagoons and it is very likely that the bluff serves an important function to prevent loss of genetic diversity, a so-called migration corridor. To remove the bluff corridor can lead to genetic isolation for many species, which will limit their ability to adapt to changing environments, such as global warming, as a result of loss of genetic variability^{1,2}.
- **Endangered, threatened, of special concern, or to-watch** species of plants and animals that have been observed at or near the bluff include³⁻⁵:
 - **Plants:** Red Sand-Verbena, Short-Leaved Dudleya, Sea Dahlia, Coast Barrel Cactus, Western Dichondra
 - **Birds:** Coastal California gnatcatcher (non-migratory), Western snowy plover (migratory and non-migratory), Coastal cactus wren (non-migratory), Belding's savannah sparrow (non-migratory), Least Bell's vireo (neotropical migratory)
 - **Butterflies:** Wandering skipper
 - **Lizards:** Belding's orange-throated whiptail, California legless lizard, Coronado skink, Coast horned lizard
 - **Snakes:** Red diamond rattlesnake
- **Vernal Pools:** The Del Mar Bluff also contains Vernal Pools that are crucial for the survival of its inhabitants. Vernal Pools are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall. Plants and animals that thrive under these harsh conditions spend the dry season as seeds, eggs, or cysts, and then grow and reproduce when the ponds are again filled with water. More than 90% of California's vernal pools have already been lost⁶. It is important to protect the few remaining vernal pools as they provide habitat to some very rare plant and animal species. In addition, birds such as egrets, hawks and ospreys use vernal pools as a seasonal source of food and water. The vernal pools on the Del Mar Bluff are long and narrow along the eastern side of the bluff, commonly observed midway between 15th and Torrey Pines and have been observed to be used by frogs. To date, the frog species that depend on the vernal pools, for their survival and reproduction, have not been confirmed. They might be Tree Frogs, or also possibly be the endangered species Spade Foot Toad. Other endangered species that might use the vernal pools on Del Mar Bluff are Fairy Shrimp and California Tiger Salamanders since

they are native to Southern California and are dependent on vernal pools for their reproduction and survival. Frog species should be identified.

References, Sources:

1. Mark R Christie, and L Lacey Knowles (2015) Habitat corridors facilitate genetic resilience irrespective of species dispersal abilities or population sizes. *Evol Appl.*, 8(5): 454–463, doi: 10.1111/eva.12255
2. Harrison, R. L. (1992). Toward a Theory of Inter-Refuge Corridor Design. *Conservation Biology*, 6(2), 293–295. <http://www.jstor.org/stable/2386251>
3. <http://www.lospenasquitos.org/conservation/sensitive-species/>
4. <https://www.calflora.org/entry/observ.html>
5. <https://calscape.org/>
6. <https://www.epa.gov/wetlands/vernal-pools>
7. <http://www.californiaherps.com/frogs/pages/s.hammondii.html>
8. <https://databasin.org/maps/new/#datasets=443d192368f6409c949338014886c703>
9. https://www.fws.gov/sacramento/es_species/Accounts/Amphibians-Reptiles/ca_tiger_salamander/

○ **Biota: Bluff & Slopes**

Have complete species lists for flora and fauna on the Del Mar coastal bluff been reviewed?

- a. Do they include any sensitive or endangered natives?
- b. Where else in San Diego do these native species still exist in natural state?
- c. What species depend on the Del Mar Bluff as a corridor from lagoon to lagoon?

