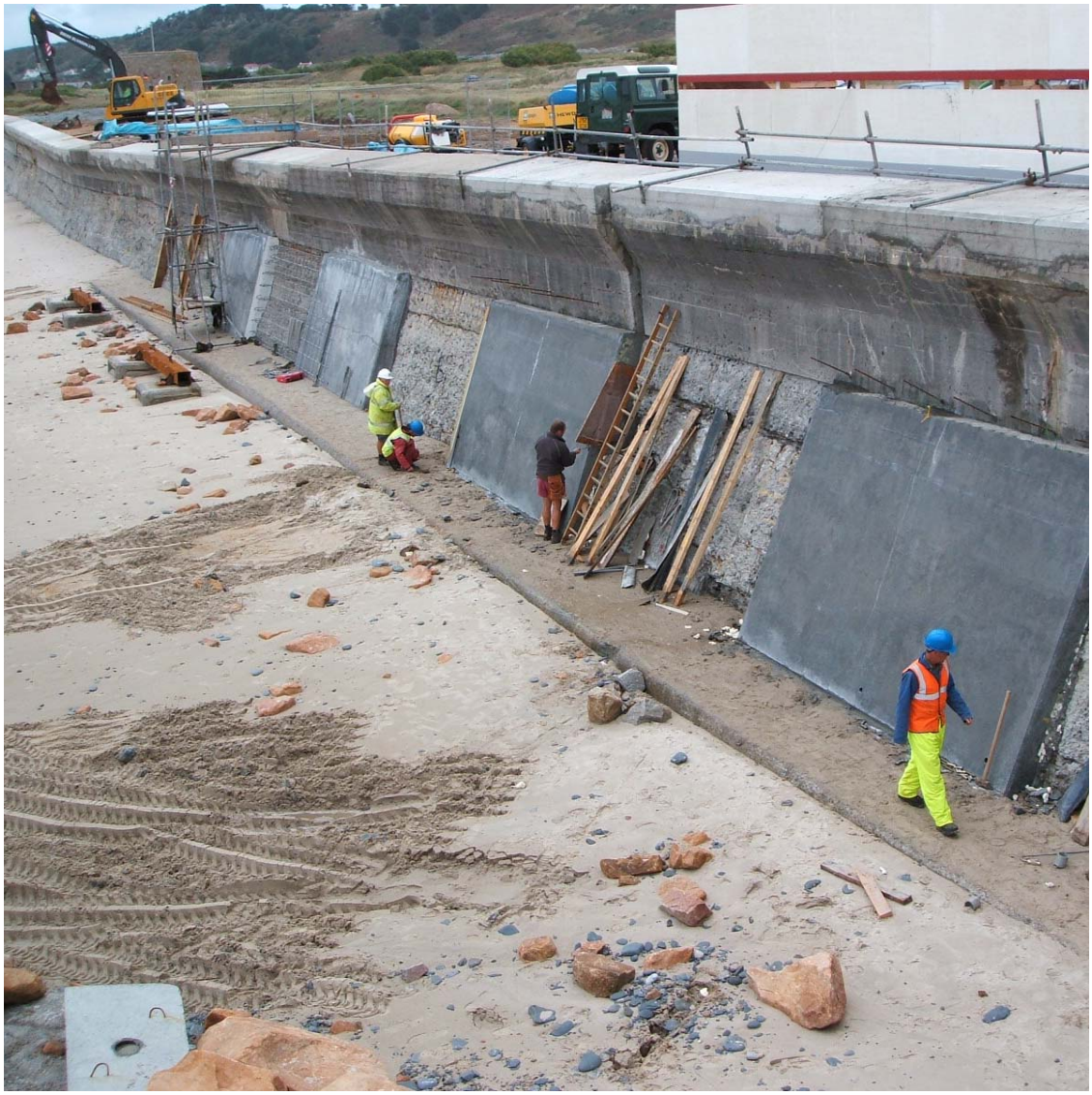
Periodic Update to Sea Defence Strategy

Transport & Technical Services



September 2015

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1. Strategic Context

The climate change impacts that Jersey has started to experience mean that a proactive policy-based, multi-agency approach, which involves more public consultation and engagement with the whole Island community, is needed to ensure future resilience for the Island that is both comprehensive and sustainable. This applies to all aspects of adaptation planning, including the development and delivery of the sea defence strategy by TTS.

