Isles of Scilly Local Flood Risk Management Strategy

Council of the ISLES OF SCILLY

March 2017

Revisions to Source Document

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1. SUMMARY

Under the Flood and Water Management Act 2010 the Council of the Isles of Scilly is Lead Local Flood Authority (LLFA) for the islands. Section 9 of the Act places a duty for a LLFA to develop, maintain, apply and monitor a strategy for local flood risk management in its area.

The purpose of the strategy is to help reduce the number of people at risk of flooding, increase the resilience of our local communities and reduce the social and economic impact of flooding.

Local flood risk is defined as flood risk from surface runoff, groundwater and ordinary water courses, including references to lakes, ponds or other area of water which flows into an ordinary water course. However it is coastal erosion, tidal action and coastal flooding that pose by far and away the most significant flood risk to the islands. It is for this reason that the Local Flood Risk Management Strategy has been expanded to include the threat of coastal flooding. The Environment Agency is responsible for coastal flood and erosion risk management in England.

This strategy will help the local communities and businesses to better understand and manage flood risk on the islands. It includes an overview of flood risk on the islands and sets out the co-ordinated approach to managing and reducing these risks.

This Local Flood Risk Management Strategy links national, regional and local approaches to flood risk management and needs to be considered alongside other strategies such as the local plan, transport plans, critical infrastructure planning, sustainable development, environmental and economic objectives.

An aerial view of St. Mary's with Tresco and St. Martin's in the background, illustrating the low-lying nature of the islands (photo courtesy of Visit Isles of Scilly)

2. INTRODUCTION

2.1 BACKGROUND TO THE AREA

The Isles of Scilly are a flooded landscape of over 200 low lying granite islands and rocks located 45 kilometres south west of Cornwall. The archipelago forms part of the wide continental shelf to the south and west of England where granitic bodies such as Scilly and the Seven Stones reef intruded through the metamorphosed rock of the flat seabed plain some 285 million years ago. Originally connected to Cornwall until around 10,000 years ago the rising sea level created the islands of St. Agnes, Annet and the western rocks around 3000 BC. The other modern day islands remained a single island until a period from around 1000 BC onwards. This process of inundation is ongoing and predicated levels of sea level rise typically vary from 15 to 60cm over the next 75 years.

There are five inhabited islands with a population of 2203, living in 1388 dwellings (2011 census). The total land area is 16.37 km^2, St. Mary's is the largest island with a land mass of 6.29 km^2 and 1723 inhabitants. The remainder of the population live on Bryher, St. Agnes, St. Martin's and Tresco. The highest point on the islands is 49m above sea level and approximately 30% of the land area is at or below 5m elevation. Evidence of human occupation and settlement, dating from the Late Upper Palaeolithic onwards, survives beneath the sea. Ancient field boundaries can be traced running from the land, across the intertidal zone, and off into the sea. The Duchy of Cornwall own most of the islands, with most properties being leasehold, except for the majority of the built up area of Hugh Town. Tresco is leased in its entirety to the Tresco Estate whilst the uninhabited islands and any untenanted land is leased to the Isles of Scilly Wildlife Trust.

The whole of the Isles of Scilly are an Area of Outstanding Natural Beauty, a Conservation Area and a Heritage Coast. Further designations applied to the islands include RAMSAR sites of global importance, Special Area of Conservation (SAC) EU Habitats Directive, Special Protection Area (SPA) EU Habitats Directive, a Marine Conservation Zone, 26 Sites of Special Scientific Interest along with 238 Scheduled Monuments, 129 Listed Buildings and one Grade 1 Registered Park and Gardens. The distinctive landscapes encompass lowland heathland, enclosed pasture, hedged bulb strips, small harbours and quays and scattered rural settlements punctuated by tiny townscapes.

The Council of the Isles of Scilly is the smallest unitary authority in England and Wales. It is responsible for the water supplies on St. Mary's and Bryher and the sewerage infrastructure on St. Mary's. Water for all the islands is sourced via boreholes, often privately owned, and supplemented on St. Mary's by the use of a desalination plant. There are a limited number of public drainage systems outside of Hugh Town and Old Town on St. Mary's meaning that private drainage arrangements such as septic tanks are often necessary. Flooding and sea water ingress into the water supplies and sewerage poses a significant risk to this infrastructure and the health and wellbeing of local communities.

2.2 FLOOD AND COASTAL EROSION RISK MANAGEMENT

A Preliminary Flood Risk Assessment (JBA Consulting, 2011) was completed as part of the duties established under the Flood Risk Regulations 2009 and Flood and Water Management Act 2010 for managing local flood risk. This involved a review of past floods and the potential for future floods as well as determining and reviewing the presence of any "areas of significant flood risk". No Flood Risk Areas were proposed as a result of that study and the Preliminary Flood Risk Assessment confirmed;

- There are no ordinary watercourses or main rivers on the Isles of Scilly
- There are no flood maps for fluvial flood risk
- There have been no significant past flood events from local sources (Ordinary Watercourse, Groundwater or Surface Water).

The initial Shoreline Management Plan (SMP) for the Isles of Scilly was completed in 1997 (Aspen, Burrow Crocker, 1997) and revised in 2011 (Royal Haskoning, 2011a, b) as part of the development of a strategic approach to the management of the entire shoreline of England and Wales. A midterm review of the SMP was undertaken in 2016 (Royal Haskoning, 2016). The SMP is a non-statutory policy document for coastal defence management planning. It provides an assessment of the risks associated with coastline evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner.

An asset register is kept for the islands comprising a list of the physical features, both man-made and natural, that have an impact on flooding in the area. This register contains basic information about the structures and features such as the location and type of structure. Basic assessments of the condition of the assets have been made and for those assets that are included on the Environment Agency's Asset Information Management System the results of their regular condition surveys are also noted.

An annual report from the Plymouth Coastal Observatory provides an overview of beach changes and wave and tidal measurements as part of the South West Regional Coastal Monitoring Programme. The first beach surveys took place using LiDAR in 2007, so these surveys can only be used to indicate short term trends. Since 2007 the majority of beach profiles have remained stable in terms of percentage change in cross sectional area, the exception being the southern beaches of Tresco

The National Coastal Erosion Risk Mapping (NCERM) project has developed to show predictions of the extent to which the shoreline of England and Wales may change over the coming century. It also shows how local authorities and the Environment Agency plan to manage the shoreline during that time. The latest update of the NCERM for the Isles of Scilly was undertaken in October 2016. As part of that update a condition assessment of all "non-natural" defences was completed.

The Devon, Cornwall and Isles of Scilly Local Resilience Forum have developed a Flood Plan which includes details specific to the multi-agency response to a significant flooding incident in the Isles of Scilly area, see Appendix 2.

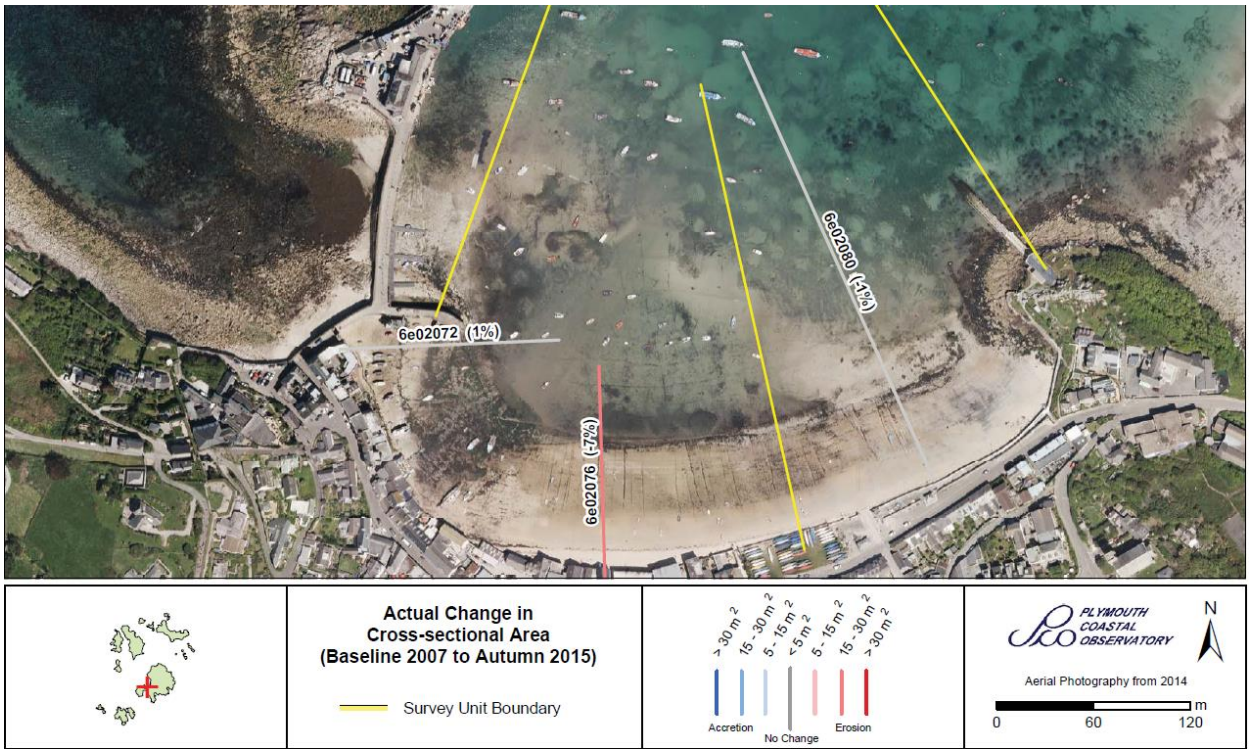
In the production of the Local Flood Risk Management Strategy a LLFA must consult with other risk management authorities affected by the strategy. These authorities are the Environment Agency, the respective water companies, the internal Drainage Board, district councils and the highways authority. As the Unitary Authority, the sole remaining public water authority in the UK, (and because the strategy does not directly impact any neighbouring districts) there is no

need or requirement for the Council of the Isles of Scilly to liaise with other Flood Risk Management Authorities except for the Environment Agency, to manage local flood risk.

This Local Flood Risk Management Strategy will be reviewed in 2021 and updated every six years thereafter. This approach to reviewing the LFRMS is aligned with the statutory cycles set out in the 2009 Flood Risk Regulations for reviewing flood risk management plans. However, the Strategy will be subject to constant re-assessment to respond to poor/accelerated performance, to adapt to changing circumstances or to reflect the consequences of unforeseen flood events and to reflect any significant change in legislation or government policy.

This approach to the LFRMS will enable;

1. A culture of partnership working and information sharing with the Environment Agency and other authorities involved in flood risk management
2. Collection of information on past and future flooding
3. Assessment of significant flood events
4. Estimation of consequences of flood events
5. Ongoing review of indicative Flood Risk Areas.



Town Beach, St Mary's – Change in cross-sectional area 2007 to Autumn 2015 (from the Plymouth Coastal Observatory Annual Survey Report 2015)

2.3 MANAGING FLOOD RISK – ROLES AND RESPONSIBILITIES

Managing flood risk is a function of joined up plans, programmes and partners;

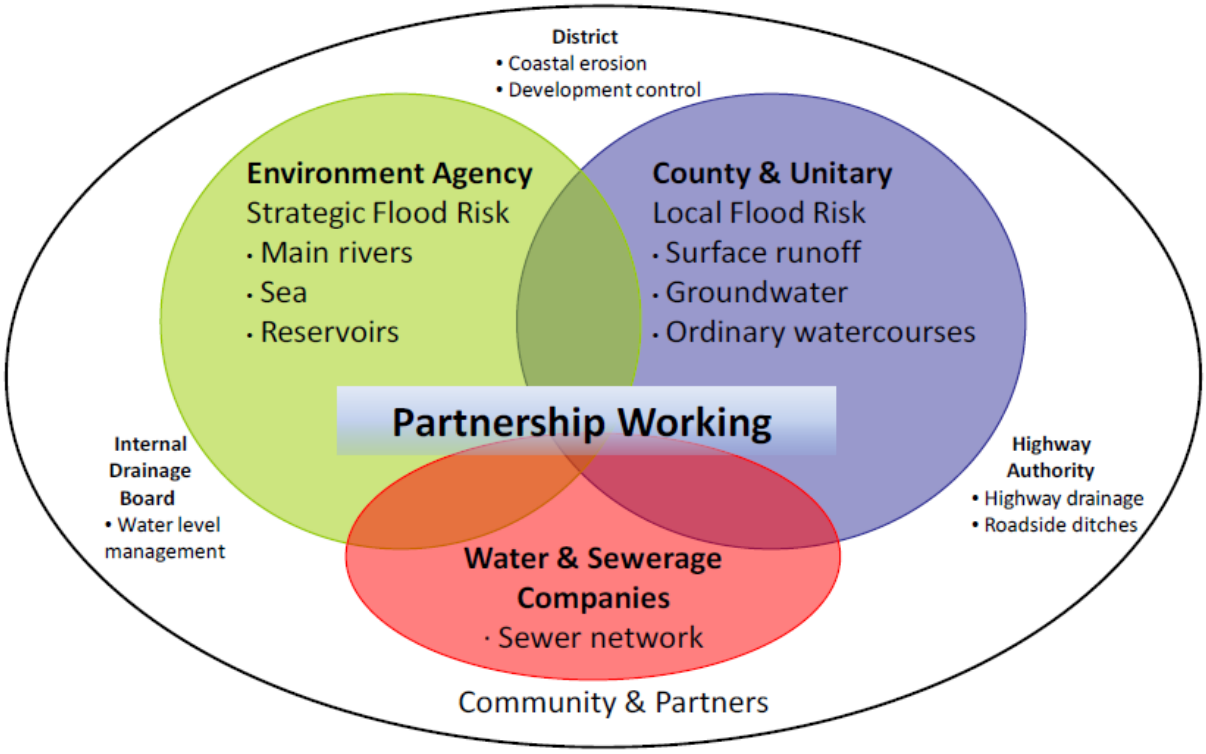


Figure 1 – Partnership working involved in flood risk management (National RFCC Handbook, 2016)

The following are the key bodies involved in managing flood risk for the Isles of Scilly

Government
The Department for Environment, Food and Rural Affairs (Defra) and the Welsh Government develop Flood and Coastal Erosion Risk Management (FCERM) policy and are the leads for FCERM in England and Wales. New or revised policies are prepared with other parts of government such as the Treasury, the Cabinet Office (for emergency response planning) and the Department for Communities and Local Government (for land-use and planning policy). These national policies then form the basis of the Environment Agency's and lead local flood authorities' work.

