West of Wales SMP2. Review of Coastal Processes and Geomorphology

Appendix C
Coastal Processes

November 2011

Final

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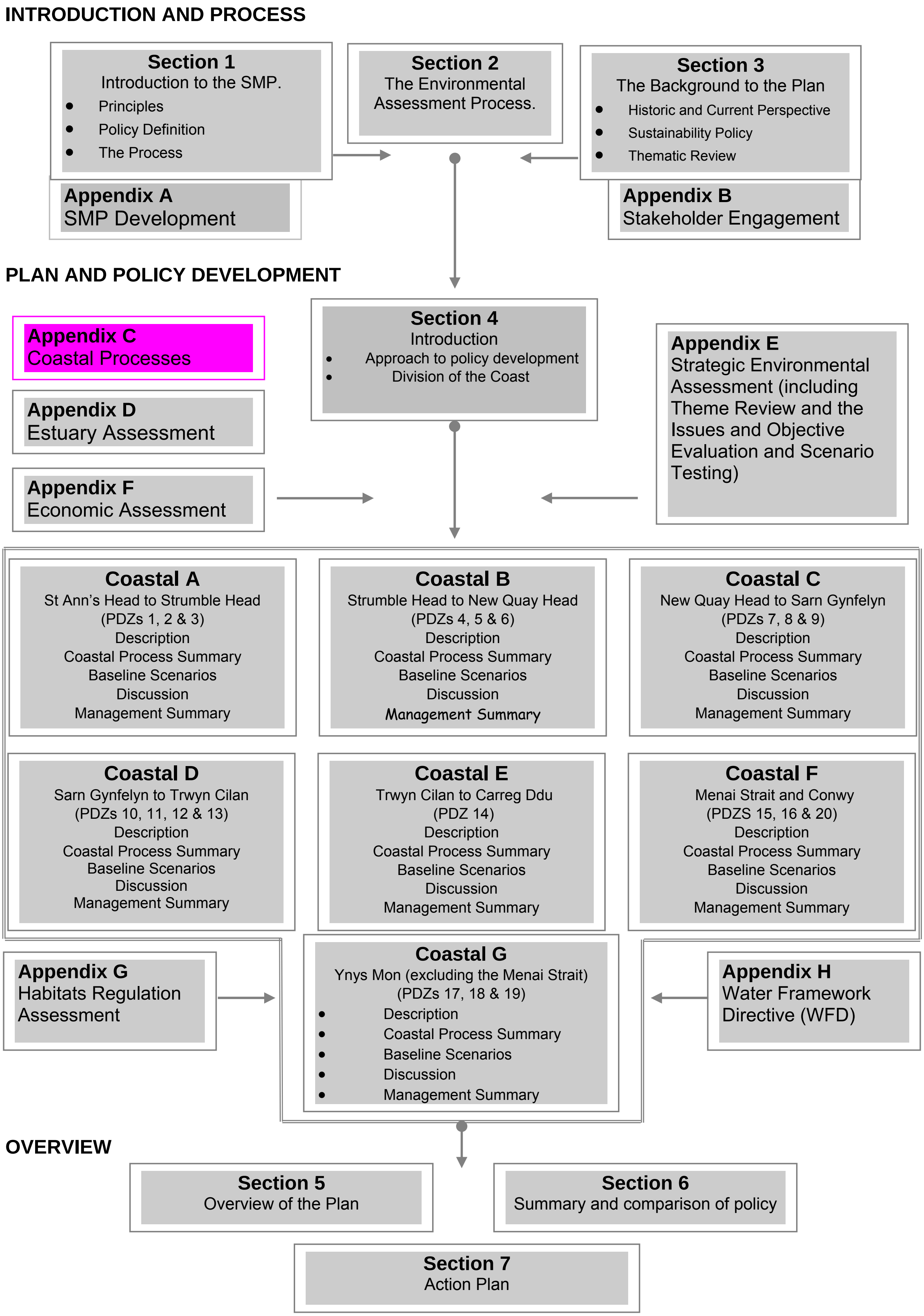

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Accretion
The addition of newly deposited sediment vertically and/or horizontally.

Aeolian transport
The transport of sediment particles by wind.

Amphidromic point
The centre of an amphidromic system; a nodal point around which a standing-wave crest rotates once each tidal period.

Amphidromic system
A tidal system, usually in an enclosed basin, where the tidal wave crest moves around a fixed point during each tidal period.

Amplitude
Half the peak to trough range of a wave (water wave or sedimentary wave).

Astronomical tide
The predicted tide levels and character that would result from the gravitational effects of the earth sun and moon without any atmospheric influences.

Backshore
Area above high water that can be affected by coastal processes.

Bar
An elongate deposit of sand, shingle or silt, occurring slightly offshore from the beach. Sometimes the bar may be parallel and/or attached to the shoreline.

Bathymetry
Topography of the sea floor.

Beach
A deposit of non-cohesive material (e.g. sand, gravel) situated on the interface between dry land and the sea (or other large expanse of water) and actively ‘worked’ by present-day hydrodynamic processes (i.e. waves, tides and currents) and sometimes by winds.

Beach profile
Cross-section perpendicular to the shoreline. The profile can extend from any selected point on the backshore or top of the beach into the nearshore.

Beach recharge / replenishment
The process of using sediment sourced from elsewhere to replenish or supplement the existing sediment volume of a beach.

Bedforms
Features on the sea bed (e.g. sand waves, ripples) resulting from the movement of sediment over it.

Bedload
Sediment particles that travel near or on the bed.

Bed shear stress
The way in which waves and currents transfer energy to the sea bed.

Berm
A ridge located to the rear of a beach, just above mean high water. It is marked by a break of slope at the seaward edge.

Biogenic
Term applied to material, processes or activities of living or once-living organisms. Something is biogenic if it has more than 30% of material derived from organisms.

BP
Before Present – relates to dates before the present day.

Breakwater
A protective structure of stone or concrete used to break the force of waves, and afford protection from their erosive power.

CD
Chart Datum – a datum or plane to which depths or heights are referred (Lowest Astronomical Tide).

Clay
Fine-grained sediment with a typical particle size of less than 0.002 mm.

Climate change
Refers to any long-term trend in mean sea level, wave height, wind speed etc.

Closure depth
The depth that represents the 'seaward limit of significant depth change', but is not an absolute boundary across which there is no cross-shore sediment transport.

Coastal currents
Those currents that flow roughly parallel to the shore and constitute a relatively uniform drift in the deeper water adjacent to the surf zone. These currents may be tidal, transient, wind driven or associated with the distribution of mass in local waters.

Coastal defence
General term used to encompass both protection against coastal erosion and defence against flooding from the sea.

Coastal protection
Relates to the threat of erosion (but can also relate to wave overtopping or encroachment by the sea).

Coastal processes
Collective term covering the action of natural forces on the shoreline and nearshore sea bed.

Coastal squeeze
Narrowing of the intertidal zone due to the prevention of its natural landward migration in response to sea-level rise, e.g. by permanent barriers (human-built or natural).

Cohesive sediment
Sediment containing a significant proportion of clays, the electromagnetic properties of which causes the particles to bind together.

Coriolis effect
Apparent force acting upon moving particles resulting from the earth's motion. It causes moving particles to be deflected to the right in the northern hemisphere, and to the left in the southern.

Crest
Highest point on a beach face, bedform or wave.

Cross-shore
Perpendicular to the shoreline. Also referred to as shore normal.

Current
Flow of water generated by a variety of forcing mechanisms (e.g. waves, tides, wind).

Current meter
An instrument for measuring the velocity of a current.

Cuspate foreland
A large triangular area of coastal deposition, often characterised by many shingle ridges.

Datum
Any position or element in relation to which others are determined.

Deflation
The removal of material from a land surface by wind-driven processes.

Dispersion
The separation of waves by virtue of their differing rates of movement.

Diurnal
Having a period of a tidal day 24.84 hours.

Drift-aligned
A coastline that is orientated obliquely to prevailing incident wave fronts.

Dynamic equilibrium
A state of balance between environmental conditions acting on a landscape and the resisting earth material which themselves fluctuate around an average that is itself gradually changing.

Ebb tide
The falling tide, immediately following the period of high water and preceding the period of low water.

Embankment
A linear mound of earth that stretches some distance along the coast that protects the hinterland from flooding.

Embayment
A concave shoreline plan shape between rocky headlands, sometimes with only a narrow entrance.

Embryonic dunes
A mound of wind blown sand accumulating around the high water level and often colonised by pioneer vegetation.

Episodic
Composed of a series of discrete events rather than as a continual process.

Erosion
Wearing away of the land or sea bed by natural forces (e.g. wind, waves, currents, chemical weathering).

Eustatic
Changes in global sea-level caused either by tectonic movements or growth and decay of glaciers.

Extreme
The value expected to be exceeded in a given (long) period of time.

Fetch
Distance of water surface over which the wind acts to produce waves.

Flocculation
The change which takes place when the dispersed phase of a colloid (e.g. clay particles in suspension) forms a series of discrete particles which are capable of settling out from the dispersion medium (e.g. water).

Flood tide
The rising tide, immediately following the period of low water and preceding the period of high water.

Foreshore
A morphological term for the lower shore zone/area on the beach that lies between mean low and high water.

Glaciation
The covering of a landscape or larger region by ice; an ice age.

Glacial
Products of, or deposited by, or derived from a glacier.

GPS – Global Positioning System
A navigational and positioning system by which the location of a point on or above the earth can be determined by a special receiver at the point interpreting signals received simultaneously from a constellation of satellites.

Gravel
Loose, rounded fragments of rock larger than sand but smaller than cobbles. Material larger than 2 mm (as classified by the Wentworth scale used in sedimentology).

Greenhouse effect
The absorption and re-emission of infrared radiation, emitted from the earth, by Greenhouse gases, acting to warm the atmosphere. This is a naturally occurring process, but the levels of warming change with atmospheric greenhouse gas concentrations.

Greenhouse gas
There are several greenhouse gases. The most significant is naturally occurring water vapour. Second most important is carbon dioxide (CO_2), which is naturally occurring but also released by human activities.

Groyne
Coastal defence structure constructed perpendicular to the shore and designed to reduce the longshore sediment transport on a beach.

Habitat
The environment of an organism and the place where it is usually found.

Headland
Hard feature, natural or artificial, forming the local limit of the longshore extent of a beach.

High water
Maximum level reached by the rising tide.

Hinterland
The land directly adjacent to and inland from a coast, extending landward from the upper limit of extreme wave and tidal energy.

Holocene
The last 10,000 years of earth history.

Hydrodynamic
The process and science associated with the flow and motion in water produced by applied forces.

Interglacial
Period of warmer climate that separates two glacial periods.

Intertidal
Area on a shore that lies between Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT).

Isobath
Lines connecting points of equal water depth, sea bed contours.

Isostatic
Vertical movements of the earth's crust in response to changes in the forces applied to it, e.g. as an ice sheet grows the crust is depressed, then as the ice sheet melts, and the weight is reduced, the crust rebounds.

Isthmus
A narrow strip of land connecting two larger land areas, usually with water on both sides.

Laminar flow
Smooth non-turbulent flow of fluid, characteristic of low fluid flow velocities and particles of sediment in the flow zones moved by rolling or saltation.

Landslide
The large-scale mass movement of sub-aerial material down slope, or its vertical movement down a cliff face.

LAT
Lowest Astronomical Tide (CD).

Lithology
The description of the macro features of a rock or rock-type.

Littoral
Of or pertaining to the shore.

Longshore
Applied to sediment transport and involving the area immediately adjacent to and parallel with the coastline.

Longshore current
A current located in the surf zone, moving generally parallel to the shoreline that is generated by waves breaking at an angle with the shoreline.

Longshore transport
The movement of sediment approximately parallel to the shoreline.

Longshore transport rate
Rate of transport of sedimentary material parallel to the shore. Usually expressed in cubic metres per year.

Long-term
Refers to a time period of decades to centuries.

Low water
The minimum height reached by the falling tide.

Managed realignment
The setting back of existing coastal defences in order to achieve environmental, economic and/or engineering benefits. Typically being undertaken in estuarine systems to combat the issue of coastal squeeze.

M_2
The main lunar semi-diurnal constituent of the tide.

Macro-tidal
Greater than 4 m tidal range.

Mean water level
The average level of the water over the time period for which the level is determined.

Mean sea level
The average level of the sea over a period of approximately 12 months, taking account of all tidal effects but excluding surge events.

Medium-term
Refers to a time period of decades.

Megaripples
Bedforms with a wavelength of 0.6 to 10.0 m and a height of 0.1 to 1.0 m. These features are smaller than sand waves but larger than ripples.

Meso-tidal
2 to 4 m tidal range.

MHW
Mean High Water.

Micro-tidal
Less than 2 m tidal range.

MLW
Mean Low Water

Morphodynamics
The mutual interaction and adjustment of the seafloor topography and fluid dynamics involving the motion of sediment.

Neap Tide
A tide that occurs when the tide-generating forces of the sun and moon are acting at right angles to each other, so the tidal range is lower than average.

Nearshore
The zone which extends from the swash zone to the position marking the start of the offshore zone (~20m).

Ness
Roughly triangular promontory of sand or shingle jutting into the sea, often consisting of mobile material e.g. shingle.

Numerical modelling
Refers to the analysis of coastal processes using computational models.

OD
Ordnance Datum – a specific datum or plane to which depths or heights are referred to.

Offshore
Area to seaward of nearshore in which the transport of sediment is not caused by wave activity.

Overtopping
The process where water is carried over the top of an existing defence due to wave activity.

Pleistocene
An epoch of the Quaternary Period (between *c*. 2 million and 10,000 years ago) characterised by several glacial ages.

Pocket beach
Small beach comprised of either sand or shingle that commonly has headlands on either side preventing longshore drift.

Post-glacial
The period of time after the withdrawal of the last ice sheet.

Progradation
The outward building of a sedimentary deposit, such as the seaward advance of a shoreline.

Progressive wave
A wave that is manifested by progressive movements of waveforms.

Quaternary Period
The last 2 million years of earth history incorporating the Pleistocene ice ages and the post-glacial (Holocene) Period.

Refraction (of water waves)
The process by which the direction of a wave moving in shallow water at an angle to the contours is changed so that the wave crests tend to become more aligned with those contours.

Regression
The horizontal movement of a shoreline in a seaward direction as result of a relative fall in sea level.

Relative sea-level
Mean sea-level relative to the land, taking account of both isostatic and eustatic components.

Relict
Features or sediment formed or deposited by processes no longer active in the area.

Residual water level
The components of water level not attributable to astronomical effects.

Return period
In statistical analysis, an event with a return period of *N* years is likely, on average, to be exceeded only once every *N* years. Can also be expressed as percentage likelihood of annual exceedance.

Ripple
Undulations in the sediment surface produced by fluid movement. Oscillatory currents (e.g. wave currents) produce symmetric ripples whereas a well defined current direction produces asymmetric ripples.

Rock platform
Gently seaward sloping, intertidal bench cut into the land mass by the action of waves and also known as a wave-cut platform.

Runnels
Linear depressions on shallow foreshores separated by low broad ridges (swash bars).

Run-up
The rush of water up a structure or beach as a result of wave action.

S_2
The main solar semi-diurnal constituent of the tide.

Salient
An accumulation of sediment extending seawards towards an island breakwater or other obstruction, but not connecting to it.

Saltation
A term used to describe the movement of a particle being transported that is too heavy to remain in suspension. The particle is rolled forward by the current, generates lift and rises, loses the forward momentum and settles to the bed.

Sand
Sediment particles, mainly of quartz with a diameter of between 0.063 mm and 2 mm. Sand is generally classified as fine, medium or coarse.

Sand wave
Bedforms with wavelengths of 10 to 100 m, with amplitudes of 1 to 10 m.

Sea defence
Construction engineered to reduce or prevent flooding by the sea.

Sea level or Mean sea-level
Generally refers to 'still water level' (excluding wave influences) averaged over a period of time such that periodic changes in level (e.g. due to the tides) are averaged out.

Sea-level rise
The general term given to the upward trend in mean sea level resulting from a combination of local or regional geological movements and global climate change.

Sediment
Particulate matter derived from rock, minerals or bioclastic matter.

Sediment sink
A point or area at which sediment is irretrievably lost from a coastal cell or transport pathway, such as an estuary or a deep channel in the sea bed.

Sediment source
A point or area from which sediment arises such as an eroding cliff or river mouth.

Sediment transport
The movement of a mass of sedimentary material by the forces of currents and waves.

Semidiurnal
Having a period of approximately one half of a day (12.4 hours). The predominant type of tide throughout the world is semidiurnal with two high waters and two low waters each day.

Shallow water
Commonly, water of such depth that surface waves are noticeably affected by bottom topography. It is customary to consider water of depths less than half the surface wave length as shallow water.

Shingle
Gravel-sized beach material normally well rounded as a result of abrasion.

Shingle ridge
Feature of the upper beach, comprising built up deposits of shingle often fronting lower lying backshore.

Shoreface
The subtidal zone below mean low water and about 10 to 20 m, where sedimentary processes are governed by wave action.

Short-term
Refers to a time period of months to years.

Significant wave height
The average height of the highest of one third of the waves in a given sea state.

Silt
Sediment particles with a grain size between 0.002 mm and 0.063 mm, i.e. coarser than clay but finer than sand.

Slack water
The state of the tidal current when its velocity is virtually zero, particularly when the reversing current changes direction.

Sorting
Process of selection and separation of sediment grains according to their particle size (or shape, or specific gravity).

Spit
Narrow accumulation of sand or shingle generally lying parallel to the coast with one end attached to the land and the other projecting seawards, often formed across the mouth of an estuary.

Spring tide
A tide that occurs when the tide-generating forces of the sun and moon are acting in the same directions, so the tidal range is higher than average.

Standing wave
Type of wave in which the water surface oscillates vertically between fixed points (called nodes) without progression.

Still-water level
Water level that would exist in the absence of waves.

Storm beach deposits
An accumulation of coarse sediments that are deposited on a beach above the high-water mark by high water levels brought about by storm action. This accumulation often forms a ridge or beach berm.

Storm surge
A rise in water level on the open coast due to the action of wind stress as well as atmospheric pressure on the sea surface.

Surf zone
The nearshore zone along which waves become breakers as they approach the shore.

Surge
Changes in water level as a result of meteorological forcing (wind, high or low barometric pressure) causing a difference between the recorded water level and the astronomical tide predicted using harmonic analysis.

Suspended load
The material moving in suspension in a fluid kept up by the upward components of the turbulent currents or by the colloidal suspension.

Swash-aligned
A coastline that is orientated parallel to prevailing incident wave fronts.

Swash bars
Low broad ridges separating linear depressions (runnels) on shallow foreshores. Formed by sediment movement in the surf and swash zones.

Swash zone
The area onshore of the surf zone where the breaking waves are projected up the foreshore.

Swell (waves)
Wind-generated waves that have travelled out of their generating area. Swell characteristically exhibits a more regular and longer period and has flatter crests than waves within their fetch.

Terrigenous sediment
Particles and deposits derived from the land.

Threshold velocity

The minimum velocity at which the sediment on the bed becomes mobile.

Tidal current
The alternating horizontal movement of water associated with the rise and fall of the tide.

Tidal prism
The amount of water that enters and exits an estuary every flood and ebb tide respectively.

Tidal range
Difference in height between high and low water levels at a point.

Tide
The periodic rise and fall of the water that results from the gravitational attraction of the moon and sun acting upon the rotating earth.

Till
Poorly-sorted, non-stratified and unconsolidated sediment carried or deposited by a glacier.

Tombolo
An accumulation of sediment or spit extending from the shore to an offshore island, formed by the deposition of material when waves are refracted and diffracted around the island.

Transgression
The horizontal movement of a shoreline in a landward direction as result of a relative rise in sea level.

Unconsolidated
Sediment particles packed in a loose arrangement.

Wave climate
Average condition of the waves at a given place over a period of years, as shown by height, period, direction etc.

Wave height
The vertical distance between the crest and the trough.

Wavelength
The horizontal distance between consecutive wave crests.

Wave period
The time it takes for two successive crests (or troughs) to pass a given point.

Wind current
A current created by the action of the wind on the water surface.

Wind set-up
Elevation of the water level over an area caused by wind stress on the sea surface.

Preface

Scope of the coastal process and geomorphology review

This review of coastal processes and geomorphology of west Wales draws into a single document the outputs and conclusions of previous key texts and sources. It draws both interpretive descriptions and the results of quantitative analysis directly from prior high level reports, such as the original Shoreline Management Plans, Futurecoast, and other regional studies. The results underpin subsequent tasks within the SMP review; particularly the quantification of shoreline evolution and the development of policy recommendations. It aims to present the results in a logical and concise way, without unnecessary repetition of original SMP content, in a form that is accessible to a non-technical audience. This review does not undertake any new analyses or quantification; instead it uses existing sources to provide a coherent description of the patterns of behaviour of the West of Wales coast. In this respect this document should not be seen as replacing detailed information presented in SMP1, but does highlight where further information has added to the original data collation. This baseline information is used and discussed in more detail in relation to future management of the coast in the main SMP2 document (section 4). Here the implication of the way which the coast behaves is discussed, linking this through to management decisions.

Structure of the coastal process review

Section 1 is a review of prior work. It identifies key texts and information sources and outlines how and where these have been used.

Section 2 is a broad scale description of the coast of west Wales. It includes an overview of the formation of the region, with a discussion of the hydrodynamic forces that have shaped it. The geology is described, in outline, along with the large scale sources and transport of coastal sediment.

Section 3 is a series of annexes covering various aspects of the review in more detail:

- Annex 1 – discusses in more detail how sea level rise scenarios have been used in both exploring flood risk and in amending baseline information in relation to erosion.
- Annex 2 - describes the coast of West Wales in a series of local sections, beginning in the south at St Ann’s Head, and ending at Great Orme’s Head. The length of these sections is determined by the local coastal processes, and so is quite variable. The localised shoreline processes are described in the context of the broader scale understanding developed in Section 2.
- Annex 3 – includes the estuary assessment.
- Annex 4 – Provides a list of defences identified from NFCDD and other data sources. This information is contained in more detail in the coastal defence data base, linked to the GIS.
- Annex 5 – provides a full range of maps showing flood risk areas and the baseline management scenario erosion mapping. These maps have been used in the baseline scenario descriptions provided in section 4 of the main SMP2 document.

C.1 INTRODUCTION

C.1.1 Extent and scope

This review of coastal processes and geomorphology encompasses the coast of west Wales from St Ann's Head (the northern boundary of the entrance to Milford Haven) to Great Orme's Head at Llandudno. It includes Anglesey, but not small uninhabited islands. Estuaries are described in Annex 3, in the Estuaries Assessment. The results are presented at two scales; an overview of the whole region and detailed descriptions of coastal segments. The segmentation is based on coastal processes and are, therefore, of variable length.

This review is chiefly concerned with the dynamics of the coast, particularly shoreline movement. Such movement occurs as a natural response of the geology and mobile sediments to driving forces such as waves, tidal currents and sea level rise. Each of these elements and their interactions are therefore described. Coastal behaviour is not entirely natural, in many locations it is influenced by human interventions, such as coastal structures and ports. Consequently coastal structures and their roles are also described.

All the information presented within this review has been interpreted from prior reports, and other sources. It follows that the level of detail (and certainty) with which the various sections can be described depends strongly on how extensively they have been explored by prior studies. Consequently although each coastal section is described in the same tabulated format, the level of detail in each table varies from region to region.

C.1.2 Review of literature and information

The descriptions of coastal processes and morphology of the welsh coast presented below are based on the four shoreline management plans (SMPs) that this study reviews. These SMPs address the Pembrokeshire coast (Pembrokeshire County Council, 2001), central Cardigan Bay (Cardigan Bay Coastal Group, 2002), North Cardigan Bay (2003) and Ynys Enlli to Great Orme's Head (Conwy County Borough Council, 2000).

The information garnered from the SMPs has been updated through a review of subsequent literature and site studies. In addition, several studies that predate the original SMPs have been reviewed, where they provide additional useful information. These sources are described in outline below, along with an overview of the new information that they provide.

In 2003 Bullen Consultants reported on two relatively small scale projects for the Isle of Anglesey County Council. Both were apparently initiated, at least in part, by the occurrence of severe storms in February 2003. The first (Bullen, 2003a) considered the issue of dune erosion at Borthwen Bay, which is on the southwest side of Anglesey. The report contains new information on defence type and condition and a new wave rose based on four years of Met Office data. In the same year Bullen (2003b) reported on the Traeth Lligwy Coastal Management Review project, a project that was prompted by beach lowering and erosion of underlying clay. This study explored the composition and morphology of this bay and presented some new hydrodynamic information, including four years of Met Office wave data and estimates of extreme water levels.

In Atkins (2005) reported on the Barmouth Bay and Islawrffordd Holiday Villages Coastal Evolution Investigation. This was initiated following concerns over erosion of the sand and shingle beach, and explored potential management interventions. It provides some new information relevant to the SMP review, including a pictorial representation of the local wave climate (derived from Met Office wave data) and estimates of future shore recession based on one-line beach modelling. Other new information is presented including the results of sediment size analysis and beach profiles.

Pye and Saye (2005) reported on the state and future evolution of welsh sand dunes for the Countryside Council for Wales. This report deals in detail with seven sites within the region of this SMP review, between and including Ynyslas (Borth) and Aberffraw (on the south side of Anglesey). Amongst other information they report on geomorphic trends of the dunes and their sediment sources and constraints. Predictions of future shoreline change are also presented. The principal contribution of this work, from the perspective of the SMP review, is an original and comprehensively documented and mapped analysis of historic change for each site.

Pye and Bloot (2006) reported on a study of the coast between Aberdovey and Tywyn, which was commissioned by the Aberdovey Golf Club. This contains several original contributions including: an overview of geomorphology, historic evolution and environmental context, and descriptions of sediment sources, transport and budget. Topography is also examined, using EA beach profiles and EA LiDAR, both of which post date the SMP. The study also comments on flood risk.

Jacobs Babtie (2006) reported on the Aberystwyth Coastal Defence Strategy study for Ceredigion County Council. This study addressed the issues of erosion and flooding extensively. Of particular relevance to the SMP review are its reviews of geomorphology and coastal interventions. This contains original quantification of geomorphic change, including sediment budgeting and assessment of storm ridge breaching. An original wave climate derived from Met Office data from 1988 to 2004 is also presented.

Brown and Davies (2009) reported on a numerical modelling study that explored the medium term behaviour of the Dyfi estuary. The modelling described river flow, waves, tides, sediment transport and changing bed topography, and was therefore unusually holistic. The paper provides a description and review of the estuary’s broad scale behaviour with new insights derived from the model output.

Faber Maunsell (2006) reported on the Trearddur Bay Coastal Study, for Anglesey County Council. Trearddur is a sandy bay held between hard rock promontories on the south side of Holy Island. This study was initiated by concerns over the conditions of flood defences and its purpose was to explore options for reducing vulnerability. It provides some information useful to this SMP review, including: a summary of local geology and geomorphology, results of ground investigations and historic retreat rates. In addition ‘simplified’ assessment of extreme sea levels, wave climate and overtopping are presented with detailed defence information including construction history and stability.

Borth has been the subject of a series of studies, initiated to assess erosion and flood vulnerability and to explore management options. Collectively these studies developed understanding of the geomorphology of the frontage, including the Ynyslas spit. Royal Haskoning (2006) reported on the Borth strategic appraisal, which included a review of the prior work and gave projections of future development under management options, including ‘No Active Intervention’ and scenarios similar to ‘With Present Management’, which are the two scenarios explored in this review. In addition the Borth Coastal Study Posford Haskoning (2001) contains information on structure condition, estimates of sediment transport rates and discussions of geomorphic changes discerned from historic maps and charts.

At Aberaeron the North Beach has been the subject of several studies. Babtie Group (2003) reported on the Aberaeron North Beach Coastal Defences Project Appraisal. This gives information on geology, geomorphology, sediment dynamics, extreme water levels, wave climate and extreme wave heights at the site. Atkins (2007) subsequently reported on the Aberaeron North Beach Coastal Defence Study. This provides information on geomorphology, sediment dynamics, extreme water levels, wave climate, and extreme wave heights.

The coastal slope at New Quay has been the subject of a series of reports, the latest being the New Quay Coastal Slope Instability Project Appraisal Report (High-Point Rendel, 2007). This discusses the issue of erosion at this coast and suggests historic rates for this. It also gives information on extreme water levels and tidal flows.

Faber Maunsell (2008) reported on the Traeth Crugan (near Pwllheli) Coastal Defence Options Study for Gwynedd Council. This report describes the historic geomorphic evolution of the frontage and its potential future development under a series of management options. It contributes data and information not previously published including bathymetry, beach topography, ground investigations and an overview of (fifteen years of) local wave data obtained from a hydrodynamic model developed by Bangor University. The model was also used to provide spring/ neap tidal flow information. New estimates of extreme water levels based on Barmouth tide gauge data were also derived, along with a wave/ water level joint probability statistics. Estimates of net annual drift along the frontage are also given.

Several relatively old reports (i.e. prior to the original SMPs) have been identified that provide additional relevant information. Posford Duvivier (1993) describes the geomorphology, geology and wave climate of Hell’s Mouth bay. Gibbons and McCarroll (1993) provides a detailed account of the geology of the western tip of the Llŷn Peninsula including Ynys Enlli. Posford Duvivier (1996a) reported on the Detailed Appraisal of Coast Protection work at Aberdaron and includes information on wave climate, past shoreline evolution, rates of erosion, and geology. Posford Duvivier (1996b) describes the geology, geomorphology, wave climate, extreme water levels and sediment dynamics of the Pwllheli area. Of particular value to this review was the Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (Anon, undated), which provides recession rates for many locations along the Pembrokeshire coastline.

C.2 GENERAL COASTAL DESCRIPTION

C.2.1 Historic evolution

The stage was set for the development of the coast of west Wales at the end of the last ice age. A massive sheet of ice covered much of Wales, extending as far south as Milford Haven, whilst a larger sheet rested on the bed of what is now the Irish Sea. The welsh sheet flowed westward and northward off the mountains to collide with the latter. Underneath this ice the surface form of the hard welsh geology was, in broad terms, similar to that seen today. The Isle of Anglesey, Llŷn Peninsula and Pembrokeshire were ranges of hills extending across the basin of what is now the Irish Sea. These projected into the path of the Irish Sea ice sheet, which was drifting towards the south. In doing so they provided some protection to the western edge of the ice flowing west from the welsh mountains, allowing it to project further westwards before the two ice sheets converged in what is now Cardigan Bay. Geological evidence implies that the region of convergence probably reached the current coastline close to New Quay.

Ice sheets weather rock over which they move. The debris generated tends to be washed out to settle, where conditions allow, forming deposits composed of a wide range of particle sizes (known as till). This region is no exception, and the bed of the Irish Sea is covered in many areas by thick deposits of till. As the climate warmed and the sea level generally rose towards its present condition, the surfaces of these soft materials were worked by marine processes. Marine currents more readily carry fine material, and so erosion of till surfaces tends to leave behind larger particles. Through this process (winnowing) large areas of gravel have formed on the outer limit of Cardigan Bay. The finer material has generally been carried towards the coast.

The flow and retreat of the welsh ice sheet had a dramatic effect on the underlying geology. Both the weight of the ice and its flow rate were greatest in the deeper and steeper valleys. This increased the rate at which rock could be detached, and so these valleys were deepened and enlarged. Glacier retreat released great volumes of outwash, which flowed down these valleys, further scouring and incising them. The material they carried was eventually deposited as moraine along the gentler sections of these valleys. These processes probably formed the three linear boulder features that extend seaward many kilometres from points on the shoreline of Cardigan Bay, known as ‘sarnau’ or sarns. These are partially exposed as causeways at low tide.

As the climate warmed, sea levels rose to flood the landscape left by the ice sheets, largely comprising exposed bedrock and fresh tills. Where sufficiently low, the incised margins of the welsh landscape flooded, to form rias. Areas of till were exposed to marine forces and began to retreat and release large volumes of sediment. Currents driven by tidal and wave forces then moved and sorted these sediments. The rias provided protection from wave action and so sediment tended to settle within them, and they began to infill. The largest examples within this region are the estuaries of the rivers Mawddach, Dwyryd, and Dyfi.

Sediments also tend to assemble at the coast to form beaches. Where they are relatively exposed they are susceptible to being carried alongshore by wave action. Within Cardigan Bay, for example, there is a generally northerly movement along the coast. Where beaches are reduced the underlying geology is exposed to wave attack, and erosion continues. Where they tend to accumulate the geology may be buried by these coastal sediments, and the northern section of the coast of West Wales has numerous examples of large depositional spits, sand dunes and wide sandy bays. The material comprising these features may be carried by tidal currents rather than wave action, as in the case of Conwy Bay, which acts as a trap for sediment carried in the currents of the Irish Sea.

Around the Llŷn Peninsula, Anglesey and Pembrokeshire, the bedrock is particularly exposed and generally hard. Here variations in lithology lead to the formation of irregular coastlines, which tend to trap beaches between headlands. This general type includes many variations of form and development, of which the west Wales coast has many varieties. These include wide stable sandy beaches fed by erosion of the soft cliffs they protect, and sediment limited gravel barrier beaches, which roll back along infilled valleys in response to sea level rise and wave action.

The current coast of west Wales has, therefore, been formed by natural processes associated with both the flow and melt of ice sheets, and marine activity under more temperate climates. Human settlements are significant recent additional agents of coastal formation, and it is, in part, the purpose of this review of Shoreline Management Plans to understand and manage their interaction with the coast. These natural and anthropogenic processes have interacted with the welsh geology, to create a great variety of coastal landforms, which will be described in greater detail in the sections below.

C.2.2 Geology and geomorphology

The geological story of the coast of Wales is extensive and complex, and can only be outlined in brief here. Some geological information is necessary for the interpretation of coastal processes. The two most relevant geological properties are material strength and sediment composition. The former influences the rate at which material can be eroded by the sea, and the latter determines how much sedimentary material is released in the process. The bedrock geology of the coast of west Wales can be described in four regions: Pembrokeshire, central Cardigan Bay, the northern mainland and Anglesey.