There is a strategic commitment and recognition of the need to ensure the Island's climate resilience. The States of Jersey became a signatory to the Kyoto protocol, through the UK in 2007. The Minister for P&E requested, in July 2015, that the Ministry of External Relations (MD-PE-2015-0048) indicate that Jersey wishes to be included in the second commitment period of the Kyoto Protocol and that this is extended to Jersey at the same time as the UK's ratification.

The commitment to the development of a climate change adaption plan is supported by the States of Jersey (Energy Plan P38/2014) and adaptation requirements will be integrated into policy in the Island Plan revision, as well as into other departmental policies and the long term strategic plan, severe weather plan and emergency measures plan.

The Council of Ministers have confirmed that the Energy Executive, which comprises of the Ministers for Planning and Environment, TTS, EDD and Social Security, will provide the political oversight and governance for the development of the climate change adaptation work stream (June 2105). The long term strategic planning process has identified climate change as a golden thread with social, economic and environmental impacts and opportunities. The development of a sustainability appraisal process to inform policy decision making will provide a tool to ensure that climate change is integrated across government.

Ensuring climate resilience for the Island presents a significant challenge, especially in a time of resource constraint. It will require a fundamental change in approach, requiring more partnership working across departments and with key stakeholders and the wider community.

It is important to recognise the strategic context within which the update to the sea defence strategy is presented in order to ensure that the significant contribution to the Islands resilience, and future policy development, made by TTS sea defence strategy is recognised.

In 2016, an economic assessment of climate change impacts for Jersey will be commissioned by DoE, which will assist in informing decisions on the sea defence strategy and will provide evidence and input to the revision of the Island Plan. This assessment will ensure that both project and policy decision making consider the full social, environmental and economic costs of climate change as well as the direct technical construction and maintenance costs.

Communication is recognised as a key aspect of climate change adaptation. Wide public engagement and debate across the whole Island community will be needed to consider the challenges and options around sea defence projects. Climate change has implications for those communities along the coast and/or in areas traditionally

susceptible to or at most risk of flooding. The whole Island community will be affected by decisions in terms of considering the future location of new development and community infrastructure, as well as the protection of existing assets.

This sea defence strategy update is presented within the context set by the strategic plan 2015 and other policy commitments listed below.

States of Jersey Strategic Plan 2012

14. Develop sustainable long term planning;
Capital replacement and maintenance of the Island's main infrastructure assets will require investment in the short, medium and long term. (Vision 2035)

TTS Business Plan 2014

Key Objective 5: The integrity of the Island's sea defences is maintained.
Success criteria:
(i) Sea defences not breached;
(ii) Scheduled implementation of the Sea Defence Strategy;
(iii) Continual review of climate change predictions to inform the Sea Defence Strategy.

Drainage (Jersey) Law 2005

2 General functions of Minister
(1) The Minister shall be the sewerage undertaker and flood defence authority for Jersey.
(2) The Minister shall be responsible for the administration, control and maintenance of –
(c) designated watercourses and designated flood defence works
(3) In the discharge of his or her functions, the Minister may –
(c) Provide, maintain, improve and extend facilities and measures to protect Jersey from flooding.

Revised 2011 Island Plan

Policy SP 1
Spatial strategy
Development will be concentrated within the Island's Built-up Area, as defined on the Proposals Map, and, in particular, within the Town of St Helier. Outside the Built-up Area, planning permission will only be given for development:

1. appropriate to the coast or countryside;
2. of brownfield land, which meets an identified need, and where it is appropriate to do so;
3. of greenfield land, in exceptional circumstances, where it justifiably supports parish communities or the rural economy and which meets an identified need and where it is appropriate to do so.