Environment Agency
The Environment Agency (EA) has a strategic overview of all sources of flooding and coastal erosion including working in partnership with the Met Office to provide flood forecasts and warnings. The EA is also the lead authority for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea as well as being a coastal erosion risk management authority. It also looks for opportunities to maintain and improve the environment for people and wildlife while carrying out all of its duties.

The Environment Agency's work includes:

- Developing long-term approaches to FCERM. This includes working with others to prepare and carry out Shoreline Management Plans (SMPs). The SMP assesses the risks of coastal flooding and erosion and propose ways to manage them. The EA also collates and reviews assessments, maps and plans for local flood risk management.

- Providing evidence and advice to support others. This includes national flood and coastal erosion risk information, data and tools to help other risk management authorities and inform Government policy, and providing advice on planning and development issues.
- Monitoring and reporting on flood and coastal erosion risk management across the country.

Lead Local Flood Authority (LLFA) – Council of the Isles of Scilly
Under the Flood and Water Management Act, 2010, the LLFA is required to:

- Prepare and maintain a strategy for local flood risk management in their areas.
- Maintain a register of assets that have a significant effect on flooding in their area.
- Investigate and report on local flooding incidents.
- Establish approval bodies for design, building and operation of Sustainable Drainage Systems (SuDS).
- Issue consents for altering, removing or replacing certain structures or features on ordinary watercourses.
- Play a lead role in emergency planning and recovery after a flood event.

If a flood happens, all local authorities are 'category one responders' under the Civil Contingencies Act. This means they have a duty to warn, inform and advise the public in the event of an emergency and must have plans in place to respond to emergencies, and control or reduce the impact of an emergency.

Coastal erosion risk management authorities
Coastal local authorities will work alongside the EA to develop and maintain coastal flood and erosion risk information.

Water and sewerage companies
They manage the risk of flooding to water supply and sewerage facilities and the risk to others from the failure of their infrastructure. The Council is responsible for the water supplies on St. Mary's and Bryher and the sewerage facilities on St. Mary's.

Internal Drainage Boards
Internal Drainage Boards are independent public bodies responsible for managing water levels in low-lying areas. There are no Internal Drainage Boards on the islands.

Highways Authority
The Highways authority has the lead responsibility for providing and managing highway drainage and roadside ditches under the Highways Act 1980. The owners of land adjoining a highway also have a common-law duty to maintain ditches to prevent them causing a nuisance to road users.

SW Regional Flood and Coastal Committee
The Regional Flood and Coastal Committee (RFCC) helps the EA and partners to understand local issues better, and to balance local and national priorities. The committee plays a key role in local funding and giving consent to programmes of work, agrees a levy for their area and provides advice to help protect local communities from flooding and coastal erosion.

SW Coastal Group
The SW Coastal Group was a Defra initiative to ensure that coastal groups played a more strategic and stronger role in the future planning of flood and coastal erosion risk management. The Group

aims to facilitate the best available advice on coastal issues and be a strong influencer in optimising strategic and sustainable policies, plans and programme's to best manage coastal risks. The SW Group covers the coastline from Portland Bill in Dorset, clockwise around the Southwest Peninsula of England up to Hartland Point in Devon, and includes the Isles of Scilly.

Cornwall and Isles of Scilly Coastal Advisory Group (CISCAG)
CISCAG works to promote sustainable shoreline management, and to facilitate the duties and responsibilities of local authorities and other organisations managing the Cornwall and Isles of Scilly Coastline. The area covered by the Group spans from Rame Head in Cornwall to Hartland Point in Devon and also includes the Isles of Scilly.

SW Flood Risk Managers Group
This Group provides a forum for Flood Risk Managers to discuss current and future issues and share best practice to aid the delivery of efficient and high quality flood risk management services in the South West.

The Local Community
It is important that effective communication takes place with the public to ensure that residents, visitors, businesses and others have the knowledge to contribute to their own resilience to flooding. Individuals need to recognise the seriousness of the greater likelihood of flood risk due to sea level rise and the impacts of climate change. People need to accept a certain level of flood risk and to accept that they need to share some of the responsibility in addressing flood risk management. There also needs to be an appreciation that this could involve designing spaces to flood safely and how this could also provide increased ecological benefits.

Devon, Cornwall and Isles of Scilly Local Flood Resilience Forum
The Devon, Cornwall and Isles of Scilly Local Resilience Forum aims to plan and prepare for localised incidents and catastrophic emergencies, working together to identify potential risks and produce emergency plans. The Local Resilience Forum Flooding Subgroup has developed the multi-agency response to a significant flooding incident in the Council of the Isles of Scilly area. It provides liaison and communication to ensure all possible flood risk is understood.

2.4 REPORTING INCIDENTS OF FLOODING

Residents who have experienced flooding incidents are urged to report events and identify potential “hot spots” for flooding across the islands.

People are asked to submit information about floods of all sizes from ones which may have only affected one or two properties to larger scale flooding incidents. Whenever possible these reports should be are accompanied by a description of the impact that the flooding event has caused, whether this be social or business related and to provide details of any financial implications.

The information gathered will be added to that of other sources to help the Council to build a complete picture of the impact of flooding to the community and to improve the management of flood risk in the area.

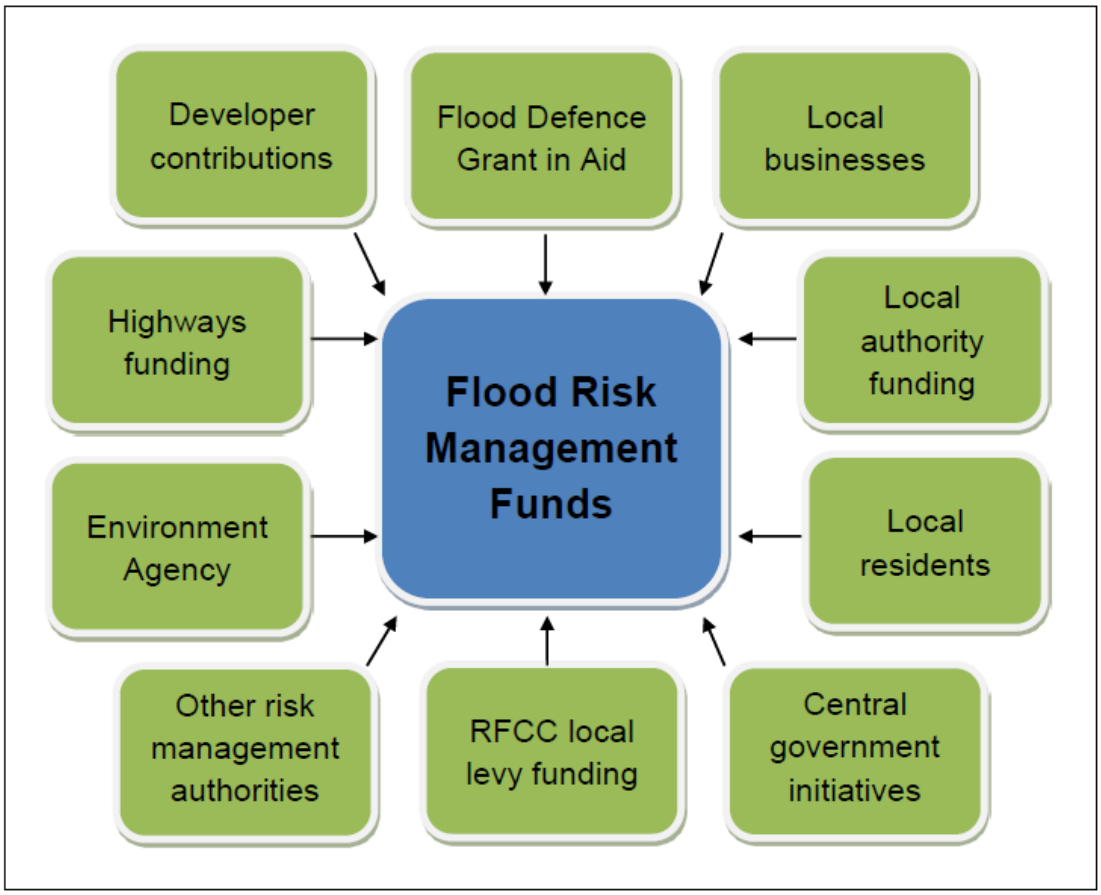
An example of the flood incident record form is included as Appendix 1.

2.5 FUNDING STREAMS

The main source of funding for flood and coastal erosion risk management is the national Flood Defence Grant in Aid (FDGiA), administered by the Environment Agency (EA) on behalf of the Department for Environment, Food and Rural Affairs (Defra). The amount distributed to individual capital schemes is determined principally by the number of existing residential properties that would benefit from them. FDGiA for maintenance of flood risk assets is also administered by the EA.

All risk management authorities can bid for FDGiA by submitting required data of a proposed scheme that determines its cost benefit ratio. This is further adjusted by weighting factors called 'outcome measures' that are based on Defra targets. These regional and national funding allocations and the Council of the Isles of Scilly and the Environment Agency work in partnership to secure appropriate funds for the islands. A medium term plan covering proposed expenditure across the SW region is developed by the EA.

The FDGiA funding is supplemented by additional funding from other sources to cover the total costs of projects. The various funding avenues for financing flood defence works are summarised in the below;



The funding avenues for flood risk management works.

3. TYPES OF FLOODING

A flood includes any occasion where water covers land which is not normally covered by water and it can result from one or a combination of sources and influencing factors. Under the Flood and Water Management Act the following are not considered as a flood;

- Water from any part of the sewerage systems (unless an increase in the volume of rainwater entering or affecting the system is a contributing factor); or
- Water from a burst water main.

There are several different types of flooding;

River (Fluvial) Flooding – Not applicable, as there are no ordinary water courses or main rivers on the Isles of Scilly.

Surface Water (Pluvial) flooding – Surface water flooding occurs when natural and man-made drainage systems have insufficient capacity to deal with the volume of rainfall. It generally happens quickly and can be hard to predict. The critical factors for surface water flooding are the volume of rainfall, where it falls and its intensity.

Groundwater flooding - Groundwater flooding will generally occur when the water levels in the ground (the "water table") rise to a level higher than the ground itself resulting in springs or boggy conditions. It typically happens in low-lying areas after prolonged periods of wet weather.

Sewers
Flooding from sewers occurs when the capacity of the sewer is exceeded due to heavy rainfall or sea water ingress. The contamination of flood waters by sewage can increase the impact that flooding has on people property and public health. Only Hugh Town and Old Town on St. Mary's have a formal piped foul drainage system. All other properties and small holdings rely on septic tanks.

Reservoirs
Reservoirs can hold large volumes of water above ground level which could cause a flood risk should they fail. There are no water reservoirs on the Isles of Scilly of sufficient size to pose a significant flood risk, all being considerably below the risk threshold of 25,000 cubic metres of water above natural ground level.

Coastal (Tidal) Flooding – Coastal flooding occurs when the sea level rises above the level of coastal land. This can be caused by tidal movements, ground swell, strong winds or other extreme weather conditions and can be exacerbated by low barometric pressure and/or heavy rainfall. High spring tides are predictable but weather conditions can create storm surges and ground swell that add to the water levels. Both tidal levels and storm surge frequency are predicted to increase in the future. The mean spring tide range for St. Mary's is 4.97m (Alcock et al 1988) with mean high water springs of 5.7m above chart datum (Johns et al 2004).

The islands are very exposed to wave energy, storm wave heights attaining 16m during the storms of 2013/14. Directional data shows that the biggest waves approach from between the south-west and north-west, but that large waves can also approach from the east (Munro and Nunny 1998). Around the islands tidal currents are not as influential on shoreline morphology as the wave climate, but they can attain significant velocities in the narrow channels between islands and islets. Flows of

2 knots or greater occur around the outer edges of the archipelago, with strong tidal races off major headlands (Munro and Nunny 1998).