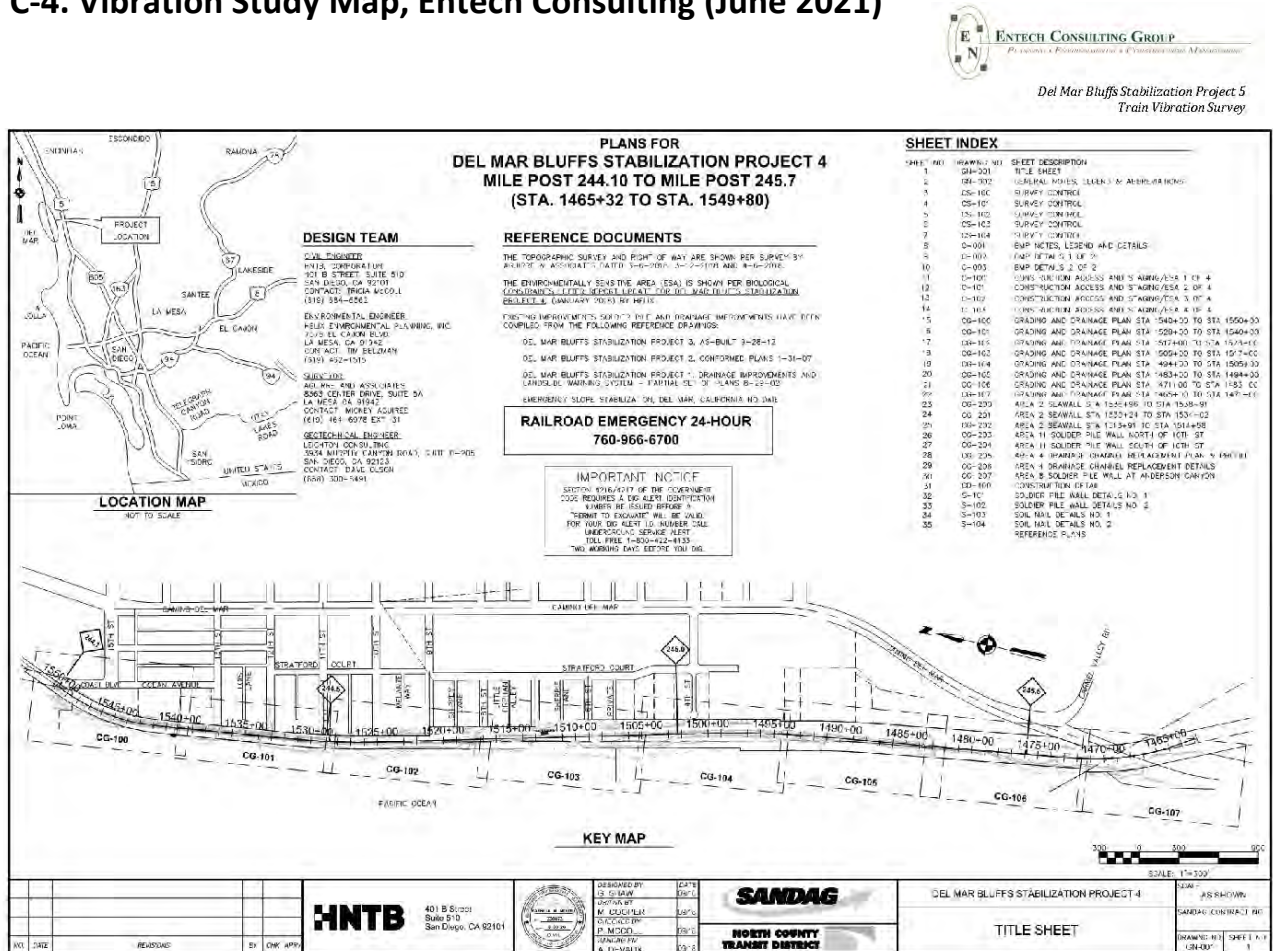
○ **Biota: Beach & Intertidal**

Have complete species lists for flora and fauna on the Del Mar beaches been reviewed?

- a. Do they include any sensitive or endangered natives?
- b. What will be the impacts on shorebirds due to loss of bluff face nesting areas?
- c. What will be the impacts on grunion runs at top of high tide along the bluffs? Grunion runs need a protected area without lights.
- d. What will be the impacts on nighttime fauna and flora? Because the main north beach in Del Mar has extensive lighting, the bluff beaches provide scant dark areas for species active at night.

Bottom Line: Without proper flora and fauna species identification, there is no clear picture of the bluff lifeforms, their surface and subsurface habitats, and their uniqueness.

Figure C-4. Vibration Study Map, Entech Consulting (June 2021)



• Vibration Impacts

- SANDAG's consultant Entech Consulting Group measured vibration east of the tracks on the upper east bluff in 3 locations in June 2021.
- The study measured vibration for only a 24-hour period in which two freight trains passed on the Bluff, and sampled in only 3 locations – an **insufficient sampling**.
- Figure C-4 shows the Vibration Study map and measurement locations.
- Measurements were at least 100 feet east of the tracks and at least 50 feet from the edge of the each upper bluff on top of surface streets.
- Data from the study showed 15 second intervals between measurements, too long a period to sample multiple times during the passing of a train.
- Data two of the three sampling points seemed to have duplicate values, indicating some sort of **measurement artifact or data processing error**.
- Entech did not measure vibration in the limestone of the Bluff west of the tracks.
- A person standing on the coastal Bluff or the upper east bluff when the train goes by will feel the Bluff vibrate.