Energy Plan (P38/2014) Pathway 2050

Development of a climate change adaptation strategy for Jersey

Strategic Plan: 2015 to 2018

Ensure that key issues such as our ageing population and climate change are embedded into our strategy development process

Council of Ministers – Climate Change Adaptation Action Plan June 2015

Agreed development of plan and governance of climate change adaptation work stream through Energy Executive (Ministers for P&E, TTS, EDD and Social Security)

Emergency Planning and business continuity plans

Emergency Measures Plan
http://www.gov.je/SiteCollectionDocuments/Staying%20safe/R%20States%20of%20Jersey%20Emergency%20Measures%20Plan%20201407 14%20LB.pdf

Severe Weather Strategy
https://soj/DocsForms/Documents/CMD/TD%20severe%20weather%20plan%20internal%2020150216%20LB.pdf#search=severe%20weather%20plan

2. Background - Sea Defence Maintenance 1990 - 2015

Following major storms in the 1990's, the Public Services Committee (predecessor to the current Transport and Technical Services department) appointed H.R.Wallingford (HRW), to carry out a survey of the condition and remaining life expectancy of the Island's sea defences. A detailed report was produced for States consideration in April 1996, which summarised HRW's report, the decisions made by the Public Services Committee up to the date of the report and the funding that had been received to carry out planning and Capital Works. The report advised that Fauvic Bay, Anne Port Bay, St Brelade's Bay and St Ouen's Bay were in need of immediate attention.

An extensive data gathering process was carried out during 1997, 1998 and 1999 which aimed to establish the coastal movements around the Island which affected Sea Defences. On completion of the field studies, the data was used to produce a coastal model, which simulated coastal processes. This was used to establish current integrity and decide on future management of the Island's sea defences. HRW produced a final report in 1999 for the Public Services Committee, which included a list of the possible options with indicative prices.

At its meeting of 17th September 2001, the Public Services Committee received a report from the Director of Municipal Services concerning the amalgamation of sea defence capital votes. The Committee was informed that in order to meet long term visions regarding the Sea Defences in the Department's Strategic Plan 2001 – 2006, it would be necessary to bring forward a Sea Defence Strategy which would provide effective sea defences for the foreseeable future with initial indications that investment in excess of £10 million would be required in order to repair and maintain the Island's sea defences. The Committee agreed that the remaining balances on the five existing Sea Defence Capital Votes (totalling £1,456,422) be combined, with the resulting funding being used for the ongoing maintenance, repair and emergency works of the sea defences and the Sea Defence Strategy.

At the same meeting, the Public Services Committee received a further report from the Director of Municipal Services and an associated report produced by HRW entitled "Coastal Processes and Shoreline Management Study – St Ouen's Bay," which contained a number of options regarding the Island's Sea Defences. The Committee considered the options and decided that one major Capital Contract to upgrade and repair the wall and continual minor maintenance could be funded from the Department's revenue budget.

The Planning & Environment Committee, at its meeting of 22nd November 2001 received a report from the Acting Head, Environmental Services Unit and welcomed the Director of Municipal Services PSd, who advised of the continued maintenance option mentioned above and the effect of taking an alternative "managed retreat" option which would involve the loss of land to 200 metres inshore. It was also noted that HRW who had undertaken a comprehensive survey of St Ouen's Bay had recommended revetment (rock armour), however, this had been dispelled due to the dramatic effect it would have on the bay and beach users. A "do nothing" option was also explained in respect of associated costs, as such costs would be incurred for safety related matters as the wall naturally eroded. The Committee noted that the Environmental Services Unit was satisfied that the requirement for a full and objective review of all potential engineering options had been fulfilled as far as this was practicable. All professionals who had commented on the existing situation had

confirmed that the St Ouen's Bay Sea Defences were unsustainable by design. Future sea level rise combined with a range of other factors would ensure that the wall would fail. Having considered the matter, the Committee agreed to support the adoption of the continued maintenance option which involved the following approach:

- upgrading, replacing or constructing new aprons to the toes of the granite and concrete walls;
- repair the face of the concrete wall; and
- possible realignment of L'Ouzière Slip.

In April 2002, HRW produced their report entitled "Coastal Defence Asset Management Assessment – Jersey". The report contained recommendations for prioritised coastal defence works and associated estimated costs. In association with the report a software database to provide terms of reference for the proper prioritisation and management of Sea Defence works was also provided.

The 2004 – 2008 Resource Plan as approved by the States contains the following capital allocations to Sea Defences:

	£'m
2004	2.465
2005	1.5
2006	1.0
2007	1.5
2008	1.0
Total	**£7.465**

This led to a major programme of capital works in accordance with the recommendations in HRW report "Coastal Defence Asset Management Assessment – Jersey".

In April 2007, HRW produced their report entitled "Climate Change Jersey: Effects on Coastal Defences". The report concluded that the major risks to people and property around Jersey's coastline arise from flooding where the existing seawalls, while presently providing a good standard of defence, could suffer from more frequent and more intense overtopping in the future. The report noted that existing defences would need to be improved in an adaptive manner over the coming decades to cope with this threat.