A storm surge is a change in sea level that is caused by a storm. The main cause of a storm surge is high winds pushing the sea water towards the coast causing it to pile up there. There is also a smaller contribution from the low pressure at the centre of the storm “pulling” the water level up by about 1cm for every 1 millibar change on pressure. The strong winds in the storm will also generate large waves on top of the surge leading to increased risk of damage to defences and flooding.

Porthcressa Beach, circa 1962 (photo courtesy of the Duchy of Cornwall)

4. PAST FLOOD EVENTS

The Isles of Scilly are vulnerable to the impact of climate change, rising sea level, inundation and coastal erosion. The islands bear the brunt of Atlantic storms and storm surges, vulnerability to flooding is increased by their low lying character coupled with the fact that much of the housing stock, critical infrastructure, water resources and commercial property are located close to sea level and, as is the case for Hugh Town the administrative centre for the islands, on a narrow sandy isthmus.

There have been no significant past local events from local sources of flooding, namely surface water and groundwater. The risk from fluvial and pluvial flooding is considered to be very low. During periods of heavy rain, water is held within the heathland areas (and some of the permanent grassland areas on St. Mary's) or runoff either feeds into wetland areas such the Higher and Lower Moor areas on St Marys' and the Great Pool area on Tresco, away from residential areas, or it finds its own way to the coast. The Big Pool on St. Agnes, Great Pool on Bryher and Pool Green on St. Martin's are other significant water catchment areas.

On St. Mary's if high intensity rainfall events occurred there used to be a build-up of surface water at Rams Valley behind Porthcressa. This was resolved by the addition of a second dual surface water pipe to double discharge capacity with the outfall onto Porthcressa Beach. At times of high tide and excess surface run off flooding can occur due to tide-locking, when the high tide prevents the natural drainage system to function in its usual way. This has occurred in locations around Hugh Town and around the perimeter of Lower Moors area at Old Town and Porth Mellon. At Porth Mellon this can result in localised flooding of the Industrial Estate and the islands' waste facility at Moorwell. The Mermaid Public House in Hugh Town has been flooded on more than one occasion. This pub is located at the western extent of Town Beach and, at times of tide-locking and excess surface water run-off, sewage has been forced back into the property through toilets located in the basement. This is primarily the result of a cross connection between the foul and surface water drainage systems close to the slipway at the Atlantic Hotel.

Flooding of Hugh Street, impact of tide locking (photo from Scilly Today 3/1/2014)

There is no highway drainage on the islands. At Trewince, on the A3110 towards Telegraph Hill, there is a tendency for surface water runoff to be directed into the local fields and in so doing, debris picked up and carried by the flow, is deposited over a manhole cover. This is cleared by the Council's operational services team and does not result in any property flooding. The area around Carn Friars on the A3110 is also susceptible to flooding from surface water run-off and this has, in the past, led to flooding of property at Carn Friars Farm. This has been alleviated by local measures including trenching although the situation is monitoring by the Council's Operational Services team during periods of high rainfall.

The main threat imposed on the Isles of Scilly is from coastal flooding from the Atlantic Ocean at times of high tide and storm. Flooding from the sea defences being over topped is more likely to occur if particularly high tides coincide with bad weather conditions such as high tides and storm surges. High tides (spring tides) occur every month during new and full moon with the largest tides a day or two after the full or new moon around the equinoxes at spring (typically the 20th March) and autumn (typically the 22nd September).

Documentary evidence of the storms is variable, significant events resulting in extensive damage and significant levels of flooding having been recorded during; the "Great Storm of 1744", December 1771, March 1962, the winter of 1989/90 in particular the storm of 16/17th December 1989, Easter 1994, early 1995, October 2004 and the winter of 2013/14 culminating in the storm on 14th February 2014.

The areas which have been the most vulnerable in the past are:

ST. MARY'S

St. Mary's is extremely exposed to waves and swell from westerly, southerly and easterly directions. It covers an area of 6.29 km^2 and the maximum ground elevation is about 49m AOD.

Hugh Town – is located on a narrow isthmus and is extremely vulnerable to storms and high tides from both Town Beach and Porthcressa directions with flooding via road gulleys and the drainage system also occurring at high tides due to tidal locking.

Tidal flooding of the Thoroughfare behind Town Beach (taken from Arup, 2011, report)

Porth Mellon – undercutting of the bank and road along with breaching of the stop-log defence at the top of the slipway at the south western end of the beach. Vulnerability of the dune embankment at the back of the beach and the overtopping of the dunes and sea wall at the north eastern end of the beach.

Porthloo - Erosion, breaching and overtopping of the embankment along the shoreline.

Old Town – Breaching and overtopping of the sea walls and embankment from the Old Town Church around to the old quay at Old Town. Events in this area have also resulted in sea water inundation into the Lower Moors area one of the main sources of freshwater for the island.

Wave impact and flooding at Old Town, 2004 (above)
Old Town Road following storm damage in 1962 (below) (photo courtesy of the Duchy of Cornwall)

Porth Minick – Low lying land behind the embankment at the back of the sand and boulder beach has been flooded by past breaches with the housing estate at Launceston Close being at the limit of the area flooded in the past.

Inundation of the land behind Porth Minick 1989 (taken from Arup 2011 report)

Porth Hellick – Shingle bank protecting the Higher Moors SSSI and one of the island's main freshwater sources, subject to overtopping and erosion.

TRESCO

Tresco is mostly sheltered from the extremes of the wave climate along all its coast except its northerly shore. However the other shorelines are vulnerable to storm surge. It covers an area of 3.0 km^2 and the maximum ground elevation is about 44m AOD.

New Grimsby – The sea front from the quay around to Timothy's corner is protected by a dry stone wall that is subject to overtopping. The extension of the wall at Timothy's Corner is less substantial than the main wall and has been demolished by sea action over time with erosion removing the reserve between the road and the cliff. The wall protects access to the quay, residential properties and the road behind it contains the main sewer and water main.

The seawall at New Grimsby, 2016

Flying Boat Club – the sea frontage is vulnerable to the surge that travels along the channel between Tresco and Bryher.

Appletree Bay – The original roadway, supported on beams off the top of the reinforced concrete sea wall was destroyed during storm activity and has been abandoned with the road diverted further inland. The risk of breaching of the sea wall could result in flooding through the Abbey Gardens to the Abbey Pool and the isolation of the southern end of the islands where there is the quay providing the only low water access to the island.

South Dunes Complex – A dynamic dune complex subject to considerable erosion and sand removal. There is a vulnerable low point at the point of entry of the BT communications cable into the island.

Pentle Bay – the dune complex behind Pentle Bay is vulnerable to erosion although this is a dynamic system that appears to quickly re-establish itself.

Old Grimsby, Sea Garden Cottages – a bank and beach front properties offers protection to the low lying area behind.

BRYHER

Bryher is particularly exposed to waves and swell along its south western and western shores. But its eastern shore line is also vulnerable to storm surge. It covers an area of 1.3 km^2 and the maximum ground elevation is about 42m AOD.

Great Pool Area (Little Popplestones, Great Popplestones, Stinking Porth, Great Porth) – The Pool of Bryher and Popplestone Bank SSSI area is vulnerable to overtopping and breaching. Overtopping at Little Popplestones threatens the island's water supply.

Green Bay and Bryher Lowlands – Green Bay is vulnerable to the surge and swell that flows along the channel between Tresco and Bryher. The lowlands area behind Green Bay flood via overtopping from both the west and east and will act as a reservoir of salt water due to ground water saturation.

Flooding of the lowland behind Great Porth, 2014 (photo courtesy of Gareth Tibbs)

Town Beach and Church Quay – the banks at the back of the beach have been breached in the past and erosion at the southern end of the bay and north end of Green Bay threatens access to Church Quay

ST. AGNES

St. Agnes is very exposed to the wave climate from all directions, although the uninhabited islands and islets lying to the west can offer some protection from westerly swells. It covers an area of 1.8 km^2 and the maximum ground elevation is about 29m AOD on St. Agnes and 34m AOD on Gugh.

Big Pool SSSI and Lower Town (Periglis, Porth Coose, Porth Killier) – the area is vulnerable to erosion and breaching. Sea water inundation of the area poses a threat to the water supply to the Lower Town area and to the habitat and associated eco-tourism which is dependent on migrating birds flocking to the existing fresh water supply.

Works repairing the bank at Periglis following the 2014 storms (photo courtesy of the Duchy of Cornwall)

Bergecooth – the ram cliff which fronts Troy Town well and a camp site is vulnerable to erosion.

Cove Vean – this is a sheltered cove facing south east. Erosion of the upper beach has previously exposed the armoured mains electricity cable which enters the islands through this bay and feeds the transformer located further inland from this point.

ST. MARTIN'S

St. Martin's is exposed to waves and swell from the north west, north, north east and east. Its southerly and south westerly facing shorelines tend to be well sheltered. It covers an area of 2.2 km^2 and the maximum ground elevation is about 47.8m AOD.

Higher Town Bay – A 700m long dynamic dune system protects the land behind. The western end is vulnerable to erosion which increases the vulnerability of access to the quay at Higher Town

Lawrences Bay – The bay is 600m long and is composed of dune for one half and ram cliff for the other. The ram cliff is vulnerable to erosion and has experienced considerable retreat after recent storms.

Erosion of the ram cliff at Lawrences Bay, 2016

Middle Town Bay / Neck of the Pool – The dynamic dune system here is 600m long and does show evidence of possible erosion but it is dynamic system that repairs itself over time. The dunes protect a freshwater well and a campsite.

5. EXISTING FLOOD DEFENCES ON THE ISLANDS

A number of formal defence structures, including seawalls, embankments and revetments are located across the islands. These are supplemented by sand dunes and banks that have developed as natural features (many of which have been reinforced or had material added to increase their effectiveness). The principal structures are:

St. Mary's

- The quay and harbour walls that provide protection to the north side of Hugh Town and Town Beach.
- The seawall and rock armour at Porthcressa, Hugh Town.
- The seawall at Little Porth, forming a continuation of the defence at Porthcressa.
- The seawall at Old Town, originally built following storms in 1962, but re- built at its eastern end following settlement damage.
- The revetment system and rock armour at Porth Minick, also protecting the hinterland around Old Town.
- The seawall at Town Beach.

Porthcressa Sea Defences after the December 1989 storm (taken from Arup, 2011 report)

Although not formal defences sand dunes and banks to the rear of the following beaches on St. Mary's help to provide defence against coastal inundation:

- Porth Mellon.

Flooding of the slipway at Porth Mellon from 2014
(photo courtesy of the Barefoot Photographer)

- Porth Thomas.
- Porthloo.

Erosion of Porthloo bank following 2014 storms (photo courtesy of Duchy of Cornwall)

- Porth Hellick.

Porthloo, Porth Mellon and Porth Hellick help to protect St. Mary's groundwater supply from saline intrusion, whilst Porth Mellon also provides a defence to St. Mary's industrial estate and the Moorwell waste site.

Tresco

- A seawall and rock armour at the former Island Hotel site, Old Grimsby built to halt erosion of a ram cliff undermining the hotel extension.

The seawall and rock armour at the former Island Hotel site, 2016

- An old seawall at the north end of Appletree Bay.
- The quay and sea wall at New Grimsby.
- The natural dune complex on the south and eastern sides of the islands protects the areas of the Great Pool, Abbey Pool and Abbey Garden.

Erosion of the dunes at the south end of Tresco, 2016

St. Agnes

- Sea defences on St. Agnes include seawall, concrete revetment reinforced embankments, rock armour and erosion control matting at Porth Killier, Porth Coose and Periglis, believed to have been built in 1997.

View from Porth Killier to the Big Pool, 2 weeks after the 2014 storm

- A cribwork of old railway lines containing boulders protecting the area out to Ginamoney Carn between Porth Coose and Periglis.
- The quay wall and rock armour at St. Agnes Quay.
- The slip and sea walls in front of the Turks Head Pub.

Bryher

- Sea defences on Bryher include:
- An old seawall supplemented with rock armour in the 1990s at Great Popplestone.
- A seawall built in the 1960s to protect the Old School House, Great Porth, supplemented with rock armour in the 1990s;
- The remains of a 500m long stone wall protecting the coastal path in Green Bay.
- The natural dune system at Great Popplestone and Little Popplestone protect the island's water supply.
-

The seawall at Great Popplestone (taken from Arup, 2011, report)

St Martin's

There are no formal defence structures on St. Martin's although there are some revetment works undertaken in front of the hotel but behind the quay wall at Lower Town and rock armour has been positioned around the west end of Par Beach to protect the access to Higher Town Quay.

Rock armour at the west end of Par Beach, 2016

Coastal Protection of Archaeological remains

Coastal protection schemes specifically designed to protect archaeological remains are restricted to three locations in Scilly:

- Nornour (Eastern Isles); a low concrete and stone bank at the top of the beach in front of the excavated prehistoric settlement and Roman-British shrine on the south side of the island (built in 1988 by the Royal Marines for the Isles of Scilly Environmental Trust);
- The Garrison (St. Mary's); in the 1990s EH's Historic Properties Workforce (HPR) carried out coastal protection work to prevent erosion of two of the post-medieval batteries on The Garrison. At Lower Benham Battery a mortared granite wall was built in front of the outer face of the original battery wall. Below King Charles' Battery, concrete-filled sacks were used to infill cavities in the cliff-face resulting from undercutting by the sea. Work was also carried out at Colonel Boscawen's Battery (infilling cavities in the cliff-face);
- Cromwell's Castle (Tresco); concrete and stone were used in the 1990s to revet the causeway that provides access from the land to infill cavities undermining walling at the base of the castle (work carried out by HPR).

