Pathway 1:
Sea level rises and retreat early

This pathway allows maximum freedom for natural coastal processes to unfold with a minimum of intervention or resistance from existing or new development or erosion and flood protection works. Where erosion threatens structures with failure in the short term, they would be removed if they cannot resist the hazard[1]. Little if any new (re)development would be allowed in hazard areas, and certainly no intensification of existing areas (eg further subdividing existing residential blocks).

Property owners would be allowed to take action that extends the life of their existing structures by making it resistant to erosion (underpin foundations), but only within their own property boundary and as long as it has no impact on adjacent areas. Filling and raising land would generally not be allowed, nor would hardening shorelines with rocks or concrete or even dune or beach nourishment.

1 Where property is regularly inundated, it would eventually not be worth repairing and the property would be abandoned. This is unlikely in the study area for sea level rise of up to 0.8m

How might things proceed with this pathway?

With this pathway, erosion is expected to become progressive, with some cycles of sediment/dune rebuilding but a long term recession of perhaps 23 to 49 metres from the current High Water Mark by 2050 and 50 to 83 metres by 2100. With property removed as erosion proceeds, the beach would be allowed to retain form further shoreward, maintaining amenity.

A total of 47 properties, including 38 dwellings, may be at risk of erosion at present day if an extreme event was to occur. These properties are worth $50 million. These properties are mostly along Nutgrove Beach and the foreshore around Blinking Billy Point. Most of the built structures on properties are away from the coastline and therefore probably not presently at risk but valued land would be lost. With active vegetation management, the susceptibility to erosion may be reduced and shoreline regression slowed down.

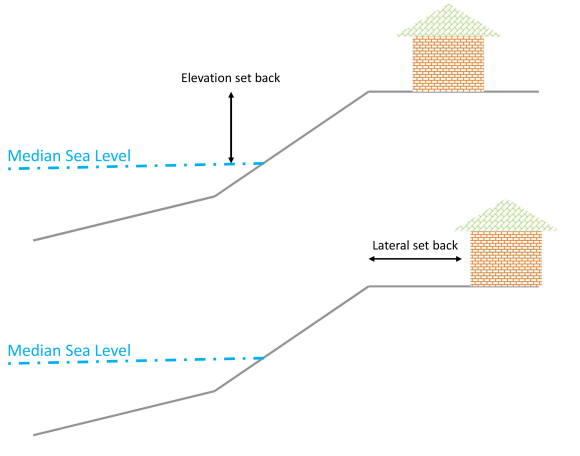
Nonetheless, those properties most at risk today may be required to start retreating before 2050. This is the case along Nutgrove Beach and Blinking Billy Point where most residential uses are located within the hazard bands. Long Beach and Sandy Bay Point will remain fairly protected due to existing foreshore protection, and these areas are not expected to actively retreat until the sea wall fails, probably well after 2100.

Inundation as a result of an extreme storm event would primarily be due to rainfall and stormwater drainage issues, and may result in some localised flooding with depths of below floor level and little if any damage. Flood risks increase little over the projected timeframe and mostly affect properties that would already have been affected by erosion.

With the sea level rising, low lying areas may increasingly experience issues of rising water tables and salinization, and stormwater drainage especially after extreme rainfall events. This may become an issue at the recreation grounds along Long Beach. Over time, vegetation may change due to the increased salinity levels in the soil combined with the effects of other climate factors.

Likely options for this pathway

Major works and modifications to the landscape would not be permitted under this scenario. Most work would be involved in vegetation management, selective retreat and reconfiguring infrastructure to remain serviceable.



Elevation set back (top) to cope with coastal flooding and lateral set back (bottom) to cope with coastal erosions

Retreat

Vegetation management

Indicative costing of options under pathway 1

The table below shows the indicative costs of the various options under this pathway. It shows how options and costs play out over time. The most significant cost would be the loss of prime residential and other land as a result of retreat (in the area of $25 million). Other options, for which the costs are uncertain, include vegetation management, maintenance and periodic repair of the seawall and the fact that infill development would no longer be allowed, which could result in an opportunity cost for some properties.

TABLE 1: INDICATIVE COSTING OF OPTIONS UNDER PATHWAY 1 ($ MILLION)

Option	Cost or applicable At present day	To 2050	To 2100	Past 2100	Present day to 2100
Maintain sea wall	√	√	√	√	√
Minimal/No subdivision	√	√	√	√	√
Protection individual assets	-$0.80	-$1.40	-$1.40	√	-$3.60
Redevelop less vulnerable					
Retreat		-$13.90	-$11.20	√	-$25.10
Vegetation management	√	√			√
TOTAL	-$0.80	-$15.30	-$12.60		-$28.70

Source: SGS (2014)

Other implications and costs (in addition to the cost table)

- Flood/erosion direct and indirect damage expenses (private and public property). The amount depends upon level of reinvestment/maintenance of property in hazard areas, degree of investment in protection, effectiveness of warnings and community response
- Land value lost to current owners
- A gain in community value of some additional open space/wetlands, but this partly just replaces areas lost to open water
- Emergency services expenditure (limited if residents leave before major event- unlikely; higher if leave after major event, but depending on effectiveness of emergency planning)
- Some other infrastructure reconfiguration
- Impact on population, commercial and social services available unless replaced with development on higher land
- Psychological impact of 'decline' of a coastal community

Things to think about and explore

What are the positives? The negatives? What does the overall balance feel like? Is it 'desirable'?

Is it a plausible scenario? Can I imagine this actually happening? Is it likely to happen? If not, why not?

Could it be made to happen and if so, what would be required? Would that be desirable or acceptable?

How might things develop differently if:

- Sea levels don't rise? Rise faster? It becomes stormier and erosion increases? Erosion stops by itself? (the experts just got it wrong!)
- Capital improved value fall independent of the course of action being chosen (ie in general or at least all coastal, not just locally eg sea becomes smelly from acidification; the economy crashes)?
- Capital improved value rise strongly? (coastal risks perceived as manageable, large population increase)
- A major storm hits and takes out part of a main access road with no alternative in place.
- Some major technology trend or innovation?

How would it happen:

- Who decides and who pays? Why those in particular?\How critical is it that these particular organisations/ individuals decide and or pay?
- How might this arrangement be established?
- How could this process fail? (eg disagreements, unwilling/unable to pay).
- What happens if this process fails – how would things 'fall apart' and who suffers?

After exploring this pathway, do you think this is a realistic option for Nutgrove-Long Beach?