

Coastal Hazard Adaptation Concept Planning - Ocean Beach

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Impacts from **climate change, coastal erosion, rising sea levels and extreme sea level events** coupled with increasing population demands and environmental pressures on coastal environments prompts the need for development and implementation of site concept planning that links adaptation and mitigation strategies.



Coastal hazard risk management and adaptation planning is an integral part of **decision-making for sustainable development** and land use in the coastal zone.

The *State Coastal Planning Policy 2.6: State Coastal Planning Policy*, supports a risk-management approach and provides a framework for undertaking coastal hazard risk management and adaptation planning for coastal hazards in Western Australia.

Focus is on coastal areas with current erosion trend, narrow foreshore reserves, low relief, inadequate coastal protection works – to assess distance required for buildings & structure placement to absorb erosion from ESL's, erosion and accretion.

CASE STUDY: Ocean Beach is Denmark's primary beach, popular with locals and tourists, used all year round, with a very active community Surf Life Saving Club.

Activities include swimming, surfing, boating & fishing with associated surf club, kiosk, public amenities, angling club, and boat ramp facilities.



Coastal Erosion Hotspot - CHRMAP



Ocean Beach was identified as one of 55 Coastal Erosion Hotspots *Assessment of Coastal Hotspots in WA* (2019) prepared by Seashore Engineering



Ocean Beach and Peaceful Bay Coastal Hazard Risk Management and Adaptation Plan (2018)

- Identification & assessment of **coastal hazards**
- Establishing the context of **coastal asset values** and community expectations
- **Risk assessment** of the potential impact of coastal hazards upon coastal assets
- **Adaptation planning** for both short term (ten year) and long term (100 year) planning horizons

10 Year Adaptation Planning

- Beach monitoring – baseline beach & cliff surveys/photos annual and 5-yearly
- Inspections – annual engineering inspections of coastal assets (buildings, stairs, retaining walls, jetties)
- Installation of tide board to monitor inundation over road at PRC
- Geotechnical inspections of limestone cliff stability at OB lookout, with planning & construction of new access stairs.

100 Year Adaptation Planning

Options range from:

- Avoid new development in potentially effected areas
- Managed Retreat (eg. relocate assets - buildings, stairs - back from shoreline)
- Accommodation (eg. redesign structures)
- Protection (eg. retaining sea wall)

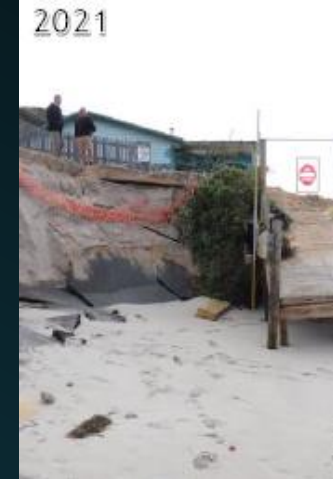
Table 6.1 Ocean Beach Longer Term Coastal Adaptation

| Coastal Asset | Planning Horizon (years) | | | | | | | | | | |
|--|--------------------------|---------------------------|-----------------|----|----|---------|----|----|----|----|-----|
| | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Prawn Rock Channel: Ocean Beach Road and footpath along channel, including wooden bridge | Accommodate* | | | | | Protect | | | | | |
| Ocean Beach: Carpark and Lookout | Monitor | Managed Retreat | | | | | | | | | |
| Ocean Beach: SLSC and Sea Rescue Buildings (incl. toilets, change rooms etc.) | Monitor / Protect | Managed Retreat / Protect | | | | | | | | | |
| Ocean Beach: Coastal stairs and platforms | Accommodate | | Managed Retreat | | | | | | | | |

Coastal Erosion impacts at Ocean Beach

Extensive damage caused to coastal infrastructure at Ocean Beach from severe erosion in winter 2021 due to:

- Extreme rain events
- Early southern opening of Wilson Inlet with elevated inlet water level creating a deep channel in front of SLSC allowing greater exposure to wave energy
- Persistent high swells during July 2021
- High tides and associated storm surge, causing waves to erode the foredunes

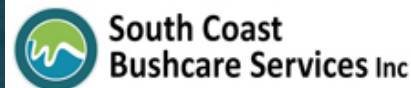


Extent of damage caused by coastal erosion considered as severe as any site inspected in past 20 years.

Complicating Factors

Concept plans for Ocean Beach are developed in conjunction with CHRMAP to reflect the community's aspirations for future development and land use, balanced with the need for coastal hazard adaptation.

- Multiple stakeholders
- Conflicting user groups
- Historic sentimentality with existing infrastructure
- Funding constraints – multiple sources (BBRF, Lotterywest, Sport & Rec grants, Council)
- Difficult to attract federal funding as small population small Shire
- Challenges include a high number of assets
- Whole of precinct planning- multi-million dollar project
- Complex ecosystem – erosion OB inundation in PRC area, inlet and tidal impacts



Government of Western Australia
Department of Water and Environmental Regulation

Ocean Beach Adaptation Planning

Adaptation as defined in SPCP2.6 "Adaptation is the means for maximising the gains and minimising the losses associated with coastal hazards over the planning timeframe."

Short Term Response: Restrict access to public, remove stairs, reinforce retaining wall, establish rock batters

Medium Term Response: Refurbish retaining wall, relocate and reinstate stairs/ramps, relocate sand from adjacent beaches to reinstate foredunes

Long Term Response: Review OB concept Master Plan to ensure DSLSC and structures in context of Coastal Adaptation Hierarchy.

AVOID: demolish existing boatshed and kiosk and do not build any more structures in the high risk zone

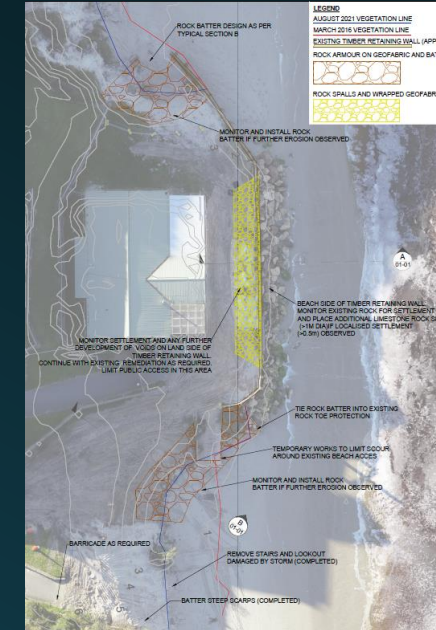
MANAGED RETREAT: public realm, remove and relocate the asset (refurbish surf club building to incorporate boat shed, patrol room, kiosk)

ACCOMMODATE: build access stairs in deep piles to allow for erosion

PROTECT: granite sea wall and/or sand nourishment to provide beach access



Coastal Adaptation Hierarchy



Protective granite sea wall

Constant re-scoping project



Timber retaining wall, and rock scour protection



Review influence of bar opening regime on coastal erosion.