VIBRATION QUESTIONS:

- **What are the effects of vibration from trains within the limestone Bluff over time?**
- **What will doubling the number of trains do to the effects of vibration?**
- **What will increasing the speed of the trains do to the effects of vibration?**
- **Should the trains run more slowly, not faster?**

- **Seismic Risk and Impacts**

- **Rose Canyon Fault:** Experts estimate that this active fault, located less than 2 miles offshore from Del Mar's Bluffs, is the greatest seismic threat to the region as it is capable of earthquakes of magnitude 6.9. In the 1800s, the fault previously generated 6.5 and 6.0 earthquakes that caused widespread coastal bluff slope failures (Griggs and Scholar 1997). According to the Earthquake Engineering Research Institute's recent scenario of a 6.9 earthquake, "tracks in Del Mar are potentially subject to earthquake-induced bluff failures. Service can be expected to be disrupted for weeks to months while tracks are repaired" (EERI San Diego Scenario 2020, p. 48).

- **Stability Impacts**

- **Assurances needed:** According to the Coastal Act's Section 30253, "new development shall assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs."
- **Fencing:** NCTD's proposed fencing project will drill over 1,000 post holes into the fragile sandstone bluff to create over 1,000 new avenues for water intrusion and add almost 300 tons of weight from cement and fencing on the most vulnerable bluff edges. **How does this contribute to erosion and geologic instability?**
- **Heavy Equipment:** SANDAG's project utilizes heavy construction equipment that can cause substantial ground borne vibration from pile drivers and large earthmoving equipment. **Given the many fissures on the bluff, how can SANDAG decapitate (or "shave") over 620,000 cubic feet (23,000 dump truck loads) from the top of the oceanfront bluffs between 8th and 11th St. without damaging them or causing more slides?**
- **Risk/Reward:** SANDAG's engineer stated there is only an expected 10% reduction in bluff slide risk which is a very low risk/reward payoff given the high probability of failure and permanent damage to the long-term stability of the bluffs and train tracks.

- **Double-Tracking:** SANDAG acknowledges that vibrations from increased train traffic along rail ways from the “double-tracking of the LOSSAN railway corridor may also cause or exacerbate soil erosion along coastal bluffs.” (current draft EIR for the 2021 Regional Plan). Will this create more stress on the fragile bluffs lining both sides of the train tracks? Is this what is contributing to the increasing frequency of large slides that now total 9 in the last 3 years, including the most recent on Oct. 29, 2021?
- **Permanent Alteration of Natural Land Forms**
 - **Scenic and Visual Resources:** According to the California Coastal Act Section 30251, “the scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.”

APPENDIX D: Summary of Citizens' Petition

The following text from the one-page summary of the Citizens Petition to the California Coastal Commission summarizes the overall situation:

For over 100 years, the public has used the trails on the iconic Del Mar bluffs ("Bluffs"). Despite decades of dangerous bluff collapses, SANDAG and NCTD have failed to take action to relocate the train tracks installed in 1910. SANDAG has finally commenced efforts to relocate the tracks by seeking alternative, inland train routes. In the meantime, NCTD and SANDAG propose to stabilize the Bluffs by grading the Blufftop, erecting concrete structures in the Bluff and making other changes, many irreversible.

Even though the fragile sandstone bluffs are fast eroding, NCTD plans to further destabilize the Bluffs by erecting nearly two miles of six foot chain link fencing along the Bluffs.

This fencing project will require extensive drilling of postholes, to be filled with cement to support the fence. The holes will create more than 1,500 new sources of water intrusion and add 317 tons of weight which accelerates erosion of the already stressed Bluff edges. While NCTD claims extensive two-mile fencing is required to avoid "trespassers," NCTD's data shows that all pedestrian and vehicle accidents occur at or within a third of a mile of the crossing at Coast Blvd and that extensive fencing is unnecessary in addition to destabilizing.