Pembrokeshire

Pembrokeshire is largely composed of hard mudstones in the north, and similarly resistant sandstones in the south. The hardness of this rock leads to the slow recession rates of much of this coast. Faster recession is, however, found in some places where localised layers of clay are exposed at the coast. Variation in rock strength and the presence and orientation of discontinuities give rise to the characteristic irregular form of the coastline. The southern Pembrokeshire coastline is characterised by north-west to south-east trending outcrops of Carboniferous limestone and old red sandstone. The boundary between the mudstone and sandstone intersects the coast at Newgale. Within this general setting there are many intrusions of volcanic origin. Skomer Island, Midland Isle and most of the peninsula (west of Marloes) to which it was once connected is formed of lava. Marine action has exploited weaknesses within it to form the islands. The south-eastern section of Ramsey Island is also composed of lava. The north facing coast west of Little Haven is formed of igneous rock, which intruded into the sandstone and solidified there. Along the mainly mudstone coast of the northern part of Pembrokeshire can be found exposures of lavas, ash and agglomerates (essentially cemented angular material produced by ancient volcanoes). There is a short example around Porthlysgi Bay and a more substantial length around Pen Caer, behind Strumble Head. St David’s Head has formed on an igneous intrusion.

Central Cardigan Bay

The geology of central Cardigan Bay is described in the original Ceredigion SMP as being formed from well-bedded Ordovician and Silurian shales and sandstones. Generally, from Cemaes Head to Llangrannog, the rocks are Ashgill/Llandeilo mudstone of the Ordovician period. Approximately one mile north of Llangrannog, the rocks become Silurian, of the Llandovery series, and various formations can be seen until Penmoelciliau, around three miles north. From Penmoelciliau to Harp Rock, south of Borth, the rock is Greywacke of the Silurian Telychian series, which is better known as the Aberystwyth grits. The rock between Harp Rock and Borth, although of the same series, is of the Borth mudstone formation.

Much of the coastal cliff between Aberystwyth and New Quay is overlain by boulder clay, with two distinct low-lying boulder clay platforms formed in front of an older cliff line. These platforms are between Llanrhystud and Llannon, and Aberaeron and Aberarth. Two main types of boulder clay occur along the Ceredigion coastline, a Welsh boulder clay, grey in colour and with local erratics, and an Irish Sea boulder clay, which is calcareous, with far-travelled boulders.

Although the rocks along the coast are locally folded and faulted, the Ystwyth fault is the only major one. This runs in an east–west direction and can be seen on the coast at Llanrhystud.

Northern mainland

The rocks found in the north Cardigan Bay area are largely sedimentary, and were formed in the Paleozic Welsh Basin. To the south of Tywyn the rocks consist of silty mudstones and greywackes. Between Tywyn and Barmouth they consist of marine mudstones and turbiditic sandstone, with evidence of volcaniclastic debris. From Barmouth to Porthmadog, increased volcanic activity has produced a mixture of basalts, rhyolites, volcaniclastic and sedimentary rocks. To the west of Porthmadog, the lithology returns to sandstone, siltstone and mudstone.

The geology of the Llŷn Peninsula and Bardsey Island is a complex mixture of sedimentary rocks from the Ordovician, Cambrian and Pre-Cambrian periods. The western part of the peninsula is mainly formed of various highly resistant metamorphic and igneous rocks, similar to those found on Anglesey. The eastern section is largely formed of Ordovician sedimentary, volcanic and intrusive rocks. The intrusions form peaks along the northern region of the peninsula. The glacial history of the Llyn has resulted in a variety of glacial forms and deposits at the coast. Porth Neigwl is backed, to the east, by thick glacial till. Extensive sections of till are also exposed from Nefyn to Dinas Dinlle. At Porth Dinllaen the till sections are over 30 m high, and exhibit a range of sedimentary and glacial tectonic structures. Boulder clay forms low cliffs in some areas, as at Dinas Dinlle and Yr Eifl.

Around Conwy Bay the fault system exposed by the Menai Strait is replaced by the more southerly Aber-Dinlle fault. The coast of the bay is mainly formed of low ground; backed by mudstones and volcanics. Llandudno is founded on a large tombolo behind the carboniferous limestone of the Great Orme.

Anglesey

The geology of Anglesey is exceptionally diverse and contains rock from most of the major geological eras. Some of the rock is more than 600 million years old. When viewed from above, its composition appears to comprise bands of rock of variable width oriented northeast – southwest. The similarity of this alignment to that of the Menai Strait is not coincidental; the Strait has been eroded from a band of limestone constrained by harder metamorphic rock along its northeast side. This banding means that the coastal exposures are quite variable. The most extensive exposures are composed of green schist of the New Harbour Group, and Carboniferous limestone. The green schist is seen around most of Holy Island, and in the northwest and northeast corners of Anglesey. The carboniferous limestone is exposed around Molefre, and forms the western cliffs of Red Wharf Bay. It is also found along the southern half of the Anglesey side of the Menai Strait and forms the eastern most tip of the island. The next most common coastal rock is Gwna Melange, which is found along the southwest coast of the island between Pen-y-parc and Barclodiad y Gawres. There are also exposures of granite and slate, and the South Stack Group; which consists of bedded sandstones and siltstones, and includes quartzites.

C.2.3 Wave Climate

Most waves seen at the coast are caused by wind. Wind causes ripples to form, and these capture wind energy and grow into recognisable waves. The direction of wave travel is, at least initially, the same as that of the wind. Waves are often very ‘confused’ when they are first formed, i.e. they may have many different heights and lengths and travel at different speeds and directions. This is especially true for waves generated during storms. However, waves tend to become less confused with time. Short over-steep waves tend to spill and transfer their energy to longer waves. Longer waves travel at higher speeds, leaving shorter waves behind. Waves travelling in different directions go to different destinations. Through such sorting processes, the confused, short-crested and violent state of young waves can give way to regular, smooth, long-crested waves, which are known as ‘swell’. Typical coastal wave conditions are a combination of locally generated wind waves and swell from further afield. The Irish Sea has a semi-enclosed form, and this prevents most oceanic swell from entering. However some enters from the south west through St George’s Channel.

In general terms the size that a wave grows to depends on: the speed of the wind driving it, how long the wind blows, and the length of the open sea over which the wind acts (termed the ‘fetch length’). The dominant storms over Britain tend to travel from the west and southwest. The fetch between Wales and Ireland is generally less than 100 miles, and this limits the height to which waves can grow from the west. The most severe waves arrive from the southwest because the fetch length is extremely long in this direction; many thousands of miles across the Atlantic.

The combined effects of oceanic swell, storm direction and fetch length make the southwest the dominant source of waves for the southern Irish Sea.

Waves within the Irish Sea are ultimately affected by the sea bed. In deeper waters this only happens to the largest waves, but ultimately all waves will be influenced as they move to shallower waters. The sea bed transforms waves in three ways: shoaling, refraction and diffraction. Waves slow down in shallowing water, and this causes the wave length to reduce, and the crest height to increase. This is termed shoaling, and it ultimately leads to the wave becoming unstable, and breaking. Refraction is a closely linked process that causes wave crests to turn towards the coastline. This can be illustrated by considering a wave stretching between St David’s Head and the Irish coast, travelling into Cardigan Bay from the Atlantic. As this wave moves up the Irish Sea the water depth below its central section is greater than below its eastern section, which is closer to the Welsh coast. The eastern section therefore shoals and slows more than the central section. This causes the wave to stretch and curve, and the eastern section turns towards the coast. This process continues whilst the water depth decreases, and means that waves normally arrive with their crests almost parallel to the shoreline.

Diffraction is prevalent along the coast of Wales, because of its rocky and irregular form. Waves travelling past a headland (whether this is a small local feature or an obstruction as large the Llŷn Peninsula) are partially destroyed and a ‘shadow zone’ of protection is formed on the lee side. The protection is not complete because wave energy radiates into the shadow. Waves curve around the headland as the wave energy leaks perpendicular to the direction of wave motion. This energy leakage is termed ‘diffraction’, and allows waves to turn quite sharply into enclosed areas behind headlands and coastal structures.

Understanding of these processes allows the pattern of wave activity along the coast of west Wales to be interpreted. Waves are created by wind in all directions across the Irish Sea, but the relatively small width of the sea limits the height that these waves can grow to. As was noted above, larger wind waves and oceanic swell move from the southwest to the northeast through St Georges Channel. Because of this direction of movement, larger waves would be expected on the Welsh coast than on the eastern shores of Ireland. The south coast of Pembrokeshire is most exposed to these conditions, and so should be subjected to the largest and most energetic waves.

Pembrokeshire shelters some southern parts of Cardigan Bay and this protection is enhanced in local areas by the numerous rocky headlands such as Strumble Head and Cemaes Head. However the protection is not absolute; the processes of shoaling and diffraction allow waves to turn towards the coastline and to radiate into sheltered areas. Waves tend to be reduced by such transformation, however focussing can concentrate wave energy, locally increasing wave heights. In central and northern Cardigan Bay the sheltering effect of Pembrokeshire diminishes, and the coast is more exposed to the large waves from the southwest. However there is some loss of wave energy as they propagate over fairly gently shallowing water to reach the coast.

The southern origin of the dominant waves along the coast of Cardigan Bay means that beach material tends to be driven towards the north. This is the reason for the north-pointing spits found along this coast, as at Ynyslas, Tywyn and Fairbourne.

Along the south side of the Llŷn Peninsula the coast becomes more exposed to the large waves from the south west. There is less sheltering and, because deeper water extends closer inshore, waves lose less of their energy before arriving at the coast. The orientation of the peninsula, relative to the dominant waves, means that beaches tend to be moved east.

From the tip of the Llŷn Peninsula to Great Orme’s Head, the coast faces into the northern Irish Sea. The passage to the Atlantic (North Channel) is quite slender and so relatively little oceanic swell enters through it. In addition the Isle of Man provides some shelter from that direction. Some wave energy does pass into this area from St George’s Channel, but most of the waves arriving at this part of the coast are created in the Irish Sea. Consequently the direction of wave travel is quite diverse in this area, although the largest waves are still generally from the west and southwest. The irregular form of the coast and the large scale features of Anglesey, and the Llŷn Peninsula, lead to much more alongshore variation in wave conditions than is found along the Cardigan Bay coastline.

Further information on the local detail of wave conditions can be found in section 3 of this review.

C.2.4 Water levels

The surface of the sea is never stationary, and is rarely flat. At any moment there will be a small, but significant gradient in sea level along the coast of Wales. In addition the sea level will fluctuate through time because of a wide range of processes; from small waves and daily tides, through to global ice ages. It is important to understand these fluctuations in water level, particularly during extreme conditions, because of the hazard of coastal flooding. In addition, though less obviously, changing sea levels influence rates of coastal erosion. Of the many processes that affect water level, the ones of greatest relevance to this SMP review are tides, surge and sea level rise.

Tides

Tides are created, for the most part, by the gravitational attraction of the moon and sun. In general terms, when both the moon and sun are aligned (during a full moon or a new moon) their gravitational forces are also aligned, and high ('spring') tides occur. At the other extreme, when the moon is at its first or last quarter, these gravitational forces pull in roughly perpendicular directions, and so smaller ('neap') tides are formed.

Tides travel around the earth, responding to the movement of the moon and sun (relative to the earth). They are most easily understood as very long waves. These 'tidal waves' approach the British Isles from the Atlantic. They pass through the Celtic Sea before reaching St David's Head, and moving north up the coast of west Wales. It can take around four hours for them to pass from St David's Head to Anglesey. This is why more northerly parts of the welsh coast experience high tides later than more southerly areas.

The speed and height of a wave is affected by the depth of water it moves through, and by constraints it encounters. For example the Irish Sea is narrower at Holyhead than at Aberystwyth and as a result the tidal range is greater at Holyhead.

Differences in the timing and height of the tide cause dramatic effects at the Menai Strait. Because the tidal wave must travel around the Isle of Anglesey, high tides reaches the northern opening around one hour after it reaches the southern entrance. In addition the spring tidal range is around 2.7 metres greater at the north end of the strait. These differences in water level drive very strong currents through the strait.

Because the motion of astronomical bodies is well understood, tides are highly predictable. However the observed water level is rarely that which is predicted, and this is normally due to surge.

Surge

The term 'surge' refers to meteorologically forced changes in sea level. These are driven by wind and atmospheric pressure, which are closely linked but simpler to discuss as separate processes.

The weight of the atmosphere rests on the surface of the planet. This is experienced as air pressure, which presses down on the land and oceans. The level of pressure is never constant; it fluctuates with atmospheric weather. Being fluid, the oceans respond to these changes; where the pressure is greater the surface of the sea is lowered. When the pressure falls the sea can rise. As a general rule of thumb, one millibar of pressure drop causes a 10 mm rise in sea surface level. Such pressure changes are one form of surge.

In addition, as winds blow over the surface of the sea they tend to drag it along. Stronger winds blowing for longer durations drag more water, and can cause measureable changes in sea surface level. Since the wind tends to come to the British Isles from the west, it tends to drag water over the Irish sea towards the welsh coast.

The amount of sea surface change in response to wind drag is inversely related to the depth of the water. This means that winds are most effective in raising water levels where the water depth is relatively shallow; for example along the edge of Cardigan Bay. Fortunately this also means that the surge tends to diminish at high tide, and so the maximum surge level does not normally happen at the same time as the highest point of the tide.

Of course high winds and changes in air pressure are often coupled. Typical British winter weather involves areas of low pressure arriving from the Atlantic, accompanied by high winds. Consequently the two causes of surge often act together.

Extreme water levels are normally understood statistically. They tend to be expressed using the concept of a period of return; which means the length of time one would expect to wait for the water to exceed a certain level. So for example a 1 in 1 year level (1:1) would be expected to be reached every year, whereas a 1:100 year level would only be expected to be experienced every 100 years.

Figure 1 has been produced to represent the variation in extreme water levels along the coast of west Wales. It shows estimated 1:100 year water levels (relative to Ordnance Datum), which have been taken from extreme water levels studies for the area. The distance is taken along the open coast, ignoring estuaries.

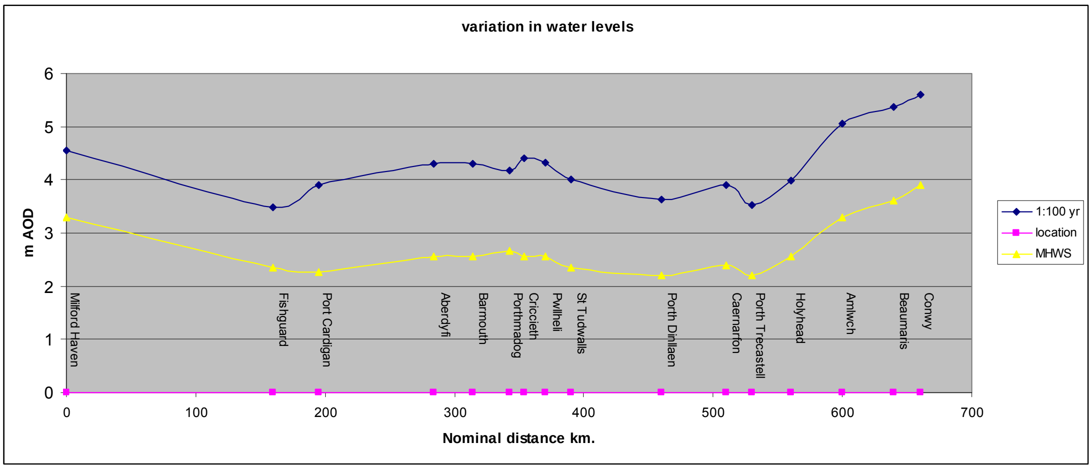

Figure 1 Extreme (1 in 100 year) water levels along the coast of west Wales

The figure shows, in effect, how extreme water levels vary as a tide (or combined surge and tide) travels up the Irish Sea. The extreme water level at St David's Head (Fishguard) is reduced as the tide moves into Cardigan Bay, and is able to widen. As it travels to the north of Cardigan Bay it increases in height until it reaches a maximum between Tywyn and Criccieth. Here the tide is compressed as it moves both north up the bay and east along the Llŷn Peninsula. As the wave travels around the end of the Llŷn Peninsula towards the northern Irish Sea, the maximum water level reduces initially but the increases within Liverpool Bay. The figure shows this increase around Ynys Mon, highlighting the significant difference in tidal and extreme water levels across the Menai Strait (between Caernarfon and Beaumaris).

Historic sea level rise

Sea level rise essentially formed the coast of west Wales, as it filled the Irish Sea during the Holocene. At the peak of the last ice age, global water levels were around 120 metres lower than they are today. At that time the bed of the Irish Sea was covered with a massive ice sheet, rather than water. As the ice sheets of the world retreated, the water they released lifted sea levels. In recent millennia sea level rise has slowed but not stopped.

Although sea level rise is a global process, it is modified by local effects. The level of Great Britain, for example, is changing in response to the loss of its glaciers. Where the weight of the glaciers has lifted, the land has slowly sprung up (this is termed isostatic rebound). This lifting is greatest in Scotland, where the ice was thickest. In contrast, most of England and perhaps all of Wales is sinking. The pivot line between these two areas runs close to the northern shore of Anglesey where, as a result, there is relatively little isostatic change. On average, Wales is sinking at around 0.5 mm/year.

Other regional effects influence the rate of sea level rise at any particular point along the coast. The net result, for west Wales, is that at Milford Haven the sea is rising at around 0.5 mm/year, but this increases with distance north along Cardigan Bay, such that it is around 2 mm/year at Aberdovey and around 3 mm/year around Anglesey (Dixon and Tawn, 1997).

Future sea levels

Rates of sea level rise will increase due to global warming. Although this is clear, the amount of change is uncertain. It depends on many things including the rate at which humans choose to emit greenhouse gasses, and the ways in which the earth responds. A major uncertainty at present is the rate at which ice sheets move into the sea. The Intergovernmental Panel on Climate Change estimated that, over the 21st century, global sea levels would rise by between 0.18 m and 0.59 m (IPCC 2007). However the IPCC chose to not include the movement of ice sheets. More recent work, which does represent this, estimates global sea level rise by 2100 of between 0.5 and 2 metres (e.g. Rahmstorf, 2007, Pfeffer et al, 2008).

The Department of Food and Rural Affairs (Defra) determines how coastal studies, such as this SMP review, should interpret such projections. They recommend that, in Wales, the relative rate of sea level rise (accounting for isostatic effects) should be assumed to be the rates shown in Table 1.

To - 2025	2025 – 2055	2055-2085	2085 - 2115
3.5 mm/year	8 mm/year	11.5 mm/year	14.5 mm/year

Table 1 Projected rates of relative sea level rise around Wales, provided by Defra

Summing these values provides an estimate of 859 mm of sea level rise between 2009 and 2100. These values do not account for local variations, which are relatively small.

Such sea level rise will tend to increase vulnerability to coastal flooding of some low lying areas, and will cause many shorelines to retreat. Soft cliffs will tend to erode more rapidly, whilst the shore platforms of hard cliffs will be submerged more often. Beaches will tend to 'roll back' if they are not constrained on their landward side. Beaches that are constrained, for example by a cliff or coastal structure, will tend to be submerged, so that less of their surface it exposed by the tide. In addition, structures built to manage flood risk or erosion will be put under greater pressure. As the water depth in front of them increases, larger waves will reach them, increasing the forces they are subjected to. This will increase the rate at which they deteriorate and mean that, if they are replaced, then this must be with larger structures.

Due to the uncertainty associated with sea level rise, it is sensible to examine a range of potential scenarios in the future. In examining both the potential of future flood and the extent of erosion, this SMP has considered the rates of change identified by Defra (as given above) and a more extreme situation of 2m sea level rise. While the SMP2 looks at management over the next 100 years, the intent of the plan is to consider the question of "what then". The 2m sea level rise might be considered as an extreme case over the 100 years, but is also provides a useful scenario against which the longer future may be assessed. In developing a sustainable plan for managing the coast having this possibly longer term perspective is helpful.

UKCP09 states:
"*While we do not attempt to derive a probability for (the H++) scenario it should be viewed as being very unlikely to occur during the 21st century. It is presented to provide justification for not ruling out options for adaptation until the science is more certain.*"

The way in which sea level rise scenarios have been addressed and how these scenarios have been used in assessing risk and in assessing coastal behaviour is discussed in Annex 1.

The consequences of sea level rise are not all negative; indeed the coast of Wales is itself largely a product of this process. Where coasts erode they release sediment, which often builds beaches. As described above the current welsh beaches have been formed by coastal erosion driven by sea level rise.

C.2.5 Sediment Sources

Coastal sedimentary features such as beaches, spits and dunes are normally dynamic; they are reshaped by the forces imposed on them. As they develop they may lose or gain material as sediment flows into them or away. The availability of sediment is therefore a key issue when determining future coastal evolution.

Sources of sediment may be found offshore, along the coast, within estuaries or along rivers. They may be features entirely composed of sediment, such as sandbanks and dunes, or be geological material that releases sediment when worked by the sea or weathered on land. Sediments may also be created by biological action, such as the growth of shells, or the capture of carbon by the growth of biota and plants within estuaries. Sediments may also be formed by human activities such as mining and quarrying, where spoil is dumped on beaches.

The great diversity of the coast of west Wales is reflected in the variety of different sediment sources. Cliff weathering and erosion releases sediments of a variety of types and at a range of rates. The hard rocks of Pembrokeshire retreat very slowly and so the sediments they release have little effect, except at a very local scale. In other areas softer rock is eroded and weathered to form gravel beaches that extend along, and therefore influence, neighbouring areas, for example as occurs at Allt Wen. The supply of sediment from these beaches may be still quite low, but it is sufficient to play an important role for example along the beaches south of Aberystwyth. Far greater volumes of sediment tend to be released from till cliffs, such as along the coast of the Llŷn Peninsula and at Mochras. These rocks tend to be a good source of sediment because they are both readily eroded by wave action and often contain high quantities of material suitable for beach building, such as sand and gravel.

Still higher rates of sediment release can occur from features formed by the coast itself, such as dunes. The northern section of the coast of west Wales has extremely large dune systems, some of which have shown erosion in recent decades, such as at Aberdovey, Morfa Dyffryn and Newborough Warren. The sand released in this way is drawn into local beaches and the nearshore zone, where is may be transported and deposited over large distances.

Material also arrives at the coast from offshore sources. In very broad terms sediment tends to accumulate in relatively protected areas. Good examples of this exist at the Glaslyn/Dwyryd estuary, Conwy Bay and the Menai Straits.

Most of the offshore area of Cardigan Bay and Caernarfon Bay is covered by a thick layer of boulder clay. As it is eroded it releases mud which typically moved offshore and settles, or is trapped by calm areas within estuaries. The erosion also releases gravel, which tends to form a thin layer over the boulder clay and this in turn may be covered by areas of finer sediments. The gravel is not necessarily immobile; in some areas it supplies material to adjoining beaches, as at Gwbert, and Nefyn.

Bais Bank is a major sand bank north of the St David’s Peninsula. The bank is around 11 km long, and rises from a water depth of more than 50 m, to within 8 m of the sea surface (Futurecoast). However the sediments of this bank are believed to lie too far offshore to feed local beaches. Smaller banks exist on the north and south of Bardsey Sound and are believed to be formed of sand. The largest, Bastram Shoal, rises from a water depth of around 40 m, to within 6 m of the surface of the sea. Sand from this area supplies the dunes at Newborough Warren and Morfa Dinlle (Futurecoast).

Relatively thick layered and fine grained Holocene sediments are present in the inner parts of St Bride’s Bay, Cardigan Bay and Caernarfon Bay, where the tidal flows weaken. In St Bride’s Bay, these are mainly sand and gravelly sand at least 17 m thick. The sandy beach at Newgale may be a product of this offshore source, and may still exchange sediment with it. The gravel and cobble upper beach at Newgale is probably fed by local ongoing cliff erosion.

In Cardigan Bay, the sarns divide the Holocene sediment cover in the inner bay into four areas. The southern area, from the Teify estuary to Sarn Cynfelin, reaches the coast between Aberystwyth and the Dyfi estuary. This area is covered by a discontinuous sheet of sand, locally muddy, that thins out within 2-3 km of the coast where thin immobile gravel or bedrock outcrops at the sea bed. Exchange of sediment between this offshore sand sheet and the small sandy pocket beaches along this coast is uncertain. The muddy sediments accumulate in a 10 m depression, the Trawling Grounds, which is to the north of New Quay. Nearer the coast the bottom currents increase due to wave action, and this removes both sand and mud.

An offshore sand sheet between Sarn Cynfelin and Sarn y Bwlch reaches the coast, and is linked to sediments within the Dyfi estuary. There may also be an exchange of sand between this offshore sand sheet and the beach and dune system south of Towyn. The tidal flows out of the Dyfi and Mawddach estuaries cause a southward movement of sediment off their mouths, but this returns to move northward further offshore, as the effects of the estuary tidal jet diminishes.

The area between Sarn y Bwlch and Sarn Badrig is very similar to that directly to the south. The offshore sand sheet extends into the Mawddach estuary, which has a spit at its entrance similar to that at the Dyfi estuary. Sarn Badrig meets the shore 2 to 3 km south of the apex of Morfa Dyffryn. As the prevailing winds are from the south, this complex must have been fed over an historic timescale by sediment from the offshore sand sheet to the south and west. However, the present exchange of sediment is uncertain.

Tremadoc Bay lies between Sarn Badrig and the coast of the Llŷn Peninsula to the north. The Holocene sediments here are thicker, and muddier, than in the south. Holocene sediments are absent offshore of the northern coast due to increased wave action in the shallower water.

Rivers and estuaries can act as important sources of coastal sediment. However, along the coast of west Wales the estuaries are more likely to take in sediments and hold them, or to be sediment neutral. The exceptions to this are the estuaries of the Dyfi, which delivers sand to the coastal and nearshore zone and, though more weakly, the Teifi and Traeth Dulas.

C.2.6 Sediment Transport

Mobile sediments are often found in the coastal zone; being transported by hydrodynamic forces or wind. Their movement can build, maintain or deplete sedimentary coastal features such as spits, beaches, dunes and sandbars. Some non-sedimentary features also require sediment transport to be maintained. For example some eroding cliffs and shore platforms, which release sediment, would become buried relic features if that material were not transported away to allow ongoing erosion.

Sediment transport allows interaction between the coast, estuaries and the offshore zone. The removal of sediment (erosion) from one area implies its ultimate accretion in other areas. In some situations this can mean an area of coastal erosion results in the growth of neighbouring beaches. Overall though, there tends to be a net loss of sediment from the coast. This is partly due to sea level rise, which naturally submerges coastal zones. It also increases the storage capacity of estuaries, which respond by trapping more sediment.

The main processes driving coastal sediment transport are wave action and tidal currents (sometimes enhanced by surge). In general terms wave action is most important in shallower water, where the waves impinge on the sea bed, whilst tidal currents dominate offshore. Often these two processes act together, such that waves stir sediment up from the bed, and they are then carried by the tidal currents. The cyclic nature of tides means that material tends to be moved back and forth. However the flow is rarely identical in both directions and as a result there is a ‘residual’ net movement.

The most important properties of the sediment determining how far it will be carried are particle size and density. Large heavy sediments produced by rockfalls along the Pembrokeshire coast are relatively static. The largest clasts may not even be moved by the biggest waves; until they have been broken down over time. At the other extreme, fine muds lifted from the boulder clay that covers most of the offshore area of Cardigan Bay and Caernarfon Bay may travel very long distances. Such material will tend to be ‘lost’ offshore, and only settle in the calmest coastal areas, such as within estuaries.

This varying sensitivity to driving forces allows the sediment sorting that is normally found along the coast. For example, whilst boulder clay muds are transported away by tidal currents, heavier gravels released at the same time may only be moved by wave action. Thus gravel may be washed ashore to build beaches, (as at Gwbert and Nefyn).

The boundaries of the SMPs have been selected at places where there is little sediment exchange. There is, therefore, little flow of sediment at St Ann's Head and around Great Orme's Head. In addition, little sediment is entering Cardigan Bay from the south (around St David's Head) or north (around Bardsey Island), and the outer part of the bay is largely starved of mobile sediment. However, sediment in the inner bay may be moved inshore to beaches by waves and tidal currents.

Since tidal currents dominate the processes of sediment transport offshore, the sedimentary features found there normally show evidence of these currents. Areas of sand waves and megaripple fields (both due to tidal currents) have been found in Cardigan Bay.

Off the southern coast of Cardigan Bay, from the Teify estuary to west of Strumble Head, the direction of net sand transport is to the south-west. In the northern outer part of the bay, sand moves generally northward and eastward. North of the Llŷn Peninsula, net sand transport is to the north-east into Caernarfon Bay. There is a parting of sediment transport between Bardsey Island and the Irish coast, with the net sand transport diverging to both the north and south.

Overall the thickness and extent of sand sheets, coupled with the limited size of the sandwaves and the low-energy tidal regime, suggests that the volume of sediment in transit across the region is relatively low. Tidal currents around the western exposed coasts, and especially between the small islands, are stronger, and in most cases mobile sand has been largely removed, or is preserved only in pocket beaches. There is a weak northerly tidal residual nearshore in Cardigan Bay, but wave-induced currents are probably more important in determining the nearshore sediment transport throughout the region, except along the westerly headlands.

Wave induced sediment transport varies along the coast, but most of the time it tends to move material landward through the surf zone; indeed this is a fundamental reason why beaches accumulate. Waves normally arrive at the surf zone at a small angle to the shoreline; and consequently they tend to move material along the shore, as well as across it (longshore transport).

Around the crenulate shorelines of Pembrokeshire, the western Llyn and much of Anglesey, beaches are held between headlands. In this situation the longshore transport tends to be weak because of the effects of shoaling within the bays, and diffraction around the headlands. If longshore currents do exist, they tend to reduce as they push sediment towards one side of the bay, and the beach line rotates to face the incoming waves.

Along much of Cardigan Bay the dominance of waves from the southwest results in a net northerly alongshore transport; although this may be stopped or reversed in some local areas. This overall behaviour can be clearly seen in the north-pointing spits found across the mouths of the estuaries, as at Ynyslas, Tywyn and Fairbourne. At the north of Cardigan Bay, sediment tends to accumulate around Tremadog Bay. Here the northerly transport converges with material moved east along the south coast of the Llŷn Peninsula. A similar pattern of convergence can be seen at the southern opening of the Menai Strait. Here spits extend in from both sides; they are kept apart by strong tidal flows through the strait.

Historically patterns of sediment transport have had a major influence on the form of the coast around Conwy Bay. Great Orme's Head was an island, close to the shore. Because of its size and proximity to the shore, it acted as an effective barrier to wave action. In the calm waters between it and the mainland, sandy sediments settled. Diffraction processes around the island helped this sediment form a salient; a seaward pointing peninsula. Over time this grew to meet Great Orme's Head, and the island became a peninsula. This peninsula increased the protection to Conwy Bay, which was already defended by the mainland and Anglesey. Here extensive sedimentation occurred, allowing the formation of the large intertidal flats now seen.

C.3 ANNEXES

Separate documents are produced covering:

1 - Sea Level Rise Scenarios and how these have been used.

2 - Unit Descriptions

3 - Coastal Defences

4 - Baseline scenarios maps of flood risk and erosion.

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Annex 1 - Sea Level Rise Scenarios

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Final
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Approved by	Client Steering Group
Date/initials approval	29/11/11

CONTENTS

C.1 SEA LEVEL RISE SCENARIOS

Rates of sea level rise will increase due to global warming. Although this is clear, the amount of change is uncertain. At the peak of the last ice age, global water levels were around 120 metres lower than they are today. During the last interglacial period, it has been estimated that sea level was some 2m higher than at present.

SMP2 is looking forward over a period of 100 years. Over that period of time the change from present sea levels will have a profound affect on the way in which we may perceive the coast and how we manage important interest on the coast in specific areas. One aspect of coastal management is therefore, not just how issues arising from sea level rise are dealt with over a 100 year period but that in addressing these issues, the course for management is set for beyond the 100 years.

C.1.1 Flood Risk Damages

Risk is defined in terms of the consequence of specific conditions occurring multiplied by probability of that consequence occurring. This analytical approach is taken in the SMP in determining potential flood risk damages that might occur in the future. For this analysis the Defra guidance on sea level rise has been used. This guidance on sea level rise over the period of the SMP2 is given in Table 1 below:

1990 - 2025	2025 – 2055	2055-2085	2085 - 2115
3.5 mm/year	8 mm/year	11.5 mm/year	14.5 mm/year

Table 1 Projected rates of relative sea level rise around Wales, provided by Defra

This takes as its base date 1990. From this the following sea level rise values are taken:

End of epoch 1 – 2024,	SLR = 0.12m.
End of epoch 2 – 2054,	SLR = 0.36m
End of epoch 3 – 2105,	SLR = 1.0m

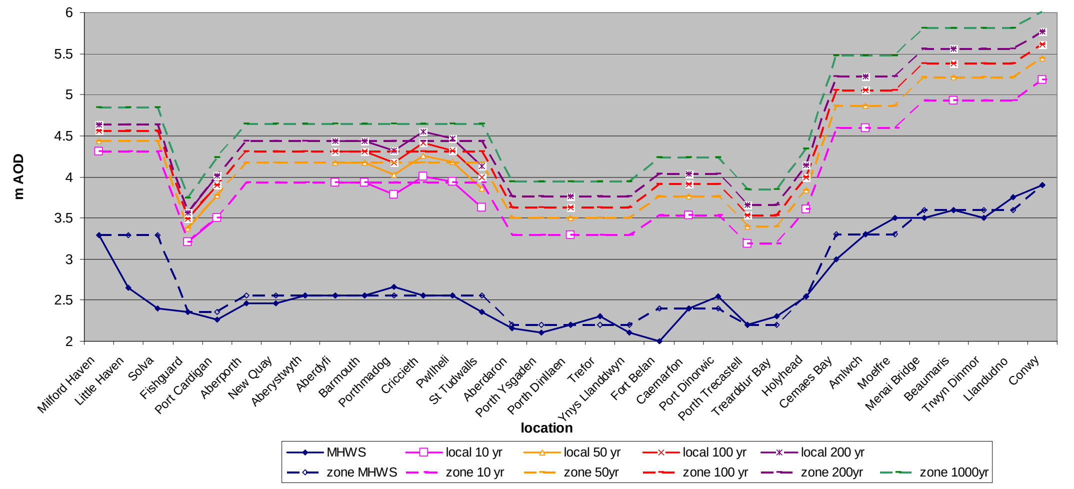
These values of sea level rise were added to the values of present day extreme water levels developed from various detailed studies covering the whole coast.

