



CITY OF CARMEL-BY-THE-SEA

Hazard and Asset Summary Sheet for the Beach, Bluff, Coastal Armoring, Public Infrastructure, and Private Property

January 21, 2021

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| TO: | Climate Committee Members |
| SUBMITTED BY: | Scott Lonergan, Committee Member |

SUMMARY

Asset: Beach, Bluff, Coastal Armoring, Public Infrastructure, and Private Property

Hazards: Sea Level Rise, Stronger Storms and Waves, More Variable Rainfall

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General Comments and Outlook:

- It is not widely understood that the climate change threat to coastal infrastructure, private property, the beach, along with the associated impacts on tourism and Carmel's economy, is so substantial, and that the potential solutions so complex.
- Nearly the entire coastline south of Ocean Avenue has been armored by a combination of seawalls, vertical or stepped retaining walls, or engineered rock revetments. Secondary impacts to the use of armoring often includes escalating maintenance costs, and the loss of beach, aesthetics, and ecology.
- Coastal erosion and storm events already pose a threat, and climate change driven sea level rise and storm intensity will dramatically increase that threat.
- Longer term, the degree to which the City should, or can, forestall the natural processes driven by climate change is not understood.

Identified Issues:

- The frequency and duration of beach inundation and wave attack on armoring and natural barriers is increasing. The impacts of armoring on beach sand loss, as well as the seasonal migration of sand on and off shore, has not be investigated.
- The natural erosion processes along the mostly unarmored North Dunes area will accelerate bluff retreat and create space for the beach to migrate inland, while at the same time reducing dune habitat and recreation above.
- Seawall integrity is being compromised by ongoing erosion of the relatively soft sandstone base of some seawalls. Equipment access to areas on the beach required for completing repairs and maintenance is increasingly limited.
- Public infrastructure at risk including beach access stairways, bathrooms, armoring, Scenic Road, Ocean Avenue beach parking, and some utilities.
- Private property at risk including that along Scenic Road and adjacent to North Dunes.
- The need to educate the community about the climate change threat to coastal infrastructure, private property, the beach, and the associated impacts on tourism and Carmel's economy, along with the potential solutions.

Remaining Issues to be Understood (in Preparation for the Committee's Final Report):

- Engagement of a coastal engineer with experience in planning for climate change in an LCP context.
 - Further assessment of the risks to our coastal assets.
 - Determine adaptation measures and LCP policy options. Draft updated or new LCP for certification with the Coastal Commission.

- Prioritize adaptations and projects that protect and maintain public resources and beach access, and the viability of the community and tourism.
 - Coordinate with regional partners (e.g. County, Pebble Beach) and align with the Coastal Commission on acceptable plans.
 - Determine how the options and strategies are different along the 1) mostly natural, unarmored North Dunes, 2) armored bluffs adjacent to Scenic Avenue, and 3) bluffs and dunes adjacent to private lands on either side of North Dunes.
 - Evaluate feasibility and phasing, including the use of thresholds for when different elements of these strategies are implemented. For example, maintaining armory or other defenses up to a point, but then if a threshold is reached, embracing a new bluff line and different adaptive measure.
 - Consider legal liabilities, coastal armoring and building regulations, real estate disclosures, and fiscal impacts.
- Community-wide outreach and education, including that focused on exposed property owners.
 - Review, and if appropriate apply for, funding opportunities for pre-disaster planning and mitigation (The State is about to award \$8M funding for coast resiliency planning and projects, and additional funding will be available next year).
 - Position for requesting FEMA disaster relief post-disaster.
 - Consider use of the USGS Coastal Storm Modeling System (CoSMoS).
 - Reach out to NPS coastal physical oceanographer, Dr. Mara Orescanin, or other experts that might be willing to offer expertise and guidance.

Possible Actions to be Recommended in the Committee’s Final Report

- Update the CBTS Shoreline Management Plan and the General Plan / LUP.
- Proactive sourcing or contracting for repair resources prior to episodic events.

REFERENCES

- Coastal Resource Management Element of the Carmel-by-the-Sea General Plan: <https://ci.carmel.ca.us/post/general-plan>
- Carmel-by-the-Sea / Shoreline Management Plan: <https://ci.carmel.ca.us/post/additional-forestry-division-resources>
- David Shonman and Greg D’Ambrosio 19-Nov-2020 Climate Change Committee presentation slides: [https://ci.carmel.ca.us/sites/main/files/file-attachments/shonman - ccc presentation - final nov 19 2020.pdf?1605903015](https://ci.carmel.ca.us/sites/main/files/file-attachments/shonman_-_ccc_presentation_-_final_nov_19_2020.pdf?1605903015)
- USGS representative, Andrea O’Neill, 17-Dec-2020 Climate Change Committee presentation video: <https://carmel.novusagenda.com/agendapublic/MeetingView.aspx?MeetingID=922&MinutesMeetingID=510&doctype=Agenda>
- California Coastal Commission and Local Government Public Workshop on 17-Dec-2020 to discuss sea level rise planning in an LCP context: <https://documents.coastal.ca.gov/reports/2020/12/SM-Th3/th3-12-2020-report.pdf>

History

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