The 1997 Shoreline Management Plan considered the following sites to be candidates for protection or further protection;

- Nornour; multi-phase prehistoric settlement and Romano-British shrine.
- The Garrison; post–medieval batteries which are part of an internationally important military complex.
- Cromwell's Castle, distinctive 17th century castle which is one of Scilly's best-visited sites.
- Halangy Porth (St. Mary's); Iron Age settlement remains exposed in the relatively low cliff-face and apparently extending some distance inland.
- East Porth (Tean); a late Roman/early medieval midden exposed in the very low cliff-face, part of an important multi-period (Roman-18th century) domestic and ecclesiastical site.
- Pendrathen (St. Mary's); extensive but as yet little understood prehistoric remains in the dune-covered cliff-face.
- Porthcressa (St. Mary's); Bronze Age settlement and Romano-British cist graves in the cliff face.

6. FLOOD MANAGEMENT MEASURES

Notification

The Flood Forecasting Centre (FFC) is a partnership between the Environment Agency and the Met Office combining meteorology and hydrology expertise to forecast tidal and coastal flooding as well as extreme rainfall which may lead to surface water flooding. The FFC provides the following to the council via e-mail, text alert and/or fax:

- Extreme Rainfall Alerts.
- National Flood Guidance Statements.

The Council also receives Severe Weather Warnings from the Met Office via the National Severe Weather Warning Service (NSWWS). These warnings cover a wide area and are therefore not always specific to the Isles of Scilly.

Dissemination of Warnings

Provision of flood warning systems is the responsibility of the Environment Agency. However, the Council of the Isles of Scilly, as a Category 1 responder under the Civil Contingencies Act 2004, has a duty to warn, inform and advise the public in the event of an emergency. To ensure that the public are kept advised well in advance of potential flooding incidents weather is monitored, particularly when there are significant Spring tides. When weather/flood warnings are received, or if felt necessary, precautionary warnings of potential flooding are advertised as follows:

- Council website.
- Community Message Board.
- Tourist Information Office.
- Town Hall.
- Radio Scilly.
- Posters in various locations.
- Where deemed appropriate – door knocking in specific vulnerable areas or in the case of off-islands telephone calls.
- Direct to IOS Fire and Rescue Service.

General flooding advice is provided on the Council website and Z-Cards have been produced and distributed to all households giving information about how to be prepared in the event of an emergency including flood incidents

Flood Response Measures (Pre event)

In addition to warning and informing the public, the Council of the Isles of Scilly will undertake the following as deemed necessary based on the information available to them:

- Additional checks of storm drains (particularly those in known vulnerable flood risk areas).
- Deploy storm boards on the Atlantic Slipway, Thoroughfare and Porth Mellon beach (St. Mary's) as required.
- 1 ton sandbags (kept loaded in storage) are ready to be deployed in Old Town (St. Mary's). A chicane is formed using these bags across Old Town Road (from the corner of Trench Lane and 'Dolphins') leaving the road passable to traffic. Additional bags are placed on site should the need arise to close off the chicane forming a wall and close the road.

Sand bags in storage for deployment at Old Town (taken from Arup, 2011, report)

- If required IOS Fire and Rescue Service will standby to pump out any water that breaches this barrier.
- Sandbag Hugh Town (St. Mary's) pumping station.

Arrangements are in place with local haulage firms for the transportation of sandbags.

Authorities involved in an incident of flooding

The following organisations can be involved in specific action during a flooding event on the Isles of Scilly. Property owners are listed as it is their responsibility to protect their own property from flooding.

- Environment Agency.
- Council of the Isles of Scilly.
- Devon and Cornwall Constabulary.
- Isles of Scilly Fire and Rescue Service.
- South Western Ambulance Services Trust.
- Maritime and Coastguard Agency.
- Utility Companies.
- Property Owners.

Action Lists in the event of a flooding incident on the Isles of Scilly
Environment Agency

The principal actions of the EA are:

- Issue flood warnings.
- Monitor the situation and advise other organisations.

Council of the Isles of Scilly

The principal actions of the Council in response to a flooding incident include:

- Facilitate a multi-agency Joint Operations Centre if required as outlined in the Council's Emergency Procedures Guide (EPG).
- Maintain safe conditions on the roads.
- Put flood warning signs on the highway.
- Organise road closures and traffic diversions.
- Clear blockages of highway drainage systems.
- Flood warning dissemination.
- Environmental health issues – pollution.
- Blocked road channels and gully gratings - street cleaning.
- Provide temporary accommodation, set up and run rest centres.
- Clearing blockages in mains sewers.
- Repairing burst mains and sewage systems.
- Action to protect property from flooding or discharges from the mains sewerage systems.
- Provision of fresh water supplies.
- Arranging special refuse collections of flood waste.
- Where a major incident is declared the Council will carry out their role as outlined in the Devon, Cornwall and Isles of Scilly Local Resilience Forum (LRF) Combined Agency Emergency Response Protocol (CAERP).

Devon and Cornwall Constabulary

The principal actions of the Police are:

- Protection of life and security of property (where practicable) in affected areas.
- Co-ordination of the initial control of response activity in affected areas.
- Traffic control (if required).
- Notification of other emergency services.
- Controlling evacuation where required.
- Casualty bureau (if required).
- Where a major incident is declared the police will take the full co-ordination role as outlined in the Devon, Cornwall and Isles of Scilly LRF CAERP.

Isles of Scilly Fire & Rescue Service

The principal actions of the Fire and Rescue Service are:

- Rescue of trapped persons.
- Recovery of deceased in consultation and co-operation with the Police.
- Dealing with any fires or chemical hazards.
- Assistance with pumping out of properties.
- Where a major incident is declared the fire service will carry out their role as outlined in the Devon, Cornwall and Isles of Scilly LRF CAERP.

South Western Ambulance Services Trust

The principal actions of the Ambulance service are:

- To remove casualties to designated hospitals.
- Set up casualty clearing stations as required.

- Arrange any medical assistance as required.
- Act as the 'gateway' to other health services.
- Where a major incident is declared the Ambulance service will carry out their role as outlined in the Devon, Cornwall and Isles of Scilly LRF CAERP.

Maritime and Coastguard Agency (MCA)

The MCA will (subject to maritime search and rescue operations):

- Respond to emergency flooding incidents when requested by local authority or police.
- Rescue where both MCA training and equipment allow;
- Assist the local population where a need is identified and MCA involvement is justified.

Utility Companies
The principal actions of the utility companies are:

- Attend to emergencies relating to their service at properties putting life at risk as a result of flooding.
- Attend to flooding emergencies at their own service installations.

Property Owners

The principal actions of owners of property at risk of flooding or which is flooded are:

- Prepare a personal emergency plan.
- Move to a safe area if life is at risk.
- Prevent water from entering property if possible.
- Switch off electricity and gas at supply.
- Move valuable possessions above floor areas liable to be flooded.

This is not an exhaustive list as there are other agencies whose services would be activated as required including voluntary agencies both medical and community based.

Evacuation and shelter

National guidelines suggest that the public should be encouraged to shelter unless there is a clear and obvious danger to life. A decision to evacuate would be taken by the Police Incident Commander with advice from other responding agencies. Any evacuation would be undertaken in accordance with the Devon, Cornwall and Isles of Scilly LRF CAERP.

If the decision is made to evacuate properties as a result of flooding, the Council will, if required, open a designated Rest Centre in accordance with the Council's Rest Centre Plan.

Recovery

If required a Recovery Team may be formed to manage recovery and restoration to normality following an incident of flooding. The Chief Executive and members of the Council's Crisis Management Team will agree the need for and composition of the Recovery Team.
Issues may include:

- Co-ordination of support to the wider community.
- Temporary accommodation.
- Facilitation of a Humanitarian Advice Centre (advice and information such as insurance, legal advice, co-ordination with utility providers).
- Waste management.
- Co-ordination of repairs to Council owned/leased property.
- Compilation of appropriate claims, e.g. Bellwin Scheme.
- Management of relief funds.

Evacuation and Reinforcement

The Isles of Scilly Reinforcement Plan has been developed by the LRF Reinforcement Task and Finish Group. This plan details the arrangements for supplementing and supporting the workforce and emergency teams in the event of an emergency requiring mutual aid support. This Plan also details the method of requesting military aid which could be required should it be necessary to evacuate the islands.

The Rest Centre Plan by the Council of the Isles of Scilly identifies buildings which may be suitable for such use and outlines the necessary procedures for the provision of Rest Centres and welfare support for inter and intra island evacuees. Evacuation Assembly Points (EAPs) should be identified by the Police, perhaps in conjunction with other relevant responding agencies, as necessary, to achieve a controlled and co-ordinated evacuation of the area. The Council of The Isles of Scilly should be advised of these locations immediately. Management of the EAPs will be led by the Police with the assistance of other relevant agencies.

Rest Centres currently identified on the islands are;

ST. MARY'S; Airport, Town Hall, Chapel Hall, Church Hall, Mundesley Boarding House, Children's Centre Carn Thomas, Cadet Hut, Scillonian Club, Masonic Hall, Five Islands School, Sports Hall, Golf Club.
ST. AGNES; Community Hall
BRYHER; Community Centre
TRESCO; Community Hall
St. Martin's; Community Centre

7. FLOOD RISK ON THE ISLANDS

7.1 CURRENT IDENTIFIED RISK

The risk from fluvial and pluvial flooding is considered to be extremely low. There have been no significant past local events from surface water and groundwater. The water reservoirs on the islands are all significantly below the risk threshold size.

The only significant threat of flooding to the Islands is from coastal flooding. There is the potential for coastal flooding when the tides are particularly high and if they coincide with bad weather conditions such as high winds and wave surges. Properties at or below sea level are most at risk.

The Shoreline Management Plan (SMP2) provides an assessment of risks associated with coastal processes and presents a policy framework to address the risks to people and the developed, historic and natural environment. A mid-term review of the SMP2 was completed in 2016 to reassess what were the most appropriate actions to focus on to achieve real progress in managing change on the coastline. Taking account of subsequent information and progress against the SMP2 action plan the mid-term review identified a prioritised list of actions and forms the basis for defining policy and developing the evidence for funding sea defence works.

The SMP2 considers objectives, policy setting and management requirements for three main epochs; from the present day, medium-term and long-term, corresponding broadly to time periods of 0 to 20 years, 20 to 50 years and 50 to 100 years respectively. The policy options applied in the SMP2 are:

- **No Active Intervention (NAI)** – a decision not to invest in providing or maintaining defences or natural coastline

- **Hold The Line (HTL)** – maintain or upgrade the level of protection provided by defences or natural coastline

- **Managed Realignment (MR)** – manage the coastal processes to realign the natural coastline configuration, either seaward or landward, in order to create a future sustainable shoreline position.

Those areas with a policy of HTL or MR within the plan are outlined below. Full details are of individual policy units are documented in the SMP2 Mid Term Review, Royal Haskoning DHV, 2016.

St. Mary's

The key risks are focused around the main development areas of Hugh Town and Old Town and the critical nature of the two freshwater supply areas at Lower and Higher Moors along with the increasing vulnerability of St. Mary's to sea level rise and increased storminess.