Mapping of flood risk areas, under the different SLR scenarios and extreme water levels , was then undertaken at a regional scale, with open coast water levels being extended in land and across estuaries as a uniform level. Therefore, no account has taken for water level changes further up estuaries within the base mapping.

Furthermore, in order to provide this regional scale of mapping, the coast was divided in to representative sections with similar predicted range of extreme water levels. This division into representative areas is shown in Figure 1; such that, the whole area between Aberporth and Aberdaron was considered has having a consistent water level, but that this was different from, for example, the area around Llandudno; where a different set of extreme water levels were considered representative of the area between the Menai Bridge and Llandudno.

This approach to mapping necessarily introduces some degree of approximation. The sensitivity of this was considered in comparison with the Environment Agency's Flood Risk Mapping and differences where assessed. Where there are differences for any local area these were not considered critical with respect to policy development.

Figure 1 - water levels zones used for flood risk mapping



Even so it is recommended that for detailed flood risk information, this should be obtained from the Environment Agency web site.

C.1.2 Scenarios

As distinct from the evaluation of risk set out above, the SMP is considering the long term trends and consequences of sea level rise. This has to take account of the uncertainties associated with sea level rise. Rather than defining specific values for sea level rise for any year, the SMP has to consider how different management scenarios would address different sea level rise scenarios. The approach taken within the SMP2 is, therefore, to explore different scenarios - If the coast is managed in a certain way would this still be sustainable under a range of possible scenarios for sea level. This focuses on the consequence rather than the probability of occurrence and allows consideration of when management thresholds may be reached.

Two baseline scenarios have been considered and the sensitivity, in terms of time, has been examined. Figure 2 shows a graph of the Defra Guidance values for sea level rise together with the UKCP09 H++ scenario. These scenarios are referred to within the SMP2 document as the 1m SLR scenario (with a 1m projected sea level rise over a nominal 100 years) and the 2m SLR scenario (with a 2m projected sea level rise over a nominal 100 years). The graph also shows an 80% and 120% banding of values, this has been used as a sensitivity in assessing erosion rates discussed later. The graph is projected forward over 150 years.

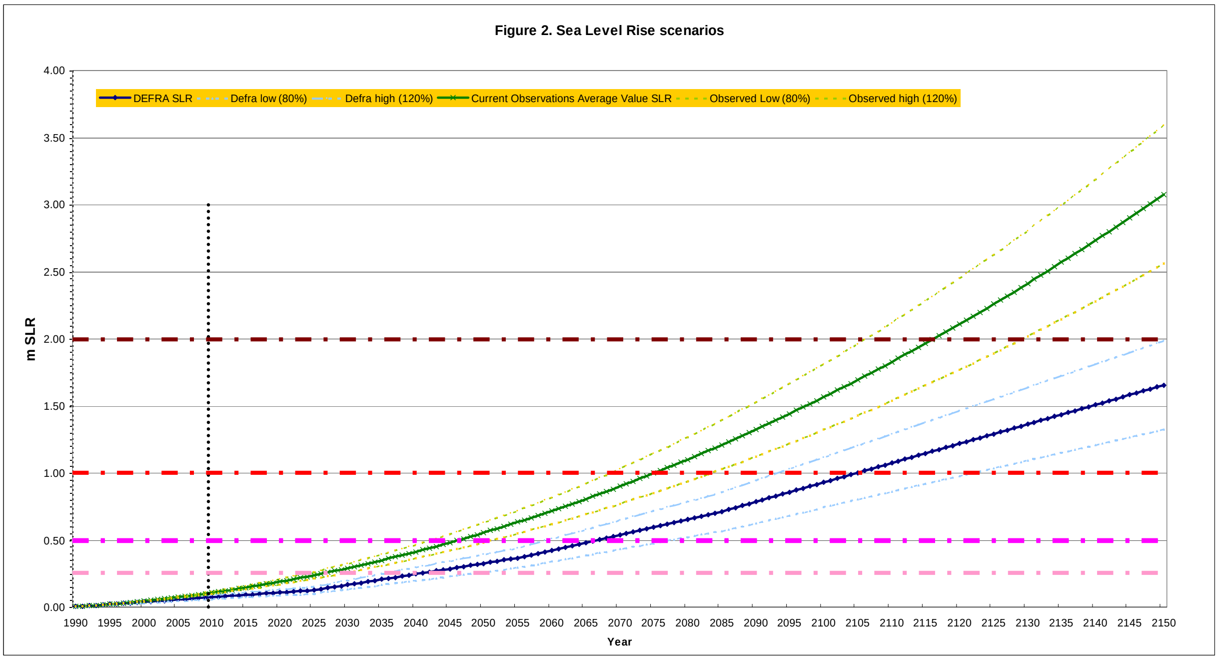


Figure 2. Sea Level Rise scenarios

Table 2 sets out for the two baseline scenarios the year in which certain SLR values might be reached.

Sea level rise	0.25m	0.5m	1m	2m
1m SLR scenario	2041	2067	2105	-
2m SLR scenario	2026	2046	2075	2116

Table 2 Potential Year for values of Sea Level Rise

A key impact of sea level rise would on the frequency of specific water levels. Typical extreme water level values are presented below for Fishguard (Figure 3).

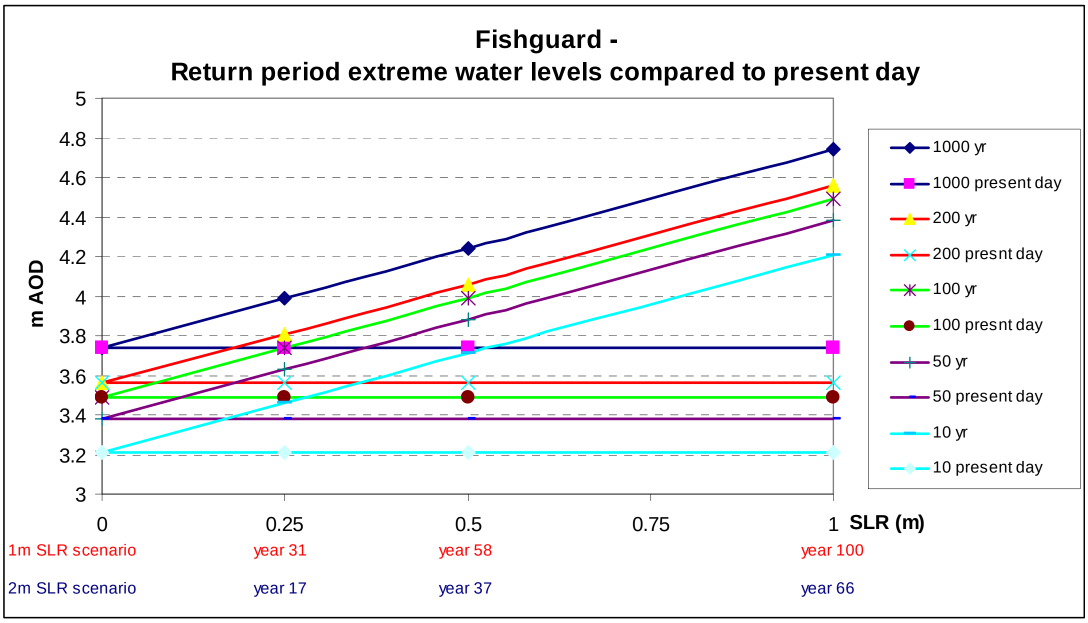
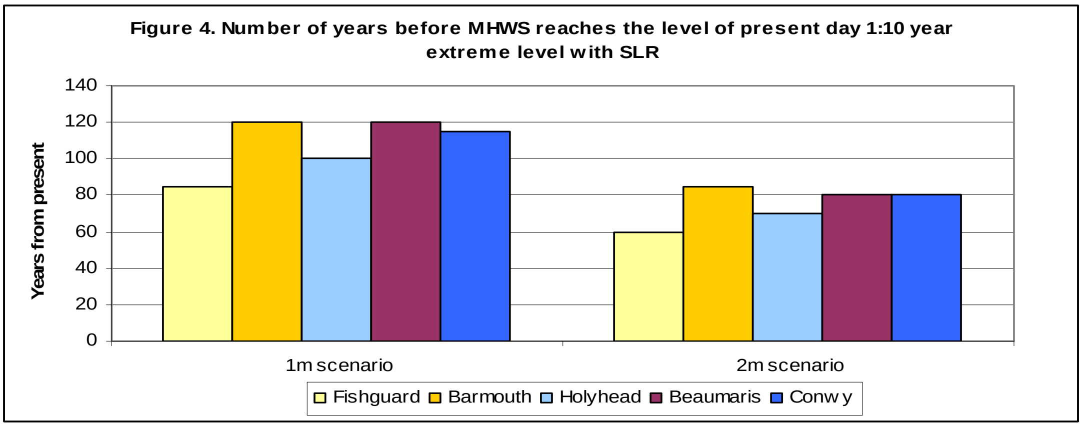


Figure 3 Change in return period of extreme water levels for Fishguard.

It may be seen that a 1:1000 year return period water level (present day) might occur with a return period of 1:10 years in 60 years time, under a 1m SLR scenario, and in 40 years time, under a 2m SLR scenario. Potentially more significant is that with sea level rise, normal tidal levels (MHWS) would reach that expected during extreme events. This is illustrated in Figure 4, showing a comparison in years between MHWS and the 1:10 yr. extreme water level for the two baseline SLR scenarios.



There is no probability associated with the scenarios outlined above. UKCP09 states:

"While we do not attempt to derive a probability for (the H++) scenario it should be viewed as being very unlikely to occur during the 21st century. It is presented to provide justification for not ruling out options for adaptation until the science is more certain."

However, as noted by UKCP09, the 2m scenario provides a baseline for considering future change in behaviour and consequences as a result of shoreline management, ensuring that the way in which management is developed over the next 100 years establishes an approach which can be sustained into the future.

It also has to be recognised that the 1m scenario is by no means certain. If sea level rise was in fact less than the 1m scenario, then the changes discussed in the main SMP2 would be over a longer period of time. At present the Defra Guidance is taken as the principle baseline for defining policy for the three epochs covered by the plan; consideration of alternative scenarios is used in testing and identifying the overall need for adaptation in developing a robustly sustainable plan.

C.1.3 Erosion Risk Mapping.

Erosion and coastal recession rates have been collated from a variety of sources, including studies of historical maps and air photographs and more recent monitoring data. Where there is little or no information available, rates have been derived from considering the nature of the coast and geomorphological influence. Much of this information is taken from previous collation undertaken during SMP1, updated where possible by more recent measurement or studies.

This information has been used as input to the National Coastal Erosion Risk Mapping system. Specific aspects of coastal recession are included within this system. These include:

- The presence and condition of existing defences
- Underlying erosion rates
- Cliff instability, either in term of continuous slippage or the one off landslides.

There are inherent difficulties in defining long term recession. There are four basic aspects to this.

- Lack of long term data or underlying inaccuracy in historic mapping. In many areas erosion or cliff failure can be episodic, cyclic or may be dependent on a variety of other external factors. Erosion may be triggered by storms or periods of wet weather. Changes in natural coastal processes of management may have long term influence on recession rates. These changes may not be apparent from historic records.
- Different parts of the coastal system may respond in different ways, such that beaches may be steepening with greater retreat occurring at low water than at high water. The crest of a cliff or coastal slope may be retreating at a different rate to erosion at the beach level. Sediment supply from a dune or cliff may provide sediment that maintains beach levels.
- Erosion in areas may expose harder geology which then acts to control the pattern of erosion as sections of the shore move from drift alignment to swash alignment. Erosion may equally increase as long term sediment supply is reduced.
- Definition of a baseline from which to measure rates of erosion or recession. In some areas it is more appropriate to define the baseline from the crest of a cliff, in others to define this baseline as the crest of the beach or as mean high water mark. This may critically depend on the nature of the coast or the specific management issues relating to a coast. Even in defining an appropriate baseline, the precise position, whether it be the crest of a cliff or the crest of the beach, may vary between different map scales.

While the SMP attempts to resolve these issues, this is at a broad scale. The aim of the SMP erosion mapping is in relation to establishing long term planning of shoreline management. The mapping may therefore be taken as a guide in terms of identifying at a high level specific areas of risk but reference should be made to base information in assessing specific risk to assets.

C.1.4 Use of SLR Scenarios in Relation to Erosion.

The initial baseline erosion mapping is based on present day assessment of erosion rates. Quite clearly sea level rise can have a significant influence on this.

Where the coast is in equilibrium, in areas where there are storm beaches or naturally functioning dunes, these sections of the coast have adjusted naturally to the wave and tidal current energy to which they are exposed. With sea level rise, where there is sufficient sediment, the whole profile of the beach will attempt to re-adjust. This adjustment will be principally in terms of the crest of the beach attempting to build vertically but in order for this to happen the shoreline has to move landwards. This is the basic principle of roll-back. This is in simple terms a function of the slope of the foreshore and the rise in level of the water. In these terms if the foreshore slope is at a typical gradient of 1:20, then a 1m rise in water level would result in the beach crest rolling back some 20m.

Where, as is more often the case, the coast is eroding, this indicates that the coast is not in equilibrium. The coast is sufficiently hard that it is still in a state of response to the energy to which it is exposed. This is most obviously seen at the beach or cliff face where the shoreline is actively eroding horizontally. This may also result in the coastal slope being over-steepened and the slope failing and retreating landwards at it crest. However, associated with this is the potential erosion of the sea bed, so that there is a complex system, with the whole shore profile retreating. As sea level rise increases in the future, the rate of erosion would also be expected to increase. Under these conditions where there is both an erodable sea bed and backshore the following basic relationship (Walkden, M.J.A., Hall, J.W., 2005) has been derived:

Future erosion rate = Present erosion rate x $(SLR_{future} / SLR_{present})^{-0.5}$

Based on the SLR scenarios this gives the following average factors as set in Table 3

	Over epoch 1			Over epoch 2			Over epoch 3		
	Av.	Low	High	Av.	Low	High	Av.	Low	High
1m SLR scenario	1.06	0.95	1.16	1.24	1.11	1.36	1.51	1.35	1.66
2m SLR scenario	1.37	1.30	1.42	1.62	1.52	1.72	1.96	1.81	2.11

Table 3. Increase in erosion rates by epoch for baseline SLR scenarios.

Other factors included are accelerated erosion following failure of defences, cliff or coastal slope instability and the potential control imposed by the underlying geomorphology for each section of the coast.

These various aspects have been included in developing erosion zones for each epoch along the whole SMP frontage and erosion maps are included as Annex 4 to this Appendix C.

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Annex 2 - Coastal Processes: Unit Descriptions

November 2011
Final
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CONTENTS

C.1 COASTAL PROCESSES AND GEOMORPHOLOGY PROCESS UNITS

C.1.1 Unit 1 - St Ann's Head to Wooltack Point

Description	This unit is at the south-western tip of Wales. It begins at St Ann's Head, which is the tip of the Dale Peninsula, and runs northwest to Wooltack Point. It is bounded at its southern limit by Milford Haven, and is situated behind the islands of Skokholm, Skomer and Gateholm. The unit is quite undeveloped, although Dale Airfield is situated at the root of the Dale Peninsula.
Geology and Physical Controls	The south pointing Dale peninsula is sandstone, whilst the west pointing peninsula, and Skomer Island, are volcanic. A portion of the frontage, between Renny Slip and Red Cliff is mudstone. Between St Ann's Head and Great Castle Head the hard rock cliffs have softer overburden material, creating gentler coastal slopes. The main physical controls on this unit are the two boundary headlands. The smaller headlands also provide more localised protection, particularly Great Castle Head, Hooper's Point and Gateholm Stack. Gateholm Island helps to hold beach material at both Marloes Sands and Albion Sands. The islands Skomer and Skokholm provide some protection from westerly and south-westerly storms.
Geomorphology	Most of this frontage comprises resistant rock platforms bounded by steep hard cliffs. Bays have formed at a range of scales; the largest (Marloes) being almost two kilometres across. Marloes is sandy, as is Westdale Bay. Numerous small beaches have also formed in the smaller coastal embayments.
Wave Climate	Wave conditions have not been quantified for this unit. However, it is situated on the most exposed section of the welsh coast, in that it faces Atlantic swell and wind waves propagating northeast through the Celtic Sea.
Erosion and Flood Risks	Although this is, essentially, an erosional coast, there is no significant vulnerability to erosion or coastal flooding.
Sediment Dynamics	Wooltack Point and St Ann's Head provide effective barriers to sediment transport, so that there is no exchange of sediments with neighbouring units; The sediments present within Marloes Sands and Westdale bay are produced locally.

<table>
<tr><td>Structures and Defences</td><td>There are no manmade defences or structures within this unit.</td></tr>
<tr><td>Historical and Future Shoreline Evolution</td><td>
<p>The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park report provides the following recession and accretion rates for locations along this frontage:</p>
<table>
<tr><th>Location</th><th>Cliff (m/yr)</th><th>MHW (m/yr)</th><th>MLW (m/yr)</th></tr>
<tr><td>Dale Peninsula</td><td>-0.05</td><td>-0.05</td><td>0.39</td></tr>
<tr><td>Marloes Beach</td><td></td><td>-0.02</td><td>2.03</td></tr>
</table>
<p>N.B. Negative values indicate recession</p>
<p>The dominant geomorphology processes involve the slow ongoing erosion of shore platforms, and undermining of steep cliff faces, leading to intermittent cliff failures. The resulting coastal recession rates are very low. There is some localised low recession at Westdale Bay and Marloes sands.</p>
<p>The characteristic indented shape of the coastline is formed by hydrodynamic exploitation of localised weaknesses in the hard lithology.</p>
<p>Accelerated sea level rise will cause narrowing of the steep rocky intertidal areas, and an increase in wave attack on the cliffs. This will tend to increase the (currently very low) rate of cliff recession. The rising sea will tend to partially submerge the beaches, and drive them landward. The beaches will be strongly constrained by the cliffs behind them, leading to beach narrowing.</p>
</td></tr>
<tr><td>Information Sources</td><td>
<p>Shoreline Management Plan from ST Govan’s Head to the Teifi Estuary, Stage 2 (WS Atkins).</p>
<p>The Futurecoast database.</p>
<p>Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated).</p>
</td></tr>
</table>

C.1.2 Unit 2 - Wooltack Point to Pen Dal-aderyn

Picture: Newgale barrier beach	
Description	This unit is situated at the tip of the Pembrokeshire Peninsula and encompasses St Bride's Bay. The bay is bounded by (1) the southerly hard rock coast between Wooltack Point and Little Haven, (2) the easterly frontage between Little Haven and Newgale, which is characterised by beaches held between rocky headlands, and (3) the northerly hard rock coast between Newgale and Ramsey Island. The frontage includes the settlements of Little Haven, Broad Haven, Nolton Haven, Newgale, and Solva.
Geology and Physical Controls	The volcanic rock of Wooltack Point is followed by sandstone, which is present to the north of Newgale, although an igneous intrusion forms the cliffs west of Little Haven. The south facing coast to St David's Head is predominately mudstone. The northern and southern boundaries effectively form massive headlands that limit the wave climate within the bay and prevent sediment exchange with neighbouring units. There are also numerous headlands of smaller scale that have strong local effects. Ramsey Island provides protection to the northern boundary of the unit.
Geomorphology	The geomorphology of this large unit is quite varied. Most of the coastline is comprised of hard rock cliffs, fronted by steep shore platforms. Although eroding they are highly resistant and so retreat very slowly, producing little sediment. The next most dominant features of the bay are the long sandy beaches fringing the eastern boundary. The largest of these is

	Newgale Sands, which is in the northeast corner. In most places these are backed by cliffs or seawalls. The hard rock north facing shoreline also contains some beach material. At Martin's Haven there is deeply indented bay with a small pebble and shingle beach. Musslewick Sands is the only extensive beach on this section of the shore. There is another small bay at St Bride's Haven. Between Little Haven and Broad Haven there is an extensive sandy intertidal area with shingle towards the top of the beach. This is backed by artificial defences at Little Haven and Broad Haven and is divided into two sections by the cliffs at Fox Hole and The Rain. North of the beach at Broad Haven the rock outcrops and cliffs resume until Druidston Haven, where there is another sandy intertidal area with shingle towards the top of the beach. This is mostly backed by cliffs except where a small stream outfalls across the beach. There is also a small beach at Nolton Haven, which is a deeply indented bay. The beach is sandy and backed by areas of gravel. The shore then returns to cliff until the large beach of Newgale Sands, which has an extensive perched gravel barrier. This is backed by cliffs at its southern end, but at Newgale it protects a low lying plain against coastal flooding. Directly behind the barrier is a wall retaining the gravel to prevent it from rolling over the coastal road. Gravel washed onto the road by storms are cleared, and moved back to the ridge. North of Newgale the shoreline changes orientation to become south facing, and the cliffs return. Here there are many small rocky bays, the most notable of which are Aber west, Porth y Bwch, Porth Gwyn, Caerfai Bay and Porthlysgi. There are two river mouths, those of the Solva and the Alun. The Solva discharges through a partially infilled ria.
Wave Climate	The Futurecoast database includes inshore wave data for a point within this unit at Druidston Haven, on the western facing shoreline. As would be expected from the position and form of the unit, the predominant wave direction is between 240° and 300° (i.e. westerly). Futurecoast describes wave heights of up to 5.0 m from this direction.
Erosion and Flood Risks	Newgale has an extensive coastal floodplain in the valley of Brandy Brook, and suffers from inundation events. A recent flood occurred on the 10th March 2008. There is also flood risk around the River Solva at Solva.

	There are no noted areas currently vulnerable to erosion.
Sediment Dynamics	There is no sediment exchange with adjacent units because of the the boundary headlands. There is relatively free movement of sediment along the west facing frontage within the bay, and longshore transport occurs in both directions. The main beaches are substantially swash aligned, although a widening of the Newgale barrier towards the north indicates a slight northerly bias. Along the east-west aligned coasts potential longshore transport is easterly. Offshore, there is some accumulation of sand within the bay and some gravel. These are likely to be the original source for the beaches within the bay, and some exchange of material still occurs between Newgale and these deposits. Newgale is also fed by gravel released by cliff recession in the south.
Structures and Defences	*Seawalls at broad Haven.* *Wall retaining the gravel at Newgale* *Seawall at little haven* *Small sections of sea walls at the upper reaches of Solva and across the inlet at Porth Clais.* *A small sea wall protecting the car park and lifeboat station at Whitesand Bay.*
Historical and Future Shoreline Evolution	The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park report provides the following recession and accretion rates at locations along this frontage:

Location	Cliff-Line (m/yr)	MHWM (m/yr)	MLWM (m/yr)
Little Haven to Broad Haven		-0.0156	0.0433
Broad Haven to Newgale Beach	-0.0004	0.0030	0.0007
Newgale Beach		-0.0060	-0.0363
Newgale to Solva		-0.0014	0.0047
Solva to Pen Dal-aderyn		-0.0021	0.0016

N.B. Negative values indicate recession

These low recession rates are mainly due to the hard nature of the exposed geology.

The gravel barrier at Newgale is known to have been retreating since the 1890s, although this behaviour probably has a much longer history.

Historic maps show fluctuating beach widths at Little Haven and Broad Haven. This may indicate offshore losses coupled with the release of fresh material from local rockfalls.

	Accelerated sea level rise will cause narrowing of the steep rocky intertidal areas and increased wave attack on the cliff bases. The beaches will tend to roll back as the sea level rises. Most of these will be held by backing cliffs, leading to narrowing of the intertidal and subaerial areas. Elsewhere, particularly at Broad Haven, the nature of the response will be determined by whether or not existing seawalls are retained. Retreat of the Newgale barrier will increase, and it may become narrower.
Information Sources	Shoreline Management Plan from ST Govan's Head to the Teifi Estuary, Stage 2 (WS Atkins). The Futurecoast database. Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated).

C.1.3 Unit 3 – Pen Dal-aderyn to St David's Head

Description	This relatively small unit is situated on the tip of the Pembrokeshire Peninsula. It comprises the west-facing coastline between the headlands of Pen Dal-aderyn in the south, and St David's Head in the north. The coast here is remote and quite undeveloped. A lifeboat station is situated at St Justinian, sheltered behind Ramsey Island.
Geology and Physical Controls	The exposed geology along this frontage is mainly hard mudstone, although St David's Head itself is igneous. Ramsey island is composed of hard mudstones and volcanic rocks. Between the headland of Pen Dal-aderyn and Porth Mawr are high sandstone cliffs with a small beach of gravel and boulders under the lifeboat station at Porthstinian. The headlands that surround Porth Mawr are formed of steeply north-dipping rocks of fine grained sandstones and siltstones with quartz veins. The bay is carved into Cambrian strata and lower Ordovician slates. The major features influencing wave action and sediment transport along this unit are Ramsey island to the west, and the boundary headlands. In addition the major central headland behind Point St John plays an important role in maintaining a beach at Whitesands Bay.
Geomorphology	The coast is predominantly composed of exposed rock cliffs fronted by steep shore platforms, except at Whitesands Bay (Porth-mawr), Porth Lleuog and Porthmelgan, where sandy beaches have formed. The backshore of the northern half of Porth Mawr is a shingle storm beach. The beaches are help in place by their bounding headlands, and by the generally westerly waves they are subject to.
Wave Climate	Wave conditions have not been quantified within this unit. It is in a generally very exposed situation. This exposure is reduced, however to a great extent (particularly in the south) by the presence of Ramsey Island, and to a lesser extent by numerous offshore reefs and rocks, most notably the Bishops and Clerks.
Erosion and Flood Risks	There are no immediate erosion or flood risks in this unit.
Sediment Dynamics	There is a general lack of sediment in this system, except where it is held within the beaches. The main beach of Whitesand Bay is fed by erosion of cliffs to the south. Strong tidal scour behind Ramsey island winnows sediments in this area, to leave a predominantly gravel beach at St Justinian.

<table>
<tr><td>Structures and Defences</td><td><i>Lifeboat station</i></td></tr>
<tr><td>Historical and Future Shoreline Evolution</td><td>The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park provides recession and accretion rates for the following locations:

<table>
<tr><td>Location</td><td>Cliff-Line (m/yr)</td><td>MHWM (m/yr)</td><td>MLWM (m/yr)</td></tr>
<tr><td>Maenbachau to St. David’s (N)</td><td></td><td>1.52</td><td>0.52</td></tr>
<tr><td>Point St John</td><td></td><td>-0.02</td><td>-0.50</td></tr>
<tr><td>Whitesands Bay</td><td></td><td>-1.23</td><td>-3.66</td></tr>
<tr><td>St David’s Head</td><td>-0.01</td><td>0.01</td><td>0.01</td></tr>
</table>
N.B. Negative values indicate recession

The predominance of hard rock geomorphological processes means that this shoreline retreats slowly. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure.

Accelerated sea level rise will cause narrowing of the steep rocky intertidal areas, and an increase in wave attack on the cliffs. This will tend to increase the (currently very low) rate of cliff recession. The rising sea will tend to partially submerge the beaches, and drive them landward. The beaches will be strongly constrained by the cliffs behind them, leading to beach narrowing.</td></tr>
<tr><td>Information Sources</td><td>Shoreline Management Plan from ST Govan’s Head to the Teifi Estuary, Stage 2 (WS Atkins).

The Futurecoast database.

Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated).</td></tr>
</table>

C.1.4 Unit 4 - St David's Head to Strumble Head

Picture: Abereiddy beach and seawall	
Description	This unit is situated at the southern most limit of Cardigan Bay. It extends east and north from St David's Head to Strumble Head and is largely undeveloped, although there are two small villages, Porthgain, which has a harbour, and Abercastle. There are also cottages close to the beach at Abereiddy.

Geology and Physical Controls	The igneous rock of St David's Head abuts mudstones, sandstones and shales. Strumble Head is composed of volcanic material, and is overlain by glacial till. Between Penmaen Dewi and Abereiddi the headlands are comprised of steeply north-dipping rocks of fine grained sandstones and siltstones with quartz veins. The coastline is strongly indented, with multiple headlands defining small embayments. Beaches have formed within some of these bays, where sedimentary material is available and the headlands protrude sufficiently.
Geomorphology	The coast is mostly comprised of resistant rocky shore platforms, backed by hard rock cliffs. Gravel/ cobble beaches exist, across infilled glacial outwash channels at Abereiddy, Aber Mawr and Aber Bach. At Aberdraw, soft friable rock cliffs are evident above a harder rock toe, and these are overlain by boulder clay. The cliffs are subject to land slips due to undermining. At Aber Mawr an eroding clay cliff is fronted by a cobbled beach, which extends for several hundred metres across a low lying infilled glacial outwash channel. This beach is separated from another at Aber Bach, to the north, by the rock outcrop of Pen Deudraeth. North of Aber Bach to Trwyn Llwyd, are sandy cliffs of hard rock overlain by deep boulder clay deposits. There is one beach of note at Pwllcrochan Bay, which is cliff backed. Beyond Trwyn Llwyd the cliffs continue, with some indented bays at Pwll Deri and Carreg Onnen, to the end of this unit at Strumble Head.
Wave Climate	Wave conditions have not been quantified within this unit. It is rather more protected than the units further south, because it faces west-northwest across the Irish Sea, rather than towards the Altantic. However Atlantic swell diffracts towards this area around St David's Head.

Erosion and Flood Risks	Low recession rates mean that erosion is generally not a problem along this frontage. Where the shore is retreating the coastal margin is mostly undeveloped and so can accommodate change. The beach car park at Abereiddy is, however, vulnerable to erosion. Failure of the existing seawall would result in rapid loss of around half the car park (Royal Haskoning, 2009). The gravel barrier of Aber Mawr fronts a plain that may be vulnerable to flooding, should a breach occur.
Sediment Dynamics	There is very little sediment motion of significance to the overall coastal system. The sediment transport that does occur, is largely confined within the embayments, although there is some evidence of fine offshore material being trapped at Porthgain and Abercastle. The most significant sediment flux is into the beaches from the limited erosion of the rock, and sedimentary deposits around them.
Structures and Defences	*Abereiddy beach car park is protected by a seawall, which was constructed in the 1970s from narrow steel piles and timber sleepers. This has suffered damage, resulting in blowout of the backing infill. This has been managed through the placement of armourstone behind the wall. In places the structure is now a seawall/ revetment hybrid. The structure now has a very short residual life.* *Porth Gain is an inlet that has been developed to create a small harbour, with two small breakwaters and a quay. It has a small beach consisting of a thin layer of fine mud and sand over rock.* *There is a low sea wall at Abercastle to the crest of a natural beach.* *Possibility of quarry waste historically building the beach at Abereiddy.*
Historical and Future Shoreline Evolution	The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park report provides the following recession and accretion rates for locations along this frontage:

Location	Cliff-Line (m/yr)	MHWM (m/yr)	MLWM (m/yr)
Penclegyr		-0.08	0.33
Abereiddi Bay	-0.02	-0.4	0.19
Traeth Llyfyn	-0.03	1.55	3.79
Porth Egr to to Ynys Denllyn		0.10	0.15

N.B. Negative values indicate recession

	The predominance of hard rock geomorphological processes means that this shoreline retreats slowly. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure. The gravel/cobble beaches are more susceptible to retreat, where they are not constrained on their landward side. Recession has been noted at Abereiddy, Ynys Barry, Aber Draw and Aber Mawr. At Porth Gain there is evidence of sediment accretion behind the main harbour wall, which is likely to restrict access. The each at Aber mawr is retreating in response to sea level rise by 'rolling back'; a process by which storms carry gravel from the front face to the rear. At Abereiddy a sea wall constructed in the 1970s has partially held the shoreline, but is now in a poor state of repair, and is frequently breached by storms. The absence of this seawall would result in around 25 metres of rapid retreat (Royal Haskoning, 2009). Recession of this coastline will continue in the future. Sensitivity to sea level rise will depend on the coastal feature, with the harder rock coasts being least responsive. The shorelines along beaches will be most responsive, retreating through a combination of roll-back and inundation.
Information Sources	Shoreline Management Plan from ST Govan's Head to the Teifi Estuary, Stage 2 (WS Atkins). The Futurecoast database. Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated). Royal Haskoning (2009). Abereiddy Realignment Study. Report for Pembrokeshire County Council and the National Trust.

C.1.5 Unit 5 - Strumble Head to Dinas Head

Picture: Lower Town harbour	
Description	This unit is situated within the southern part of Cardigan Bay, and faces north into the Irish Sea. It includes the heavily managed Fishguard Harbour and the smaller quay at Lower Town.
Geology and Physical Controls	The geology of this unit is generally composed of sedimentary sandstones and shales, interspersed with hard intrusive igneous rocks, which tend to form the headlands. Strumble head is volcanic, and is capped with glacial till, whilst Dinas head is formed of sandstone. The primary natural physical controls on this unit are the boundary headlands, and the headland around Pwll Hir, from which Fishguard breakwater projects. The breakwater is itself an important control, as is the inner harbour breakwater.
Geomorphology	The coast is mostly comprised of resistant rocky shore platforms, backed by hard rock cliffs. The unit also includes beaches, at Pwll Hir, Goodwick, Lower Town, and within small bays along the south eastern margin of Fishguard Bay. The beach at Goodwick fronts low lying marshland and is divided in the middle by the East Breakwater. The western half is reinforced with rock and walls, and is intersected by concrete slipways. The eastern half is more natural, and more sandy, with a small area of dunes, though is still managed with groynes and is backed by rock in its eastern section. Sediment transport here is towards the north-west, due to the protection provided by the East breakwater.