Following a major storm in 2008, all available funding was spent on repairing the walls damaged by the storm.

In December 2009, HRW produced a report entitled "Seawall review, Jersey – The Effects of Climate Change on Jersey's Coastal Defence Structures". The report contained recommendations for prioritised coastal defence works and associated estimated costs. Whilst the 2002 report focused on structural condition, this report utilised a multi-criteria assessment to develop the programme of recommended work. This assessment considered structural condition, overtopping performance, risk to people, risk to property, sensitivity to beach level change and sensitivity to sea level rise.

This led to a programme of oceanographic, bathymetric, and geophysical surveys to support the sea defence capital programme. The survey work contract was let to

Scottish Oceans Institute (SOI) and the data collection, production of reports and charts was completed December 2012.

Pressures on capital funding have slowed the capital programme since 2013

Following a sustained period of significant storms in 2014, all available funding was spent on repairing the walls damaged by the storms.

1992 to 2007 tide gauge observations show that Jersey mean sea level has increased by 2.3mm/year (average). 3.5cm in 15 years. This is comparable with the global mean sea level rise. (The Institution of Civil Engineers “Rising Sea Levels in The English Channel 1900 to 2100”)

UK Climate Projections (UKCP09) is the leading source of climate information for the UK and its regions. Whilst Jersey and the Channel Islands are not directly covered by UKCP09 sea level predictions, observations at sites around the English Channel and the rest of the UK coastline confirm that sea levels are rising at similar rates. The UKCP09 sea level projections were produced using results from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC AR4, 2007). IPCC Fifth includes the most recent global sea level predictions but UKCP09 remains current on a national level.

Figure 1 shows predicted relative sea level over the 21st century at two locations in the UK. The predictions are based on three greenhouse gas emission scenarios developed by the IPPC.

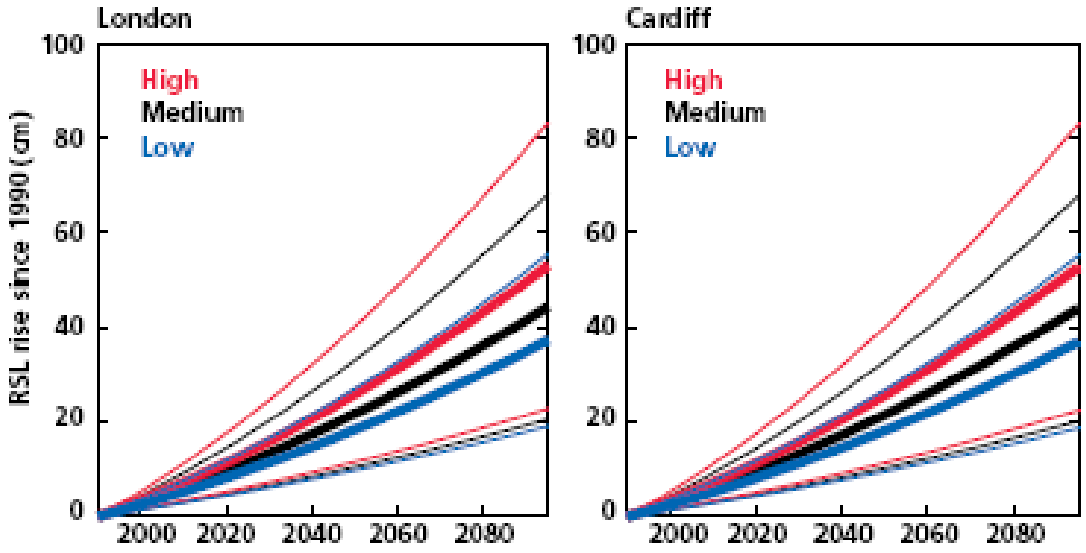

Figure 1

In the period 2007 to 2015 TTS have been proactive in establishing the impacts of climate change on sea defences and coastal flooding but have not been able to make significant progress in implementing flood protection improvement schemes. This is due to three significant issues;

- Insufficient funding
- The absence of an Island climate change adaption policy to support the schemes
- The potential negative impact of solutions such as raising sea defences to amenity and residents

3. Sea Defence Strategy 2015 and beyond – The Impacts of Climate Change and Planning for the Future

Global warming is changing the world's climate and will increase, amongst other things, the risks of coastal flooding and erosion in Jersey. The main impacts for sea defence are an increase in sea level and more frequent and intense storms. The seawalls around Jersey will provide a reducing level of defence and or protection as mean sea levels rise.

