Option	Description	Standard of Protection			Technical		Economic		Environment		Social		Political		Legal		Total	Summary of long list
					Technical performance and adaptability	Buildability	Capital cost	Maintenance and monitoring	Ecology and environment	NFM and RBMP	Landscape and Heritage	Tourism	Strategic alignment	Stakeholder views	Waste management and contamination	Regulatory consenting and approvals	Short list options in green	Key reason for shortlisting / discounting
		Short-term Present day to 2030	**Mid-term** Present day to 2070	**Long-term** Present day to 2118	**Aims:** Provides desired standard of protection throughout the design life of the scheme or is easily adaptable to allow for modifications	**Aims:** Safe to construct, local sources of approriate material for construction, suitable ground conditions and would not conflict with existing services.	**Aims:** Low capital cost.	**Aims:** Minimal ongoing maintenance and/or moitoring requirements and costs.	**Aims:** No environmental impact on local habitats, geology and ecology, including local designations.	**Aims:** Works with nature to provide natural protection and does not downgrade the existing classifications	**Aims:** Works with the existing landscape and is sensitive to listed buildings and heritage designations.	**Aims:** Maintains access to beaches, considers local views and provides connectivity	**Aims:** Aligns with local strategies.	**Aims:** Supported by stakeholders and the local community.	**Aims:** Minimal waste disposal requirements or contamination risks.	**Aims:** Regulatory framework would be readily achievable.		
	INNER HARBOUR																	
3	**Small rock armour revetment**				1	3	3	4	3	2	3	3	3	3	3	4	35	
	Rock armour could be installed at the base of the existing sea wall to increase flood protection performance. As this solution does not increase the height of the defence it is only viable in the short to mid-term without the full effects of sea level rise. The rock armour would encroach onto the amenity beach (or into the mooring zone within the harbour), but it would not affect line-of-site from the town.				+ Increased performance in the mid term + provides scour protection - disrupts mooring and	- Beach based activity - difficulty excavating at toe of defences	+low / medium capital costs.	+ limited maintance costs for rock armour	larger footprint than sea wall so habitat loss would occur. Potential impacts	- Additional coastal land take which is not inline with the RBMP objectives	Potential impact on amenity value of beach, but equally could become a feature	No impact on views or access.	+ Provides HTL - in short-medium term only		- Disposal of excavated harbour deposits	- Marine licence required		Option discounted as it will impede on harbour operations and not provide sufficient protection into the long-term.
7	**New stepped or sloping revetment**				5	2	2	4	3	2	3	3	5	3	3	4	39	
	The existing defences could be replaced by a new stepped revetment (as currently seen along the Cowie promenade), or by a similar modular blockwork structure or rock armour structure. All solutions could be designed such that their wave overtopping performance is suitable into the long-term scenario. Given the present-day overtopping risk, a higher crest level than existing will be required. To adapt to climate change, the wall would need to be raised further, which may require raising the promenade and				+ High standard of protection and design life	- Difficult construction in harbour	- High capital costs for consturction type and difficulty	- Small maintanence costs	Replacement of existing defences may not increase the footprint. Potential impacts on geology of	- Additional coastal land take which is not inline with the RBMP objectives.	change in activity type within the harbour - setting of listed harbour will need to be considered.	No impact on views or access.	+ Provides HTL policy with increased SoP		- Limited disposal of excavated harbour deposits - concrete waste	- Marine licence required		Option taken through to short list as it meets the technical requirements and can be designed to have a similar appearance to the existing aligning with heritage aims.
16	**Advance the line with new vertical wall**				4	3	3	3	4	3	3	3	5	3	5	4	43	
	Within the harbour a new wall alignment could be built at the toe of the existing defence without effectively increasing the footprint of the structure. The defence would likely be made from sheet piles, which could be clad with timber to aid with mooring and improve the appearance of this option. Concrete or masonry would also be suitable materials for construction, though may have a larger footprint. This option would also widen the promenade/road making better access for pedestrians				+ High standard of protection and medium to long design life	- Beach based activity - diruptive construction and access	- Medium costs	- Maintanence costs associated with pile corrosion	Relatively localised impact. Outside of SSSI. Change in defence type may have impacts on local	+ No additional coastal land take works towards RBMP objectives.	Increase of amentiy space on landward side without loss of beach. Careful	No impact on views or access.	- Against HTL policy		- limited waste	- Marine licence required		Option progressed to short list as it is practical to construct and cost-effective.