	The Lower Town harbour is situated in the recessed rocky mouth of the river Gwaun. It is a natural harbour that benefits, in addition, from the protection of the north breakwater. As a result finer sediments have accumulated within it. These are backed by coarser gravels and artificial defences. Between the mouth of the Afon Gwaun and Pwllgwaelod the shore is again composed of hard rock cliffs with small coves, some of which contain beach deposits. At Pwllgwaelod is a bay with low sand foreshore and steeper upper storm beach with an outwash channel from Cwmyr Eglwys. This bay is slowly eroding. The remainder of the unit to Dinas Head is comprised of hard rock cliffs.
Wave Climate	Wave conditions have not been quantified within this unit. It is quite protected, because it faces north across the Irish Sea, rather than towards the Atlantic. The Fishguard breakwaters provide significant additional protection within Fishguard Bay.
Erosion and Flood Risks	Depending on the rate of sea level rise, the hinterland of Pwllgwaelod may be vulnerable to coastal flooding, which may separate Dinas Island from the mainland at high tide. Goodwick Moor, behind Fishguard harbour, is an extensive area at risk of coastal flooding. A smaller area of flood risk is present at Lower Town, at the outlet of the river Gwaun. In addition the area around Hes'cwm mill, behind Aber Bach, is also vulnerable to flooding.
Sediment Dynamics	There is very little sediment flow around this system, because of the predominance of hard lithology, and the lack of inputs from neighbouring systems. Sediments within the embayments tend to be retained by their bounding headlands. Some finer material has settled in both Fishguard harbour and around the mouth of the river Gwaun, due to their sheltered locations.
Structures and Defences	*From Futurecoast:* *There are numerous defence structures within Fishguard Bay: breakwaters to the north and south of Fishguard harbour afford shelter to the ferry terminal, which is also protected by a sea wall. The low-lying hinterland at Goodwick is protected by rock revetment and groynes, and Fishguard Lower Town is protected by a sea wall. The foreshore of Cwym-yr Eglwys is backed by a sea wall which was extended southwards in the late 1970s*
Historical and Future Shoreline Evolution	There has been very little change in the bathymetry of the bay since the construction of the breakwaters at Fishguard, indicating the general stability of this system.

<table>
<tr>
<td></td>
<td>
The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park gives recession and accretion rates for locations along this frontage, and these are shown below:
<table>
<tr><th>Location</th><th>Cliff (m/yr)</th><th>Mean High Water (m/yr)</th><th>Mean Low Water (m/yr)</th></tr>
<tr><td>Strumble Head to Fishguard</td><td></td><td>-0.0007</td><td>0.0025</td></tr>
<tr><td>Fishguard to Dinas Head</td><td>-0.0001</td><td>-0.0007</td><td>-0.0008</td></tr>
</table>
N.B. Negative values indicate recession
The predominance of hard rock geomorphological processes means that in most places this shoreline retreats slowly. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure.
Accelerated sea level rise will submerge shore platforms, allowing larger waves to attack the cliffs. This will lead to an increase in the (low) cliff recession rates. The higher sea levels will cause beaches to retreat, where they are free to do so; elsewhere they will tend to narrow and steepen. Overall the bays will tend to become more indented. Increased recession rates will lead to more frequent rockfalls, increasing supply to local beaches.
The flat intertidal area within Fishguard Harbour will tend to rise and migrate inland with sea level rise. For most of the frontage this will be prevented by backing defences and so narrowing of the beach and intertidal should be expected. Ongoing rising water levels will increase the probability of flooding of the backing hinterland.
</td>
</tr>
<tr>
<td>Information Sources</td>
<td>
Shoreline Management Plan from ST Govan's Head to the Teifi Estuary, Stage 2 (WS Atkins).
The Futurecoast database.
Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated).
</td>
</tr>
</table>

C.1.6 Unit 6 - Dinas Head to Cemaes Head

Picture: Parrog and The Bennet	
Description	This unit is in southern Cardigan Bay, contains Newport Bay and faces northwest into the Irish Sea. It is rocky and relatively undeveloped, but does include the settlement of Cwm-yr-Eglwys behind Dinas Head, and Parrog, which is at mouth of the river Nyfer. The Nyfer estuary, and its coastal interactions, are described in the Estuaries Assessment.
Geology and Physical Controls	Dinas head is composed of Sandstone. The cliffs between Newport Sands and Cemaes Head are within the Ordovician slate, and alternate between resistant grits and shales. The main physical controls are the boundary headlands, Dinas and Cemaes. The recessed form of Newport Bay also provides protection to the Nyfer estuary. At a smaller scale the many headlands protect small embayments.
Geomorphology	Over most of the frontage the geomorphology is dominated by hard rock processes, involving the slow ongoing erosion of shore platforms and undermining of steep cliff faces, leading to intermittent cliff failures. Lithological weaknesses are exploited by wave action, and this forms the characteristic planshape indentations. At Cwm-yr-Eglwys the shoreline has recessed into what was probably a glacial outwash channel. This bay retains a sandy beach that is independent of the rest of the unit. East of Cwm-yr-Eglwys within Fforest Bay is a stable shingle beach backed by grass banks.

	Newport Sands is the estuary of the river Nyfer. This was once a ria, but has infilled with sand. A substantial duned sand ridge (the Bennet) has developed from the northern side, which pushes the channel towards the south. Rocky margins can still be seen at Parrog and on both sides of the estuary behind the bar. At Parrog the rock continues above the platform area but is then overlain with a well vegetated clay slope around three metres high. Occasional scour has led to the placement of rock. Between Newport Sands and Cemaes Head the shore returns to the hard rock cliffs typical of this unit. This is interrupted at Ceibwr Bay by a shingle beach backed by scrub.
Wave Climate	Wave conditions have not been quantified within this unit. It is quite protected, because it faces north across the Irish Sea, rather than towards the Atlantic. The original SMP indicates that the predominant wave direction is from the west-northwest.
Erosion and Flood Risks	Depending on the rate of sea level rise, the hinterland of Cwm yr Eglws may be vulnerable to coastal flooding, which could separate Dinas Island from the mainland at high tide. Scour has been observed at Parrog, and this location has the potential for increased recession, given its relatively high exposure and the presence of softer deposits. Active Landsliding has been observed recently at Cell Howell. There are small areas of flood risk associated with the streams around Aberfforest and Aber Rhigian.
Sediment Dynamics	There is a small flux of sand southwest along the seaward boundary of this unit from Teifi estuary to the west of Dinas Head. The estuaries assessment of this SMP review found that the Neifi is likely to act as a weak sink for sediments, and that it exchanges material with the open coast. However this exchange is likely to be restricted to the area of Newport sands. Throughout most of this unit sediment transport processes are only significant within embayments, where they maintain beaches by retaining locally released sediments. Newport Bay is also largely closed to sediment flux at its boundaries, although it is more complex internally around Newport Sands. This is explained within the description of the Nyfer estuary. At Parrog shingle has accumulated at the beach crest, just below the clay bank. Flotsam tends to accumulate at Parrog indicating low currents at high tide.

<table>
<tr><td>Structures and Defences</td><td><i>Seawalls at Cwm yr Eglwys</i>
<i>Seawalls and rock at Parrog</i></td></tr>
<tr><td>Historical and Future Shoreline Evolution</td><td>
<p>The predominance of hard rock geomorphological processes means that in most places this shoreline retreats slowly. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure.</p>
<p>The Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park provides the following rates of change of locations within this frontage.</p>
<table>
<tr><td>Location</td><td>Cliff (m/yr)</td><td>Mean High Water (m/yr)</td><td>Mean Low Water (m/yr)</td></tr>
<tr><td>Dinas Head to Newport</td><td>-0.0001</td><td>-0.002</td><td>-0.0046</td></tr>
<tr><td>Newport to Pwll Coch</td><td>-0.0009</td><td>-0.0037</td><td>-0.0046</td></tr>
<tr><td>Pwll Coch to Careg Wylan</td><td>-0.0009</td><td>-0.0097</td><td>-0.0088</td></tr>
<tr><td>Careg Wylan to Pwllygranant</td><td></td><td>-0.0002</td><td>0.0032</td></tr>
<tr><td>Cemaes Head</td><td>-0.0006</td><td></td><td>0.0052</td></tr>
</table>
<p>N.B. Negative values indicate recession</p>
<p>There has been little change in the shoreline at Newport Sands over the last century. Between 1890 and 1910 the foreshore width decreased due to a landward movement of the low water mark, but since then there appears to have been little change.</p>
<p>A port at Parrog silted up by the end of the 19th Century.</p>
<p>Seawalls have previously been undermined at Cwm-yr-Eglwys, following beach lowering.</p>
<p>Accelerated sea level rise will submerge shore platforms, allowing larger waves to attack the cliffs. This will lead to an increase in the (low) cliff recession rates. Increased recession rates will lead to more frequent rockfalls, increasing supply to local beaches.</p>
<p>Parrog has the potential for increased recession as sea level rise allows larger waves to approach the shoreline, exposing softer deposits. Such recession would increase sediment supply to Newport Bay.</p>
<p>The Bennet dunes will tend to respond to sea level rise by rolling back into the estuary. Eroded material from the dune front is likely to be deposited within the bay, having little effect on the adjacent sections of coastline.</p>
</td></tr>
</table>

Information Sources	Shoreline Management Plan from ST Govan's Head to the Teifi Estuary, Stage 2 (WS Atkins). The Futurecoast database. Investigation of the Stability of Coastal Cliffs along the Pembrokeshire Coast National Park (anon, undated).

C.1.7 Unit 7 - Cemaes Head to New Quay Head

Picture: defences on the north side of Gwbert Spit	
Description	This unit extends from Cemaes Head across the Teifi estuary, east to Aberporth bay, and then east northeast to New Quay head. The Teifi estuary and the spit features at its mouth are described in Section 5 of the Estuaries Assessment. The coast is mainly undeveloped, except around Aberporth.
Geology and Physical Controls	Cemaes Head, the headland of Carreg Lydan and Cardigan Island, protect the Teifi estuary. Elsewhere headlands provide local protection. Notable examples include: Foel y Mwnt which retains the Mwnt beach, Pencribach, and the other headlands along the Aberporth frontage, and Ynys-Lochtyn. The sheltering effects of Pencribach can be seen to Tresaith The outcrops of rock seen between Craig-y-Gwbert and Traeth-y-Mwnt belong to the Gwbert formation. The rocks comprise alternating bands of mudstone and thin sandstone. There are patches of eroding boulder clay. From Mwnt to Ynys-Lochtyn the rocks are mainly shales of the Ordovician period. The dominant lithology of the Mwnt formation is a grey banded mudstone, and thin cross laminated sandstone. Mwnt, and the area around it, is overlain by boulder clay. The Tresaith formation is well exposed in the cliffs at Penbryn Beach where it comprises a series of mottled green and grey mudstones with black shales. These pass laterally into a thick sequence of banded mudstones, with thin silty and sandy laminae, which are exposed in the cliffs at Aberporth and Cribach Bay. The Tresaith formation grades into the overlying Llangrannog formation through the gradual introduction of thin sandstone laminae and lenses

	The Penbryn Beds, the lowest member of the Llangrannog series, outcrop south of Carreg-y-Nodwydd where they consist of light grey, cross-laminated, medium-grained sandstones. The junction with the succeeding member, the Carreg-y-Ty Beds, is well exposed in the cliffs at Carreg-y-Nodwydd, where thinly bedded sandstones pass abruptly into dark grey mudstones containing large sandstone lenses. Soft sediment deformation is widespread in this member. North of Llangrannog, the rocks become Silurian, of the Llandovery series, for the first few miles and are then of the Telychian series. The latter rocks are better known as the Aberystwyth Grits. The Garglwyd formation is the first of the Llandovery series and is well exposed at Traeth-yr-ynys, Ynys Lochtyn and Gaerglwyd. The lithology is predominantly argillaceous, consisting of banded grey and dark blue mudstones with thin sandstones. Following this formation is the 115m thick sequence of well-bedded sandstones and mudstones comprising the Allt Goch formation, which is well exposed on the ridge extending from Traeth-y-Gaerglwyd. The Allt Goch formation is succeeded by a 240m thick sequence of mudstone, with thin siltstone seams of the Cefn-Cwrt formation, which are well exposed between the Gaerglwyd and Cefn-Cwrt beaches. The following formation of Llangraig comprises a thick sequence of banded light and dark grey mudstones with infrequent beds of dark grey to black graptoliferous mud. The estimated thickness of the formation is 300m. The Llangraig formation is succeeded by the Grogal formation. This is a distinctive unit of alternating mudstones, sandy siltstones and sandstones. A 5m thick bed of grey–green banded mudstone occurs at the top of the formation, and marks the contact with the overlying Aberystwyth Grits. The frequency of sandstone and sandy siltstone beds gradually increases upwards although the thickness of individual beds shows little increase.
Geomorphology	This coast is largely comprised of hard rock cliffs, fronted by steeply sloping shore platforms. There is rather more beach sediment here than in units further to the south. The western half of the unit includes sandy beaches such as Mwnt, Parc Llyn, Aberporth, Tresaith and Penbryn. The eastern half also has sandy beaches, but these tend to be overlain by gravel, such as at Llangrannog and Cwmtydu, Castell Bach and Coybal. Cardigan Island is within this unit, a small distance offshore of Carreg Lydan. The sediments released by this erosion are either carried away in suspension, where they are very fine, or accrete on the foreshore, where they can be moved by wave action, which generally works to slowly move material towards the northeast . Where this movement is prevented by a headland, material tends to accrete into a beach, such

	as on the southwest side of Ynys-Lochtyn. Where two headlands are close together, such as at Aberporth Bay, longshore transport can be stopped entirely by the coupled effects of headland sheltering, and wave redirection. In such places beaches can accumulate more readily.
Wave Climate	Wave conditions have not been quantified within this unit. It is quite protected, because it faces northwest across the Irish Sea, rather than towards the Atlantic. However Atlantic swell and storm waves will reach this coast, as they shoal across the decreasing bathymetry of Cardigan bay, and rotate in a clockwise direction.
Erosion and Flood Risks	This is an erosive frontage, but this occurs at rates that are so low that it does not represent a hazard. There is some vulnerability to flooding, in small areas where streams discharge at Llangrannog and Cwmtydu. In the latter location beach movement can block the stream and cause minor flooding of the road.
Sediment Dynamics	The general trend of longshore drift is towards the northeast, however there is little alongshore movement because of the indented planshape of the coast, and the generally narrow beaches. Neighbouring coves interact little, if at all. The low cliff recession rates mean that only small volumes of fresh sediment are released. A weak supply from the offshore feeds beaches. These general conditions become more complex in some locations, particularly around Aberporth bay, as described below. The estuaries assessment within this SMP review found that the Teifi estuary is likely to act as a weak source of sandy sediments. It exchanges material with the spit and beach features at its mouth. Erosion of boulder clay at Mwnt and in neighbouring coves releases fines into the water, which are carried offshore. There is minimal release of coarser sediment. Erosion of the glaciogenic cliffs releases coarse sand and gravel to the local system. This is occurring from Gwbert to Aberporth and Careg y Nodwydd to Ynys-Lochtyn. Around Aberporth bay the principal source of material is the offshore/ nearshore sandy bed. As well as this cross-shore motion, there may also be some limited drift to the northeast in the offshore area. This cross shore sediment exchange links the three beaches around the bay (Aberporth, Tresaith and Traeth Penbryn) and makes them, to some degree, sensitive to changes to the offshore sediment supply. The sandy nearshore is protected by Pencribach Headland, but it is still subject to an eastward drift, estimated (within the original SMP) to be 150,000 m^3/yr. At the shore there is a weak but clear potential easterly drift over the western half of the bay. Along the eastern half of the bay the beach is highly dynamic but in net equilibrium.

	The Aberporth beaches are relatively stable and cut back into the shelter of the main cliff line. Any material lost from the cove may be carried towards the east. The beaches are, therefore, sensitive to any conditions or actions that remove material from the cove or stop the replenishment of the bay. There is known to be quite severe local movement of material across both frontages and between the top and bottom of the beaches. A concrete wall has been constructed behind Traeth Dolwen, indicating that at some time in the past the beach may have been considerably lower. There is a transfer of beach material between these two beaches across the front of the interconnecting rock outcrop. The presence of a stream running out through the frontage of Traeth Dyffryn has resulted in the development of a sand bank on the foreshore. At times this bank moves inshore and forces the stream close against the top of the beach. Prior to protection works being undertaken, there was persistent sliding and erosion of the coastal slope. Tresaith is set back from the main line of the cliffs, which allows it to retain a beach. It benefits from alongshore sediment influx from both sides. Under certain storm conditions the beach is drawn down, exposing a clay backshore, and this has led to artificial protection. Traeth Penbryn is situated along the curve of the bay and is swash aligned, so that although quite dynamic, there is no net alongshore flux. Further east the cliffs project further forward and the potential drift is towards the west, tending to drive material back to the beach. The frontage is therefore relatively stable and this has allowed the accumulation of a small area of dunes. The main beach movement is onshore–offshore. The shape of the coast either side of Llangrannog, and the fact that the cove is set well within the general line of the cliffs indicates that Llangrannog is effectively a longshore sediment trap. Some offshore–onshore movement is probable. Within the cove there is considerable variation in beach levels and in the composition of the beach. A small storm shingle beach has developed at the northern end of the cove. Wave reflection occurs off the northern cliffs, and this tends to drive material south along the village frontage. While the beach at the northern end of the village tends to extend above normal tide levels, the beach at the southern end tends to be intertidal indicating some coastal squeeze. The foreshore is generally sand, and at times this can be driven in over the upper shingle. On other occasions the shingle is exposed as the sand is scoured away by reflected cross waves. Ynys-Lochtyn is an effective barrier to longshore movement. Between this headland and the end of the unit at New Quay Head the only significant sediment interaction is with the offshore. The offshore drift referred to above probably increases past New Quay Head. Local to Ynys-Lochtyn, is a drift reversal that has allowed the development of small beach (Traeth Lochtyn).

	Cwmtydu, a small valley cut back behind the general line of the cliffs, is a longshore sediment sink, benefiting from a convergence of drift on both sides. The actual longshore supply may be quite small, and onshore–offshore movement is probably more significant. Within the bay itself, there is quite significant movement along the shore from one end of the cove to the other. This is dependent upon both wave direction and wave reflection off the bay cliff. To the northern end of the unit, New Quay Head may locally increase current flows on the flood with a tendency to increase drift in the offshore area in a north easterly direction.
Structures and Defences	There are small local defences on the western side of the Tefi Estuary Entrance. On the eastern side of the estuary entrance Coronation drive is protected by a seawall which incorporates a slipway. The Patch Caravan Park at Pen yr Ergyd is protected by a rock revetment and there are rock groynes on the seaward side of the spit. Within the Tefi estuary there are defences to protect St Dogmaels and Cardigan. These mostly comprise masonry walls, however there are also gabions and revetments at Cardigan. There are also numerous slipways along the estuary. At Aberporth there are a combination of concrete seawalls and a rock revetment at the rear of the beaches. There are small local defences at Tresaith, Llangrannog and Cwmtudu.
Historical and Future Shoreline Evolution	The predominance of hard rock geomorphological processes means that in most places this shoreline retreats slowly. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure. This is an eroding coast, but the resulting shore recession is generally slow. Mwnt's clay cliffs are eroding more quickly, as are other smaller sections of clay overlying rock in this area. Under present conditions the beach frontages are relatively stable, although subject to periodic loss of material and, as a consequence, potential erosion of the backshore. In the long term little further evolution should be expected. The defence line along Llangrannog village frontage protrudes into the active foreshore zone, and will be subject to periodic erosion. Increased wave action or sea level rise will aggravate this process and may result in a decrease in beach levels across the village frontage. Periodic erosion is already an issue at the southern end of Llangrannog village. There is also periodic change in the composition of the village beach.

	Accelerated sea level rise will submerge shore platforms, allowing larger waves to attack the cliffs. This will lead to an increase in the cliff recession rates. Increased recession rates will lead to more frequent rockfalls, increasing supply to local beaches. The beaches will respond to the rising sea level by rolling back, where they are free to do so. Generally the beaches in this unit are constrained by structures or cliffs, and so they will tend to narrow, and increasing wave forces will be exerted on the structure/ cliff behind them.
Information Sources	Shoreline Management Plan from ST Govan's Head to the Teifi Estuary, Stage 2 (WS Atkins). Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). The Futurecoast database.

C.1.8 Unit 8 - New Quay Bay

Picture: Boulder Clay cliffs along New Quay Bay	
Description	This unit comprises a 2km wide north-facing bay between New Quay Head in the west and Llanina Point in the east. New Quay town and harbour are situated on the rocky headland of New Quay Head. There are several caravan parks and individual properties located on the eastern and central sections of the bay.
Geology and Physical Controls	Mudstone outcrops are present at the shoreline at New Quay, where they curve behind boulder clay within New Quay Bay. At the western end of New Quay Bay is a coherent deposit of boulders, often striated, in a bluish-grey clay, which is exposed in cliff sections of up to 25 m high. New Quay Head and the Stone Pier both act to redirect and modify waves and currents, while Llanina Point acts as an anchor point, helping to retain beach sediments. The soft coastline beyond New Quay Head, anchored by the presence of Llanina Point, has been shaped to closely match the net wave energy pattern. The construction of the New Quay Stone Pier has formed a smaller bay in its lee.
Geomorphology	The shoreline is comprised of a series of vegetated sea cliffs and coastal slopes. A sand and gravel beach fronts much of the cliff line, except immediately south of New Quay Harbour, where a boulder covered rock platform is exposed. The predominantly soft erodible clay cliffs have allowed the coast to develop to a bay shape, controlled principally by the sheltering given by New Quay Head. The underlying bay shape is distorted by the

	secondary intertidal submerged headland of Carreg Ina. This strong point comprises glacial deposits and may be similar in formation to the sarns further north, although more truncated. The eastern headland is an anchor point for the bay, rather than an influence on wave characteristics.
Wave Climate	The nearest ocean point at which the original SMP provided wave conditions is at 52°30'N, 4°28'W. Here the most frequent and largest waves come from the west and west southwest, with relatively broad distribution of angles due to the southern exposure. This data indicates that 74% of waves are less than 1.5m high but, more energy is imparted by the less frequent larger waves. The nearest inshore wave climate of the original SMP (Point 3) shows dominant wave activity from the west and west-northwest. The highest waves, of up to 3m, are from the west-northwest. The overall spread of wave direction is between south-southwest and north.
Erosion and Flood Risks	There are no areas of flood risk within this unit. The cliffs and coastal slopes of New Quay Bay have suffered from erosion and landslips. The cliff stability has been studied and potential management options have been considered (High-Point Rendel, 2007). Historic erosion of the coastal slope at Traeth Y Dolau led to the existing coastal protection works. However erosion of the clay above the rock cliff continued through non-marine processes.
Sediment Dynamics	Although there is substantial erosion over much of this unit, the boulder clay cliffs contain little coarse material, and so this internal sediment source is small. There may be some sediment sourcing from the cliffs under Charlie's Field, but this is not believed to be substantial. Llanina Point is erodible, and at present reinforced. The principal source of sediment is the nearshore area, and this may be fed by material flushed into the bay by acceleration of northeast tidal flows around New Quay Head. Some material may pass beyond Llanina Point, via the nearshore rather than the foreshore. The prominence of New Quay Head has created a tidal flood eddy on the western side of New Quay Bay. To the north of the Stone Pier there is persistent longshore drift to the south and east, towards and along, the pier. The beach at Traeth Dolau is retained in part because the beach is actually set behind the line of the pier and in part by a rock outcrop acting as a natural groyne. Little or no material is transferred naturally back from the direction of the pier, but the beach is nourished to a limited degree by material from the cliffs under New Quay Head, and by beach management material from New Quay Harbour. South of the Stone Pier, the bay may be considered in the following five lengths:

	(1) The Harbour area has accreted since the construction of the pier. The area comprises a sand beach backed by rock cliffs. Accreted material is regularly removed from the harbour. There is significant movement of material between the upper and lower beaches. (2) The area from Glanmore Terrace to George Street has a generally sand foreshore, backed by hard shales and grits, above which is a layer of clay and rock detritus. To the east the section becomes a steep clay cliff, with a boulder clay foreshore. The clay cliffs are gradually eroding and produce some cobbles, but little sand or gravel. (3) The Traeth Gwyn foreshore comprises a relatively thin layer of sand and shingle over boulder clay. The level and nature of material is known to vary. The coastal slope is boulder clay and liable to deep-seated slippage. It is believed that on balance there is little movement at the toe of the slope. Major slips every 15 to 25 years tend to push material over the foreshore, advancing the toe. This material is eroded, first at a relatively high rate and subsequently more gradually. The reduction in material at the toe increases the likelihood of further slips. More minor slips occur more frequently. Little sand and shingle is present in the clays. (4) The Charlie’s field foreshore is composed of sand and shingle, and is backed by a clay cliff. The land above the coastal slope tends to dip inland. Failure tends to be through undercutting and toppling. The clay contains a higher degree of sand and gravel than at other sections of the coast, and so acts as a minor sediment source. (5) The Llanina coast is similar in many respects to the proceeding frontage, although the cliffs are substantially lower. Beach sand and gravel is retained by a groyne. In all sections, except the area of transition between the George Street and Traeth Gwyn sections, beach levels can vary quite considerably. The overall processes acting within the bay are complex, and several geomorphic interpretations were identified by the original SMP. The shape of the bay strongly indicates that wave action, modified by the local headland, has been the overriding developmental influence. Analysis of sediment movement around the shore indicates that, with respect to longshore wave energy, the bay is close to net equilibrium. However, material to the west of the bay tends to be driven towards the lee of the Stone Pier. Material over the central bay section tends to be moved towards Llanina. Sediment modelling carried out for the original SMP estimated a net drift of 30,000m3/yr towards the northeast. This movement is countered by a marginal net westward drift along the Llanina frontage. Although the bay is influenced by a persistent westerly current, this is only strong enough to move material (independent of wave action) close to the Penpolion Jetty and the Stone Pier. The material that enables the observed rapid change in beach levels must be exchanged with nearshore areas of the bay.

<table>
<tr><td>Structures and Defences</td><td>At New Quay the main defence structure is the Stone Pier at the north of the harbour, within the harbour there are masonry seawalls, with a masonry seawall at the southern end of the harbour.

There are rock groynes and revtements at Llanina Point, at the eastern limit of New Quay Bay.</td></tr>
<tr><td>Historical and Future Shoreline Evolution</td><td>The recession of the coastal slopes of New Quay Bay has been studied by High-Point Rendel (2007). The reported recession rates are shown in the table below.

<table>
<tr><th>Location</th><th>Cliff Top Retreat Rate (m/year)</th></tr>
<tr><td>New Quay Cliffs</td><td>0.2</td></tr>
<tr><td>Brongwyn Lane Cliffs</td><td>0.4</td></tr>
<tr><td>Traeth Gwyn Cliffs</td><td>0.4</td></tr>
<tr><td>Llanina Cliffs</td><td>0.2</td></tr>
</table>
Cliff recession rates in New Quay Bay 1880-2004

In the future, as sea level rise accelerates, these recession rate will increase. However the wide sandy condition of the beach will provide some protection. The beach will build, fed partly by increased cliff landsliding, and partly from nearshore sources (assuming that they are not exhausted), and this will reduce the sensitivity of the cliff system to the higher sea levels.

The flux of beach material from the centre of the bay to its ends will mean that recession rates will be greatest in the central section, leading to a change of planshape towards a marginally more indented form.</td></tr>
<tr><td>Information Sources</td><td>New Quay Coastal Slope Instability, Project Appraisal Report (High-Point Rendel, 2007).

Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000).</td></tr>
</table>

C.1.9 Unit 9 - Cei Bach to Gilfach-yr Halen

Description	This undeveloped unit is situated in Cardigan Bay, east of new Quay. It extends eastward and northeast from the small headland of Llanina Point to the hard rock cliffs of Gilfach-yr Halen. This is a fairly straight frontage, with a small embayment (Little Quay bay) at its western limit.
Geology and Physical Controls	Boulder clay backs the beach around Little Quay Bay, and forms a fairly high irregular platform. At Cei Bach the clay is generally homogenous and unstratified. From Cei Bach Bay to the end of the unit the cliffs are mainly composed of hard rock, with occasional pockets of boulder clay. The form of this coast is controlled by the intertidal submerged headland of Carreg Ina, below Llanina Point, and the line of the Craig Ddu to Gilfach-yr-Halen cliffs. Carreg Ina comprises glacial deposits and may be similar in formation to the sarns further north, although truncated. This headland significantly influences wave transformation.
Geomorphology	At Llanina Point the beach is composed of sand, backed by a thin ridge of gravel, with cliffs of soft boulder clay. Around the curve of the bay the gravel element becomes more substantial and the beach profile steepens. Around half way along the unit the subaerial beach is substantially gravel. At about one third of the distance along the unit the hinterland becomes very steep and the cliffs of Craig Ddu begin to interrupt the line of the beach. These rocky protrusions become more dominant with distance until at Gilfach-yr Halen the beach is absent and the foreshore is, instead, hard rock platform. The beach and cliff are linked by a process of self regulation in which, when the beach is narrowed by a cliff protrusion, wave activity erodes the backing rock more effectively. This leads to higher recession in these locations. Where the cliff is recessed and the beach wider, wave driven erosion is reduced. Through these processes the beach has tended to produce the observed straight cliff alignment. Llanina Point acts to: (1) regulate the influx of sediment from New Quay (2) protect the clay cliffs from wave attack and (3) shadow and diffract wave activity such that the beach is relatively dynamically stable in its current curved form. Any retreat of Llanina Point will allow increased sediment influx from New Quay Bay, but will also increase wave attack, and therefore erosion within Little Quay Bay.

Wave Climate	The nearest ocean point at which the original SMP provided wave conditions is at 52°30'N, 4°28'W. Here the most frequent and largest waves come from the west and west southwest, with relatively broad distribution of angles due to the southern exposure. This data indicates that 74% of waves are less than 1.5m high but, more energy is imparted by the less frequent larger waves. The nearest inshore wave climate of the original SMP (Point 3) shows dominant wave activity from the west and west-northwest. The highest waves, of up to 3m, are from the west-northwest. The overall spread of wave direction is between south-southwest and north.
Erosion and Flood Risks	The clay cliffs in Little Quay Bay are susceptible to erosion, but are protected. Elsewhere recession rates are naturally low. There are no areas of flood risk within this unit.
Sediment Dynamics	There is a small influx of sediment from New Quay Bay, and a very limited supply from eroding cliffs within the unit. The principal supply is from offshore, although this is also small. The influx from New Quay Bay has probably reduced since the reinforcement of Llanina Point. The bay is effectively stable, with only minor erosion of the backshore and minimal drift to the east. The reef reduces both flows and wave action, allowing silt to be deposited within the bay. The weak drift is maintained across the Cei Bach section and may be reversed under certain wave conditions. The hard rock at the north eastern end of the unit has allowed a build up of material as the clay cliffs have eroded back. There is little net drift along this northern section and, if at all, it tends to be back towards Cei Bach. The convergence of drift is indicated on air photographs, which show a slight widening of the foreshore between the end of the Cei Bach section, and the cliffs at the north eastern end. Any material moved beyond the unit to the north, under particular wave conditions, will be lost to the increasing and north easterly drift further north.
Structures and Defences	*At Cei Bach the sand and shingle beach has been stabilised with groynes, and the previously unstable backing clay cliffs have been defended with a revetment.* There are groynes and a revetment at Cei Bach that stabilise the beach and protect the backing cliffs.
Historical and Future Shoreline Evolution	At Cei Bach erosion rates of 0.2 m/yr were calculated within the original SMP, prior to defence construction. The cliffs at the eastern end of the frontage are reported to be retreating at 0.1m/yr. The whole unit is relatively stable at present, in part due to the reinforcement of Llanina Point and, the stabilisation of the clay cliffs

	over the central section. Little change would therefore be anticipated under current climate conditions The bay will respond to climate change. Increased sea level rise will, in effect, tend to narrow the intertidal area, and allow larger waves to attack the cliff. In addition the submergence of the reef will allow larger waves into the southern part of the bay. Both these effects will cause the cliff line to retreat, where it is not defended, and the shore platform to lower. The relatively small sediment supply to the beach will increase as a result, and so beaches may become slightly larger. However they are also likely to become more volatile, as local wave energy increases.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000).

C.1.10 Unit 10 - Aberaeron South Beach

Picture: Aberaeron	
Description	This short unit is situated in Cardigan Bay, south of Aberaeron. It faces northwest into the Irish Sea, and extends northeast from the hard rock cliffs of Gilfach-yr-Halen to the harbour of Aberaeron.
Geology and Physical Controls	The hard cliff line provides the main control on the area. South Pier retains material on South Beach Aberaeron. At Gilfach-yr-Halen, high boulder clay cliffs front the underlying bedrock. They are also evident from Cwm Cilfforch up to 400m south west of Pen-y-Gloyn.
Geomorphology	Exposed boulder clay cliffs are found around Gilfach-yr-Halen gives way to hard inerodable sections. The hard cliffs effectively control the rate of erosion of the southern section, but at present do not influence its plan shape strongly. Between Pen-y-Gloyn and the south pier at Aberaeron is a shingle beach stabilised by groynes. Where the clay cliffs have been eroded the foreshore is fairly wide.
Wave Climate	The nearest ocean point at which the original SMP provided wave conditions is at 52°30'N, 4°28'W. Here the most frequent and largest waves come from the west and west southwest, with relatively broad distribution of angles due to the southern exposure. This data indicates that 74% of waves are less than 1.5m high but, more energy is imparted by the less frequent larger waves. Futurecoast provides an inshore wave point at Aberaeron. The dominant wave directions are between 270° and 330° (i.e. from the west to northwest). The largest waves, of up to 3.75m, arrive from between 270° and 300°.