HTL Areas:

- The Mermaid Wall
- The Quay
- The Quay to Carn Thomas
- Porth Mellon
- Porth Hellick

- Porth Minick
- Old Town Slip to Old Town Church
- Porthcressa (Playground to Sally Port)

MR Areas:

- Porthloo

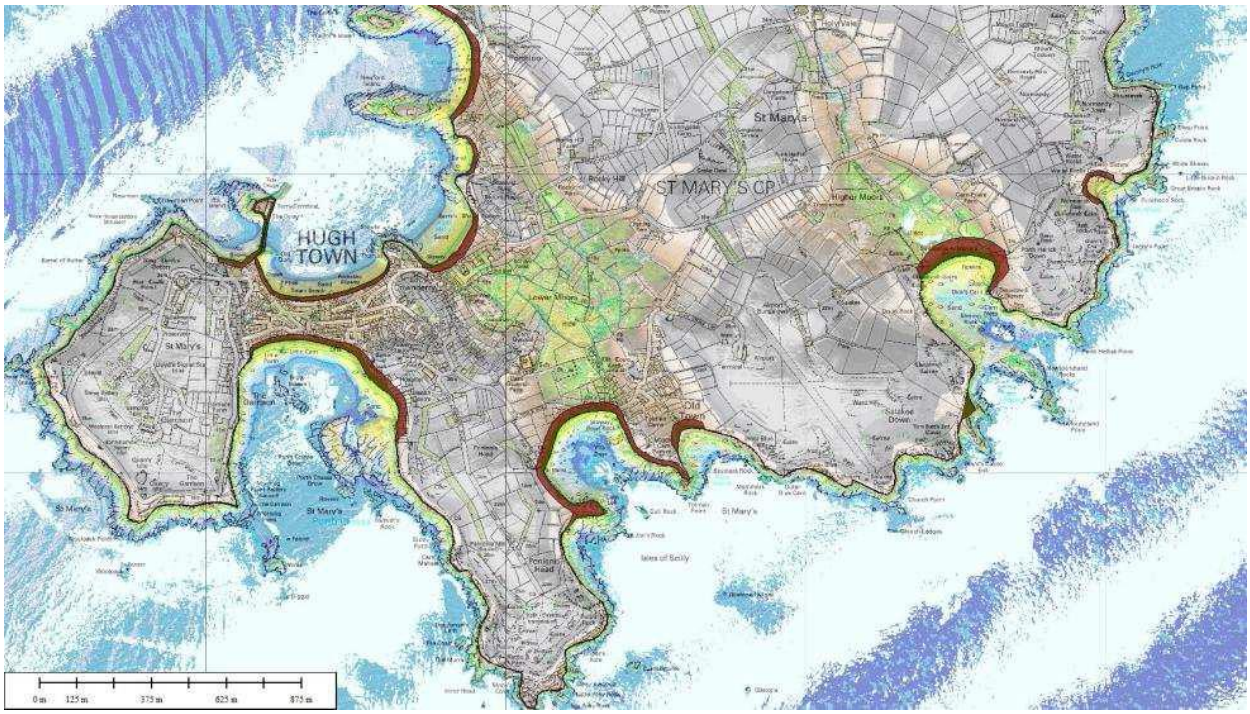


Figure 2 – St. Mary's SMP2 data showing vulnerable low lying areas (green/yellow) and potential areas of erosion brown) over the next 100 years

Tresco

The SMP2 recognises the important landscape value of the coastline with an aim, wherever possible to maintain the natural evolution of the shoreline. The increasing pressure on the sea front at New Grimsby is identified along with the need for adaption of the coastline over a longer term at Old Grimsby.

HTL Areas:

- New Grimsby
- Ravens Porth
- The potential for localised areas of HTL within areas in the southern half of Tresco is also noted.

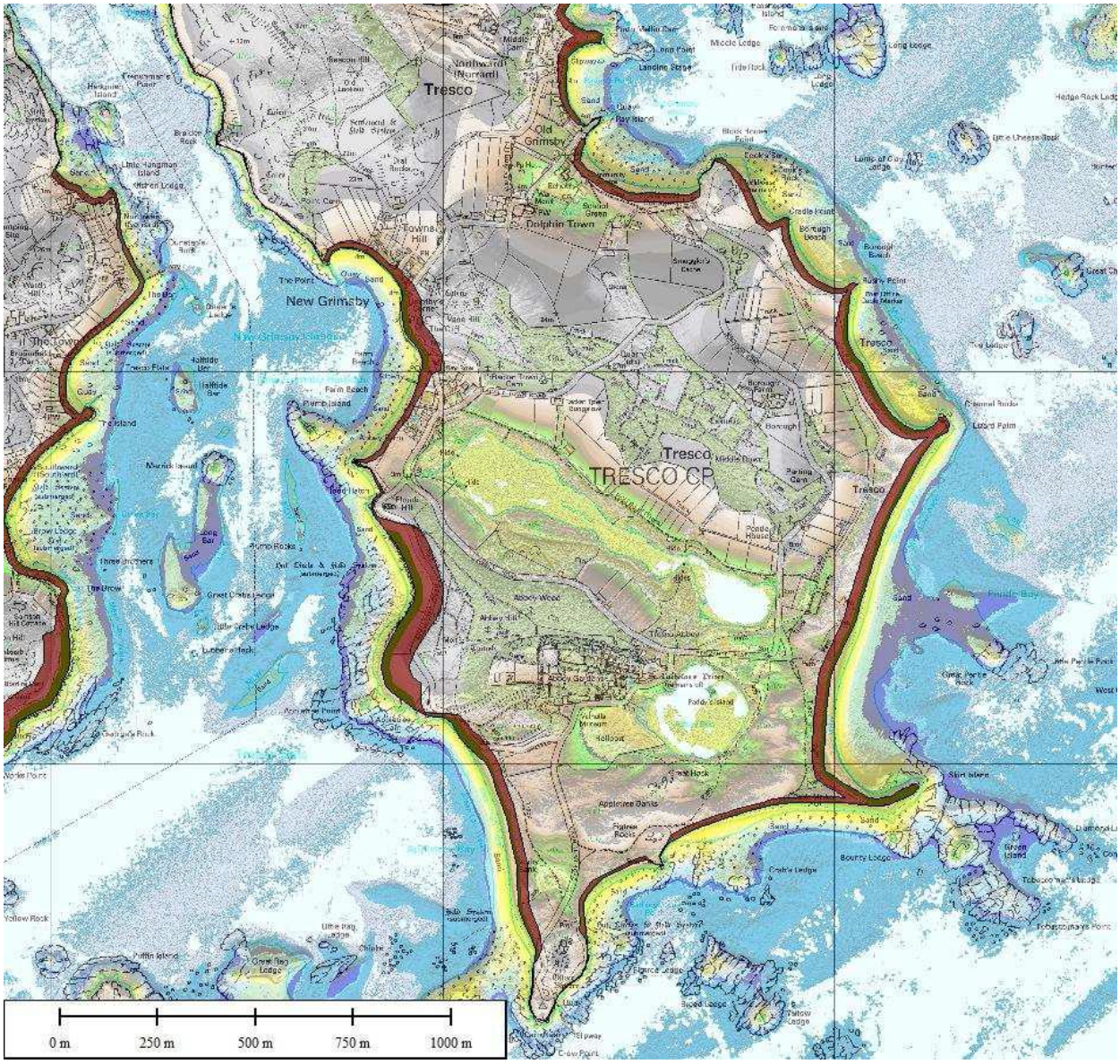


Figure 3 – Tresco SMP2 data showing vulnerable low lying areas (green/yellow) and potential areas of erosion brown) over the next 100 years

Bryher

The SMP2 policy is steered by the need to maintain the natural character of the island and maintaining the natural function of its ecological system. The main settlement areas tend to be on higher ground and naturally protected. Policy identifies the desire to sustain assets such as the Hotel to the back of the Great Pool , which is considered as important to the economy of Bryher, and by protecting freshwater supplies from saline intrusion.,

HTL Areas:

- Great Porth
- Great Popplestones
- Little Popplestones

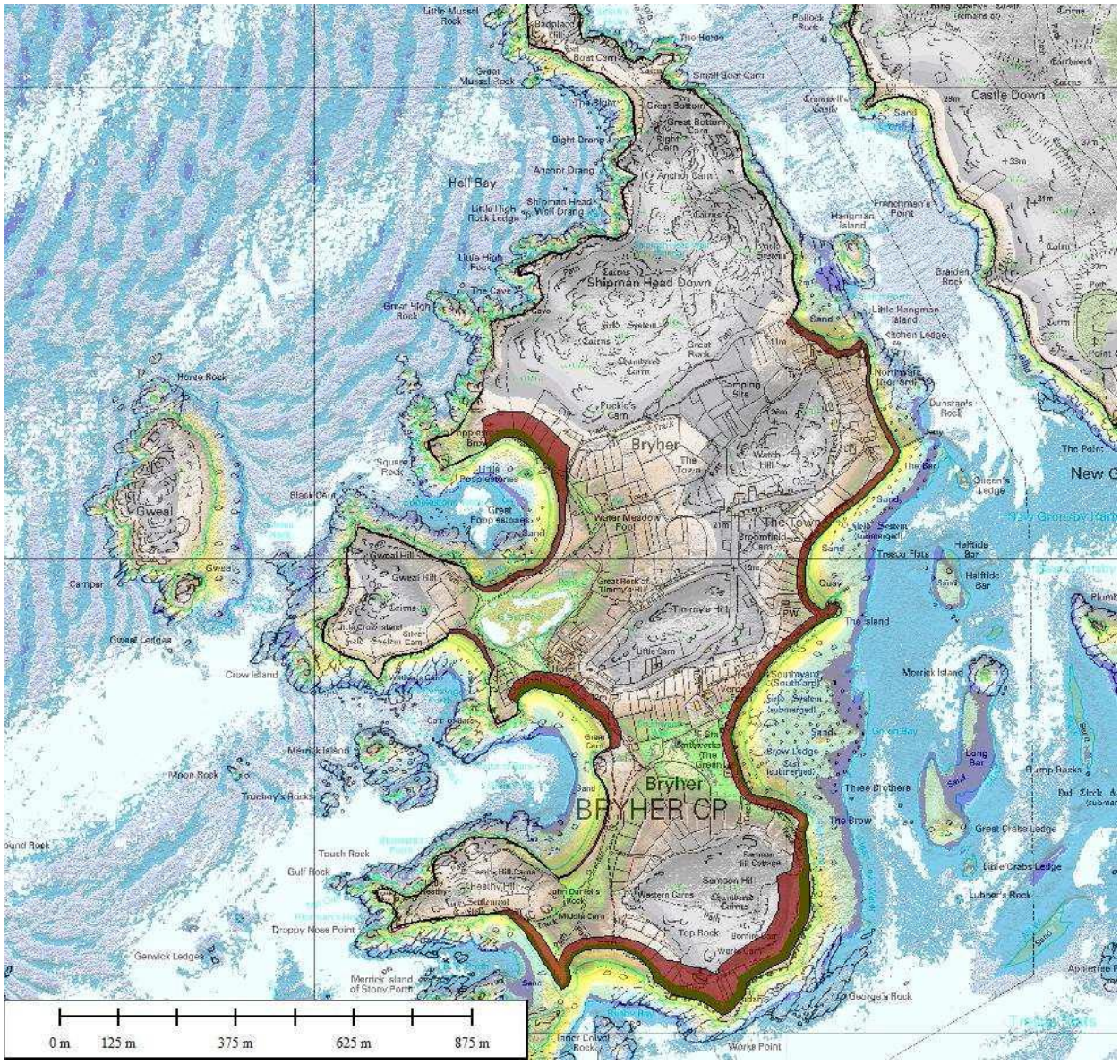


Figure 4 – Bryher SMP2 data showing vulnerable low lying areas (green/yellow) and potential areas of erosion brown) over the next 100 years

St. Agnes

The main issue identified in the SMP2 focussed on the area of the Big Pool, to the north of the island, identifying the risk from erosion and inundation and possible saline contamination of drinking water supply. However, the SMP also goes on to highlight that "for a longer term perspective it may be necessary to consider how this is done and whether it is technically sustainable into the future". The plan highlights that the drinking water issues need to be considered in more detail as part of an overall strategy into fresh water supply security for the entire archipelago.

HTL Areas:

- St. Agnes Quay to the Bar
- Periglis Slip to Browarth Point
- Browarth Point to Kallimay Point (Localised HTL)

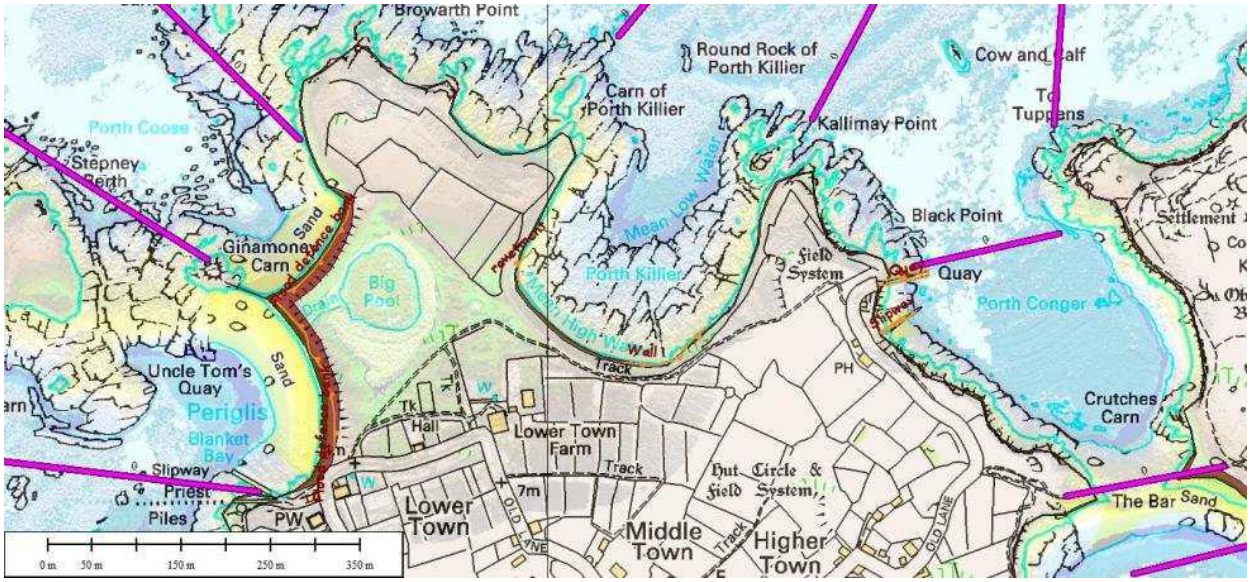


Figure 5 – St. Agnes SMP2 data showing vulnerable low lying areas (green/yellow) and potential areas of erosion brown) over the next 100 years