Continued maintenance of seawalls is essential, but is no longer enough, in the future there will be a need for adaptive improvement to seawalls and other defences around the Island so that they continue to maintain or improve their present standard of protection against coastal flooding.

In 2016, an economic assessment of climate change impacts for Jersey will be commissioned by DoE, which will assist in informing decisions on the sea defence strategy and the revision of the Island Plan. The sea defence strategy is flexible and will continue to be updated in light of revised States of Jersey policy as it emerges.

1. TTS Policy Work on Adaptation for Climate Change

Jersey has a number of sea defences which will require adaption based on the predicted impacts of climate change. In almost all instances this will mean raising the height of the existing structure, or considering some form of secondary defence, or complete reconstruction of the existing defence.

As well as being technically challenging and expensive to carry out, adaptation projects are likely to affect the amenity, environment and aesthetic character of the existing coastline, all of these factors, along with stake holder consultation, will need to be considered as part of the decision making process.

In order to understand and inform decisions about future flood risk, TTS will carry out reviews of low lying coastal areas. These studies will assess and determine future flood risk and recommend potential adaptions required to mitigate the effects of climate change. In 2015 TTS will complete the first two of these studies at the Gunsite in St Aubin's bay and the stretch of coastline from Havre des Pas to Greve D'Azette. As a result of this work and an increase in the frequency of flooding in recent years, TTS plan to construct a raised crest wave return wall at the Gunsite in 2016.

Flood mitigation schemes will be designed to the following criteria;

- The upper limit of the current UK Climate Projections sea level predictions for a high carbon emission scenario
- 50 year sea level predictions
- Capability to adapt to future sea level rise
- Social, economic and environmental impacts

2. Proposals for Developing a St. Helier Flood Risk Assessment

The Future St Helier project is a key strategic priority identified in the strategic plan. It is recognised that the TTS sea defence strategy has a key role in the development and delivery of the Future of St Helier project.

The project scope recognises the need to integrate climate resilience into the planning and decision making process. St Helier is the economic, social and cultural centre of the Island with a high population, a strategic port, the Island's principal retail centre and many visitor facilities. It is built on low lying land and will become increasingly vulnerable to coastal flooding as sea levels rise. Ensuring St Helier is climate resilient is especially important for the businesses and residents of the town area who are more likely to be impacted by climate change in the town centre.

The sea defence strategy has a key role to play in the development of the economic, community and environmental resilience of St. Helier, and the Island, and its differentiation as a secure and safe place to locate, work, and live.

Coastal flood protection for St Helier is provided by a number of sea defences and harbour structures maintained by either TTS or Ports of Jersey. Figure 2 shows the maintenance responsibilities and highlights the need for TTS and Ports of Jersey to work collaboratively in planning for sea level rise and flood protection for St Helier. The development of a new master plan for the Port of St. Helier, together with the incorporation of Ports of Jersey and relationship with the management of the harbour provides a significant opportunity for partnership working on this issue.

A suggested approach to the development of flood risk assessment and adaption for St Helier would be via a multi department and stakeholder involvement approach which would need to include the following actions;

1. Integration with the Future St Helier Project; working with key stakeholders and the Island community.
2. Department of the Environment to develop climate change adaption action plan to support Energy Plan (P38/2014) and Kyoto protocol commitments.
3. TTS to review previous and current schemes that impact St Helier and review their capital programme accordingly
4. Ports of Jersey to consider the impacts of climate change on St Helier as part of their current Ports Master Plan
5. Expert advisor to carry out flood risk assessment of St Helier and make recommendations for adaptions to the existing sea defence and harbour structures
6. Adaptions to be included in TTS and POJ future capital programmes as funding allows