Erosion and Flood Risks	There are no areas of flood risk within this unit. The original SMP recorded recession of 0.04m/yr at Gilfach yr Halen, and 0.2 m/yr at Aberaeron South Beach. This part of the frontage is now protected, in part, although limited erosion occurs at the defence ends.
Sediment Dynamics	Some sediment is supplied from the eroding cliffs and foreshores, especially locally around Gilfach yr Halen. Much of the material over the South Beach frontage has accumulated over a long period. There is the potential for a strong drift to the northeast along the frontage. This may be locally interrupted just to the north of Gilfach yr Halen, where the clay cliffs have been cut back. Also at this point it appears that local cliff erosion may provide a significant supply to the retained beach. The actual rate of drift is uncertain, but it seems likely that the cliff weathering here supplies sediment to areas further north. The eroding clay cliffs at Aberaeron South Beach appear to contain little beach supply material. The artificial protection of this area has not had, therefore, a significant impact on sediment supply. Further north along the beach, a large shingle bank is retained by the South Pier of Aberaeron Harbour. In this local area the accumulation of material has reached a point where the beach is in relative, but highly dynamic, equilibrium with the wave energy. Coarse material does not appear to progress beyond the pier. Prior to the construction of the northerly pier, over 100 years ago, there may have been a transfer or flushing of material in to the nearshore area. There may be some general weak northerly drift of material in the offshore area, but this seems of little significance to the unit. There is little evidence of a current transfer of material into the harbour, or the unit to the north.
Structures and Defences	The defences of Aberaeron South Beach comprise timber groynes and a rock revetment. In addition Aberaeron South Pier which is formed of masonry Blockwork has significant influence on the frontage.
Historical and Future Shoreline Evolution	The cliffed sections of this unit are eroding, although the recession rates have not been quantified. Increased sea level rise will tend to narrow the intertidal area, and allow larger waves to attack the cliffs, accelerating the recession and causing more landsliding. Some erosion of the clay cliffs at Aberaeron South Beach is occurring and this may allow a breach into a lower-lying area behind, adjacent to the southern flank of the harbour.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000).

C.1.11 Unit 11 – Aberaeron Harbour

Description	This is a small, shallow and largely artificial harbour, through which the river Aeron discharges. It is largely detached from coastal processes by substantial piers.
Geology and Physical Controls	The harbour is formed and protected by man-made structures. The beach at the rear of the harbour acts to dissipate the energy of waves, reducing reflection.
Geomorphology	The harbour is relatively stable.
Wave Climate	The nearest ocean point at which the original SMP provided wave conditions is at 52°30'N, 4°28'W, which is in mid Cardigan Bay. Here the most frequent and largest waves come from the west and west southwest, with relatively broad distribution of angles due to the southern exposure. This data indicates that 74% of waves are less than 1.5m high but, more energy is imparted by the less frequent larger waves. Futurecoast provides an inshore wave point for this unit at Aberaeron. The dominant wave directions are between 270° and 330° (i.e. from the west to northwest). The largest waves, of up to 3.75m, arrive from between 270° and 300°.
Erosion and Flood Risks	Scour has been a persistent problem beneath all the walls, which have been underpinned. The harbour walls are generally below the level of estimated 1:100 year water level. Consequently additional defences have been constructed above some sections of the frontage. A large section of Aberaeron is vulnerable to coastal flooding.
Sediment Dynamics	The Afon Aeron carries silt into the harbour, which is then distributed by tidal flows. There is no indication of accretion of coastal sands. The harbour piers and their crib groyne extensions interrupt alongshore sediment transport effectively.
Structures and Defences	The harbour is formed of masonry and concrete seawalls. Its seaward channel is protected and directed by large concrete piers. Localised additional flood defence structures have been added.
Historical and Future Shoreline Evolution	With appropriate maintenance erosion will be minimal, although scour will continue. Increasing sea levels will reduce the standard of flood defence.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000).

C.1.12 Unit 12 – Aberaeron North to East Llanrhystud

Picture: Aberarth beach	
Description	This unit is situated in central Cardigan Bay, to the northeast of Aberaeron. It includes the frontages of Aberaeron, Aberath and Llanon. The rivers Cledan and Peris discharge to sea around Llanon, whilst the Wyre Fach discharges at Llanrhystud.
Geology and Physical Controls	The geology here comprises mudstones and sandstones, with boulder clay platforms from Aberaeron to Aberarth and Morfa Mawr to Llanrhystud, Control points within this unit include the defences at Aberaeron North Beach, including the North Pier, defences west of Aberarth, the Morfa Mawr headland, the strong point at Llansantffraed, the mouth of the Afon Wyre at Llanrhystud and the hard rock cliffs at Carreg Ti-pw. The structure and shape of this section of coast is strongly influenced by intertidal strong points, which comprise well-bedded and compact glacial deposits of stones and boulders. Although probably similar in formation to the more obvious sarn features to the north, these strong points are shorter and more spread out. Generally, between the more prominent points, the foreshore is strewn with a well-compacted layer of stones and boulders. While not strongly influencing or modifying the approach of waves, the strong points have allowed the coast to develop as a series of steps or shallow bays.

Geomorphology	Most of the section between Aberaeron and Aberarth is fronted by shingle, although south of Aberarth drift is exposed in cliffs up to 5m high. The frontage from Aberath to Llanrhystud is characterised by steep low backshore gravelly clay cliffs, generally fronted by gravel beaches and wide expanses of well-bedded scree foreshore. The unit between Aberath and Morfa Mawr includes high vertical rocks. However, north of Aberarth the cliffs are fronted by boulder clay. Around the mouth of the Afon Cledan (and Peris) coarse fluvial gravels have been deposited, becoming thinner and finer to the north and the south. The section provides a rare and excellent exposure through a periglacial alluvial fan, and shows Welsh till, Irish Sea till and several gravel facies. From Llanrhystud, extending for some 2km south of the Afon Wyre, the boulder clay platform is fronted by a shingle beach. The one section of hard cliff (1.5km north of Aberarth) apparently plays little role in influencing the erosional development of the frontage.
Wave Climate	Babtie (2003) analysed Futurecoast inshore wave data for Aberaeron (Point 56, 235307mE 264177mN). This data showed an extremely tight banding of wave direction from between 270 and 330 degrees. The analysis revealed a 1:50 year wave height of 4.4 m.
Erosion and Flood Risks	There is a significant area of coastal flood risk behind Aberaeron North Beach, and at several smaller areas of Aberarth, South and North of Llanon and South of Llanrhystud. Local flooding could also occur up the river at Aberarth. At Llanon there is a risk of flooding to the basement of the hotel.
Sediment Dynamics	There is very little drift into the unit from the south, and probably little from the north. Much of the eroding cliff contains a significant proportion of shingle and the material on the coast appears to be the residual deposits of long-term erosion. Fresh supply of material may be cumulatively important, but relatively small in comparison to the existing gravel banks. There may be supply from offshore, particularly where there are sand beaches. Sediment tends to collect in the small embayments between the strong points, and this process helps to regulate the overall coastal recession.

Based on the original SMP sediment modelling and observations, the unit may be spit into six subunits of sediment drift. Each of these is associated with either a natural or a man-made strong point. The six subunits are:

(1) Aberaeron North Beach: beyond the immediate effect of the North Pier, drift rates accelerate and then decline, allowing accumulation of deposits. The pattern of erosion is coupled to this process, with increasing erosion followed by an area of relative stability. A northeast drift continues at a reduced rate. Modelling for the original SMP calculated a net easterly sediment transport rate here of 330,000m^3/yr.

(2) Aberarth: the coast here has been strengthened artificially to the west of the Afon Arth. Net drift rates fall although the beach is still quite dynamic. Some drift moves through and beyond this area.

(3) Aberarth Cliffs to Morfa Mawr: the hard cliff here is not sufficiently exposed for it to control drift on this subunit. Control is instead being provided by the Morfa Mawr strong point. The net drift is reversed at the northern end of the section, acting to create the relatively stable shingle beach on the west of the headland. Drift can move either way across the headland but the net drift is to the northeast. This has resulted in erosion to the south west side of the Morfa Mawr headland.

(4) Llanon to Llansantffraed: the drift from the Morfa Mawr strong point increases, reaching a maximum in front of Llanon but decreasing further north, and reversing just before the Llansantffraed strong point. The coast has cut back where the foreshore is generally lower between the strong points. Between Llanon and Llansantffraed are notable local changes in the rate of erosion. These changes are mirrored substantially by variation in the level of the foreshore. Drift rates at Llansantffraed are very low and this is associated with a relatively stable gravel bank in this area. At the Headland north of Llansantffraed, modelling within the original SMP showed a low northerly net transport over the upper beach and a net southerly transport over the lower foreshore. Overal transport rates were low.

(5) Llanrhystud Bay: the land behind this subsection is quite low and the clay cliffs disappear over most of the centre of the section. This valley is also seen in the nearshore bathymetry. The shoreline has been allowed to move inland into the valley to such an extent that:
- The frontage has a developed bay shape with little net drift,
- A shingle bank defence has formed,
- The shape of the bay depends upon the hard points to north and south.

The southern point has formed partly as a result of the higher stronger foreshore, and partly by the influence of the Afon Wyre, which has tended advance the shingle in this area.

<table>
<tr><td></td><td>(6) Llanrhystud to Carreg Ti-pw (Pigyn): this section of the frontage ends at the start of the rock cliffs that anchor the north of the unit. The clay cliff at the back of this section has been cut back quite sharply from the Llanrhystud headland creating more of an embayment than in other areas of the unit. There are indications of a modest drift from the southern headland, although this may not be realised given the very gradual shingle bank slope.</td></tr>
<tr><td>Structures and Defences</td><td><i>Coast protection works have been carried out over much of Aberaeron North Beach. Behind these defences is a second line of walls. However these rear walls do not provide a continuous flood defence. Further along the seaward face of the area, coast protection is provided by timber groynes with no hard defence behind. A bank is raised at the back of the defence.</i></td></tr>
<tr><td>Historical and Future Shoreline Evolution</td><td>
<p>This is an erosional coast. The shore platforms gradually wear down, allowing waves to attack the base of the cliffs, ultimately leading to undermining or other destabilisation, and cliff failure.</p>
<p>The original SMP provides recession rates at locations along this frontage, and these are reproduced in the following table. The SMP analysed air photographs and records of the mean high water mark to determine long term recession rates. It should be noted that these rates predate recent coastal management works.</p>
<table>
<tr><th rowspan="2">Location</th><th colspan="2">Erosion Rate Methodology (m/yr)</th></tr>
<tr><th>SMP1 Air Photograph Analysis</th><th>Mean High Water Mark Analysis (1880-1970)</th></tr>
<tr><td>Aberaeron North Beach</td><td>0.4</td><td></td></tr>
<tr><td>Aberaeron North Beach</td><td></td><td>0.71</td></tr>
<tr><td>Aberaeron to Aberarth</td><td>0.1</td><td></td></tr>
<tr><td>Aberarth</td><td></td><td>0.65</td></tr>
<tr><td>Morfa Mawr</td><td></td><td>0.14</td></tr>
<tr><td>Llanon</td><td>0.3</td><td>0.21</td></tr>
<tr><td>Llansantffraed to Llanrhystud</td><td>0.25</td><td>0.18</td></tr>
<tr><td>Llansantffraed to Llanrhystud</td><td></td><td>0.12</td></tr>
</table>
<p>Accelerated sea level rise will cause narrowing of the steep rocky intertidal areas, and an increase in wave attack on the cliffs. This will tend to increase the rate of cliff recession. The rising sea will tend to partially submerge the beaches, and drive them landward.</p>
</td></tr>
</table>

	The following change has been projected for the first half of the 21st century by SMP1 (Posford Duvivier, 2000): (1) The coast position at Aberarth will be largely unchanged. (2) The cliff north of Aberarth will erode back to the underlying hard rock (possibly between 25 and 40m) and material will tend to be trapped by the resulting embayment. (3) Morfa Mawr may erode some 5–10m, this will release relatively small quantities of beach material. (4) At Llanon, erosion will be between 15 and 30 m. (5) At Llansantffraed the erosion will be considerably less. This will further reduce material carried north to Llanrhystud. (6) Llanrhystud Bay should remain relatively stable with a gradual retreat as the Llansantffraed headland moves slowly back. (7) The retreat at North Beach will expose the low-lying ground to the north of Aberaeron, and may result in increased flood risk to the town. (8) Erosion at Llanon will cut through to low-lying land around the mouth of the Afon Clydan and this may result in some loss of beach material to either side, further encouraging erosion. The gradual retreat of Llanrhystud Bay may result in a breach through to the lower-lying land just at the mouth of the Afon Wyre. Considerable quantities of shingle could be lost into the area, disturbing the equilibrium around the bay.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). The Aberaeron North Beach Coastal Defences Project Appraisal (Babtie Group 2003). The Aberaeron North Beach Coastal Defence Study, Concept Design Report (Atkins 2007). The Futurecoast database.

C.1.13 Unit 13 – Carreg Ti-pw to Allt Wen

Picture: Morfa Bychan	
Description	This unit is situated south of Aberystwyth, in central Cardigan Bay. It is undeveloped, and extends north-northwest for approximately 10 km from the hard rock cliffs at Carreg Ti-pw to Allt Wen.
Geology and Physical Controls	This area of coastline is mainly fronted by rock cliffs of sandstone and mudstone, with areas of boulder clay. Drift-fronted cliffs extend for about a mile south of Morfa Bychan. The cliffs are the main physical control on this frontage. Sarn Gynfelyn Provides some protection from waves approaching from the north.
Geomorphology	This is an erosional cliffed coast, which develops through ongoing downwearing of the shore platform, which exposes the backing cliffs to wave attack and destabilisation. The failure of those cliffs releases sedimentary material, which builds the beach. Most of the cliffs here are hard, and erode slowly. In the centre of the unit are the drift fronted cliffs south of Morfa-Bychan, and these are more vulnerable to erosion.
Wave Climate	This frontage is partially sheltered from waves from the northwest by Sarn Gynfelyn, although this is not a particularly energetic wave direction. Jacobs Babtie (2006) studied wave conditions at 52.5º N 4.5º W, using output from the Met Office's European Wave Model (July 1988 to March 2004). These data are reproduced in the table below.

Return Period (years)	**Wave Direction**				
	210	**240**	**270**	**300**	**330**
	Hs (m)	**Hs (m)**	**Hs (m)**	**Hs (m)**	**Hs (m)**
1	5.94	5.66	5.90	5.06	6.51
10	6.96	6.67	7.06	6.04	7.72
25	7.35	7.04	7.50	6.41	8.18
50	7.63	7.32	7.82	6.69	8.51
100	7.91	7.60	8.14	6.96	8.85
200	8.18	7.86	8.45	7.22	9.17
300	8.33	8.02	8.63	7.38	9.36
500	8.53	8.21	8.86	7.57	9.59

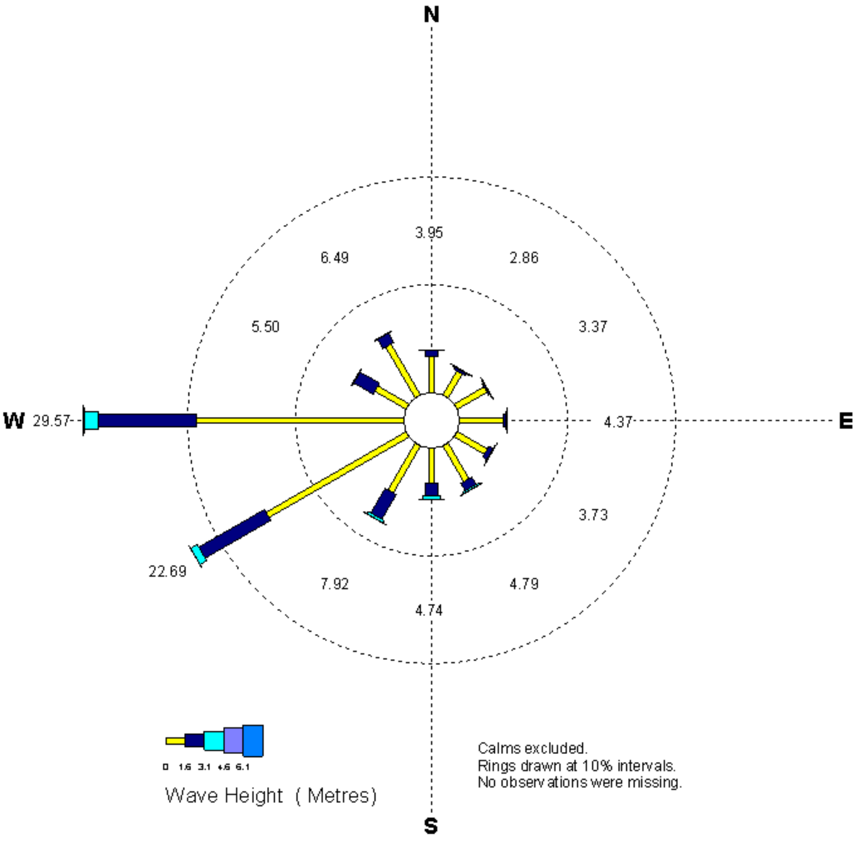
Extreme Offshore Wave Conditions for 52.5ºN 4.5 ºW

The nearshore wave climate was assessed using a SWAN numerical model for several locations across the Aberystwyth frontage. The nearshore wave climate for Alt Wen (257465 mE 278550 mN) shows a predominant wave direction from the west and southwest.

Erosion and Flood Risks	There are no areas of flood or erosion risk within this unit.
Sediment Dynamics	There is limited drift from the south, and some sediment supply from the weathering cliffs, particularly at Allt Wen. This provides some material to the adjacent unit in the north. There is little interaction beyond the general through-flux of material.
Structures and Defences	There are no manmade defences or structures within this unit.
Historical and Future Shoreline Evolution	This is an erosional coast, although the only location where this as been quantified is Tregynan, where the original SMP reports recession of 0.4m/yr. Accelerated sea level rise will tend to submerge shore platforms, allowing larger waves to attack the cliff faces. This will result in increased destabilisation and cliff top recession. This erosion will release sediment into the beaches at increased rates. The softer cliffs in the centre of this unit will be more sensitive than the hard rock frontages, and so will recede more rapidly. The increased flux of sediment from the cliffs will benefit the unit to the north.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). Aberystwyth Coastal Defence Strategy (Jacobs Babtie, 2006).

C.1.14 Unit 14 – Aberystwyth South

Description	This west facing unit is situated in the centre of Cardigan Bay. It extends from the cliffs at Allt Wen to Castle Hill, and includes the bay beaches at Tan-y-Bwlch and South Marine Parade, and also Aberystwyth harbour. The harbour, which is largely artificial, is the point of discharge of both the Afon Rheidol and Afon Ystwyth.
Geology and Physical Controls	The main physical controls are the cliffs at Allt-Wen, the harbour entrance structures and the Castle Hill outcrop. The Allt Wen cliffs are comprised of shale, mudstone and greywacke rock that have been folded. The lithology includes soft layers, and talus is normally present at the base of the cliffs, from rock falls and weathering. The cliffs of Tan-y-Bwlch have been subject to intense and repeated compression and distortion. As a result the rocks show a complex structure with numerous folds and fractures.
Geomorphology	The two beaches in this unit appear to have originally been a single bay, which was divided by the construction of the harbour. Tan-y-Bwlch beach is composed of gravel and is backed by a ridge. It lies between the Allt Wen cliffs and the harbour, and is backed for half its length by the Afon Ystwyth. It rests on a generally sandy foreshore. To the south of the bay the shingle fronts a clay bank. At the north the clay is lower and submerged beneath a massive shingle bank. The natural condition of the Tan-y-Bwlch would be to roll back, in response to sea level rise, over the floodplain of the Afon Ystwyth. Originally the Ystwyth may have discharged through the beach, but it appears to have been diverted along the back of the barrier to flush sediment out of the harbour. The location at which the river currently impinges most strongly on the beach (roughly the mid point of the bay) has been engineered to prevent a breach, through the construction of a concrete wall. Tan-y-Bwlch can be sub-divided into southern, middle and northern geomorphological sections. The southern section, closest to the Allt Wen cliffs, has been partially stabilised through the placement of rock armour at the crest of its ridge. The middle section of Tan-y-bwlch contains fine-grained material (gritty sand), which forms a lower gradient ridge. The elevation of the beach is lower at this section (approximately six metres OD) than it is further north (approximately eight metres), and so overwashing is more frequent here. This produces washover fans on and behind the ridge. In the north the gravel ridge is steepening, as the lower beach is retreating between three and six times faster than the upper parts of the ridge (Pethick *et*

	al., 2003). Distinct storm berms can be found along this section. South Marine Terrace has finer gravel material and gritty sands within a moderately steep beach backed by a continuous sea wall and promenade. Every two years around 500 m^3 of material is dumped on the beach from maintenance dredging of the harbour. This is mainly gravelly sand. The beach may also be fed by material from Tan-y-Bwlch, bypassing the harbour and its structures. Further to the north of the beach there is a rock outcrop at Castle Hill, which acts as a groyne reducing sediment transport to the north.
Wave Climate	 Waves in this region are best described by the wave rose shown above, which is taken from Jacobs Babtie (2006) and was derived from six years of Met Office data for location 52.5^0N, 4.5^0W.

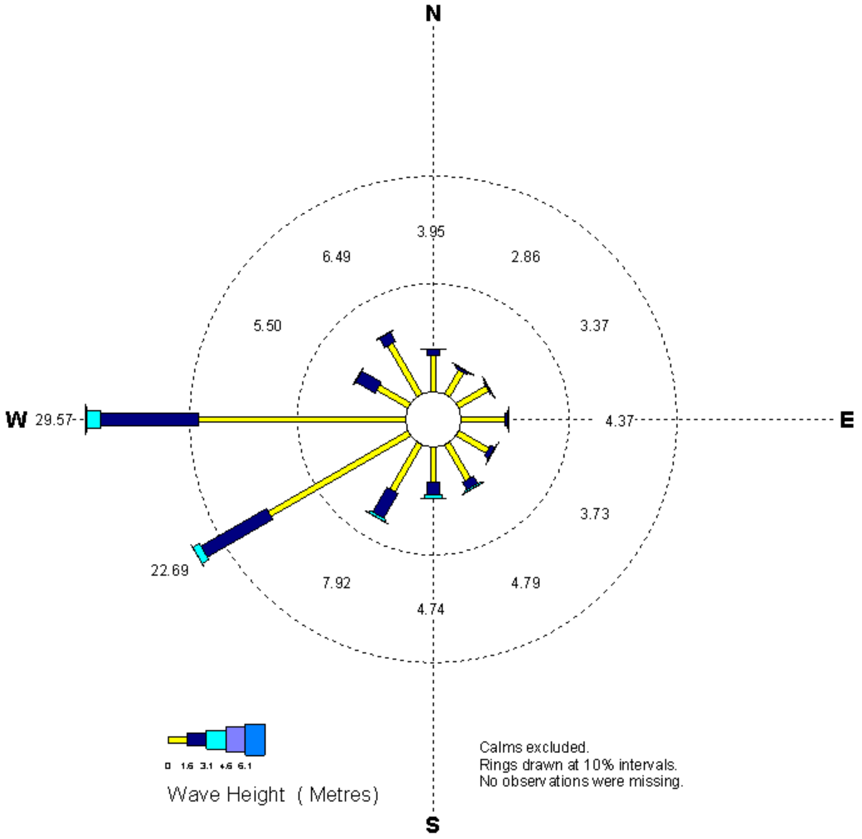
Erosion and Flood Risks	Erosion was noted by the original SMP at Tan-y-Bwlch and South Marine Terrace, and this was reiterated by the Aberystwyth Coastal Defence Strategy. Flooding of the low lying land behind Tan-y-Bwlch is prevented by the beach ridge. Consequently this area would be vulnerable should breaching or excessive overtopping of the ridge occur. There are also several flood zones in and around Aberystwyth Harbour; two are at risk from within the harbour, while one is also at risk from overtopping of the Marine Parade Frontage.
Sediment Dynamics	There is believed to be a significant coarse sediment supply to Tan-y-Bwlch from erosion and weathering of cliffs, in particular the immediate frontage of Allt Wen. The Aberystwyth Coastal Defence Strategy quantified the release of sediment from these cliffs, using recession rates given in the Futurecoast database. However these rates appear to have been misread, and so the sediment release rates should only be used after this issue has been reviewed. At the south of the unit SMP modelling indicated a very strong northerly drift (approximately 170,000m^3/yr), but rather less elsewhere in the bay. The SMP also reports a drift divergence close to the area where the Ystwyth impinges on the rear of the beach, which provides an explanation of why the beach is narrow there. Defences have been constructed (a wall with armouring) to reduce the probability of a breach in this location. Monitoring has demonstrated that this beach is very sensitive to wave direction. There is some input of sandy gravel to the South Marine Terrace beach from the two rivers, which is dredged every two years and deposited on the open coast north of the harbour. There is also believed to be a limited offshore supply of sand and grit. There may be a small movement of sediment from Tan-y-Bwlch to South Marine Terrace, but the Old Stone Pier is an effective barrier to Longshore transport. The construction of the Stone Pier reduced drift to the north. So (1973) suggests that only finer grits can now pass the pier, and this is supported by the smaller grain sizes on South Marine Terrace to the north.

	Records indicate a gradual but progressive reduction in volume of the South Marine Terrace beach. The level of material against the back defences drops towards the harbour entrance. Records show that when waves approach from the south and west, they run up the beach and along the face of the rear sea wall. This tends, naturally, to move material to the north and results in mounds accumulating normal to the slope of the main beach. On occasions the beach in the central part of this section develops a berm which becomes vegetated. Such features may remain for several years before being washed away. A 1990 storm caused quite severe damage and beach lowering, exposing the toe of the defences. Beach levels recovered within a year, indicating that the sediment was not moved far across the shore profile. Since then, beach levels have varied considerably. Any material moving north beyond Castle Point is lost to the beach, as there is no return process. As indicated above the harbour is quite artificial. It was created and maintained, in part, by the construction of the Stone Pier, works to the back of the shingle bank of South Marine Terrace and through the redirection of both the Rheidol and the Ystwyth. More recently, major works have been undertaken to create a marina through the reclamation of intertidal mud flats and the deepening of the inner harbour basin. These works have modified harbour flows and reduced flood probability in the Trefechan area. Outside the harbour is a bar that restricts access but also may act to reduce waves entering the harbour. At the confluence of the Ystwyth and the Rheidol there is a small shingle shoal. Directly within and facing the entrance to the harbour is a small spending beach, which dampens wave action within the harbour.
Structures and Defences	*Concrete wall with rock backing part of the northern section of the Tan-y-Bwlch beach, where the river Ystwyth runs close to it.*
Historical and Future Shoreline Evolution	Material is being lost from South Marine Terrace, and so beach levels are falling. This will result in increased exposure of and damage to the backing structures. The Tan-y-Bwlch barrier beach has changed over time due to varying conditions of sediment supply and sea level rise. Previously, the barrier beach extended to Castle Rock but, was divided by the construction of the harbour. The beach was previously much wider and possibly higher than it is at present.

	In the 1970s it was estimated that the barrier volume had reduced by approximately 1,000 m^3/yr over the prior 200 years (Wood, 1978) and that the general landward retreat of the whole barrier is about 0.4m/yr. The maximum rate of retreat is occurring in the middle section of the beach (Pethick *et al.*, 2003), where it is most vulnerable. Tan-y-Bwlch is in a delicate state of balance. There is some indication of progressive erosion of the southern end of the frontage and eventually this may retreat sufficiently to result in loss of integrity of the central section of the beach. Within a 50-year period it would be expected that a breach would occur, with associated relocation of the river mouth. This would have significant effects on both the Ystwyth floodplain and the harbour, which would no longer be flushed by the river discharge.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). Aberystwyth Coastal Defence Strategy (Jacobs Babtie, 2006).

C.1.15 Unit 15 – Aberystwyth North

Picture: Aberystwyth beach from Constitution Hill.	
Description	This short west facing unit is situated at Aberystwyth, in the centre of Cardigan Bay. It comprises the bay fronting Marine Terrace and Victoria terrace, between the rock outcrops of Castle Hill and Constitution Hill; and is split into two beaches by the Bath Rocks.
Geology and Physical Controls	The geology of this unit consists of Aberystwyth Grit series that includes a range of rock types such as greywacke, sandstone, fissile shale and mudstone. The series has been folded and faulted and now has a range of bed orientations and dips exposed at the coastline. The principal controls are the Castle Rocks and the raised shore platform below Constitution Hill, which provide some protection to the unit and acts to retain material within it. In addition the Bath Rocks acts to stabilise the beach and reorient local drift.
Geomorphology	This unit begins and ends with hard rock platform fronting resistant cliffs, although at Castle Hill the cliffs have been protected with seawalls. Within the bay is a sandy gravel groyned beach, backed by defences, and which is divided by the rocky outcrop of Bath Rocks.

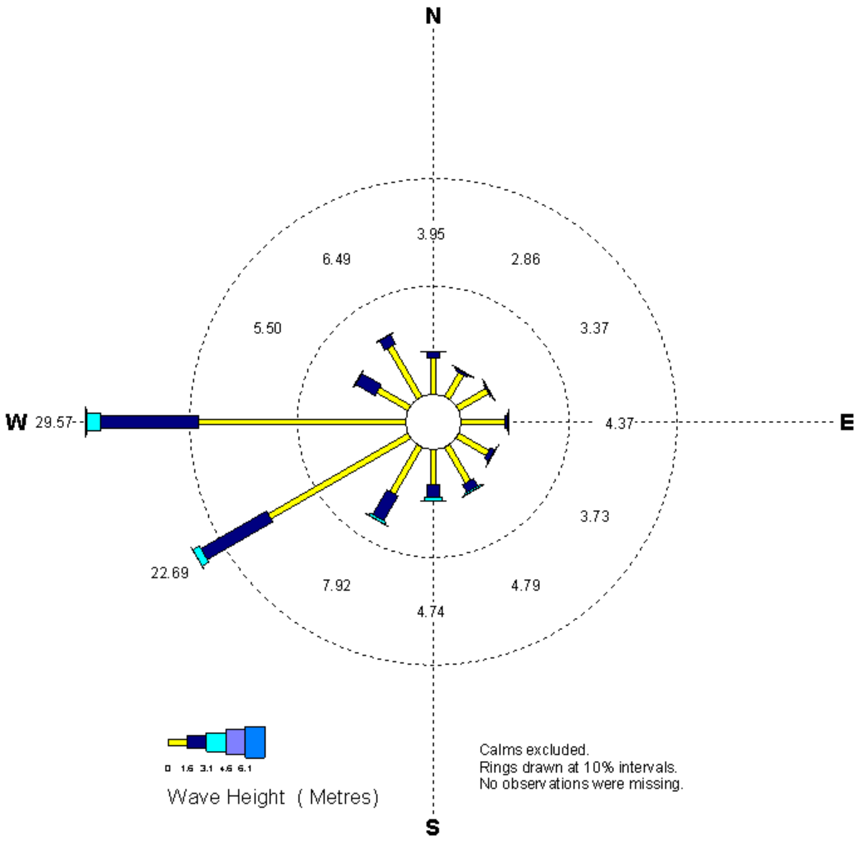
Wave Climate	 Waves in this region are best described by the wave rose shown above, which is taken from Jacobs Babtie (2006) and was derived from six years of Met Office data for location 52.5^{0}N, 4.5^{0}W. It can be seen that the predominant wave direction is the west and west-southwest. The largest waves, of over six metres, approach from the west.
Erosion and Flood Risks	The original SMP recognises that beach erosion can be high, but variable throughout this unit. The seawalls prevent loss of the seafront. Erosion was not highlighted by the Aberystwyth Coastal Defence Strategy (Jacobs Babtie, 2006). There is relatively low-lying land behind Marine Terrace, which would be liable to flooding in the absence of defences.

Sediment Dynamics	Castle Rocks has a wide clean rock foreshore, backed by high masonry walls. Any sediment moved into the area is swept northwards by the action of waves running along the face of the wall. There is a limited supply of sediment to the unit from the south. Some finer material may also be brought in from offshore. Small losses of sediment occur at the north, around Constitution Hill. This northerly loss is reduced by a groyne, and will tend to diminish over time as the beach volume falls. Any material that does pass to the north is lost. The beaches fronting Marine Terrace and Victoria Terrace are closely linked and exchange sediment above and behind Bath Rocks. The Marine Terrace beach tends to be higher than that along Victoria Terrace, which has suffered erosion. This erosion has resulted in the installation of rock protection along the seawall toe, to reduce scour. Bath Rocks acts as a reef sheltering the central part of the unit and bend waves into its lee.; this results in a local build up of material around the rocks. The net drift is from south to north along Castle Rocks and Marine Terrace, and the original Shoreline Management Plan estimates the rate to be 3000 m^3/yr. A southerly net drift was estimated over the southern section of Victoria Terrace, although given the relatively closed nature of this sedimentary unit any net drift in the area must be small. Given the semi-closed nature of the beach within this frontage, any action to retain material in one area would result, in loss elsewhere.
Structures and Defences	The unit is strongly influenced by management interventions. The seawalls prevent growth of the bays, and the release of fresh sedimentary material. They also cause wave reflection at high tide, which under certain conditions promotes beach scour and the loss of material offshore. Rock armouring has been placed along some of the unit to reduce this effect. The groynes help to reduce the movement of material through the unit. The groyne below Constitution Hill helps to retain sediment within the unit.
Historical and Future Shoreline Evolution	Originally the beaches in his unit were wider and more continuous, but have reduced in volume and become increasingly divided by Bath Rocks. Beach reduction is expected to continue, however shoreline retreat is currently prevented by the continuous defence.