St. Martin's

The overall intent of the policies within the SMP2 for St. Martin's are to maintain and allow enhancement of the natural environmental landscape. The original policy of NAI developed in the original SMP in 1997 is continued. There is the potential for localised areas of HTL where sea defence works are required to ensure access to the quays

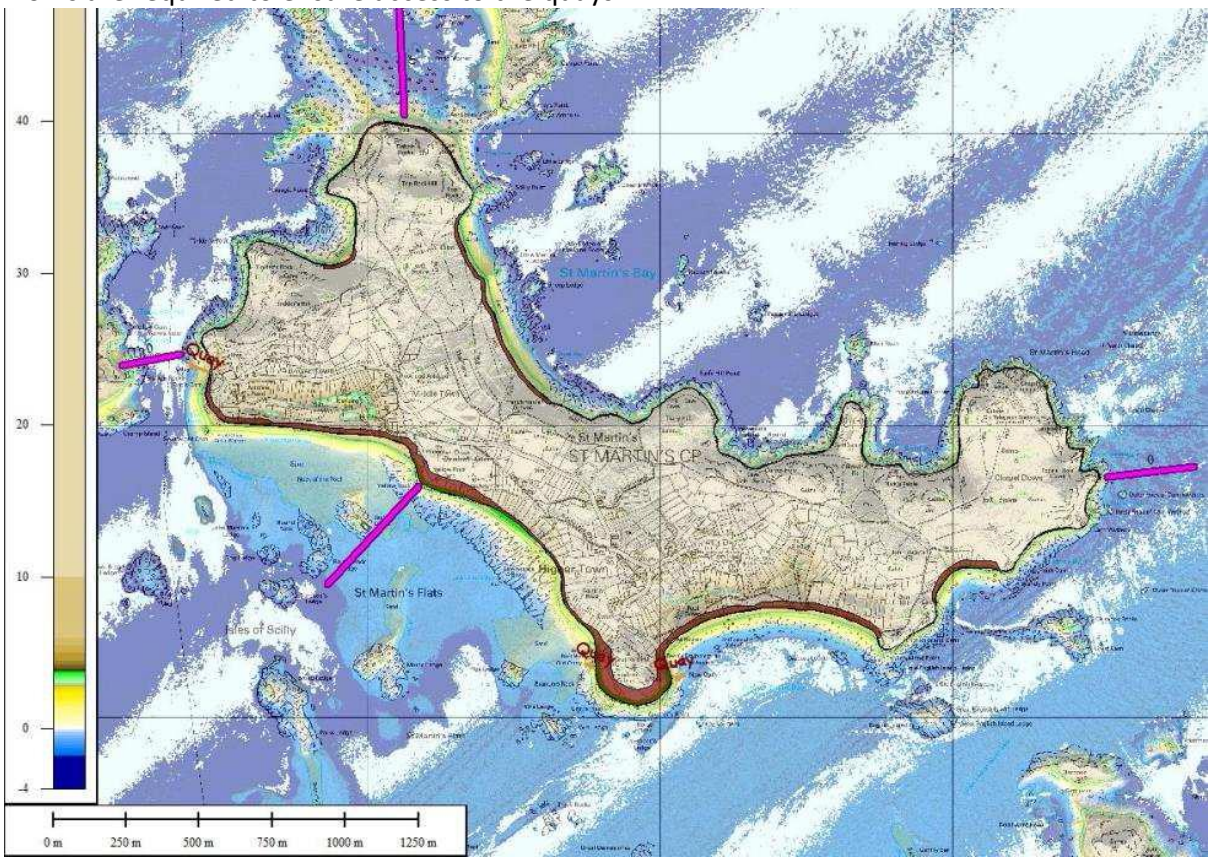


Figure 6 – St. Martin's SMP2 data showing vulnerable low lying areas (green/yellow) and potential areas of erosion brown) over the next 100 years

7.2 CLIMATE CHANGE – INCREASED RISK

The Council of the Isles of Scilly Climate Change Strategy, 2011, reports that the projections for the South West region of the UK indicate that the islands will be exposed to;

- Warmer drier summers
- Milder wetter winters
- Rising sea levels – with the south west experiencing increased rates of rise compared to the rest of the UK

In addition the area will be subject to more extremes;

- More intense downpours of – both in terms of volume and frequency
- Shorter return periods for high water levels at the coast
- Storm surge levels are predicted to exceed current levels
- Offshore waves average annual wave heights are predicted to increase by 1m by 2080.

These projections suggest that;

There will be an increased likelihood of surface water and ground water flooding in the future. There will be a requirement for improved drainage systems across the islands to protect property and infrastructure. Highway drainage systems may need upgrading or increased maintenance. Soil management and land management techniques will need to be adapted to ensure suitable irrigation of crops and farmland. This has further potential to impact on surface water and groundwater flooding

The shorter return periods for high water levels will also increase the likelihood for the occurrence of tidal locking. This will put further strains on the general land drainage and highway drainage systems. It may be necessary to set aside specific sites for storing flood waters and to improve methods of conveying pluvial storm water to drains or the coast.

The higher frequency and ferocity of storm events will increase the severity and incidence of tidal flooding events and the rates of coastal erosion. The maintenance and strengthening of existing defences, both man-made and natural, will be important to protect property and critical infrastructure. It is not viable to continually raise the height of sea defences around the islands. Therefore, it will be important for the islands to adapt to flooding by developing effective mitigation measures; this needs to involve improving recovery activities and accepting that flooding will occur. This could involve drainage systems to direct flood waters and the identification of appropriate sites for containing those flood waters during storms prior to their release at times of low tide or when the storm event abates.

The Leat at Big Pool, St Agnes developed to release sea water from the area after flood events

The areas at increased risk from these climate change impacts are the vulnerable sites affected by past flooding events, see Section 7, in particular the densely populated areas and sites of critical infrastructure at Hugh Town, Porth Mellon, Porthloo, Porth Hellick and Old Town on St. Mary's, New and Old Grimsby on Tresco, the Big Pool on St. Agnes, Popplestones on Bryher and in relation to quay access on all the islands.

Overtopping of Mermaid Sea Wall, 2014 (photo courtesy of the Duchy of Cornwall)

7.3 RISK TO CRITICAL INFRASTRUCTURE

The critical infrastructure sectors delivering essential services are:

- Water and sewerage (water sources including boreholes, wells and the desalination plant, distribution and outfall networks including pipelines and pumps and treatment works including septic tanks)
- Waste (rubbish collection and disposal and waste sites)
- Communications (telecom networks)
- Energy (electricity network and diesel and gas supplies)
- Emergency services (police, fire, ambulance, lifeboat, coastguard operational ability; ability to undertake evacuations)
- Health (access to hospital/medical support, provision of social care)
- Transport – on island, inter island and with the mainland (roads, footpaths, shipping, airport)
- Food (ability to get supplies to/between islands)
- Finance (economic impact for local business, tourism)
- Education (ability to access/operate school and higher education)
- Government (ability for local government to operate).

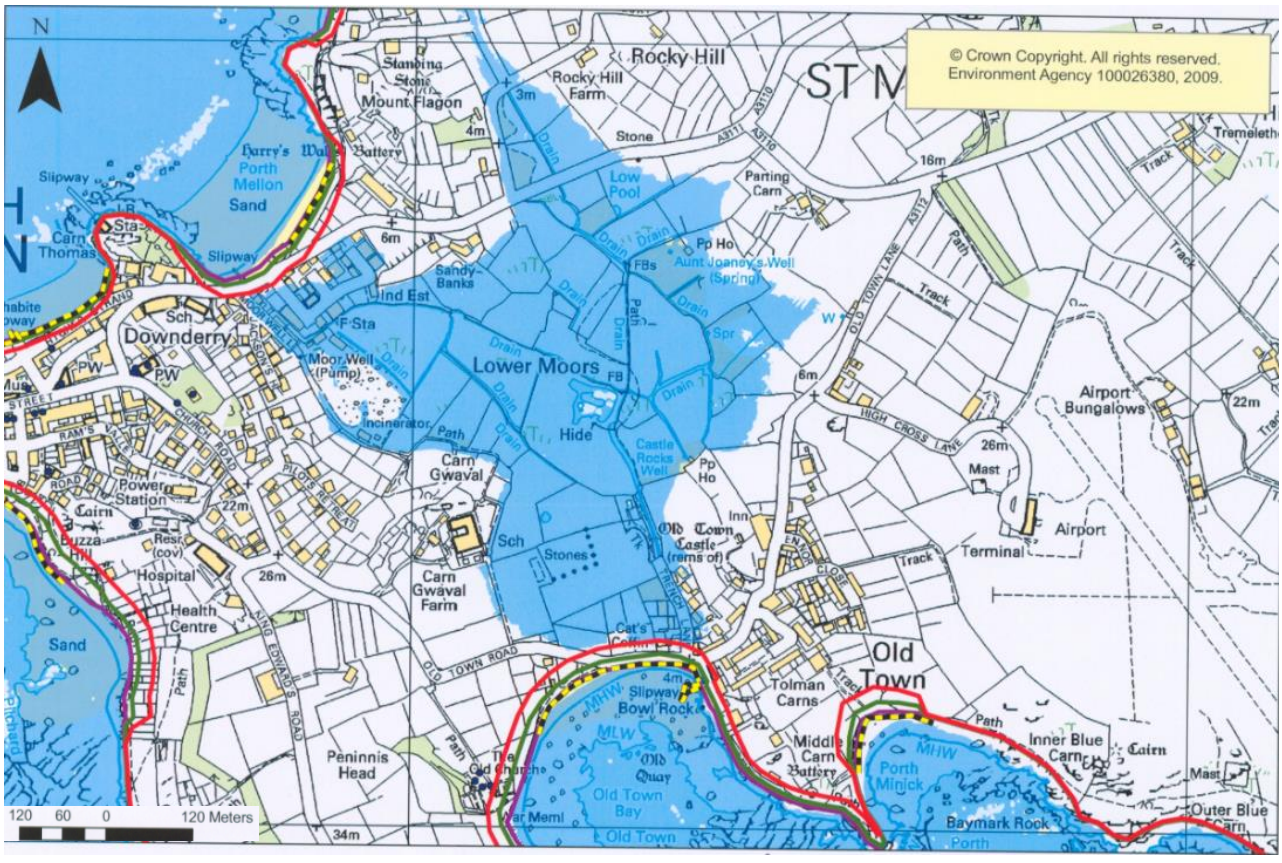
Due to the geographical situation of the islands if any part of the infrastructure is subject to flooding then it is not possible to defer services to another provider in a neighbouring authority or supplier. This isolation also means that all the services are co-dependent on each other, e.g. without access to the quay there will be no diesel supplies and it would not be possible to generate electricity locally, without electricity the desalination plant will not work and there will be insufficient fresh water supply. Consequently it is important that the risk to critical infrastructure is minimised and that the extent and time duration of any disruption is kept to a minimum.

Key critical infrastructure locations that are vulnerable to flooding and coastal erosion are identified below;

Service	Location	Description
Water and Sewerage	St Mary's; Lower and Higher Moors.	Groundwater abstraction wells.
	St Mary's; Pelistry ledges and coastline below Mount Todden Down.	Desalination plant sea water abstraction boreholes and floating inlet with land connections.
	St Mary's; Hugh Town, Old Town, Porth Mellon, Porthloo.	Mains water supply.
	St Mary's; Hugh Town and south east Garrison shore to Morning Point.	Mains sewerage and pump station (located behind Bishop and Wolf).
	St Mary's; Old Town.	Mains sewerage and bio bubble treatment plant.
	Tresco; New Grimsby Palace Row to Timothy's Corner.	Mains water supply and sewerage.

	Bryher; Great Pool to Popplestones and surrounding area.	Groundwater abstraction wells and water treatment plant.
	St Agnes; Big Pool and surrounding area.	Ground water abstraction wells and freshwater acquifer.
	St Agnes; Island Hall.	Bio Bubble treatment plant.
Waste	St Mary's; Porth Mellon / Moorwell.	Islands' waste management and recycling site.
Communications	Tresco; South Dunes. St Agnes; south west end of the Bar.	Telecommunications link for the islands.
	St Mary's; Porthcressa.	Subsea fibre broadband cable link to the islands.
Energy	St Mary's; Porthcressa, Bar St Martins; Neck of the Pool, Old Quay. Tresco; New Grimsby, Pentle Bay, Rushy Porth. Bryher; Town Beach.	Sites of undersea electricity cable landing points.
	St Mary's; Little Porth, Porthcressa, Porth Mellon, Trench Lane. Bryher; Church. St Agnes; Lower Town/Pereglis.	Electricity Substations.
	All islands; Quays.	For diesel and bottled gas delivery and access by service engineers.
Emergency Services	St Mary's; Porth Mellon Business Park.	Fire and Ambulance stations.
	St Mary's; Town Beach sea wall for The Strand to the Lifeboat slip.	Access to the Lifeboat station.
Health	St Mary's; Park House, Hugh Town.	Care Home offering residential care, respite care and day care for older people.
Transport – on island	St Mary's; Hugh Street, Hugh Town.	Access to the main harbour and quay.
	St Mary's; The Strand.	Beachfront principal highway out of Hugh Town connecting to the rest of St Mary's.
	St Mary's; Porthloo.	Only road access to Porthloo and site of the principal boat park and associated maritime businesses.
	St Mary's; Porth Mellon (south west end).	Principal highway connecting the administrative centre of Hugh Town to the rest of the island.
	St Mary's; Old Town.	Beachfront principal highway connecting Hugh Town to Old Town.
	Bryher; Church Quay access.	For access and supplies to and from the quay.