17	**Extension of harbour breakwater arm**				3	2	2	3	2	2	2	2	4	1	2	2	27	
	The existing outer breakwater arm could be extended to further shelter the middle basin from wave overtopping. This defence could be an extension of the concrete structure or a rock armour structure. This option would have to carefully take into account the navigation routes for vessels and might require dredging to maintain the required navigation channel width.				+ Medium standard of protection - residual risk of reflection within harbour still causing	- Difficult construction	- High costs	- Medium maintanence	Relatively localised impact in a heavily modified setting. Outside of SSSI	+ Breakwater arm is not a direct pressure on the physical	Possible impacts on views and setting of listed harbour will need to be considered	Reduction in views. No impact on access.	+ Allows for HTL to be implemented - but may require additional works		- possible dredging activities - concrete waste	- Marine licence required - offshore work		Discounted due to capital cost and stakeholder concerns.
18	**New breakwater arm**				3	2	2	3	2	2	2	2	4	3	3	2	30	
	A new southern breakwater arm could be built further out from the harbour and connected to the headland. This option would provide additional shelter to the harbour, potentially protecting the inner and outer areas of the harbour and could increase the active harbour space allowing a new mooring basin to be designed by the South Pier and old lifeboat house. The form of this new breakwater arm would likely be of rock armour				+ Medium standard of protection - residual risk of reflection within harbour still causing	- Difficult construction	- High costs	- Medium maintanence	Relatively localised impact in a heavily modified setting. Outside of SSSI	+ If inner harbour deosn't require further work the degree of physical	Possible impacts on views and setting of listed harbour will need to be considered	Reduction in views. No impact on access.	+ Allows for HTL to be implemented - but may require additional works		- possible dredging activities - concrete waste	- Marine licence required - offshore work		Discounted due to capital cost and stakeholder concerns.
20	**Property relocation**				2	1	2	2	2	3	1	3	1	1	1	2	21	
	Properties at immediate flood risk behind the current coastal defences could be relocated, reducing potential flood damages while also providing additional space for flood protection improvement schemes behind the existing defences. While this option does not seek to reduce wave overtopping it could be coupled with other mid to long-term strategies to reduce flood risk damages.				+ Reduced properties at risk - infrasturcture and harbour still at risk	- Difficult to relocate buildings	- Cost associated with relocation	- High cost of mainanence of existing structures	Potential bat habitats in existing buildings. Distruption to terrestiral	No impacts.	Setting of listed harbour will need to be considered.	No impact on views or access.	- Against HTL policy		- Debris from property relocation	- relocation of properties, land-based consenting		Discounted as not in stakeholder interest or practical.
21	**Property Flood Resilience and Resistance (PFR)**				2	5	5	2	3	3	3	3	3	3	5	5		
	A short-term option to address flooding in less severe storm events, PFR measures could be a valuable option to incorporate into those properties at risk of flooding. For more severe storms and with increasing sea levels, the level of resilience will be limited and is therefore not considered to be a mid-term option, unless coupled with improvements to the coastal defences				- Short term performance and deisgn life - existing harbour walls at risk of failure	+ Simple constrction	+ low cost	- High maintanence of existing walls and properties	No impacts.	No impacts.	Limited visual impacts.	No impact on views or access.	+ Partially supports HTL - but only in short-term		- limited scale of disturbance	+ limited disruption		Taken through as 'quick win' instead of short list option.
22	**Do Nothing**				1	5	5	5	2	3	2	1	1	1	2	5	33	Option discounted as it does not limit wave overtopping and flood risk.
23	**Do minimum**				1	5	5	2	3	3	3	3	3	1	3	3	35	Option discounted as it does not limit wave overtopping and flood risk.