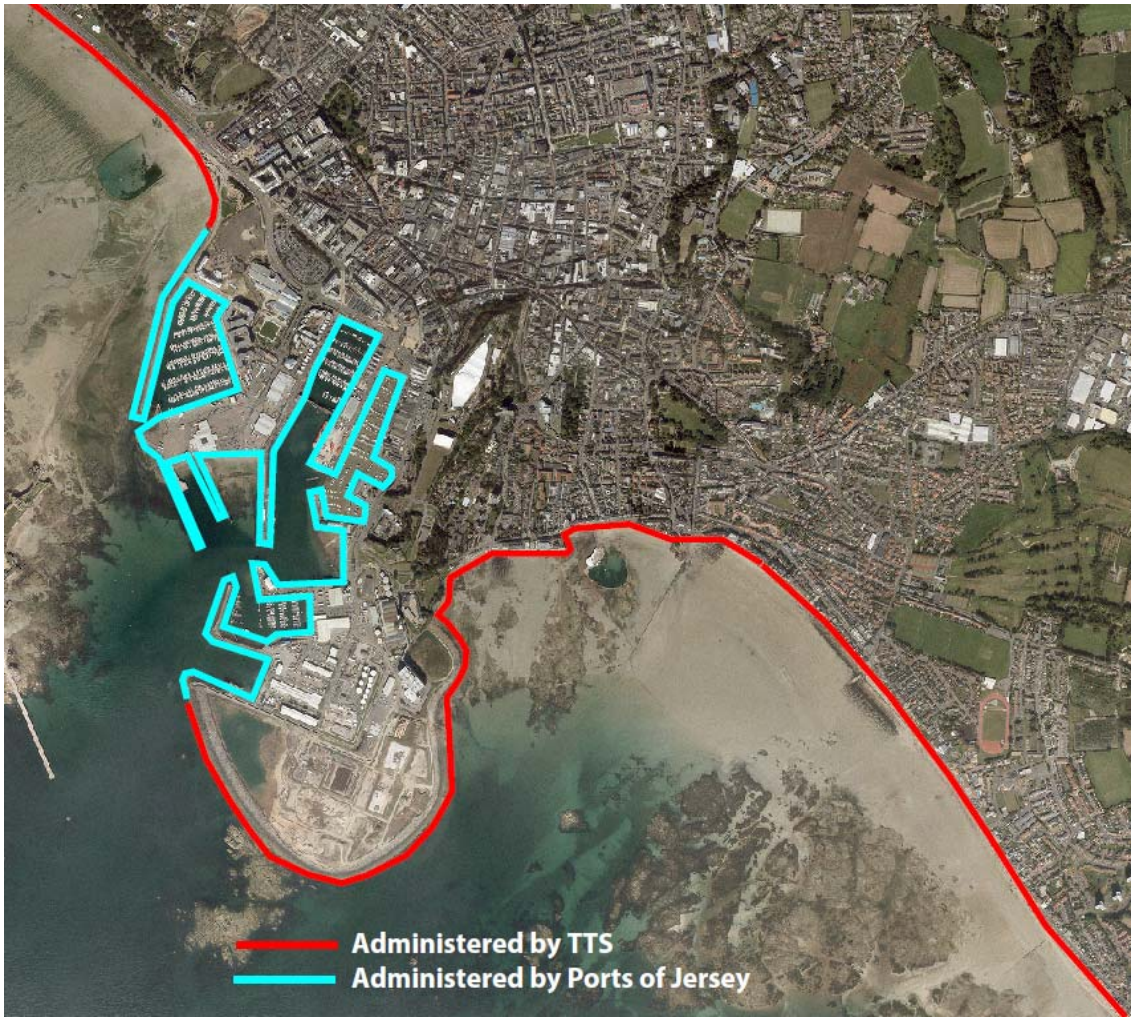

Figure 2

3. TTS Capital Programme and Continued Maintenance

Ongoing general day to day maintenance of the sea walls will continue to be funded by TTS revenue budgets, with capital funding required for all major repairs or upgrades of the sea defences. The capital programme (Appendix 1) sets out a prioritised list of works as developed by the department.

In addition to planned maintenance, emergency repairs are required at times following storm damage. TTS will continue to fund these repairs by re-allocation of budgets in conjunction with the Treasury Department.

The prioritisation of the capital programme is derived from a multi criteria assessment based on the following considerations;

- Defence condition and performance
- Risk to people and property
- Sensitivity to beach level change
- Sensitivity to sea level rise
- A focus on flood risk to highly populated areas

The capital programme will be reviewed periodically in line with changing conditions on the coast, developments in climate change predictions, States of Jersey and departmental policy changes and available budgets.