	Under natural conditions the beach would retreat and be supplied with material from the south, and from erosion of the backing cliffs and shore platform. Downwearing of the gravel would be compensated by release of fresh material through shore retreat, and this would allow the beach volume to attain quasi-equilibrium. Retreat has exposed the rock outcrops at both ends of the bay, and the central rocks. These tend to fix the beach close to them and diminish wave activity locally, and this has allowed the two shallow bays to begin to form. These bays generally reduce the alongshore transport of material, and so help to retain material within the unit. Over time these bays would continue to grow, forming more pronounced curves. As the beach volume decreases and sea level rise the defences will become more exposed to larger waves. There will be a resulting increase in wave impact forces and wave uprush. There is also likely to be an increased incidence of gravel being carried over the walls onto the road. Should there be a substantial breach in the defence a flood corridor may be opened into the town.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). Aberystwyth Coastal Defence Strategy (Jacobs Babtie, 2006)

C.1.16 Unit 16 – Aberystwyth to Upper Borth

Picture: Upper Borth, from Borth.	
Description	This west facing unit is in the centre of Cardigan Bay. It extends from Constitution Hill, north of Aberystwyth, to the settlement of Upper Borth. It includes Clarach Bay, where a holiday village is situated, and Wallog, where Sarn Gynfelyn reaches the coastline. The unit is characterised for the most part by cliffs. The exceptions to this are the beach of Clarach Bay, where the Afon Clarach discharges to sea and Wallog.
Geology and Physical Controls	An outcrop of the hard Aberystwyth Grits is present between Aberystwyth and Clarach Bay. The backshore of Clarach Bay is glaciogenic, dating from the start of the late-glacial period. Outcrops of the Aberystwyth Grits are again present between Clarach and Craig-y-Delyn, some 1.5km south of Borth. Wallog is composed of clay. From Craig-y-Delyn to Borth are Borth Mudstone. Mid way along this unit, at Wallog, is Sarn Gynfelyn, a shore perpendicular gravel moraine reef. The unit is generally controlled by its hard rock cliff line. The development at Clarach is influenced by the hard cliffs to either side, and also a rock scar to the north and the flow of the Clarach. The sarn influences the coastline at Wallog (causing foreshore accretion) and has broader effects on the wave climate.

Geomorphology	Over most of the frontage the geomorphology is dominated by hard rock processes, involving the slow ongoing erosion of shore platforms and undermining of steep cliff faces, leading to intermittent cliff failures. Small localised beaches collect at the toe of the cliffs, but do not influence their long term recession rate. Clarach Bay and Wallog are exceptions. At Clarach a beach has formed across the low glacial valley. Under natural conditions beach material would be readily supplied through shoreline retreat. The Afon Clarach runs to the southern side of the valley, before flowing parallel to the coast and cutting out towards the northern end of the bay. It is unclear whether this diversion of the river is man-made or a natural spit development. The river is regularly blocked by shingle and its entrance is cleared by the Environment Agency. The hard cliff line is interspersed with sections of softer material. The harder sections control the rates of erosion of the softer areas. At a local level, intertidal outcrops of rock strongly influence the form of the beaches.
Wave Climate	 Calms excluded. Rings drawn at 10% intervals. No observations were missing. Waves in this region are best described by the wave rose shown above, which is taken from Jacobs Babtie (2006) and was derived from six years of Met Office data for location 52.5^0N, 4.5^0W. It can be

	seen that the predominant wave direction is the west and west-southwest. The largest waves, of over six metres, approach from the west.
Erosion and Flood Risks	The original SMP noted erosion of the cliffs at Clarach and Wallog. There is one area of relatively extensive flood risk at Clarach. Flood vulnerability at present is associated with the river, most frequently when it is blocked.
Sediment Dynamics	There is a general drift to the north over most of the frontage. There is little sediment input from the south, but possibly more significant quantities leave the unit to the north. There is probably a weak feed of coarse material from the cliffs south of Clarach on to Clarach Beach. The weathering of the cliffs provides some beach material, particularly in the north. There may be some limited transfer of material from the nearshore to the beaches. The nearshore area is strongly influenced by the sarn. This feature has caused sediment accumulation and influences the local wave climate. To the south of the sarn, the seabed shelves so gently that the 5m isobath is, in places, over 1km offshore. To the north of the sarn, the 5m isobath approaches the base of the cliffs. Locally within Clarach Bay, there may be some net drift reversal (i.e. towards the south) over the northern end of the bay. Photographic evidence shows variation in material type forming the beach at Clarach; sand has been replaced by shingle in recent years.
Structures and Defences	At Clarach there are a collection of defences at the top of the beach comprising seawalls and rock armour. In addition there are small local defences at Wallog.
Historical and Future Shoreline Evolution	The predominance of hard rock geomorphological processes means that in most places this shoreline retreats slowly. Recession has been estimated as being of the order of 0.1m/year. Shore platforms gradually wear down, allowing waves to attack the base of the hard cliffs, ultimately leading to undermining and cliff failure. Accelerated sea level rise will submerge shore platforms, allowing larger waves to attack the cliffs. This will lead to an increase in the (low) cliff recession rates. Increased recession rates will lead to more frequent rockfalls, increasing supply to local beaches. Erosional pressure will be greater at Wallog, than in the other cliffed areas, although the sarn will continue to provide protection.

	There is also a trend of erosion generally along the Clarach backshore. This will increase under accelerated sea level rise, as the beach rolls back into the valley. This may lead to a breach in the defences and an associated coastal flood risk in the valley.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). Aberystwyth Coastal Defence Strategy (Jacobs Babtie, 2006). Pethick J., Orford J., and Young R., March 2003: *Allt Wen a Traeth Tan-y-bwlch and Aberystwyth Frontage Nature Conservation Strategy*. Report for Ceredigion County Council and Countryside Council for Wales

C.1.17 Unit 17 – Borth and Ynyslas

Picture: Ynyslas beach, showing the gravel ridge and defences.	
Description	This west facing unit is in the centre of Cardigan Bay. It extends north from the hard rock cliffs of Upper Borth, across the Dovey estuary to the head of the Ynyslas spit. The unit includes the settlements of Upper Borth, Borth and Ynyslas. The Afon Leri runs behind most of this frontage in an artificial channel, before discharging into the Dovey estuary. The Dovey estuary is described in the Estuaries Assessment.
Geology and Physical Controls	The Upper Borth headland to the south (which is composed of Borth Mudstone), and sarn Gynfelyn, both influence the local wave characteristics and the shape of the shore. Low rock at Ynyslas has anchored the spit, and influenced its development. The estuary has clearly been an important influence on the frontage, and this is discussed in the Estuaries Assessment.
Geomorphology	North of Upper Borth this is a defended beach frontage that, for most of its length, has a sandy lower component with a gravel upper beach. Close to the spit head the gravel gives way to wide sandy dunes. The settlement of Borth, and the Borth Bog is protected from the sea by a shingle ridge backed by a timber breastwork for the first 4 km. This gives way to the sand dunes partially fronted by cobbles at Ynyslas. There is an outcrop of rock at Ynyslas, set slightly back from the shoreline.

Wave Climate	The nearest ocean point at which the original SMP provided wave conditions is at 52°30'N, 4°28'W. Here the most frequent and largest waves come from the west and west southwest, with relatively broad distribution of angles due to the southern exposure. The Futurecoast database provides inshore wave data close to this unit at Aberdyfi. The dominant wave directions are shown to be between 240° and 330°, with wave heights of up to 3.75m between 300° and 330°.
Erosion and Flood Risks	Erosion was recognised at two locations on this frontage by the original SMP, a persistent but not quantified rate of erosion at the centre of Borth village, and a rate of 0.5m/yr at Ynyslas, where the shingle bank was retreating but was then protected. There is a large area flood risk area behind this frontage, this is increased by fluvial flood risk from the Afon Leri.
Sediment Dynamics	There is some sediment supply from the south, principally in the form of small to medium fragments of rock. New slabs of material break down, possibly leaving only 50% as solid gravel. There is some loss of both sand and gravel at the northern end of the unit, although the degree to which material is then recycled into the nearshore area is uncertain. Almost certainly, there is an estuary-driven circulation of sand from the north, feeding the foreshore and nearshore area. The river Dovey also introduces sediment into the Dovey estuary and the Ynyslas spit. The influence of the estuary begins at approximately the point where isobaths deviate from being parallel to the beach, and the change in character of the nearshore beach can be seen in 1948 air photographs, prior to the construction of the present defences at Borth. This location is not precise and represents a gradual change from open coast to estuary (Posford Duvivier, 1993). There is considerable onshore–offshore movement of sand. Material also moves back and forth along the main frontage, so that any major restraint on this movement, or a loss of material in one section, may have impacts elsewhere. The two elements of the beach, the relatively flat sand foreshore and the backing gravel bank, may have quite different behaviour. Analysis of the gravel drift indicates a good degree of equilibrium with the net wave climate, within a highly dynamic regime. Towards the southern and northern ends of the unit there is an indication that the net drift on the gravel ridge may be to the south. This is supported by the general accumulation of material in the south, the relative stability of the shingle bank just to the north of the village and the frequent dearth of material in front of the village and at the north end of the unit.

	As well as comprising the beach, sand makes up the lower foreshore and nearshore sea bed extending several kilometres offshore and covering the whole area around the mouth of the Dyfi Estuary. Records show that the level of sand varies quite considerably, and although there are areas where the submerged forest is exposed regularly, other areas may have been covered with sand for long periods of time only to be stripped to the bare clay during a storm. Tidal current information in the area is sparse and the influence of currents on the regime is uncertain. It is reported that flow over the northern section of the unit is flood dominated, with flows to the north. This needs to be examined in more detail. The unit is exposed to high westerly winds, which carry the finer sediments landward from the foreshore. This has clearly contributed to dune growth.
Structures and Defences	*See Table 10 Wales dune study* *The estuary is dredged.*
Historical and Future Shoreline Evolution	Some 8,000 years ago, it is believed that this frontage developed approximately 1 km seaward of its present position. Within its protection an oak and pine forest developed, the remains of which can be seen along the beach. During periods of submergence the frontage was ‘rolled’ back to its present position; anchored and controlled by the headland to the south, and constrained by the rock at Ynyslas. This rock, outcropping some distance inland, but submerged below littoral material at the shore, has effectively created a division of the frontage; to the south is a shallow embayment and to the north is an active spit, largely controlled by the dynamics of the estuary. Over the last century the Ynyslas spit has extended northwards, narrowing the estuary inlet. The Ynyslas dunes are at present at least stable, and probably accreting. The coastline fronting them has accreted seaward by an average of 0.3m/y since 1887. The shingle bank has been held in place for some time by the man-made defences; the earliest record of defence is understood to have been in the 1930s. The various works have stiffened the shingle bank and have reduced the movement of material along the frontage. The natural pattern of evolution may result in a gradual loss from the beach by attrition, and by loss to the Ynyslas Spit. This would result eventually in a breach, or series of beaches in the shingle bank. It is unlikely that these would be self repairing, and the frontage as it is at present would disintegrate.

	Flooding would become a regular feature of the area and would negate any benefit in maintaining the defence banks of the Afon Leri. There is no reason to believe that the Leri would not return to its former outfall position on the main coast south of Ynyslas. This would disrupt the flows within the Afon Dyfi and may lead to further accretion within the estuary. Pye and Saye (2005) predict that, over the 21st Century, the shoreline will remain quite stable around Borth, but will retreat for most of its length north of the Leri Brook. This retreat will reach a maximum of 25 metres at south Ynyslas. They project that north of Ynyslas the shoreline will stabilise, and the tip of the spit will extend by up to 180 metres.
Information Sources	Central Cardigan Bay Shoreline Management Plan, Volume II: Supporting Document (Posford Duvivier, 2000). Posford Duvivier (1993) Borth Coastal Study, Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005.

C.1.18 Unit 18 – Dyfi Estuary to Afon Dysynni

Picture: Aberdyfi Dunes	
Description	This west-southwest facing unit is situated in central cardigan Bay. It extends from the mouth of the Dyfi Estuary to the Afon Dysynni and includes the Aberdyfi dune system, and the protected frontage at Tywyn. The two estuaries at the boundaries of this unit, the Dyfi and Dysynni, are described in the Estuaries Assessment.
Geology and Physical Controls	The high ground of this unit is mostly composed of mudstones, shales and sandstones of Ordovician and Silurian age, overlain in some locations by Pleistocene glacial deposits. Glacial boulder clay extends NE-SE across the Tywyn area, which was deposited by ice flowing westwards towards the present day coast, along the valleys of the Afon Fathew and Afon Dysynni (Pye and Bloot 2006). To the south of the Tywyn promontory the glacial till lies below a layer of wind blown sand, peat and alluvial marine deposits. The barrier system between Aberdyfi and Tywyn occupies a shallow embayment that is bounded by the control points of the high ground at Ffridd Cefn-isaf in the south and the Tywyn promontory to the north. The Dysynni estuary separates the Tywyn promontory from the high ground at Tonfanau, which is also a control point for this section of the coast. At a smaller scale the artificial controls on this unit include hard points at Tywyn, drainage outfalls, particularly the structure at Penllyn, sections of rock protection, and World War II concrete observation points.

Geomorphology	Between the high ground at Ffridd Cefn-isaf near Aberdyfi and at Tywyn, is the Aberdyfi dune system. These are part of a complex sand and gravel barrier system that is attached to the high ground north of Aberdyfi, and extends northwards towards Tywyn. The dunes and associated gravel ridge connect the old cliff line at Aberdyfi to the glacial till covered higher ground at Tywyn. Behind the barrier is an area of low lying ground comprising an undulating sandy sheet and marshy areas. There are two distinct areas of dunes in the north and south of the barrier system, separated by a gravel ridge (Pye and Bloot 2006). Between the mouth of the Afon Dysynni and the north of Tywyn, the hinterland is low lying and the shoreline is formed of a natural shingle bank with artificial armour stone construction.
Wave Climate	The original SMP derived an inshore wave climate for this unit. This shows a predominant wave direction of between west and south-south west, with wave heights of over 2m from these directions. The Futurecoast database provides inshore wave data close to this unit at Aberdyfi. The dominant wave directions are shown to be between 240° and 330°, with wave heights of up to 3.75m between 300° and 330°.
Erosion and Flood Risks	Pye and Saye demonstrated that, over the last 100 years, the southern most two kilometres of this coast have retreated (in contrast to the depositional south facing Aberdovey frontage). The next two kilometres further north have been stable. South of Tywyn the shoreline is formed of a shingle bank that has been occasionally reinforced with slate boulders. This section of shoreline at Penllyn is presently vulnerable to breaching, with hinterland flooding during storms. There is evidence of beach erosion along the low lying frontage between Tywyn and the Afon Dysynni, and along the Tywyn sea front. Between the Afon Dysynni and the north end of Tywyn, the hinterland is low lying and the shoreline is formed of a natural gravel bank and artificial armour stone. There is evidence of beach erosion along this frontage and, if the shoreline were breached, flooding would extend far inland.

Sediment Dynamics	Tywyn may be an area of sediment parting, with beach material moving alongshore and, under shore normal wave conditions, directly offshore (Pye and Bloot, 2006). The longshore drift is weak here, approaching zero to the south of the town frontage, but becomes southerly across the lower beach further to the south across the Aberdyfi Golf Club, with a weak net northerly drift across the upper beach. This lower beach material passes into the Dyfi estuary approaches, to form a spit influencing tidal waters within the estuary. Pye and Bloot (2006) note sediment accumulation in Aberdovey harbour and along the frontage west towards the golf course. The man made protection of the Tywyn seafront has resulted in the creation of a promontory within a sensitively balanced area for longshore drift. The introduction of hard defences has temporarily fixed the position of the coastline, and as the shore recedes on either side, Tywyn becomes a promontory. This has resulted in `null points' of longshore transport at either end of the Tywyn frontage so that only the on-offshore movement of beach material is significant across Tywyn itself. As such, the groynes are unsuitable to hold an elevated beach and now serve only to trap the weak longshore drift in certain sea states, and to hold longshore flows across their extremities for stages of the tidal cycle. The prospect for beach levels at Tywyn is continued lowering with consequent threat to sea wall and groyne integrity, unless there is significant onshore movement of beach material, which is unlikely. The hard defences of Tywyn run into the armour protected railway length to the north, and it is likely that the northern `null point' for longshore drift occurs within that frontage. There is a serious loss of sand here. The rotation of shoreline in an anti-clockwise direction south of Tywyn due to the hard protection is likely to have reduced northern drift. To the north of the hard protection to the railway, the shoreline has rotated clockwise thereby increasing northerly drift. These two reorientations have effectively starved both the Tywyn and railway defended frontages of beach material. From the northern limit of armourstone to the outlet of the Afon Dysynni, the natural shingle bank protection is now embayed, and the longshore drift at the Dysynni river outlet is clearly northward across the upper beach. This outlet is now effectively fixed by the slate boulder wall along its southern side, although it is likely to have been located further seaward previously. It is possible that southerly longshore drift is small across the Dysynni outlet so that the beach material available to form the shingle bank south to Tywyn is being `stretched' alongshore as the soft linking shoreline recesses landward. The origin of the gravel forming this section of shoreline is likely to be historic, originating from the Tywyn boulder clay and Dysynni outlet channels, prior to human intervention in the area.

	Between Tywyn and the Aberdyfi Golf Club is low-lying land in the Penllyn area. The natural defence of gravel and dune has now eroded so that the hinterland is flooded during storms. Some sections of shoreline have been reinforced with slate boulders, but this work is limited. The net northward drift at the shoreline is not being replenished from the south, due to wider foreshores and recessed sections within the Golf Club dune frontage. As valuable material diminishes protection is reduced and frequency of flooding increases. In addition the beach is now only a veneer of sand over peat and clay. This underlying material is periodically exposed, suffering erosion with dislodged material moving away and effectively lost from the beach system. Unless there is intervention at Penllyn the hinterland will be more regularly flooded and during extreme events this is likely to disrupt longshore processes with the creation of rip channels as the hinterland drains on the ebb tide. The Estuaries Assessment within this SMP review concluded that there is little interaction between the Dysynni Estuary and the open coast.
Structures and Defences	*The Tywyn frontage is defended by a continuous sea wall and a series of timber groynes alternating long and short.* *See Pye and Saye*
Historical and Future Shoreline Evolution	The landward movement of the low water mark in front of Aberdyfi Golf Club has been between 100 and 200 metres over 87 years (1896 to 1983). The combination of coastal works and natural processes at Tywyn has resulted in significant beach steepening. The landward movement of low water mark off Tywyn has been approximately 50 m over sixteen years (1975-1991). This observation should be considered in the light of the coastal works installed across the Tywyn seafront, including construction of timber groynes, which would influence the high water line. The Tywyn seawall will come under increasing threat in the short term. There has been local seaward advance of the high and low water lines at the Dysynni outlet. Between 1887 and 2002 the south facing frontage of Aberdyfi advanced by around 1.5 m/year (Pye and Saye, 2005) and the West-Southwest facing coast retreated in the south, by around 0.2m/year on average. This retreat leads to erosion of the Aberdyfi dunes. There are also public trampling pressures near Aberdyfi so that the dunes will progressively disintegrate without intervention in the medium term. There has been a scheme of sand emplacement along the dunes that front the Golf Club, which has reduced the chance of overtopping and flooding of the land behind. Pye and Saye (2005) reviewed the potential impacts of future climate change on the

	Aberdyfi dune system. It was concluded that for the open coast frontage it is likely to recede 20 to 50 m by 2080, dependant on the magnitude of future climate change.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Pye, K. and Saye, S.E. (2005) The geomorphological Response of Welsh Sand Dunes to Sea Level Rise Over the Next 100 Years and Management Implications for SAC and SSSI Sites Report Number 670, Countryside Council for Wales, Bangor Pye and Bloot (2006) The geomorphology and environmental context of the Aberdovey coastal dune system, commissioned by Aberdovey Golf Club.

C.1.19 Unit 19 –Afon Dysynni to Ro Wen

Picture: The Ro Wen spit	
Description	This west-southwest facing unit is situated in the central part of Cardigan Bay, south of Barmouth. It extends between the estuaries of the Afon Dysynni in the south and the Afon Mawddach in the north. It is mostly comprised of soft eroding cliffs, with some outcrops of hard rock. At its northern limit is the Ro Wen spit, which fronts the town of Fairbourne. The Dysynni and Mawddach estuaries are described in the estuaries assessment.
Geology and Physical Controls	The main physical controls on this unit are the high ground at Tonfanau and the hard rock outcrops at Ogof Owain, Rola and between Gwastadgoed and Ro Wen. The rocks between Tywyn and Barmouth consist of marine mudstones and turbiditic sandstone, with evidence of volcaniclastic debris. Along the coast this is overlain by glacial till. From Tonfanau to the rock cliffs of Gallt Ffynnon yr Hydd to the north of Llwyngwril, the height of the glacial till cliffs varies from a few metres along the Llwyngwril frontage to over 20m at Llangelynin. Offshore of Tonfanau a 5 km gravel bank moraine, known as Sarn y Bwch, extends into the Irish Sea on a south southwest axis.

Geomorphology	The unit begins at Tonfanau with low clay cliffs, fronted by a gravel beach over a sandy foreshore. North of Rola the cliffs disappear and are replaced by a gravel bank. Moving eastward the shoreline is formed of shingle and cobble banks whose material is most likely derived from cliff erosion south of Rola. The cliffs reappear towards Gwastadgoed, and after a short length of soft cliff, hard rock outcrops again and continues to Ro Wen. This section of shoreline has a narrow intertidal zone. Further to the north-east, the Gallt-Ffynnon-yr-Hydd gives way at the shoreline to the development of the Ro Wen. Ro Wen comprises a sand-shingle spit indicative of an historical northerly longshore drift. The northern limit of the Ro Wen is now controlled by estuarial flows, as modified by Barmouth pier and Barmouth Bridge. It has shown little movement over the last century indicating that net northerly longshore drift may now be quite weak.
Wave Climate	The original SMP derived an inshore wave climate for the Dysynni North area. This shows a dominant wave direction between west and west-southwest, with wave heights of over 2m from these directions.
Erosion and Flood Risks	Railway line close to the coast This is a retreating coast, but relatively sparsely developed and so erosion risk is generally low. However, developments behind the retreating Ro Wen may be vulnerable. Continuing erosion between Rola and Ogof Owain will place the coast railway under threat. If the Tonfanau promontory continues to erode there is little immediate threat to hinterland infrastructure. However, the receded promontory will increase erosion around the Dysynni outlet, and the slate boulder breakwater may be outflanked. This erosion would result in changed orientation and differential longshore movement of beach material. The Ro Wen shingle spit provides protection to Fairbourne, and past interventions have disrupted natural spit behaviour. The longshore drift feeding the spit from the south is likely to diminish over time so that breaching is a possibility in the short to medium term. There is a small area of flood vulnerability at Llwyngwril that would affect numerous properties and the railway line. Behind the shingle ridge of Ro Wen at Fairbourne there is a more substantial flood risk area that links to the south bank of the Mawddach Estuary.

Sediment Dynamics	The general direction of longshore drift is towards the north and east throughout this unit. The estuaries assessment within this SMP review found that the Mawddach estuary probably acts as a large sink for sand sized sediments, drawn in from the open coast and nearshore. North of the Dysynni outlet eroding cliffs extend around the Tonfanau promontory. Here boulder beds overlay the upper foreshore/ lower beach, increasing hydraulic roughness. As longshore transport drives material across such areas, the coarse sand and shingle fraction tend to settle out. This material is then available to be driven onshore by wave action to form a beach against the cliff base. There is a correlation here, and further north up to Tremadog Bay, between such strip upper beaches and lower foreshore boulder beds. Erosion of the soft cliff section of shoreline between Tonfanau and Rola releases gravel-sized sediment, which feeds the gravel bank defending the low-lying caravan parks and agricultural land at Borthwen. The gravel drift continues onto the Ro Wen spit, which does not appear to have altered significantly over the last 100 years. The influence of boulder beds upon the upper foreshore is seen near Borthwen Point where the scalloped plan form of the shingle bank is correlated with the boulder beds on the lower foreshore.
Structures and Defences	The railway is protected by a rock revetment to the north of Tonfanau and a masonry seawall at Friog. At Fairbourne there is an earth embankment at the rear of the beach with a masonry crest wall.
Historical and Future Shoreline Evolution	From Tonfanau to Ro Wen the shoreline has generally retreated at both high and low water. This trend is reversed at the mouth of the Afon Dysynni and at Fairbourne. The first section of this unit, between Ogof Owain and the Afon Dysynni is retreating particularly rapidly. Typical rates of low water recession between Tonfanau and the northern end of Ro Wen have been 3 to 5 metres/yr (1975-1991) and for high water 1 to 2 metres/yr (1975-1991); the beaches have therefore steepened in recent times.

	Between Rola and Ogof Owain the cliff is eroding but rates of recession vary, due to geological variations and changes in foreshore level and composition. Between Friog and Rola the cliffs at the eastern end are subject to slow erosion. To the north-east of Borthwen Point there is active erosion of the hinterland, which is intensified around a stream outlet. The caravan park has encroached too close to the shingle bank crest here, and it is likely that some of the active shingle is now entrapped within the development.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1.

C.1.20 Unit 20 – Barmouth to Mochras Point

Picture: Barmouth beach	
Description	This southwest facing unit is situated in northern Cardigan Bay. It begins at the developed frontage of Barmouth, and extends north to the cliffs of Mochras Point, adjacent to the mouth of the Afon Artro. In addition to Barmouth it includes the settlements of Llanaber, Tal-y-bont, and Llanenddwy, which is on the edge of the extensive Morfa Dyffryn dune system, The river Ysgethin discharges to sea at Tal-y-bont. The estuaries of the Arto and the Mawddach are described in the Estuaries Assessment.
Geology and Physical Controls	The most important physical control on this unit is the bedrock at Barmouth. Other physical controls include hard defences at Barmouth, railway defences around Llanaber, and the cliffs and sarn at Mochras. The rocks of this unit are the Arenig Volcanics. Between Barmouth and Porthmadog these are a mixture of basalts, rhyolites, volcaniclastic and sedimentary rocks. The cliffs at Llanaber are formed in erratic rich boulder clay. The cliffs at Mochras Point are also boulder clay. These are connected to the mainland by an accumulation of estuarine sand. There is evidence of a submerged forest at Morfa Dyffryn, which is partially covered by wind blown sand. This is in the form of peat that contains trees, roots and stumps.

Geomorphology	A long term surfeit of sand carried to this area has resulted in the development of a coastal margin of vegetated sand, which builds from the south side of Tal-y-bont. This increases in extent with distance north until becoming the extensive Morfa Dyffryn dune system. Around Barmouth the shore is very wide and sandy. North of the town gravel appears as an upper beach. This gives way to a clay platform and boulder bed at Llanaber. The natural sea defence of the frontage between Llanaber and Morfa Dyffryn comprises a shingle ridge at the back of a sand beach overlying a peat bed. This bed is now exposed in places and eroding. Between Llanaber and the river Ysgethin the beach becomes increasingly wide and sandy, and beyond the gravel ridge, is backed by dunes. North of Llanddwyn is the large Morfa Dyffryn dune system. The dunes are partially anchored by the clay shore of Mochras Point. Sarn Badrig, a linear glacial cobble and boulder moraine, extends 18 km southwest from the coast at Mochras Point. The Arto originally discharged south of Mochras Point, but was redirected north.
Wave Climate	The offshore wave climate was analysed by Atkins (2005). This used data for 1988 to 2004, at a location in Cardigan Bay (52.5^{0}N, 4.5^{0}W). It showed a dominant wave direction from the west, with extreme wave heights of around 4m. The nearest inshore wave climate derived within the original SMP was for Sunnysands. This revealed a dominant wave direction between west and south-southwest, with wave heights of over 2m from these directions. Atkins (2005) also derived inshore wave climates for Islawffordd, this showed similar conditions to those revealed by the SMP.
Erosion and Flood Risks	The sandy coastal margin between the Llanaber railway frontage and the Tal-y-bont has experienced erosion, which has prompted defence of caravan park frontages. The Morfa Dyffryn dune system is also receding. There are areas of flood risk at Barmouth, Egryn Abbey and Tal-y-Bont.
Sediment Dynamics	The Barmouth Breakwater has restricted flows entering the Mawddach. The \`blocking-off' of the old north channel has resulted in a broadened upper foreshore, and increased wind-blown sand problems within Barmouth town.

	Longshore transport in this unit is towards the north. Atkins (2005) report a numerical model based northerly beach sediment transport rate of 350,000 m^3/year in the area of the Sunnysands Caravan Park. The Estuaries Assessment found that both the Mawddach and Arto estuaries are likely to act as sediment sinks; the Arto is dredged every 5-10 years. North of the Afon Ysgethin outlet the shoreline is generally more stable. Longshore channels can develop along this frontage representing a potential threat to dune integrity.
Structures and Defences	*The Barmouth promenade extends northward and the intertidal zone diminishes in width, with the tide line running into the sea wall at the coastguard station. The groynes are buried beneath the beach between the coastguard station and the Barmouth Breakwater. Along the Breakwater itself the groynes are not very effective and some may be having a detrimental effect on the local beach regime.* *From the coastguard station moving northward the groynes become progressively more active in holding longshore flows offshore, but their length to the sea wall is too small to encourage significant beach development inshore. Sea wall orientation changes in plan cause noticeable alterations to beach levels and the longshore flows are clearly directed towards Llanaber Point. The Barmouth defence steps back landward at its northern end, and the groyne system here is ineffective in holding a satisfactory beach against the sea wall.* *See table 10 Pye and Saye* *Llanaber Point forms a promontory, as the shoreline recesses to either side. The Point has been substantially reinforced by a concrete sea wall and, more recently, with heavy armour stone.* *Around Llanaber, which is cliffed, a defended railway line runs along the coast. Other defences protect holiday parks between Llanaber and the point of discharge of the Afon Ysgethin.* *Most of this coast is fronted by sand beaches, which are backed by hard defences from Barmouth to north of Llanaber.* *The caravan Parks at Sunnysands; Islawrfford and Barmouth Holiday Village represent hard spots, where man-made defences have been installed.*

Historical and Future Shoreline Evolution	The contemporary morphology of this unit, under natural conditions, would be dominated by northward longshore sediment transport. This would, in general, tend to denude the beaches fronting the cliffs in the south, and promote cliff recession, and the release of fresh sediment. The intervention at Barmouth has altered the littoral regime to the north up to the Morfa Dyffryn dune frontage. The artificial hardening of the promontory at Llanaber has contributed to the littoral drift alteration, and shoreline retreat is occurring on either side of the Sunnysands Caravan Park frontage, and northwards to the outlet of the Afon Ysgethin. The high water mark at Barmouth has advanced seaward significantly in recent years, whilst the low water mark has retreated. Further north has been consistent recession of the high water mark. The beach has therefore steepened at Barmouth with foreshore width decreasing by 30%. Between 1896 and 1983 there was a net recession of low water mark between Barmouth and Llanaber of some 100 metres whilst high water has only recessed between 10 and 20 metres. North of the reinforced Llanaber Point the shoreline is naturally protected by shingle banks, but these are now overtopped and shingle overspills into the lower hinterland have been observed. The beach appears to be eroding suggesting that drift from the south has reduced and the shoreline is recessing between fixed points. The recession around and north of the defended Sunnysands Caravan Park was the subject of a specific study. The report (Atkins 2005) quotes a recession rate of 0.8m per year at Islawrffordd. Pye and Saye (2005) show general recession of the west-southwest coastline fronting the Morfa Dyffryn dune system of around 0.2 m/year (1887-2002). This recession reduces to zero at the Morfa point, and gives way to a more complex pattern of recession and accretion along the northwest facing section of coast. They predict that the dune field will retreat by around 40 metres during the 21st Century.
Information Sources	Atkins (2005) Barmouth Bay and Islawrffordd Numerical Modelling Report, Barmouth Bay and Islawrffordd Holiday Villages Coastal Evolution Investigation, May 2005. 47 pages. Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1.

	Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005, 219 pages.

C.1.21 Unit 21 – Mochras Point to Harlech Point

Description	This unit is in the north of Cardigan Bay, and forms the southern part of Tremadog Bay. It extends from the cliffs at Mochras Island to the end of the Morfa Harlech spit at the entrance to the estuary of the Glaslyn/ Dwyryd. Most of this unit is fronted by low level soft cliffs or sand dunes, with the only interruption being the mouth of the Afon Artro at Llandanwg. This is an undeveloped frontage, except for the village of Llandanwg. From the village north to the edge of Morfa Harlech, a railway runs along the coastline. The estuaries of the Arto and the Glaslyn are described in the Estuaries Assessment.
Geology and Physical Controls	There are boulder clay cliffs at Mochras Island, between Mochras Point and Bar Newydd. To the north of Llandanwg is a till cliff over 30m in height. The main controls on this unit are the cliffs at Mochras Island and Llandanwg Point, and the outflow of the Afon Glaslyn, which controls the spit of Morfa Harlech. The Llŷn Peninsula provides protection towards the northwest.
Geomorphology	Mochras Point is cliffed to Bar Newydd. These cliffs are generally eroding but not dramatically, and sand/shingle strip beaches are evident, often associated with boulder beds across the lower foreshore. The cliffs run out into a rock-protected spit from Shell Island running into the entrance to Afon Artro at Bar Newydd. The tidal prism behind Shell Island is large and, as a consequence, there is a significant flow during each tide. The present entrance to the basin is relatively new, having been relocated from Mochras Point during the last century. Both sides of the entrance have been artificially strengthened and fixed. From Llandanwg Point is an extensive section of coastal works protecting the railway. The beach is formed largely of boulders; wave and tidal currents acting to remove the smaller grained sediments. As a result, there is little sand and shingle evident until the Harlech dunes. North of Harlech is the extensive Morfa Harlech dune system, which is fronted by a sandy beach.

