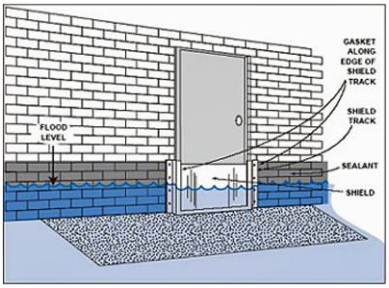
Paekākāriki Adaptation Area: Short list of possible actions for each adaptation option

Status Quo		**1. Status Quo** *Continue maintaining existing structures, dunes and infrastructure under the current management regime (i.e. reactive repair, private maintenance).* *Privately maintained structures that are consented within existing property boundaries continue to be managed privately to protect property as uncoordinated approach under existing planning framework.* *Planned works in the LTP to improve coastal resilience (e.g. Paekākāriki Seawall) to continue to go-ahead.*
Enhance		**2. Enhance existing erosion protection structures (e.g. seawalls)** *Adding material to existing structures (e.g. sea walls) to increase resilience. This could include adding height to the top of the structure, as well as material to the toe to reduce toe scour and resulting failure.* *Where structures are piecemeal and privately managed, enable private owners to increase the resilience of their structures through the planning framework. This would continue to be an uncoordinated approach (in terms of structure design).* *Where there is a publicly maintained structure this could include upgrades to a specified standard to increase resilience along a larger length of shoreline.*
		**3. Enhance Existing Inundation Protection** *Increase resilience of existing flood protection infrastructure. Incorporate sea level rise and higher intensity events into the design of existing stormwater management infrastructure when it is being upgraded.*
		**4. Education and Emergency Management** *Increasing community understanding and awareness of the hazard, continue emergency management, and increase environmental monitoring of the hazard and responses*.

		**5. Dune and/or Wetland Resilience** *Increase dune enhancement by building wind trap fences, vegetation planting, and managing access across the dune through creating walkways and vehicle access. Manage coastal wetlands and riparian planting.*
Accommodate		**6. Floodproof buildings and infrastructure** *Wet proofing – allowing water to enter the structure but minimising the structural damage through using flood resistant materials or elevating structures.* *Dry proofing – making buildings water-tight so that water cannot enter.*
		**7. Adaptable and Relocatable Buildings** *New builds can be relocatable to move away from the hazard, which can lower the cost of retreating in the longer term.*
		**8. Elevate floor levels of buildings** *Raising the floor levels of existing properties which are at risk from inundation.*
Retreat		**9. Retreat** *Proactively moving properties or infrastructure away from the hazard. This could be done through land acquisitions, buy outs, land swaps, lease backs, or future interests.*

		**10. Re-establish the line with a setback protection structure** *Retreating the minimum number of properties possible and re-establishing the shoreline landward of the existing shoreline with a protection structure (e.g. stepped, vertical or revetment type). This is a hybrid approach of retreat and hard engineering.*
Protect – Soft Engineering		**11. Beach Renourishment (soft engineering)** *Adding sediment to the beach system, either onshore or in the nearshore.*
		**12. Dune reconstruction (soft engineering)** *Redistribution of sediment across a beach profile to increase the dune/crest elevation on the beach. This can sometimes require additional sand it be brought into the system to help build up volume if there is not enough sand locally available. The new dune can be replanted to help build resilience and encourage further growth of the dune.*
Protect – Hard Engineering		**13. Sea walls (Hard engineering)** *New or replacement vertical, buried, or sloping (i.e. rock revetment) sea walls which prevent the passing of water and sediment between the hinterland and the sea. Material could include concrete, rock, gabion baskets, or timber. This would be a coordinated design approach along a long length of shoreline.*
		**14. Stopbanks (Hard engineering)** *Engineered stopbanks (earth bunds) along the settlement or river to prevent flood water from enter into the settlement***.**
		**15. Pump stations** *Pump Stations and infrastructure to pump water away from an area and back out to the water source.*

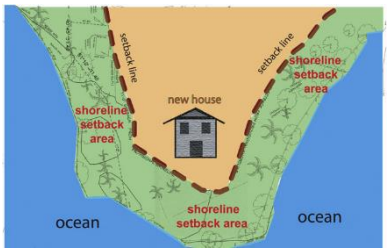
		**16. Earth bunds** *Continuous elongated structure designed to protect low-lying areas from inundation. Bunds are similar physical structures when compared to stopbanks and serve a similar purpose to reduce flood risk but are typically smaller and less engineered than a stopbank. They can be quickly built and generally use local materials, and only involve minor foundation preparations.*
Avoid		**17. Zoning and Setback controls** *Limiting future land uses in areas exposed to hazards to reduce or avoid increasing the future hazard risks in these areas.*
		**18. Trigger-based or time limited land use controls** *Including conditions on consents linked to hazards such as sea level rise, flood depths, or erosion rates that create a finite term for a particular land use.*
		**19. Building design** *Planning provisions in place for potentially susceptible areas to ensure floor levels are above design flood levels for new builds. Can also include planning provisions on the need for relocatable buildings.*
		**20. Reducing further intensification or development** *Planning restrictions to reduce further development or intensification within existing settlements that are likely to be affected by hazards in the future.*

Image Sources:

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