In the last fifteen years TTS has committed an average of £1m per annum towards the sea defence capital programme and it is envisaged that this will level of funding will continue in to the future. However, due to funding pressures on central and TTS capital this cannot be guaranteed. Due to these funding pressures there is no capital funding allocated for sea defences in 2016 and 2017 but it is hoped to resume the capital programme in 2018.

The capital programme does not have time scales attached as the works are subject to allocation of funding and an alignment of climate change adaption policies between the Department of Environment, Transport and Technical Services Department and Ports of Jersey. The capital programme (Appendix 1) contains high level options that need to be considered in more detail along with alternative solutions such that the required degree of flood protection can be achieved with the least impact.

Appendix 1

Capital Works Programme

Appendix 1 Capital Works Programme

Area / Location	Description of Recommended Capital Works	Outline Capital Cost (2015 Estimates)
High Priority		
Gunsite Gunsite Slipway to higher wall section	Raise sea wall crest height Construction of a recurve concrete crest Install flood gate	£600,000
Le Havre des Pas La Collette Slipway To Havre des Pas Slipway	Removal of coping Removal of existing railings Construction of a recurve concrete crest Granite facing on landward face Re-fitting of railings on top of recurve concrete crest Removable flood barrier at slipway	£1,570,000
St Aubin's Bay First Tower to West Park Slipway	Removal of part of masonry wall and coping Construction of a recurve concrete crest Granite facing on landward side Construction of a secondary defence wall at cycle track or road side Construction of rock toe / revetment along the wall Beach replenishment	£11,370,000
Le Dicq Le Dicq Slipway to Steps	Removal of existing railings Removal of coping Construction of a recurve concrete crest Granite facing on landward face Construction of rock toe / revetment along the wall	£578,000
St Aubin's Bay Harbour to La Haule Slip	Removal of coping Construction of a recurve concrete crest	£1,240,000
Le Nez Point to Le Hocq Point Bay of Fountains	Construction of a secondary defence wall Construction of a concrete promenade	£240,000
Archirondel Slipway to Headland	Removal of part of masonry wall Construction of recurve concrete crest Construction of a secondary defence wall Drainage	£1,080,000
Moderate Priority		
Greve d'Azette Le Dicq Steps to Millards Corner Slipway	Removal of coping Construction of a recurve concrete crest Granite facing on landward face	£1,764,000

St Aubin's Bay Bel Royal Slipway to First Tower	Removal of part of masonry wall and coping Construction of a recurve concrete crest Granite facing on landward face Construction of a secondary defence Construction of rock toe / revetment along the wall Beach replenishment	£13,945,000
Grouville Bay Tower 1 (La Rocque) to Seymour Slipway	Installation of rock armour toe protection	£59,000
Le Havre des Pas Havre des Pas Slipway to Eastern End	Removal of existing railings Removal of coping Construction of a recurve concrete crest Granite facing on landward face Installation of rock armour toe protection	£775,000
La Mare La Mare Slipway to La Mare Car Park	Removal of coping Construction of a recurve concrete crest Granular fill Construction of a new promenade	£667,000
La Rocque La Rocque Toilets to Tower 1 (La Rocque Point)	Removal of coping Construction of a recurve concrete crest	£1,263,000
Low – Moderate Priority		
La Greve de Lecq Slipway to Harbour	Move steps Recurve parapet wall	£78,000
Low Priority		
St Brelade's Bay St Brelade's Bay Hotel to Midbay slipway	Installation of toe piling and concrete apron Beach drainage improvement Beach replenishment	£433,000
Grouville Bay Le Hurel Slipway to Bunker	Extension of rock armour toe protection to the end of the defence	£42,000
Green Island Green Island Slip to Le Nez Point	Sheet pile and concrete toe	£154,000
Pontac West of Pontac Slip	Sheet pile and concrete toe	£72,400

Pontac East of Pontac Slip	Sheet pile and concrete toe Rock Armour	£175,000
Grouville Bay Seymour Slip to Tower 3	Rock Armour	£200,000
Le Petit Portelet	Rock Armour	£33,000
Bouley Bay Toilets to main slip (wall section at main slip)	Rock Armour	£28,000
Pebble Beach Ad hoc defences west of slip	Sheet pile and concrete toe	£67,000