	SOUTHERN HARBOUR																	
13	**Managed realignment**				2	5	5	3	5	5	3	3	1	2	3	5	42	
	As there is limited development at risk in the south harbour, managed realignment could be considered. This option would likely also require a setback wall with flood gate at the edge of the existing harbour arm to limit wave overtopping into the inner basin.				- performance not improved	+ no costs associated with coastal protection - limited costs associated with dismanelling buildings	+ low cost	- increased maintanence for exposed harbour wall in future	habitat would be increased - ecological benefits. Would encourage more natural functioning of the	+ Makes space for coastal habitat development. Would improve the RBMP status of the coastline. - Short term water	Loss of amenity space on landward side. Setting of listed harbour will need to be considered.	Loss of amentiy space in south of harbour. No impact on views or access.	- Against HTL policy		- debris from allowing current defences fail	- no active intervention		Taken through to short list as it is cost-effective.
15	**Rock armour revetment extension**				5	3	3	4	3	3	3	3	4	3	4	4	42	
	The existing rock armour structures located to the north of the harbour have very narrow crest widths; extending the rock armour crest width would effectively improve their performance against wave overtopping. In the long-term scenario, with the higher extreme sea levels, it might be that the defence would require a raised parapet wall at the rear of the rock armour profile.				+ High standard of protection and design life	- Disruptive construction at outer harbour	- Medium cost	+ Limited maintanence of rock armour required	localised impact in heavily modified setting. Outside of SSSI. Increase in defence footprint may impact	+ Similar defence to that already present. - additional coastal land take which is against RBMP objectives.	Same as defence type already present so no impact in terms of townscape. Potential loss of beach amenity space	No impact on views or access.	+ Provides HTL policy with increased SoP		- Disposal of excavated harbour deposits	- Marine licence required		Taken through to short list to align with stakeholder views.
19	**Advance the line**				5	2	2	4	2	2	3	4	1	2	3	3	33	
	To maximise the benefits from improving the coastal defences in the south of the harbour, advancing the line with a new defence would create a new area in which additional businesses could be built on. As this option widens the defence it will prevent overtopping flow into the inner basin. This option could re-use the existing rock armour into a new defence, or alternatively an extension of the South pier could be considered in				+ High standard of protection and design life	-complex construction	- High capital costs	+ limited maintanence depending upon defence type	Coastal land claim - could impact ecology and geology of the	- Land claim to advance defences does not meet RBMP objectives	amenity space on land. Change in views/setting due	amentiy space in south of harbour. No impact on views or access.	- Against HTL policy		- Disposal of excavated harbour deposits	- Marine licence required		Discounted from short list due to costs and against HTL policy.
23	**Do minimum**				2	5	5	2	3	3	3	3	3	1	3	3	36	Discounted due to maintenance requirements and costs.
	NORTH OF HARBOUR																	
15	**Rock armour revetment extension**				5	3	3	4	3	3	3	3	5	3	4	4	43	
	The existing rock armour structures located to the north of the harbour have very narrow crest widths; extending the rock armour crest width would effectively improve their performance against wave overtopping. In the long-term scenario, with the higher extreme sea levels, it might be that the defence would require a raised parapet wall at the rear of the rock armour profile.				+ High standard of protection and design life	- Disruptive construction at outer harbour	- Medium cost	+ Limited maintanence of rock armour required	localised impact in heavily modified setting. Outside of SSSI. Increase in defence footprint may impact	+ Similar defence to that already present. - additional coastal land take which is against RBMP objectives.	Same as defence type already present so no impact in terms of townscape. Potential loss of beach amenity space	No impact on views or access.	+ Provides HTL policy with increased SoP		- Disposal of excavated harbour deposits	- Marine licence required		Option progressed for northern harbour option to prevent overtopping into carpark. The option will look at a combination of additional rock plus a parapet wall to achieve a cost-effective defence combination.
22	**Do Nothing**				1	5	5	5	2	3	2	1	1	1	2	5	33	Option discounted as it does not limit wave overtopping and flood risk.
23	**Do minimum**				1	5	5	2	3	3	3	3	3	1	3	3	35	Option discounted as it does not limit wave overtopping and flood risk.