The Petition urges the Coastal Commission to obtain a firm commitment from SANDAG and NCTD to relocate the tracks within a specific time frame--within 10 years--to ensure that alteration of the Bluffs be the minimum necessary to ensure safety until relocation; and to reject NCTD's proposed fencing plans and avoid further damage to and erosion of the Bluffs through limited, targeted fencing near the Coast Blvd crossing.

Ultimately, it is the Coastal Commission that has the statutory mandate and singular mission and to whom the citizens of California look, to protect our precious coast, in this case specifically the Del Mar Bluffs. SANDAG and NCTD have no similar mandate but rather are beholden to railroad and commerce interests. Certainly, a balance of interests is in order, but SANDAG's and NCTD's plans, which they insist are meant to address a "temporary" problem, will inflict permanent damage and place the interests of commerce far ahead of environmental interests and those of citizen's rights as mandated to the Coastal Commission. This paper asks that the Coastal Commission test SANDAG and NCTD assurances with just some of the scientific questions that need to be asked by the Coastal Commission's scientists.

Link to full Petition available via <https://delmarbluff.com/one-page-summary-of-citizens-petition>

Appendix E: EIR Regulatory Requirements

California Requirements:

- The California Environmental Quality Act – CEQA
 - CEQA requires public agencies to “look before they leap” and consider the environmental consequences of their discretionary actions. CEQA is intended to inform government decision makers and the public about the potential environmental effects of proposed activities and to prevent significant, avoidable environmental damage.

Source: CEQA- The California Environmental Quality Act: <https://opr.ca.gov/ceqa/>
- The California Coastal Act
 - Elements of the bluff stabilization project do not meet the following requirements of the Coastal Act in PEIR 4.1:
 - Under the California Coastal Act of 1976 (Public Resources Code Sections 30000 et seq.), scenic and visual qualities of coastal areas are considered and protected as a visual resource. One of the primary objectives of the Coastal Act is the protection of scenic and visual resources, particularly as viewed from public places. Section 30251 requires that development be sited and designed to protect views to and along the ocean and other scenic coastal areas. New development must minimize the alteration of natural landforms. This policy also requires that development is sited and designed to be visually compatible with the character of surrounding areas. Where feasible, development must include measures to restore and enhance visual quality in visually degraded areas.
 - LOCAL LAWS, REGULATIONS, PLANS, AND PO

https://sdforward.com/docs/default-source/2021-regional-plan-draft-eir/4-1-aesthetics-and-visual-resources.pdf?sfvrsn=210ffd65_2
 - County of San Diego EIR Requirements
<https://www.sandiegocounty.gov/content/dam/sdc/pds/docs/EIR-Format.pdf>

Appendix F: Credits

Authors:	Payson R. Stevens & Terry Gaasterland
Text Research/ Content:	Biota: Camilla Rang; Seismic & Landforms: Laura DeMarco
Text Comments:	Drew Cady, John Stahl, Shirli Weiss
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Satellite views:	Google Earth Pro
Design:	CorePR.com

Short Biographies

Payson R. Stevens

His multi-faceted career reflects two passions: earth science/environmental protection and art in multiple media (painting, experimental video, photography, writing). Payson did PhD studies at Scripps Institution of Oceanography mentored by the renowned scientist, Roger Revelle. He was instrumental in helping to stop oil development off the coast of San Diego and Orange County organizing and preparing the science assessment and critique of the EIR of Lease Sale 48 (1978). The two companies he founded, InterNetwork, Inc. and InterNetwork Media, Inc. consulted with NASA, NOAA, and the USGS on global change/climate issues (Earth System Science, Mission to Planet Earth/1980-2000). Both companies were pioneers at the beginning of the digital age and received many awards for cutting-edge work (Presidential Design Award for Excellence from Bill Clinton/1994, USGS John Wesley Powell Award/1992). Stevens is the co-author of the acclaimed, *Embracing Earth: New Views of Our Changing Planet* (1992) and contributing author to the best-selling college textbooks (*Biology Today* /1971), *Geology Today*/1973). His public speaking includes TED 2 & 3, CNN, Robert Redford's Greenhouse/Glasnost, Apple Developers Conference. He lives half the year with his wife, the writer Kamla K. Kapur (www.kamlakkapur.com), in a remote area of the Indian Himalayas where he is involved with nature conservation and rural community work. His India projects included: advisor to the Great Himalayan National Park/GHNP (2000-15); co-founder of Friends of GHNP (2000-present), successfully spearheading GHNP's Inscription as a UNESCO World Heritage Site (2014); co-founder of My Himachal (2006-12) which focused on rural healthcare and nutrition. His projects can be seen at www.paysonrstevens.com