Wave Climate	This unit is situated just below the Llŷn Peninsula, which provides shelter from northerly waves. Futurecoast provides an inshore wave point at Tremadog Bay. This also shows a predominant wave direction of between 210° and 240°. The largest waves reported are up to 3.25m.
Erosion and Flood Risks	Erosion of the cliffs is occurring at Mochras Island; however this frontage is undeveloped. There has been human intervention for navigation in the Afon Artro basin resulting in altered exposure at Llandanwg, where the dunes are suffering from `squeeze'; erosion to seaward coupled with development pressure to landward. There are significant areas of flood risk behind Mochras Point at Llanbedr and around the Afon Artro. At Morfa Harlech there is also a significant area of low lying land.
Sediment Dynamics	The net longshore drift is eastward from Mochras Point, and then northward along Morfa Harlech. The Afon Artro entrance perturbs this longshore drift, but only locally. Erosion of the Morfa Dyffryn dunes provides material which is carried in to this unit from the south. The erosion of the soft low-level cliffs between Mochras Point and Morfa Harlech provides an additional internal source of sediment. The estuaries assessment found that the Glaslyn/ Dwyryd estuary is likely to be a substantial sink for sand sized sediments from the coastal zone and offshore.
Structures and Defences	*See Pye and Saye (2005)* *To the northeast of Bar Newydd the entrance to the Arto has been constricted by a breakwater linking to Llanbedr Sailing Club. Presumably, this structure was introduced to increase draft in the river basin nearby and within the outlet channel. It is likely to have had an adverse impact upon the shoreline to the north east towards Llandanwg promontory. The vertical profile of the breakwater and its location relative to tide levels suggest that energies are redirected now on to the dune frontage leading to Llandanwg Point.*
Historical and Future Shoreline Evolution	The Morfa Harlech spit has shown significant growth over the last century (Pye and Saye, 2005). This growth was most strongly expressed at the head of the spit in the first half of the 21st Century, where it has since slowed. Elsewhere along the Morfa Harlech dune frontage the shoreline has advanced consistently and more steadily since, at least 1887. The rates of accretion have generally increased with distance along the frontage from Harlech.

	The growth of the spit is associated with, and probably due to, a decrease in the capacity of the estuary (Steers 1939). A low water spit does periodically develop from Harlech Point indicating a process of recycling to the nearshore zone. The advance of the Morfa Harlech frontage has been coupled with foreshore steepening. Between 1950 and 1972 the foreshore consistently narrowed. No information on foreshore change is available since 1972, due to unreliable mapping. Between Mochras Point and Llandanwg the shoreline is retreating but has only reached a position previously recorded 100 years ago. Pye and Saye 2005 estimated the future development of the Morfa Harlech shoreline over the 21st Century. A range of future positions were estimated, using historical trend analysis, the 'Bruun rule' and expert geomorphological assessment. These methods revealed quite wide uncertainty. They estimated that the (southern) root of the spit would retreat by up to 35 m, and that the head of the spit would extend by up to 35 m. The point of zero change was located mid way along the spit.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Steers, J.A. (1939) Sand and shingle formations in Cardigan Bay. Geographical Journal, 94, 209–27. Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005.

C.1.22 Unit 22 – Morfa Bychan to Pen-ychain

Description	This unit extends west along the south side of the Llŷn Peninsula, from the dunes of Morfa Bychan to the headland of Pen ychain. It includes the outlets of the Afon Dwyfor and the Afon Wen, and the settlement of Cricceth. A holiday park is situated in the west, and a railway line runs along the coast in two areas.
Geology and Physical Controls	The main physical controls on this unit are the rock outcrops at Graig Du, Criccieth and Pen Y Chain. Graig Du is a dolerite outcrop, at Criccieth the castle sits on top of a rhyolite outcrop and the rocks at Pen-y-chain are felsite (Posford Duvivier, 1991). To the east of Criccieth the cliffs are about 10m high and composed of blue-grey till at the base and gravelly till higher up. Significantly thicker deposits of boulder clay are found to the west of Criccieth, where the cliffs reduce in height from 15 m to just a few metres at the Afon Dwyfor and then rise again to 15 m at Glanllynnau before falling away again to the railway defences at Afonwen. To the west of the Dwyfor the coastal cliff reveals a sequence of glacial deposits. There is also a length of low clay cliff between the Wen and Pen ychain.
Geomorphology	Morfa Bychan comprises a wide extensive sand flat that is fringed by a relatively low but wide series of dune ridges, which are fronted by a wide sandy foreshore. Backing the dunes are cliffs of hard Cambrian rocks. Between Graig Ddu and Rhiw-for-fawr the frontage is characterised by a shingle ridge (which becomes progressively coarser towards the east) backed by dunes, and lowland and fronted by a shingle foreshore. The lowland comprises a freshwater marsh that grades in places to a shallow lake. Between Rhiw-for-fawr and Pen-ychain the frontage is characterised by outcrops of gently rising glaciogenic platform (Cerrig y Barcdy to Glanllynnau and from Ty ‘n Morfa to the Afon Dwyfor) between sections where the glacially derived material becomes cliffed (Glanllynnau to Ty ‘n Morfa and from the Afon Dwyfor to Rhiw-for-fawr). A broad shingle bank forms a spit across the course of the Afon Dwyfor, which discharges at the eastern end over a widening foreshore. Fronting the glaciogenic platforms and cliffs are foreshores comprising shingle which become progressively sandier to the west. The outlet of the Afon Dwyfor appears to have caused the distortion of the shoreline seen as a step landward on its eastern side. On either side of the river shingle has built up as a low bank. Beyond the river is an area of low lying marsh, enclosed by the railway embankment. Along the frontage the foreshore comprises a mixture of sand and gravel. The marsh is connected to the sea by culverts.

Wave Climate	The original SMP describes inshore wave conditions at Cricccieth. This shows a dominant wave direction from the south-southwest, with little deviation. Wave heights from this direction are up to 2m. Futurecoast also provides an inshore wave point for Tremadog Bay. The dominant wave direction is between 210° and 240°. Wave heights of up to 3.25m are shown between 210° and 240°.
Erosion and Flood Risks	The defences around Criccieth and the holiday park in the west indicate recessive potential at these developed frontages. There are areas of flood risk in this unit associated with the Afon Dwyfor and Afon Wen. In addition west of Graig Ddu is a significant are of flood risk that includes the railway line, and extends inland to Pentrefelin. The railway is a major asset situated on soft erosional landforms and its vulnerability should be assessed.
Sediment Dynamics	With the exception of the frontage immediately in the lee of Pen-y-Chain, analysis indicates a predominant strong eastward drift between Pen-y-Chain and Criccieth. The sediment supply in this area is low and, therefore, the full potential drift rates are unlikely to occur. This estimation is supported by the apparent eastward displacement of the point of discharge of the Dwyfor. The estuaries assessment found that the Glaslyn/ Dwyryd estuary is likely to be a substantial sink for sand sized sediments from the coastal zone and offshore.
Structures and Defences	There is small revetment at Black Rock Sands. At eastern Criccieth there are several sections of seawall and revetment, and the concrete and masonry breakwater. In addition there are several slipways. While to the west of Criccieth Castle a concrete seawall and timber groynes protect Marine Crescent. The mouth of the Afon Dwyfor is protected by a deries of flood defence embankments. To the east of the Afon Wen the railway is protected by a revetment and seawall. While to the west a rock embankment and steel piling are located in front of the Butlins Holiday Park.
Historical and Future Shoreline Evolution	Photographs from the beginning of the 20th century show Morfa Bychan without any forward dune face, but with a wide sandy foreshore. It has been recorded that the Morfa progressed seawards during the 20th Century, most noticeably during the 1940s and 1970s, and it was during these periods that the dunes began to build in height. Some erosion has occurred since the 1970's. Given the sink potential of the Glaslyn estuary, and accelerated sea level rise, the

	growth of the Morfa Bychan should not be expected to continue. Eastwards movement of the eroded sand and shingle from the glaciogenic cliffs between Glanllynnau to Ty ‘n Morfa has deflected the mouth of the Afon Dwyfor by about 1.5km, which is now held in position by an outcrop of glaciogenic material on the east side of the river. Over the past century, the glaciogenic cliffs along this frontage have displayed low recession rates and historic maps indicate there has been much fluctuation in the low water mark, particularly in the areas of the glaciogenic platforms, resulting in variable foreshore widths. The cliffs are eroding at a rate of about 0.3m per year on average but this varies. The shingle bank east of the Afon Dwyfor has extended slightly since the 1940's indicating a low drift of material from the west across the Dwyfor. Erosion continues between the Afon Wen and the Afon Dwyfor although at the mouth of each of these rivers there has been some accretion. Despite attempts at groyning the clay cliffs west of Criccieth (started in the 1930's; Steers 1939) erosion continued there. Erosion of the glaciogenic cliffs in this frontage will increase as sea level rise narrows the shore platform, allowing larger waves to attack the cliffs. This will release a greater supply of sand and gravel, which would then travel eastwards. The eroded sediment would supply the beach and ridge to the east of this frontage. With rising sea level the shingle ridge which fronts the Afon Dwyfor could be subject to pressure, particularly at high water, potentially resulting in erosion of the ridge and eventual breaching. This, combined with natural roll back of the bank, could result in a permanent breach, resulting in flooding of the hinterland and the formation of a new outlet to the sea for the Dwyfor. Such development would be mitigated, but not negated, by the additional influx of material from the west.

Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Atkins (2005) Barmouth Bay and Islawrffordd Holiday Villages Coastal Erosion Investigation. Posford Duvivier (1991) South Llŷn Peninsula: Preliminary coastal study. Steers, J.A. (1939) Sand and shingle formations in Cardigan Bay. Geographical Journal, 94, 209–27.

C.1.23 Unit 23 – Pen-ychain to Mynydd Tir-y-cwmwd

Description	This unit is situated at the eastern end of the southern coast of the Llŷn Peninsula. It extends over three bays, between the headlands Pen-ychain and Mynydd Tir-y-cwmwd. It includes the settlement of Pwllheli and the points of discharge of the rivers Erch, Rhyd-hir and Penrhos.
Geology and Physical Controls	The main physical control points are the boundary headlands of Pen-ychain and Mynydd Tir-y-cwmwd. In addition the hard rock headland at Carreg y Defaid effectively separates Llanbedrog bay from Traeth Crugan. Finally at Pwllheli, Carreg yr Imbill acts as a control point holding the bays to the east and west in their current position. The rock intrusions that form these control points are from the Cambrian or Pre-Cambrian period. Pen-y-chain is felsite, Carreg yr Imbill Pwlhelli is dolerite, Carreg y Defaid is keratophyre and Mynydd Tir-y-cwmwd near Llanbedrog consists of granite. There is a significant exposure of glacial till at Llanbedrog where the cliffs are up to 20 m high, the same material is also evident to the east of Carreg y Defaid but is protected by rock armour.
Geomorphology	The unit comprises three sandy bays. The most easterly bay extends between Glan-y-Don, in the lee of the Carreg yr Imbill hard point, and the hard rock cliff of Pen-y chain. The net drift over this frontage is from east to west, and it understood that this frontage historically developed back from Pen-y-Chain towards Pwllheli. In recent times the curved shore of Glan-y-Don has been artificially shaped by reclamation behind the north training bank of the Pwllheli harbour entrance. The beach of Glan-y-don comprises loosely compacted sand giving way to a silty sand foreshore at low water. Behind the beach is an artificial earth bank merging into the natural dunes to the north and east. The beach continues as sand and then becomes more shingly. At this point the backshore dunes give way to a boulder clay outcrop overlying sandstone. The uniform curve of the bay is disrupted at this point with the beach tending to be in advance of the general line. The dunes from Glan-y Don have been slowly eroded certainly since the nineteen-forties. The boulder clay outcrop continues for some 400m before giving way to sand dunes. The beach in front of these dunes returns to sand. Further east, over the last 900m of the bay, the beach is backed by a low broad shingle bank. The foreshore over this length contains a far higher proportion of shingle sorted in bands up the shore.

	Between Pwllheli and the boulder clay outcrop the land behind the dunes is sand covered alluvium and forms the valley and flood plain of the Afon Erch. Behind the outcrop and to the east the land is covered with old grey dunes above clay. The soft terrace is traced some way behind this area. Carreg Imbill is the end of a spit enclosing the entrance to Pwllheli Harbour. This spit recurves into the entrance channel; behaviour which is encouraged by the shape of the underlying rock outcrop. The face of the spit comprises rocks, stone and shingle, with the recurve formed of sand and shingle. The spit extended noticeably since the fifties up until 1990 when improvements were made to the harbour entrance. There is still a need for regular dredging of the entrance channel. This spit is the eastern end of a bay extending from Carreg Defaid. The coast steps back at Carreg y Defaid, then curves gradually around in front of Pwllheli to Carreg-y-Imbill. Most of the backshore of this bay is composed of dunes, although in the west this gives way to artificially defended till, fronted by a sand veneer over a clay foreshore. The nearshore over much of this length is wide and flat, punctuated with small mounds of gravelly material rising above low water. The most pronounced of these features is a broad ridge extending some 150m longshore and attached to the shore by a low water causeway some half a metre above low water level. This feature effectively divides the frontage, a clear embayment being formed to the west. The foreshore to the west of this feature is gravelly shingle with exposed clay. On the flank of Carreg Defaid there is a narrow area of shingle generally above high water. This is lost as the embayment cuts back inland and is backed by a rock revetment. The third bay in this unit extends from Mynydd Tir-y-cwmwd to Carreg y Defaid, via Llanbedrog, which is deeply stepped back behind the headland. The foreshore at the western end is wide and predominantly sandy apart from the rock and boulder strewn toe to the cliffs, and the occasional rock showing from the sand. There is a small shingle bank to the seaward end of the cliffs. The central foreshore comprises a muddy gravel bed rising as a slight bank above low water. The upper foreshore is relatively steep and is comprised of sand and shingle. This is backed by the exposed till cliff. There is a small outcrop of rock near the mid point of the bay, which is exposed in advance of the eroding cliff.
Wave Climate	Faber Maunsell (2008) obtained inshore wave data for three locations along the Traeth Crugan frontage. Exposure conditions varied across the frontage with the shoreline being largely sheltered from wave directions from west of south at the western end but gradually becoming more exposed to these directions further to the east. At the west end the predominant and highest waves were from the sector 150-180°, whilst at the eastern end there is a slight shift with the predominant and highest waves from the sector 160-190°.

Generally there was an approximate 25% increase in significant wave height from west to east. From this data extreme wave heights were derived, and these are shown in the table below.

		Estimated Extreme Wave Height (m) at Location		
Return Period (years)	Probability of being realised in any year (%)	West	Central	East
0.1		1.22	1.54	1.68
0.5		1.42	1.80	1.99
1		1.50	1.89	2.08
10	10	1.70	2.09	2.30
50	2	1.82	2.18	2.37
100	1	1.85	2.21	2.40

Extreme wave heights along Traeth Crugan, from Faber Maunsell (2008).

Erosion and Flood Risks

The dunes to the north of Glan-y Don have slowly eroded since the 1940s.

The dunes to the west of Carreg yr Imbill have been progressively eroded since, at least, the start of the 20th Century. This has been more marked since the early sixties. This has resulted in accretion of material along Pwllheli promenade and has made good a loss, under south west conditions, from the beach of Morfa Garreg.

The flood defence to the east of Carreg y Defaid and the partially protected dunes in front of the Golf Course are coming under increased pressure of erosion and the length of dunes currently eroding is increasing.

Cliff erosion has historically been a problem at Tyddyncaled, resulting in the installation of armourstone. Erosion of the clay cliffs at Llanbedrog Bay was noted in the original SMP.

There is an almost continuous area of flood risk for most of the frontage excluding Llanbedrog. This includes Morfa Abererch, Pwllheli and zones associated with the Afon Erch, the Afon Rhyd-hir and the Afon Penrhos.

Sediment Dynamics

The general direction of drift within this unit is towards the east, but there are some exceptional areas.

In the far west, the western end of Llanbedrog, which is in the lee of the Mynydd Tir-y-cwmwd headland, acts as a sink for the limited fine influx of material from beyond the headland.

	In the past cliff erosion in Llanbedrog Bay would have supplied material to the beaches to the longshore drift. This influx appears to have ceased by the end of the 19th Century. Given this, and the fact that drift into Llanbedrog Bay from the west is largely prevented by Trwyn Llanbedrog, little material is available to Traeth Crugan. There is a small easterly drift along the Llanbedrog frontage, which is substantially constrained by the outcrop of Carreg Defaid. This net drift direction continues along much of the Pwllheli south frontage. The form of the headland to Crochan Berw supports this. However, local changes in inshore wave direction and in the orientation of the coast along the Pwllheli South Beach frontage give rise to significant differential drift rates. The Pwllheli Golf Course Strategy (Posford Duvivier, 1996) estimated easterly alongshore sediment transport of 10,000m^3/yr at Traeth Crugan. At the Pwllheli Promenade the same study estimated westerly transport of 13,000m^3/yr. These findings were supported by more recent modelling carried out for the Traeth Crugan to Pwllheli Coastal Defence Options Study (Faber Maunsell, 2008). There is no effective longshore drift supply onto the Abererch frontage; material from the east is lost in the Harbour entrance, while return drift from the west is curtailed by Pen-y-Chain.
Structures and Defences	*Development of the southern part of Pwllheli occurred in the late 19th Century, following the linkage of the town with the beach earlier in around 1811. The easterly section of shoreline was then fixed by construction of a promenade and associated artificial defences* *In the late 1950's and early 1960's protection works were constructed immediately to the east of Carreg y Defaid to prevent flooding of agricultural land. A second stage of work followed over the subsequent twenty years. Later revetment toe deepening and eastward revetment extension was carried out in the early 1980's.* *Over the same period the promontory opposite Towyn Camp was extended seaward with a consequent recessing of the shoreline immediately to the east.* *In 1976, 160 cubic metres of rock armour was placed in front of the dunes to the east of Towyn Camp. This was subsequently extended partly to the west but mainly to the east, in 1980, 1989, 1995 and 2002. This armour was also repaired on a number of occasions during that time.* *Pwllheli Harbour and marina were developed to their present form in 1991. Since construction approximately 100,000 cubic metres of material has been dredged from the harbour entrance, of which approximately 50% was removed prior to 1997 and 50% between then and 2007 (Civil Engineering Solutions, 2007).*

	In February and March 2002, approximately 35,000 cubic metres of harbour dredge was placed on the beach mainly to the west of the central rock armour but partly also to the east. In February 2007 a further 35,000 cubic metres was placed on the beach to the west of the central rock armour.
Historical and Future Shoreline Evolution	Examination of historical Ordnance Survey maps and more recent data shows that the shoreline in the 1950's was in approximately the same location as in 1891, suggesting that by the end of the 19th century the shoreline had evolved, without human intervention, to a near equilibrium condition with stable beaches and backshore features. The Abererch frontage appears to have developed from a general westward drift. The net drift is still to the west, but given the current lack of such sediment influx there is likely to be supply from the offshore, to account for periods of accretion on the frontage. The bay is relatively stable but sensitive to large movements of material in response to variation in wave climate. With no major supply to the dunes, the gradual erosion of the clay outcrop in the centre of the bay and the need for the shoreline to re-adjust as a result of this erosion, the dune frontage can be expected to erode slowly. Glan y Don will benefit from this erosion until a breach develops in the dunes between Glan y Don and the clay outcrop. By the 18th century the spits at Pwllheli had developed with an influx of sand from the west along the southern frontage and from the east behind Carreg yr Imbill. By the end of the 18th Century and through to the middle of the 19th the railway to Pwllheli and the embankments enclosing land around Pwllheli were all constructed. This consolidated the western spit at Pwllheli. Development of the south beach area included construction of a promenade and sea wall in the late 19th Century. Carreg yr Imbill spit gradually developed from the 19th Century as material moved along Traeth Crugan from the west was transported around the headland and deposited on the east side. The spit extended noticeably from the nineteen- fifties up until 1990, when improvements were made to the harbour entrance. The juxtaposition of the coast on either side of the river outlet has resulted in different process/shoreline interaction across this section with a bi-directional but predominantly westerly drift. Over the last 200 years the Glan-y-don frontage has developed in response to changing exposure conditions and to coastal squeeze initiated by development on the landward side, including construction of the railway into Pwllheli in the 1860's. As a result the dunes have been gradually squeezed to their present day narrow condition, which now presents a real threat of breaching to the low lying hinterland behind.

	The dunes in front of the Pwllheli town frontage that were lost during the development of the west end at the end of the 19th Century have gradually re-formed over the second half of the 20th Century and now cover the artificial defences In the future the supply to the promenade will be reduced if protection of the golf course continues. This will result in erosion of the current areas of accretion. If the defence of the dunes is not maintained then a breach will occur flooding the area behind and extending into the harbour area. Such a breach would curtail sediment supply to the east and tend to draw material in from the east. If a sediment supply is not maintained to the promenade and Morfa Garreg frontages, whether the dune frontage to the west is protected or not, there will be long term erosion along these presently stable lengths. Until the end of the 18th Century, Traeth Crugan developed as a sand spit linking Carreg y Defaid to Carreg yr Imbill. This development pushed the discharge of the Afon Penrhos to the east until it met the Afon Rhyd-hir. At the same time development of Morfa Abererch from the east pushed the discharge of the Afon Erch westwards until this met the Afon Rhyd-hir at Pwllheli. The natural shoreline comprised sand dunes that covered the entire frontage from Carreg y Defaid to Carreg yr Imbill for most of the 19th Century. The 1840 OS map shows a wide lower foreshore (Y Gamlas) linking Llanbedrog Bay with Traeth Crugan. This feature is not shown on subsequent maps but comparison of the present intertidal and sub-tidal contours and recent aerial photograph indicates much higher levels immediately offshore of Carreg Y Defaid, suggesting that whilst levels may not be as high as they were in 1840, the contour shape is similar.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Posford Duvivier (1996) Pwllheli Golf Course Strategy. Faber Maunsell (2008) Traeth Crugan – Pwllheli Coastal Defence Options Study

C.1.24 Unit 24 – Mynydd Tir Cwmwd to Penrhyn Ddu

Description	This is an east facing unit in the middle of the south shore of the Llŷn Peninsula. It includes two bays, Abersoch and Borth Fawr, around St Tudwal's Road and is centred on the town of Abersoch. The settlement of Machres is at the southern end of the unit.
Geology and Physical Controls	The main physical controls on this unit are the rock headlands of Mynydd Tir Cwmwd, Penbennar at Abersoch and Penrhyn Du. The bedrock geology is mudstone, although the headland of Mynydd Tir-y-cwmwd is granite. Abersoch bay is backed by boulder clay.
Geomorphology	Both bays have a broad sand foreshore which diminishes in width towards their northern ends. The bays are more sharply curved over their southern lengths, extending in a spiral shape to straighter sections to the north. Both bays are subdivided by small rock outcrops. The river Soch discharges across the beach at Abersoch. The broad sand beaches exhibit a ridge and runnel formation. In the case of Porth Fawr the beach is further cut by cross-shore channels resulting in a tortoise shell pattern at low water. Clay has been exposed in the central section of the northern bay suggesting a relatively thin sand veneer. At the junction of the two bays the rock headland extends to low water, with a sudden increase of depth to seaward. There is a sand spit attached to the northern leeward face of the headland, which redirects the river channel eastwards, suggesting some sand bypassing. The backshore of Borth Fawr is principally wind blown sand, with low lying sand covered alluvium behind. Abersoch Bay is backed by boulder clay and to the north by hard rock, set slightly back behind wind blown sand. The foreshore is fine to medium sand but becomes more shingly during the winter.
Wave Climate	Wave conditions have not been quantified in this unit. It is one of the more protected units along the west Wales coast. The Llyn blocks all northerly or westerly waves, whilst the mainland around Cardigan Bay provides protection from easterly conditions. This unit is situated in the path of the largest waves; those from the southwest. However it is sheltered from them by the Penrhyn Du headland and the small nearby St Tudwall's archipelago.

	Evidence of this sheltering can be seen in the broad sandy beaches at the southern ends of the two bays, whilst the direction of the spiral bay forms reveals the importance of the southerly waves.
Erosion and Flood Risks	The dunes at the centre of Borth Fawr are the only recognised area of erosion risk within this unit. However a chalet and caravan site occupying the northern half of Abersoch bay is close to the dune edge, and has been defended in part, with armourstone. There is a small area of flood risk at Abersoch and another area at the southern end of Borth Fawr.
Sediment Dynamics	There is a small net east drift along the Borth Fawr frontage. This locally reverses at Penbennar. The east drift re-establishes itself part way along Abersoch Bay and again is reversed local to the headland of Mynydd Tir-y-cwmwd. Mynydd Tir-y-cwmwd therefore acts to substantially contain material in these bays. There is short section of net southerly drift towards Abersoch Harbour, only reversed under extreme southerly or south westerly conditions. Normally this area acts as a sediment sink but sudden erosion may occur, as was seen in the 1950s. The precise location of drift reversal along Abersoch Bay varies, depending on prevailing offshore wave conditions. Areas of accretion may start to erode with material accumulating elsewhere. On easterly storms sand builds up in front of the entrance to the harbour and pushes the Soch to the south. The river cuts a more direct path to the sea during periods of high flows.
Structures and Defences	At Abersoch the harbour is protected by sea walls and a revetment. While at Porth Fawr the southern half of the bay is protected by a revetment, and then groynes and sea wall. There are also revetments at Machroes in the southern corner of the bay.
Historical and Future Shoreline Evolution	Over the last 50 years sand has accreted by the harbour mouth. In other areas sand movement is more variable. There has been intermittent but progressive erosion in the central section of Borth Fawr, while the sand levels between the groynes to the south have fluctuated, but have generally accreted. Over the last 10 years there has been accretion to the dune frontage to the northern end of the Warren and erosion to different lengths of the central frontage. Accelerated sea level rise is expected to drive shoreline recession around both bays; with a displacement of material from the dune fronts to the nearshore. This increased recession is likely to be minimised close to the controlling headlands.

Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1.

C.1.25 Unit 25 – Porth Ceiriad

Description	This short south-facing unit is situated on the southernmost part of the Llŷn Peninsula. It extends west from the headland of Penrhyn Du to that of Mynydd Cilan.
Geology and Physical Controls	The physical controls on this unit are the headlands of Trwyn yr Wylfa and Mynydd Cilan. Mynydd Cilan, and the rest of the headland, is predominantly faced by Hells Mouth Grits. Behind these cliffs the headland is significantly faulted with sandstone and mudstone (Posford Duvivier 1995). This rock is overlain, at Porth Ceriad, by glacial till, which form the cliff behind the beach.
Geomorphology	At the two containing headlands the coastal processes are mainly those associated with hard rock coasts. Resistant shore platforms slowly wear down allowing waves to attack the hard backing cliffs. Within Porth Ceiriad is a sandy bay, backed with a gravel veneer, and softer glacial till cliffs. The beach sediments are largely trapped within the bay. Erosion of the till releases fine sediment which is carried away in suspension, and material of larger grain sizes which remain within the bay. Over time the sediments accumulate and the exposure (and therefore erosion) of the till diminishes.
Wave Climate	Wave conditions have not been quantified in this unit. Since the beach is swash aligned, it is clear that the predominant direction of wave attack is from the south. The sheltering of the boundary headlands can be seen in the slight curves of the beach at its ends. Given the predominance of southwesterly wave conditions in the southern Irish sea, and the exposed setting of the unit, it is clear that wave conditions here are quite severe.
Erosion and Flood Risks	The cliffs within Porth Ceiriad are eroding, although this does not threaten assets. There are no areas of flood risk on this frontage.
Sediment Dynamics	Although cross-shore sediment motion during storms diminishes the beach depth, and increases the exposure of the till, there is no evidence suggesting that this material leaves the bay.
Structures and Defences	There are no defences in this unit.
Historical and Future Shoreline	Rates of coastal change have not been quantified in this unit. However the recession of the hard boundary headlands is clearly low.

Evolution	Although the glacial till cliffs are much softer, and are exposed to a severe wave climate, they do not appear to the retreating rapidly, indicating that the beach is well developed. Accelerated sea level rise will increase the rate of recession of the glacial till cliffs. The rate at which this occurs will be governed by the volume of liberated sediment necessary to translate the beach profile up, with the sea levels.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1.

C.1.26 Unit 26 – Porth Neigwl

Description	This unit is situated on the south shore of the Llŷn Peninsula, close to its end. It faces southwest, extends between the headlands of Mynydd Cilan and Mynydd Penarfynydd and includes the bay of Porth Neigwl (Hell's Mouth).
Geology and Physical Controls	The Physical controls on this frontage are the two boundary headlands. Mynydd Penarfynydd and Mynydd Rhiw are comprised of hard igneous intrusions and metamorphosed schists. These nearly inerodible rocks are also present beneath the surface at the north corner of the bay. The headland of Mynydd Cilan is faced by Cambrian Grits, and is faulted with sandstone and mudstone. These rocks are exposed where the grit cliffs meet the beach. Between the headlands softer glacial till overlies the solid geology of shales and grits. In the eastern section of the bay the glacial deposits are overlain by sand.
Geomorphology	Porth Neigwl contains a sand and gravel beach, backed by till cliffs, with at small area of sand dunes at Pentowyn. The till cliffs are around 5 km in length and are up to 20 m high. The beach is deeply inset into the general line of the cliffs, and is flanked on both sides by vertical cliffs, which isolate it from the adjacent units.
Wave Climate	Wave conditions have not been quantified in this unit. However it is directly exposed to waves from the southwest, which are the most severe in the southern Irish sea.
Erosion and Flood Risks	The till cliffs are recessing through agricultural land. There are no areas of flood risk.
Sediment Dynamics	There is no evidence to suggest that sand sized material leaves this bay, although there is a loss of finer material to the offshore.
Structures and Defences	There are no defences within this unit.
Historical and Future Shoreline Evolution	Posford Duvivier (2005) quantified the recession rate of the till cliffs as around 0.6 m/year. Accelerated sea level rise will increase the rate of recession of the beach and glacial till cliffs. The rate at which this occurs will be governed by the volume of liberated sediment necessary to translate the beach profile up, with the sea level.

Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Posford Duvivier (1995) Hells Mouth Study

C.1.27 Unit 27 – Porth Ysgo to Aberdaron

Description	This unit is below the tip of the Llŷn Peninsula. It comprises two southwest facing bays, which are held between headlands. The western bay includes the settlement of Aberdaron.
Geology and Physical Controls	The physical controls on this unit are the hard rock cliffs and the three headlands of Trwyn Talfarach, Trwyn y Penrhyn and Pen y Cil. In addition the stack of Maen Gwenonwy holds some beach material on the western side of Porth Cadlan. The cliffs at the eastern end of Aberdaron Bay are formed of metamorphic rocks backed by Ordovician sedimentary rock. Underlying Aberdaron Bay is Ordovician sedimentary rock with a central igneous intrusion that is burier beneath deep glacial deposits. Pen y Cil and the cliffs that comprise the western face of Aberdaron Bay are hard igneous dolerite backed by Ordovician sedimentary and older pre-Cambrian rocks. Trwyn Talfarach is comprised of hard igneous intrusions and metamorphosed schists. Glacial till is evident at Porth Ysgo overlying the solid geology.
Geomorphology	The rocky cliff line with its two bays of Aberdaron and Porth Ysgo is characterised by hard cliffs with steep platforms plunging into deep water. The deeply inset bays are the result of the erosion of glacial deposits between the hard rock headlands. To the western end of Aberdaron Bay the glacial deposits form a vegetated coastal slope while to the east there are near vertical eroding cliffs up to 30 m high. The frontage is divided by the mouth of the Afon Daron, towards the western side of the bay, which cuts through the glacial deposits. The beach and foreshore is a mix of sand and shingle overlying layers of sand clay and gravel.
Wave Climate	The original SMP provided inshore wave data for Aberdaron. This shows a dominant wave direction between southwest and south, with wave heights from this direction of 2-3m.
Erosion and Flood Risks	Part of Aberdaron is situated on the low lying coastal margin and is vulnerable to erosion. This area, where the Afon Daron discharges to sea, also carries some flood risk. Elsewhere cliffs are retreating through agricultural land.
Sediment Dynamics	There is no evidence to suggest that coarse drift material leaves the bays of Aberdaron and Porth Ysgo, although there is a loss of finer material.

	The backshore of Aberdaron has historically been eroded but this was stopped along the westerly section of the frontage, by coast protection works. The cliffs to the east are exposed and continue to erode. Posford Duvivier (1996) noted a 10 to 15m step between the protected and unprotected frontages.
Structures and Defences	*Various defences at Aberdaron.*
Historical and Future Shoreline Evolution	The Aberdaron Detailed Appraisal (Posford Duvivier 1996) identified recession rates between 0.1 and 0.3m/yr for the unprotected glacial cliffs at Aberdaron. Accelerated sea level rise will increase the rate of recession of the beach and glacial till cliffs. The rate at which this occurs will be governed by the volume of liberated sediment necessary to translate the beach profile up, with the sea level. As the cliffs to the east of Aberdaron are cut back there will be a disruption to the natural movement of material along the frontage and the beach in front of the village will drop, making the defence of this section harder to sustain.
Information Sources	Gwynedd Council Coast Protection Unit (1998) North Cardigan Bay Shoreline Management Plan, Stage 1 Consultation Document, Volume 1. Gwynedd Council Coast Protection Unit (2002) North Cardigan Bay Shoreline Management Plan, Stage 2 Consultation Document, Volume 1. Posford Duvivier (1996) Detailed Project Appraisal of Coast Protection Works at Aberdaron

C.1.28 Unit 28 – Pen y Cil to Carreg Ddu

Description	This relatively undeveloped rural unit extends east from he tip of the Llŷn Peninsula to the headland west of Porth Dinllaen. The coast faces north west and is dominated by cliffs with some intervening small sandy bays at Porth Oer, Porth Lago, Traeth Penllech and Porth Towyn. There are numerous small pocket beaches of sand or gravel.
Geology and Physical Controls	This coast includes numerous headlands that act to trap beach sediments. The largest of these beaches is Traeth Penllech, which is bounded by the headlands Penrhyn Colmon and Penrhyn Melyn, The cliffs of are comprised of the Precambrian Gwna Melange, which is characterised by a combination of clasts of various rock types in a grey-green slaty matrix. The only interruptions to this formation are thick glacial drift sequences at Porth Oer, Porth Lago, Traeth Penllech and Porth Towyn.
Geomorphology	The development of this coast is dominated by hard rock processes of slow platform downwearing and cliff retreat. The embayed beaches are the exceptions, and each of these is controlled by the hard rock cliffs that bound them. Generally the bays have formed where softer lithology is exposed, for example at Porth Oer, Porth Lago, Traeth Penllech and Porth Towyn. At Porth Oer and Porth Lago the backshore is composed of till. Although the beach is relatively full, it is not sufficiently large to entirely protect the cliff, which is eroding. At Traeth Penllech a sand and shingle beach extends for 1.5km between Penrhyn Colomon and Penrhyn Melyn. The backshore is a combination of till some harder rock outcrops. The Afon Fawr discharges across the beach after flowing onto the frontage through a gorge with some waterfalls. At Porth Towyn a sand and gravel beach is also backed by a combination of till cliffs and some harder rock outcrops. There are fresh water influences with waterfalls flowing onto the beach at various locations.
Wave Climate	The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more eastward direction in this area.