	Tresco; New Grimsby.	Beachfront road from New Grimsby quay to the Flying Boat Club, for access and delivery of supplies.
	Tresco; Carn Near Road.	For access to the low water quay at Carn Near.
	St Martin's; Higher Town Quay access.	For access and supplies to and from the quay.
	St Agnes; Quay to Turks Head Pub.	For access and supplies to and from the quay.
Transport – off island and to the mainland	All islands; Quays.	For access and supplies to, from and between the islands.
Food	All islands.	These services are dependent on the functionality of the critical infrastructure elements addressed above.
Finance		
Education		
Government	St Mary's, Hugh Town, Town Hall.	The administrative centre for the islands and the proposed site for the Emergency Planning Centre in the event of an incident.



Tidal Flood Risk Area; St Mary's, Lower Moors Area – showing predicted extent of still water flooding in 2105 The impact of storm surge and wave energy would significantly increase the predicted flood risk area and the impact on critical infrastructure in the area (the red line indicates the predicted extent of erosion)

8. VISION FOR LOCAL FLOOD RISK MANAGEMENT

UNDERSTAND THE AREAS THAT FLOOD

This will be achieved by;

1. Increasing the amount of evidence about local flooding that is collected and use it more wisely

- Collect and review flood risk information.
- Monitor and record the condition and location of coastal defences.
- Maintain and review drainage solutions for highways, land management purposes and integrity of fresh water sources.

2. Improving Flood Risk Mapping over the islands.

- Develop and publish surface water and groundwater flooding maps as part of a wider flood water mapping exercise.
- Map coastal flooding and erosion rates.

We will know we are achieving this when there is a comprehensive suite of flood risk maps that help inform the flood risk management strategy as well as other plans and activities across the islands.

MANAGE THE FLOOD RISK IN THE ISLES OF SCILLY

This will be achieved by;

1. Creating a prioritised programme of capital flood risk management works.

- Prioritise schemes to a set of criteria agreed by partners and the Environment Agency based on criteria such as social, economic and environmental factors.
- Use selection criteria to decide where funding should come from, which schemes will be built and what are the mitigation needs for those areas where schemes are unlikely to be built.
- Select schemes to be submitted for consideration for inclusion in the Medium Term Plan for approval by the SW Regional Flood and Coastal Committee where they can attract Grant in Aid or Local Levy funds.

2. Encouraging best practice for the maintenance of assets and preventing inappropriate development thereby avoiding an increased flood and coastal erosion risk.

- Work with developers and Planning Department to decide what acceptable development in areas of flood risk is; recognising that land is limited and although these areas would ideally be avoided there may be social or economic reasons for their development.

- Significant flood defence assets will be added to the Asset Register to ensure they can be managed appropriately and considered as part of future solutions.

3. Continued working to improve surface water drainage

- Work on smaller schemes with highway maintenance, landowners and developers towards the adoption or development of sustainable drainage schemes

4. Reducing flood risk through improved warnings, local scale works and local resilience

- Risk reduction can be achieved through improved awareness and response to flooding to reduce the impacts when it does occur.
- Work with the EA to deliver warnings, improve awareness of flooding risks, increase local resilience and direct people to self-protection of their property.

5. Continue to monitor and develop the approach to flood risk management

- Use the Coastal Monitoring Programme data to assess long-term coastal change.
- Periodically review, update and act on recommendations from work on flood risk management, including the Shoreline Management Plan 2 reviews and future updates, this strategy, local flood risk and erosion maps etc.
- Review and act on recommendations from Defra and the EA on flooding and coastal change policy, the UK Climate Change Projections and the Intergovernmental Panel on Climate Change as that information becomes available.

We will know we are achieving this when flood risk is managed so that no new flood risk is created, existing flood risk is reduced wherever possible and up to date resilience plans are in place to ensure that the social and economic impact of flood incidents are minimal in terms of financial cost and duration of disruption.

ENABLE PEOPLE, COMMUNITIES, BUSINESS AND PUBLIC BODIES TO WORK TOGETHER MORE EFFECTIVELY

This will be achieved by;

1. Improving communications between communities and public bodies.

- Ensure that information in the public domain is kept up to date and is clear and descriptive as possible. Explain what works are being carried out and why.

2. Information sharing to improve awareness of flood risk.

- Raise community awareness. Flood risk cannot be removed but it is possible to help prepare individuals and communities by providing the right information to those who need it, when they need it.
- Local resilience work will identify those at risk and help them prepare for flood risk and provide support and assistance, especially for vulnerable people.

3. Continued partnership working with Environment Agency.

- To continue to work with the EA to ensure that flood and coastal erosion risk management processes are effective on the islands.

4. Seeking the best ways of enabling partnership funding for schemes.

- Collaborative working and joint funding across stakeholders will be key to maximising the return on investment in flood risk management.
- Sourcing other external sources of funding which could be used for flood risk management. Making it possible for communities and businesses to make their own contributions.

We will know we are achieving this when there is a common understanding of issues, risks and opportunities and these are used to align priorities, funding and delivery across the islands.

HELP RESIDENTS BOTH DURING AND AFTER FLOOD EVENTS TO RECOVER AS QUICKLY AS POSSIBLE AFTER INCIDENTS

This will be achieved by;

1. Continued flood event planning with other emergency responders.

- Cornwall Devon and IoS local resilience forum continues to develop, appraise and revise emergency plans to take account of local factors and developing information on flood risk.

2. Improving community resilience.

- Residents and communities need to harness local resources and expertise to help themselves in the event of emergency but in such a way that it compliments and enhances the emergency services capabilities.
- Engage and develop community resilience and help people protect themselves and their property by making their homes and businesses more resilient to flooding.

We will know we are achieving this when those living and working in areas at risk are involved in resilience initiatives, and when householders, businesses and communities better understand and manage any flood risks they face.

SEEK ENVIRONMENTAL BENEFIT FROM FLOOD MANAGEMENT INTERVENTIONS

This will be achieved by;

1. Working with natural processes wherever possible to manage flood risk.

- Ensure flood risk management takes due regard of the Water Framework Directive (2000) requirements to enhance the natural water environment.
- Implementation of flood management measures that seek to create and enhance habitats.
- Increase the resilience of the natural environment by integrating the needs of different features and addressing all aspects of ecosystem structure and function when implementing flood management measures.

We will know we are achieving this as the adaptation and mitigation approaches used build more resilience into the natural landscape.

9. REFERENCES

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APPENDIX 1 – Flood Incident Reporting Form

Council of the
ISLES OF SCILLY

Please Return Form to;
Planning and Infrastructure Department
Town Hall, St Mary's
Isles of Scilly. TR21 0LW

FLOOD INCIDENT RECORD

ADDRESS OF FLOOD LOCATION (IF NOT A PROPERTY, PLEASE EXPLAIN LOCATION IN COMMENTS BOX BELOW):

DATE / TIME OF FLOOD EVENT ____ / ____

No | STREET | POSTCODE

HAVE YOU ANY DETAILS ABOUT PREVIOUS FLOOD EVENTS IN THIS LOCATION? EG PREVIOUS DATES, EXTENT OF FLOODING.

FLOOD WATER DETAILS:

NUMBER OF HOUSES / BUILDINGS AFFECTED BY FLOODING ☐

PLEASE GIVE APPROXIMATE DEPTHS OF FLOODING FOR THE FOLLOWING (IF APPLICABLE):

INSIDE HOUSE(S) / BUILDING(S) MAX DEPTH ☐ MM

INSIDE CELLARS MAX DEPTH ☐ MM

PUBLIC OPEN SPACE MAX DEPTH ☐ MM

GARDEN(S) MAX DEPTH ☐ MM

HIGHWAYS MAX DEPTH ☐ MM

IN YOUR OPINION, WHAT WAS THE ORIGIN OF THE FLOOD WATER? TICK RELEVANT BOX(S):

SEA / TIDAL ☐ | SEWERS ☐ | HIGHWAY ☐

FIELDS ☐ | UNKNOWN ☐ | OTHER, PLEASE STATE:

HAVE YOU ANY PHOTOGRAPHS OR VIDEOS OF FLOOD INCIDENT THAT WE MAY VIEW AT A LATER DATE? YES / NO

YOUR COMMENTS (OPTIONAL):

CONTACT NAME (OPTIONAL): **CONTACT NO:**

CONTACT EMAIL:

APPENDIX 2 – The Devon, Cornwall and Isles of Scilly Local Resilience Forum Multi-Agency Flood Plan; Council of the Isles of Scilly Annex

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COUNCIL OF THE ISLES OF SCILLY

Council of the Isles of Scilly Annex

THIS IS NOT A PLAN

THIS ANNEX MUST BE USED IN CONJUNCTION WITH THE DEVON, CORNWALL and ISLES OF SCILLY LOCAL RESILIENCE FORUM MULTI AGENCY FLOOD PLAN

CONTENTS

Section **Page**

MAPS

1. INTRODUCTION

This Annex forms part of the Devon, Cornwall and Isles of Scilly LRF Multi-Agency Flood Plan. It contains material specific to Council of the Isles of Scilly which may not be appropriate to include in the overarching LRF MAFP. This Annex relates to the Local Authority area of the Council of the Isles of Scilly.

1.2 AIM

The aim of this Annex is to set out the detail that is specific to the multi-agency response to a significant flooding incident in the Council of the Isles of Scilly area.

1.4 SCOPE

This document is intended for organisations that would participate in and support, the response and recovery of communities within the Council of the Isles of Scilly area affected by a flood incident.

This Annex contains details of the Council of the Isles of Scilly specific;

- Related and inter-dependant plans
- Communications plans
- Command and control arrangements
- Information about vulnerable people and groups
- Evacuation and sheltering of people (inc Strategic Rest Centres)
- Resources available
- Summary of High Risk Communities for which plans are not available.
- Area-wide mapping showing the location of High Risk Communities and access routes.

1.5 *ORGANISATIONAL RESPONSIBILITIES*

All organisations involved in responding to a flood incident are to make their own arrangements both internally and with outside organisations to ensure that they are able to respond.

1.7 *AUDIENCE*

The intended audience is all organisations that may respond to flooding within the Council of the Isles of Scilly area. This Annex is primarily intended for use at Tactical Coordinating Group, although it may be of use to Strategic Coordinating Group.

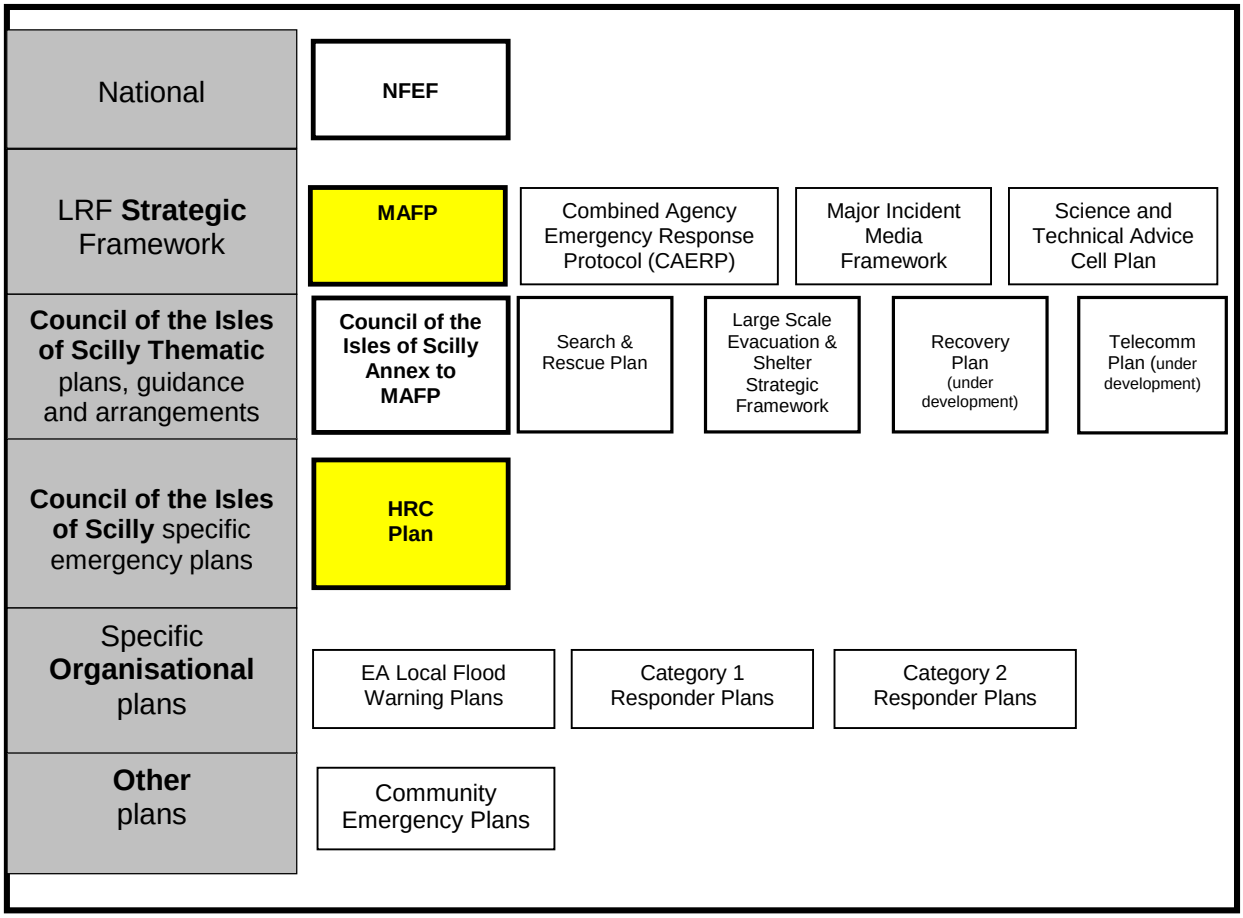
2. RELATED AND INTERDEPENDENT PLANS

2.1 PLANS OVERVIEW

This is the Council of the Isles of Scilly Annex to the Devon, Cornwall and Isles of Scilly Multi Agency Flood Plan. Appended to this Annex is one High Risk Community Plan (under development). These are defined as where the community is at risk from:

a. Major Tidal/coastal flooding affecting more than 100 properties for 1 to 7 days
b. Major fluvial flooding affecting more than 100 properties for 1 to 7 days
c. Communities may also be considered for a High Risk Community Plan, if there are other risk factors such as, high numbers of properties at risk of surface water flooding, flash flooding, or there are other factors which means flooding is likely to have a significant impact.