Terry Gaasterland, PhD

Terry directs the Bioinformatics & Systems Biology Graduate Program at the University of California, San Diego, with tenure, and is a member of the faculty of the Scripps Institution of Oceanography. She earned her Bachelor Degree in Computer Science and Slavic Studies at Duke University, with study overseas at Oxford University's New College, and then completed a PhD in Computer Science. At the Department of Energy, then as faculty at the University of Chicago, The Rockefeller University, and now UCSD, she has sought to apply AI technologies to study and solve problems in biological systems and genomics, including genetic/genomics response to climate change stresses. In 2018, Terry was elected to the Del Mar City Council. In her active dual career as a scientist and as a local elected official, she strives to bring science and policy together to address problems at the local political level with particular emphasis on challenges facing California's coastal cities and jurisdictions. She chaired Del Mar's Sea Level Rise Technical Advisory Committee (2014-2018). Under her leadership, Del Mar's Sea Level Rise Adaptation Plan was developed to address vulnerabilities and protect against beach loss, and adopted into the Community (General) Plan. *TG's contributions to this Report reflect her own views and do not speak for the City.*

Camilla Rang, PhD

Camilla is a senior researcher at the department of Ecology, Behavior and Evolution (EBE) at the University of California, San Diego (UCSD). Her research focuses on the evolution and origin of aging in single cells organisms. She earned her PhD from Göteborg University, Sweden, studying the impact of microbiome on single cell bacteria in the intestine, and her post doc from the Center of Vaccine Development, University of Maryland, Baltimore. When joining UCSD 23 years ago, Camilla and her family settled in Del Mar, where she since has been an active and involved resident.

Laura DeMarco

Laura is a 34-year Del Mar resident and experienced fiduciary and investment management executive. As a senior partner, she contributed to the successful launch and development of two investment firms, including a global asset manager which grew to over \$40B in assets under management. Laura uses her research and analytical skills to serve on investment committees and advise large public and corporate pension funds, insurance companies, financial institutions, endowments, foundations, Taft-Hartley plans and their investment consultants. She graduated from the University of San Diego and has over 30 years of institutional investment experience.

John Stanley, PE

John is a Del Mar Heights resident and licensed professional engineer with over 25 years of experience. A major area of his expertise is evaluating materials, stresses, and operational stability of machinery and aircraft in his role with the Department of Defense and as a design and engineering consultant. He is also a private pilot who has built experimental aircraft. Stanley earned his degree in mechanical engineering from San Diego State University.

Computer Visual Simulations © 2021, Payson R Stevens

Google Earth attribution:

Google Earth Pro 7.3.4.8248, (2021) Del Mar Bluffs at 7th St. 32°57'2.40"N, 117°15'56.31"W, elevation between 8'-79' above sea level. 3D Buildings, Terrain, Borders and Labels data layers. Data SIO, NOAA, U.S. Navy, GEBCO. [Online] Available at <https://www.google.com/earth/versions/> [Accessed 27 October 2021]

Visualization Coordinates

Ex Seawall 2.3 32°57'2.40"N, 117°15'56.31"W

Ex Seawall 2.2 32°57'18.06"N 117°16'2.26"W

Ex Seawall 2.1 32°57'25.19"N 117°16'3.86"W

Seawall 32°57'29.65"N 117°16'4.91"W

Visualization Notes:

Fig 2: Depicted Seawalls are 3 Meters above ground (9.84') which does not take sand into consideration and should be considered a rough approximation. Due to limitations of software the altitude of the wall can only be adjusted in 1 Meter (3.28') increments. 2 Meters (6.56'), while technically the closest to 8'; seemed too low visually as the bottom portion of the wall does "sink" or "clip" into the ground in the 3D model.

Natural Coastal Bluff Top Trail For All To Enjoy

(photo, Karl Willert)



***Protect, preserve, and respect
the Del Mar Bluffs and Beaches
now and forever.***