The list of these locations are contained in **Annex K**. The recommended list of plans will develop over time as more information on risks to particular communities becomes available, particularly in reference to rapid response (flash flooding) and surface water flooding.

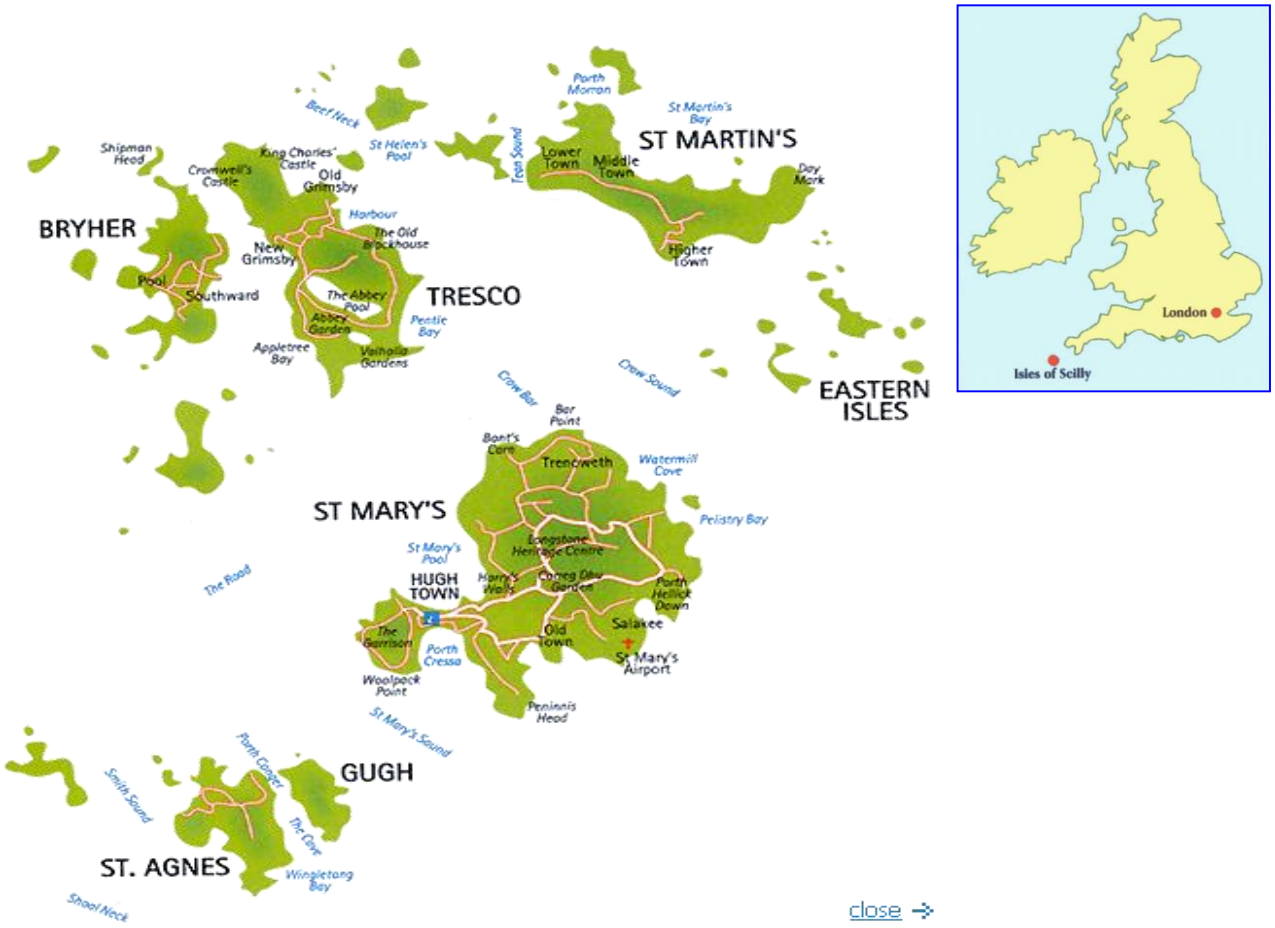


3. COUNCIL OF THE ISLES OF SCILLY COMMUNICATIONS

3.1 LOCAL RADIO STATIONS

BBC Radio Cornwall
Radio Scilly

Map 1 - Reception map for all local radio stations



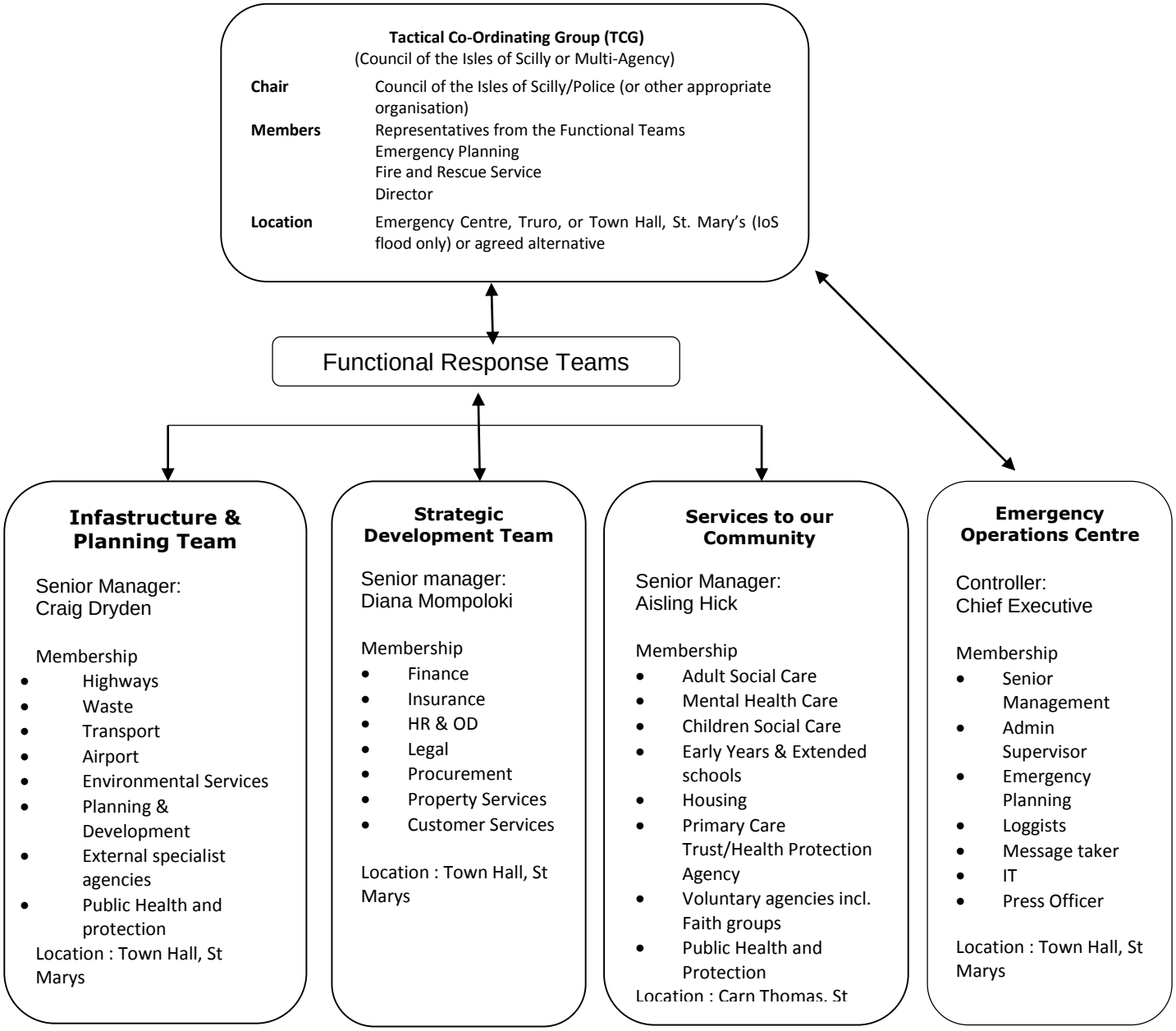
3.2 COUNCIL OF THE ISLES OF SCILLY INTERNAL COMMUNICATIONS

All communications details are contained within the Council of the Isles of Scilly Emergency Procedures and Business Continuity Plans.

4. ROLES AND RESPONSIBILITIES

4.1 Specific roles and responsibilities of LRF partners can be found in **Annex A.** These are in line with those outlined in the Devon, Cornwall and Isles of Scilly Combined Agency Emergency Response Protocol (CAERP) section 3.

4.2 Roles and Responsibilities with the Council of the Isles of Scilly area are outlined in the organisational charts below:



5 COMMAND AND CONTROL

5.1 *COUNCIL OF THE ISLES OF SCILLY*

Council of the Isles of Scilly works within the LRF agreed Command and Control structure:

The scale of the emergency will determine which level of representation is exercised and the location of the commander offices. A local emergency may be managed at Silver Control, whereas if a major emergency is declared which involves a multi-agency response, all of the following liaison arrangements will come into force:

Gold (Strategic Command)

The Chief Executive (or nominated representative), supported by at least one staff officer.

Silver (Tactical Command)

A Local Authority Liaison Officer with the appropriate authority to make tactical decisions on behalf of the Council. The Isles of Scilly Tactical Coordinating Group may be formed to manage events in the Islands, which is likely to operate from the Town Hall, St. Mary's.

Bronze (Operational Command)

A Local Authority Liaison Officer reporting to the 'on scene' Police Incident Commander and will be the first point of contact for advice and deployment of authority resources as well as being the focal point for additional Council staff reporting to the scene (this role will usually be undertaken in the first instance by the Officer: Local Resilience, Planning and coordination.).

6. VULNERABLE PEOPLE AND GROUPS

6.1 *Vulnerable People*

Vulnerable people lists are held and maintained by individual organisations and establishments and will be made available to the SCG upon request. Within Council of the Isles of Scilly these lists are held by:

Adult and Childrens Services

6.2 *Vulnerable Group Locations*

Detailed locations of facilities / buildings for vulnerable groups (e.g. schools, nurseries, care homes) but not individuals' homes are contained, where necessary, within the High Risk Communities Appendices. Map 2, 3 & 4, show the location of the High Risk Communities in Council of the Isles of Scilly.

7. EVACUATION AND SHELTERING OF PEOPLE

7.1 *Evacuation and Shelter Plan*

The LRF Large Scale Evacuation and Shelter Strategic Framework details the generic multi-agency arrangements to evacuate, shelter, accommodate and care for people displaced by evacuation.

Specific information in relation to flooding is contained within the High Risk Community Flood Plans and where necessary includes;

7.2 *Rest Centre Plans*

Detailed Rest Centre Plans are held and maintained by Council of the Isles of Scilly and Map 3 & Map 4, shows the location of Strategic Rest Centres within the Council of the Isles of Scilly

As soon as the decision is made to evacuate the Police should request the relevant local authority open rest centres to shelter displaced people.

The decision as to which rest centres will be used will be reached by discussion between the Police and Council of the Isles of Scilly. The Local Authority will organise the appropriate staffing of any rest centres.

7.3 *Transport Arrangements*

If transport, specialist or otherwise, is required by the Police for the evacuation they will ask Council of the Isles of Scilly to arrange this.

All agencies should be aware that roads, which may be required for transporting their own staff or evacuees, may not be passable.

8. HIGH RISK COMMUNITIES

Isles of Scilly

Location	Status
Hugh Town	All Draft as at July 2015