Erosion and Flood Risks	Although the till cliffs within this unit are likely to continue to erode, they will not retreat through developed areas. There are no areas of flood risk along this frontage.
Sediment Dynamics	Apart from the loss of fine sediments from the till cliffs to the offshore, this is essentially a disconnected unit. There is believed to be no sediment exchange with the neighbouring units, and negligible sediment interaction between the bays.
Structures and Defences	*There is one small defence at the south of Traeth Penllech.*
Historical and Future Shoreline Evolution	Most of this shoreline is composed of stable hard rock cliffs, which change very slowly. The till embayments retreat more quickly, but the rates of recession have not been quantified. In all areas the recession rate will increase in the future due to accelerated sea rise. In the hard rock areas the shore platforms will narrow. In the till embayments the additional release of beach sediments will allow the beaches to rise with the sea level, and so little change will be seen in the intertidal area.
Information Sources	Gibbons, w. and McCarroll, D. (1993) Geology of the country around Aberdaron, including Bardsey Island. Conwy County Borough Council (2002) Ynys Enilli to Great Ormes Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document

C.1.29 Unit 29 – Porth Dinllaen to Penrhyn Bodeilias

Picture: Porth Nefyn	
Description	This unit is situated in the central section of the north coast of the Llŷn Peninsula, and extends between the headlands of Carreg Ddu and Penrhyn Bodeilas, and comprises three bays The first bay includes a small harbour, and a small assembly of buildings. The second, has a short defended frontage, and the third includes a harbour and impinges on the village of Nefyn.
Geology and Physical Controls	The headlands Carreg Ddu, Penrhyn Bodeilas and Penrhyn Nefyn and the rocky outcrop from Trwyn Porth Dinllaen largely control this unit. Trwyn Porth Dinllaen is an igneous intrusion, whilst elsewhere the bedrock is composed of lavas, ash and conglomerates. Overlying this around most of the length of the bays are softer layers comprising boulder clay, silt and gravel and sand. Breakwaters at the western ends of the largest bays act to retain sediments locally.
Geomorphology	The unit comprises three bays, separated by the headland of Penrhyn Nefyn and an unnamed rocky outcrop, which is part of the Trwyn Porth Dinllaen headland. Between the headlands are sand and gravel beaches, which are fed by the erosion of the till cliffs.

	The beaches are quite full, and as a result the shoreline recession is small. The cliffs are mostly vegetated, indicating that landslides are rare. The exception to this is the central portion of Porth Nefyn, which is showing active landslides.
Wave Climate	The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more eastward direction in this area.
Erosion and Flood Risks	There are a number of areas of erosion vulnerability. Without defences the structures around the Porth Dinllaen harbour, and in the lee of the southerly rock outcrop would be rapidly eroded. There are structures in a similar situation at the west and mid point of Porth Dinllaen and at the west of Porth Nefyn. Although the till cliffs retreat slowly, on average, they are unstable. Occasional landslides, perhaps initiated by high rainfall, will cause rapid losses of cliff top. The car park at the east of Porth Nefyn was the site of a fatal cliff landslide in 2001. The buildings described above are very low lying, and vulnerable to flooding through overtopping.
Sediment Dynamics	There is no sediment influx to the unit. Some losses are believed to occur towards the east, around Penrhyn Bodeilas. Sediments are released within the bays through the erosion of the high backing till cliffs. The protection of Porth Dinllaen by Carreg Ddu to the west is so great that a counter drift has been set up within the bay, and net sediment transport is from east to west toward the headland. Because of this internal circulation pattern, there is little interaction between the bays at Porth Dinllaen and Porth Nefyn.
Structures and Defences	At Porth Dinllaen there is a small seawall and breakwater protecting properties at the western end of the bay, and reveetemnts and a seawall are located at Morfa Nefyn. At Porth Nefyn there is a small harbour with a concrete breakwater and seawalls that extend round to protect properties at Nefyn to the east.
Historical and Future Shoreline Evolution	The rate of shoreline recession is not precisely known, but is believed to be low. This view is supported by the highly vegetated state of much of the cliffs. As noted above, episodic landslides have caused localised loss of cliff top areas.

	This behaviour will continue in the future, and will be exacerbated by accelerated sea level rise and perhaps also by increased rainfall. Accelerated sea level rise will increase the rate of cliff erosion, as the foreshore is narrowed, and larger waves reach the cliff toe. Beaches will tend to be submerged as the cliffs will constrain their retreat. This submergence will be mitigated by the increased rate of sediment release from the cliffs.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document.

C.1.30 Unit 30 – Penrhyn Bodeilas to Trefor

Description	This northwest facing unit it on the northeast section of the Llŷn Peninsula. It extends from Penrhyn Bodeilas to the bay of Trefor, just beyond the headland of Trwyn-y-Tal. Trefor is the only settlement that approaches the coast. Disused quarries are situated at Penrhyn Glas and Porth y Nant.
Geology and Physical Controls	The bedrock geology of Porth Pistyll is mudstone. Penrhyn Glas and the southern part of Porth y Nant is igneous rock, which gives way to mudstone and lavas. Trwyn y Gorlech is also igneous, but mudstone resumes at Trwyn y Tal. Between the headlands there are intervening lengths of soft rock. The cliffs south of Trefor are composed of soft boulder clay. Porth Pistyll is also backed by clay. The physical controls on this section of coast are the hard rock headlands of Penrhyn Bodeilias, Carreg u Llam and Penrhyn Glas, Trwyn y Grolech, and Trwyn y Tal at Trefor. Shallow bays have formed between them. An old stone pier locate in the middle of the Trefor frontage protects a small drying harbour, while a masonry groyne and a small stretch of wall retain the shingle beach in the lee of Trwyn-y-Tal.
Geomorphology	The backshore is uniformly cliffed, but varies greatly in strength and in height; behind Trwyn y Gorlech the land rises to over four hundred metres. The headlands have formed the three bays of Porth Pistyll, Porth y Nant and a shallow embayment below the Yr Eifl quarry. Erosion of the cliffs releases sediment that accumulates to form beaches. These beaches are more developed where the cliff erosion is greatest, i.e. in the softer rock areas. The beaches fronting the clay cliffs tend to be sandy and wide. In front of the harder rock areas they tend to be composed of larger grains, including gravel, pebbles and boulders. To the east of the Trefor pier a raised shingle spit has developed that separates the mostly sandy beach located in the lee of the pier from the rocky foreshore to the north east.
Wave Climate	The Llŷn Peninsula protects this unit from southerly waves, whilst Anglesey provide shelter to the north. The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more eastward direction, and so this unit is quite exposed.

	Futurecoast provides an inshore wave point close to this unit at Penrhiwau Bay. This confirms a predominant wave direction of between 270° and 330°, with wave heights of up to 3.75m.
Erosion and Flood Risks	The whole frontage is eroding, although generally the retreat rates are low. The clay frontages are the most vulnerable, and active Landsliding can be seen, particularly along Porth Pistyll, however this is not impinging on developed areas. There are no areas of flood risk.
Sediment Dynamics	There may be a minor influx of sediment form the beaches at Nefyn across the headland of Penrhyn Bodeilias at the southern end of the unit. The longshore transport in this area is northeast. This carries sediments released within this unit towards and around the headland of Trwyn-y-Tal into the next unit.
Structures and Defences	There are no manmade defences or structures within this unit.
Historical and Future Shoreline Evolution	This shoreline has been retreating, although the rate at which this happens has not been quantified. In the future accelerated sea level rise will increase the rate of cliff erosion, as the foreshore is narrowed, and larger waves reach the cliff toe. This will increase the rate of sediment release, benefitting the unit to the north.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database.

C.1.31 Unit 31 – Trwyn y Tal to Fort Belan

Description	This unit is situated on the mainland, between the Llŷn Peninsula and Anglesey. It extends northeast from the headland Trwyn y Tal to the entrance to the Menai Strait at Fort Belan. The Menai Strait is described in the Estuaries Assessment. The coast is relatively undeveloped, but settlements approach the coast at Dinas Dinlle, Pontllyfni, Aberdesach and Bach Wen.
Geology and Physical Controls	The bedrock geology here is mudstone giving way to lavas at around Bach Wen. This is overlain with softer clays along most of the frontage. Variations in lithology and rock strength have allowed undulations in the planshape of the coast, although without forming strong headlands. The physical controls on this unit are rather weak. The headland of Trwyn y Tal provides protection for the bay of Trefor, and contributes to its shape, through its influence on local wave transformation. The clay outcrop of Dinas Dinlle appears to be providing an anchor, albeit a moving one, for the dunes of Morfa Dinlle. Both the Llŷn Peninsula and Anglesey provide shelter from waves, whilst the strong tidal currents of the Menai Strait have a strong effect on the coast close to Fort Belan.
Geomorphology	The southern part of this unit is backed by eroding clay cliffs; their heights decrease with distance north. Around Pontllyfni these give way to depositional features, including the dunes of Morfa Dinlle and the spit in which they exist. At Aberdesach there is a low lying shingle bank fed by material from the south. The hinterland is low lying and the Afon Desach discharges through the shingle ridge. At Dinas Dinlle the boulder clay reappears for around five hundred metres. From here onwards the beach becomes increasingly sandy, and the hinterland becomes very marshy. The peninsula that has formed from around here to the end of the unit is similar to the outer estuary features seen further south. It has grown from the south towards the Menai Strait. As it has done so it has diverted towards the north the outlets of the Afon Gwyrfai, Rhyd and Carrog. These now discharge into Foryd Bay, which has emerged behind the peninsula, and, because of its protection, has developed marshes and other estuary characteristics. The beach on the open coast here is sand, backed by a gravel ridge. This becomes increasingly sandy with distance north; although at the distal end of the spit, more coarse shingle accumulates.

	The intertidal zone consists of a glacial deposit upper beach and a sandy lower beach, with the formation of sand bars near the approaches to the Menai Straits. North of Caernarfon Airfield at Morfa Dinlle the shoreline changes from west facing to north west reducing the exposure and hence allowing a wider intertidal zone to develop with extensive sand dunes which replace the low lying marshland further south.
Wave Climate	The Llŷn Peninsula protects this unit from southerly waves, whilst Anglesey provide shelter to the north. The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more eastward direction, and so this unit is quite exposed. Futurecoast provides an inshore wave point for this unit at Penrhiwau Bay. This confirms a predominant wave direction of between 270° and 330°, with wave heights of up to 3.75m.
Erosion and Flood Risks	The cliffed areas of this frontage are soft and prone to erosion, although this is not putting pressure on developed areas. There is a risk of overtopping and flooding at Pontllyfni and to the north. The areas around Dinas Dinlle and Morfa Dinlle are low lying and at risk of coastal flooding. Flood embankments and drains have been built to protect against this. There is erosional pressure on the shingle ridge at Aberdesach and the cliffs at Pontllyfni that may threaten properties in the future. At Aberdesach there is a risk of flooding, should the gravel ridge breach.
Sediment Dynamics	Sediment passes into the unit from the south, and there is a net drift to the north. The eroding cliffs are an important internal source of sediment for the beaches. Drift is retarded at Dinas Dinlle by rock bastions. However sediment appears to be bypassing them along both the shoreline and nearshore. The southern entrance to the Menai Strait acts as a sink for the north-moving littoral sands, and to a lesser extent fine material. Material is also carried offshore from the spit by tidal currents.
Structures and Defences	At Trefor there is a rock revetment and seawall to the west of the masonry pier that protects the small harbour.

	At Aberdesach a masonry seawall protects several properties There is a revetment and seawall that protects the entrance to the Afon Llyfni at Pontllyfni. The low lying land to the north of the Afon Llifon is protected by earth flood embankments. At Dinas Dinlle there is a concrete seawall and two fishtail groynes. To the north of Dinas Dinlle as part of the 1994 works, a flood embankment was built to protect properties and act as an access road to the airfield.
Historical and Future Shoreline Evolution	The first shoreline management plan notes a decrease in beach width between Trefor and Dinas Dinlle during the 20th Century. At Dinas Dinlle historical evidence suggests that there was retreat at a rate 0.1 m/yr in the last century (Pye and Saye, 2005). This led to the implementation of defences; a box gabion sea wall was constructed in the 1970s to hold the shoreline. This led to erosion of the beach in front of the defences. This erosion and associated increasing wave energy led to breach of these defences in 1990 causing flooding of the properties behind. In 1994 two fishtail rock groynes were built and beach nourishment was implemented to protect the Dinas Dinlle frontage. The works at Dinas Dinlle have effectively fixed this section of the coast, while to the north it is accreting. Pye and Saye (2005) show that along the airport shoreline and further north the coastline generally moved seaward between 1887 and 1974. The southern part of this unit is under erosional pressure due to its unrestrained nature. In the future accelerated sea level rise will increase the rate of cliff erosion, as the foreshore is narrowed, and larger waves reach the cliff toe. This will increase the rate of sediment release, benefitting the sedimentary features in the north, and reducing their vulnerability to sea level rise. At Pontllyfni the defences may lead to the creation of the artificial promontory and the need for defence extension. Pye and Saye (2005) predict shoreline change of the dunes over the 21st Century. The different methods they apply reveal considerable uncertainty regarding the amount of recession. Using expert geomorphological assessment, they estimate that the shoreline north of the airfield will remain relatively stable. Further south, around Morfa Dinlle, they estimate it will retreat by around 60 metres.

Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005.

C.1.32 Unit 32 – Abermenai Point to Llanddwyn Island

Picture: eroded dunes at Newborough Warren, close to Llanddwyn Island	
Description	This unit is on the south-eastern corner of Anglesey, and extends west-northwest from Abermenai Point, at the entrance to the Menai Straits, to Llanddwyn Island. The Menai Strait is described in the Estuaries Assessment. The central and northern part of this unit is backed by Newborough Warren, an extensive area of dunes. The western half of Newborough Warren has been forested by the Forestry Commission, to prevent blown sand blocking roads and covering agricultural land.
Geology and Physical Controls	Most of the bedrock is metamorphic Cambrian and limestone, although the island is volcanic and Ordovician. Except on the island the bedrock is covered by sands. The rock outcrops of Llanddwyn Island provide protection to much of this unit. The tidal currents of the Menai Strait have a strong influence on the southern section of the frontage.
Geomorphology	Abermenai Point is at the end of a duned spit, which protrudes into the Menai Strait. This spit is backed by marshlands around Traeth Abermenai. Further north is the coast is backed by continuous dunes. The foreshore is wide and sandy. Llanddwyn Island is rocky with many small stacks and minor headlands. It also holds many small sandy bays.

Wave Climate	The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more eastward direction, and so this unit is quite exposed. Llanddwyn Island provides some protection from these waves, at least to the western section of this unit.
Erosion and Flood Risks	The dunes are eroding but no assets are at risk. There are no significant areas of flood risk on this frontage.
Sediment Dynamics	The unit is separated from the shoreline to the north west by Llanddwyn Island that acts as a barrier to sediment drift. Material eroded from the unit tends to pass into the Menai strait and Traeth Abermenai. A small gravel spit linking the beach to Llanddwyn island is fed by material released by the dune recession, erosion of head deposits on the island and some weathering of the bedrock.
Structures and Defences	There is a small section of rock armour on the spit north of Abermenai Point.
Historical and Future Shoreline Evolution	The dunes and spit have shown ongoing, though not uniform, recession over the period for which reliable mapping exists (1888 to 1974). Recent storms have cut the dune back further, indicating that this recessive trend continues. Pye and Saye (2005) studied historic maps of the unit, the first of which dated to 1888. They found that since the first survey, the area of dune has increased adjacent to Traeth Penrhos. Along Traeth Llanddwyn the dune area has decreased, with the loss of fixed stable dune planted with coniferous trees at the western end and probably the loss of mobile dune to semi-fixed dune grassland on the open warren. Generally, Abermenai Spit has expanded in area, particularly on the inner side, although it has incurred some loss on the seaward side, mainly near the neck. In addition, minor accretion has occurred adjacent to Traeth Abermenai.

	Pye and Saye (2005) also predict shoreline change of the dunes, including the spit, over the 21st Century. The different methods they apply reveal considerable uncertainty regarding the amount of recession. Using expert geomorphological assessment, they estimate that the spit will retreat by around 25 metres whilst the bay close to the island will retreat by up to 80 metres.
Information Sources	Conwy County Borough Council (2002) Ynys Enilli to Great Ormes Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005

C.1.33 Unit 33 – Malltraeth Bay

Description	This sandy unit is situated in the south-eastern corner of Anglesey and includes the entrance to the Cefni estuary, which is described in the Estuaries Assessment. The unit faces west-southwest and is backed on its eastern side by Newborough Forest.
Geology and Physical Controls	The bedrock in this area is Ordovician mudstone. Malltraeth Bay is bounded by Llanddwyn Island in the south and the hard rock peninsula of Pen-y-parc to the west. Llanddwyn Island anchors the coastline and provides some protection from the south east.
Geomorphology	The shore of Llanddwyn Island is hard and rocky, with small trapped beaches. The shore of Newborough Forest is sandy, and backed by wooded dunes. The hard rock shore of Cwningar Bodowen, across the estuary mouth, is high steep coastal cliff.
Wave Climate	Llanddwyn Island provides some protection from the south east, although the fetch in that direction is quite short. The Llŷn Peninsula protects the unit from southerly waves. The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest. Such waves would diffract around the north of the Lleyn, to travel in a more easterly direction, and so this unit is quite exposed.
Erosion and Flood Risks	There are no current erosion or flood risks in this section.
Sediment Dynamics	The estuaries assessment found marginal interaction between the Cefni estuary and the open coast. It has historically taken sand sized sediments from the open coast or the offshore, but sediment volumes are now reaching the estuary's capacity. Along this section of Newborough Warren, sediment is moved to the coast from offshore sources, and then carried northwest by Longshore transport.
Structures and Defences	The defences and struxctures in this unit are within the Cefni Estuary. They comprise the Malltraeth Cob, a flood embankment that protects the valley of the Afon Cefni and the associated tidal sluices. In addition there are small local defences at Malltraeth comprising seawalls and a revetment.

Historical and Future Shoreline Evolution	From around 1800, control of the discharge of the River Cefni and land reclamation encouraged accretion on the south side of the estuary and the development of the marsh and dunes. As a result the shoreline prograded seaward. Pye and Saye (2005) show that the shoreline fronting this section of Newborough Warren retreated at the end of the 19th Century, but then prograded more significantly during the 20th Century. This accretion continues, although at an uncertain rate. Pye and Saye (2005) predict shoreline change along the dunes, using a variety of techniques. The different methods reveal considerable uncertainty regarding both the amount and direction of change. Using expert geomorphological assessment, they estimate that the dunes will retreat by up to 25 metres, but will remain anchored in their current position behind Llanddwyn Island.
Information Sources	Conwy County Borough Council (2002) Ynys Enilli to Great Ormes Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005

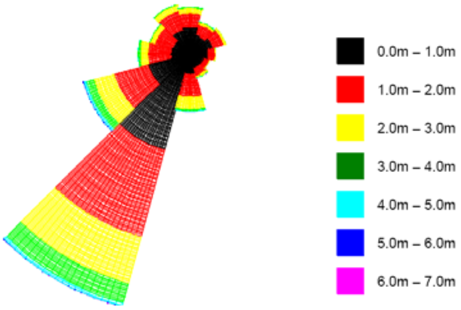
C.1.34 Unit 34 – Pen-y-Parc to Braich-lwyd

Description	This short undeveloped unit extends between the headlands of Pen-y-parc and Braich-lwyd along the southern side of Anglesey. The frontage includes the dune field next to Aberffraw and the point of discharge of the Afon Ffraw.
Geology and Physical Controls	The physical controls on this unit are the hard rock cliffs and headlands either side of Aberffraw Sands and, in addition the road across Aberffraw Sands which acts to control the Afon Ffraw, and hence stabilises the dunes. The rock outcrops to the south of this unit are predominantly schists and gneisses of the Mona Complex.
Geomorphology	To the south of Aberffraw bay the shoreline is predominantly hard rock cliffs, however where softer lithologies are exposed in the cliff line small sandy pocket bays have formed. These are Porth Gro, Porth Buarth-y-mor, Porth Twyn-mawr, Porth y Cwch and Porth Cadwaladr. At Porth Twyn-mawr sand dunes have developed that are now protected by the rocks that flank it. Aberffraw sands are the result of deposition within estuary of the Afon Ffraw, which was drowned following the last glaciation. The construction of the road across the estuary fixed the point of discharge of the river and encouraged further siltation. The dunes are contained within a valley with little sediment supply. To the north of Abberffraw Sands hard rock cliffs resume until the end of the unit at Braich-lwyd.
Wave Climate	The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest.
Erosion and Flood Risks	There is no recognised erosion risk along this frontage. There is a potential flood risk associated with the valley of the Afon Ffraw.

Sediment Dynamics	In sedimentary terms Aberffraw Sands are effectively self contained, with no exchange with neighbouring units. There is a predominantly south easterly drift across the mouth of the estuary; however this can be reversed in periods of wave activity with the estuary acting as a sediment sink, and fresh supplies of sediment are limited, although Pye and Saye (2005) note a moderate offshore sediment supply.
Structures and Defences	There are no manmade defences or structures within this unit.
Historical and Future Shoreline Evolution	In the hard rock areas there is slow ongoing erosion of shore platforms coupled with undermining of steep cliff faces leading to intermittent failures. The rate at which this occurs will increase, as sea level rise accelerates. Pye and Saye (2005) have shown that, during the period for which historic mapping data is available (1888 - 1974) the shoreline of Aberffraw Sands advanced by around 160 metres on average. They classify the current erosion/ accretion trend as 'variable'. Pye and Saye (2005) predict shoreline change along the dunes, using a variety of techniques. The different methods reveal considerable uncertainty regarding both the amount and direction of change. Using expert geomorphological assessment, they estimate that the dunes will advance by around 25 metres.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Pye and Saye (2005) The Geomorphological Response of Welsh Sand Dunes to Sea Level Rise over the Next 100 Years and the Management Implications for SAC and SSSI sites. Report for the Countryside Council for Wales, February 2005.

C.1.35 Unit 35 – Braich-lwyd to Traeth Cymyran

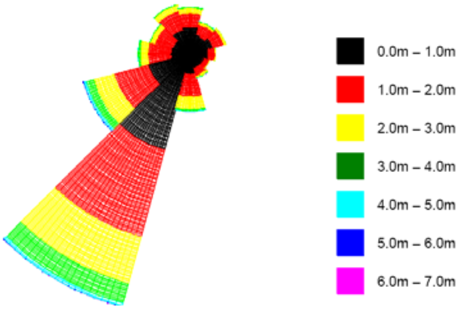
<table>
<tr><td><i>Picture: Defences at Rhosnegir</i></td><td></td></tr>
<tr><td>Description</td><td>This unit extends from the headland at Braich-lwyd to the straits between Ynys Mon and Holy Island. These straits are the southern entrance to the Afon Alow estuary, which is described in the Estuaries Assessment.
The unit includes frontages of the town of Rhosneigr and the Valley Airfield. Rhosneigr has developed behind extensive but low rocky outcrops.
The Afon Crigyll outfalls across Traeth Crigyll, north of Rhosneigr.</td></tr>
<tr><td>Geology and Physical Controls</td><td>Although this unit is relatively short, its bedrock geology is very variable. It includes, from east to west: sheared schist, granite and gneiss, Ordovician slate and green schist. Although variable in origin and type, the rock is generally hard, although there are exposures of softer lithology within some of the bays.
The physical controls on this unit are the hard rock headlands within the frontage, and the cliffs of Holy Island to the west. The low rocky outcrops at Rhosneigr provide valuable protection to the town.</td></tr>
<tr><td>Geomorphology</td><td>This unit is quite diverse, and includes hard rock frontages, beaches, dunes and estuarial conditions (at its western limit).
The shoreline north of Braich-lwyd to Porth Nolba is comprised of hard rock outcrops with some pocket bays, which have formed at exposures of softer lithologies. The pocket bays of Porth Cwfan, Porth China and Porth Trecastell have sandy beaches.</td></tr>
</table>

	Between Porth Nolba and Rhosneigr is a sandy beach with numerous rock outcrops; the backshore is comprised of dunes. To the north of Rhosneigr the sandy foreshore of Traeth Crigyll and Traeth Cymyran extend to the entrance to the straits between Ynys Mon and Holy Island. This part of the frontage is backed by dunes and the division between the two beaches is marked by the rock outcrops of Ynys Feurig, which act to anchor the shoreline.
Wave Climate	Faber Maunsell (2006) derived offshore wave conditions in this area (53.3°N 4.9°W) from Met Office data describing June 1991 to January 2004. This showed a strong predominance of waves from the southwest, as can be seen in the figure below, which is reproduced from that study.  **Wave conditions at 53.3°N 4.9°W between June 1991 and January 2004 (Faber Maunsell, 2006)** Analysis of the data provided the following extreme wave heights: 1:10 year 6.2 m, 1:50 year 7.0 m, 1:100 year 7.2 m.
Erosion and Flood Risks	Rhosneigr is low lying and has developed to the shoreline. Pressure on this frontage would be expected and is suggested by the numerous lengths of artificial coast protection that can be seen there. Areas of flood risk are associated with the valley of the Afon Crigyll and the outflow of Llyn Maelog.
Sediment Dynamics	Between Porth Nolba and Rhosneigr material may be moved onshore during more severe conditions. Material accumulates between the backshore and the rock outcrops forming salients and tombola. These aid the stability of the beach but are vulnerable to sea level rise. The channel of the Afon Crigyll does not have significant effect on beach behaviour with sediment able to pass across the outlet. The net drift across the beaches to the north of Rhosneigr is towards the south.

Structures and Defences	The dunes at Traeth Cymyran are controlled by artificial defences. There are seawalls protecting properties at Cerrig y Defaid and Rhosneigr
Historical and Future Shoreline Evolution	The dunes that form the backshore of Traeth Llydan were probably part of a complete dune system that formed along the south west shoreline of Ynys Mon in the middle ages, and would originally have been linked to the dunes north of Rhosnegir behind Traeth Cymyran and Traeth Crigyll. The development of the village of Rhosneigr has split the dunes into two distinct parts. The defences at Traeth Cymyran have prevented natural dune roll-back, and led to squeezing of the dunes between the sea and the RAF base. Between Braich-lwyd and Porth Nolba the shoreline is not expected to change significantly over the timescale of the SMP. At present the system to the south of Rhosneigr is in reasonable equilibrium, however rising sea levels will expose the vulnerable dunes behind the rock outcrops to greater wave attack. The whole Rhosneigr frontage will become more exposed as sea level rise submerges the rocky outcrops that protect to the town. Some loss of intertidal areas and increased pressure on the coast protection and sea defences works should be expected. The northern dunes at RAF Valley are vulnerable to erosion and due to the landward development natural processes cannot occur. The dunes could be lost if the current processes continue. The shoreline at the northern end of the frontage at the entrance to the straits between Holy Island and Ynys Mon may be vulnerable to erosion by the increased flows brought by higher sea levels.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database. Faber Maunsell (2006), Trearddur Bay Coastal Study, Project Appraisal report, for Anglesey County Council May 2006. 58 Pages.

C.1.36 Unit 36 –Tywyn Bryn-y-bar to Holyhead Breakwater

Description	This unit comprises the south west facing shore of Holy Island, between Tywyn Bryn-y-bar in the south and the Holyhead breakwater in the north. Much of this frontage is rural. The largest settlement is at Trearddur, and smaller settlements approach the coast at Rhoscolyn and Goferydd. The eastern boundary of this unit is adjacent to the southern entrance of the Afon Alaw estuary, which is described in the Estuaries Assessment.
Geology and Physical Controls	Headlands formed in the hard rock cliffs control the many bays within this unit. The bedrock along most of this frontage is green schist. The western tip of the island is comprised of bedded sandstones and siltstones, and includes quartzites. Faber Maunsell (2006) provide greater detail of the geology that underlies Trearddur Bay, which is comprised of metamorphic schists of the Mona Complex. The drift geology is mainly glacial till onshore with estuarine deposits offshore and onshore in low lying areas. The estuarine deposits are a mixture of silty clays to sandy silts with woody peat deposits. These deposits also contain occasional tree roots and intact trunks (Faber Maunsell, 2006).
Geomorphology	Most of this unit is comprised of hard rock cliffs and outcrops with gravel beaches and rock platforms making up the intertidal profile. Where softer geological formations are exposed a number of sandy bays have formed. The largest of these are Silver Bay, Borthwen Bay, Trearddur Bay and Porth Dafach. Silver Bay is a sandy pocket beach between hard rock formations with dunes at the backshore. Borthwen Bay is a sheltered sandy beach protected by rock headlands to either side. Unlike Silver Bay there are artificial defences in place to protect properties and a car park. Porth Diana is split into three embayments by the rock outcrops on the foreshore. Erosion of the frontages in all three sections has led to defences being constructed, but this in turn has led to lowering of beach levels in some locations. Trearddur Bay is the largest of the beaches on this stretch of the coast. It has hard rock outcrops on either side. It is protected by artificial defences for most of its length.

	Between Trearddur Bay and Porth-y-Post the rock shoreline is interrupted by a series of small inlets in which coarse sediment beaches have formed. Defences have been built to support the road that passes the head of these inlets. Porth Dafarch is the last of the small bays with the beach being formed predominantly of sand. Defences have been constructed to protect the road and amenities behind the beach
Wave Climate	Faber Maunsell (2006) derived offshore wave conditions in this area (53.3°N 4.9°W) from Met Office data describing June 1991 to January 2004. This showed a strong predominance of waves from the southwest, as can be seen in the figure below, which is reproduced from that study.  **Wave conditions at 53.3°N 4.9°W between June 1991 and January 2004 (Faber Maunsell, 2006)** Analysis of the data provided the following extreme wave heights: 1:10 year 6.2 m, 1:50 year 7.0 m, 1:100 year 7.2 m. The Futurecoast database provides inshore wave data at Penrhyn Mawr. Here the dominant wave directions are between 180° and 330°, and wave heights of up to 4.25m are possible between 210° and 270°.
Erosion and Flood Risks	Trearddur Bay and neighbouring Porth Diana are vulnerable to both erosion and coastal flooding. Erosion of the three Porth Diana frontages has led to defence construction in these bays.
Sediment Dynamics	Some sediment is exchanged between Silver bay and the southern opening of the Afon Alaw estuary. Holyhead Breakwater is an effective barrier to any sediment movement. Elsewhere along this unit alongshore sediment exchange is negligible and the small bays are essentially self-contained.

Structures and Defences	At Borthwen seawalls potect properties and an access rout at the western side of the bay. Revetments and Seawalls protect the road to the back of the beaches at Porth Castell and Porth Diana At Trearddur Bay new defence scheme has recently been built comprising a new promenade above a seawall at the rear of the beach. There are small defences at Porth yr Arfon and Porth-y-Post seawalls protect the coastal road. While at Porth Dafarch ther is a wall protecting road and gabion baskets to east of bay that are failing
Historical and Future Shoreline Evolution	This largely hard rock unit has shown slow erosion of shore platforms coupled with undermining of steep cliff faces leading to intermittent failures. Faber Maunsell (2006) document several sources that suggest rates of erosion at Trearddur. Analysis of Ordnance Survey maps suggest a retreat of the low water mark of 0.1-0.2m/yr and local historic records suggest an unconstrained rate of 0.2-0.5m/yr. The defences in Borthwen Bay and Porth Diana may cause some beach lowering as sea levels rise in the future. The hard rock cliffs of this unit are not expected to change over the timescale of the SMP. At present Silver bay is in equilibrium however sea level rise could increase exposure and lead to shoreline recession. The bay beaches will be pushed back by the rising sea level. If this is prevented by backing structures or cliffs then the beach will be partially submerged, and overall steepening of the littoral zone should be expected.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document Faber Maunsell (2006), Trearddur Bay Coastal Study, Project Appraisal report, for Anglesey County Council May 2006. 58 Pages.

C.1.37 Unit 37 – Holyhead Breakwater to Afon Alaw

Picture: ***Penrhos beach***	
Description	This unit comprises the north eastern shoreline of Ynys Gybi between the Holyhead breakwater and the Afon Alaw. This coast includes the extensive port of Holyhead and its urban frontage, and is therefore heavily engineered. However is also includes part of the relatively natural frontage of the Penrhos Coastal Park. The Alaw estuary, east of Penrhos, is described in the Estuaries Assessment.
Geology and Physical Controls	The bedrock here is Cambrian and metamorphic. At Newlands this is overlain by clay. The major physical controls on this unit are the various port structures, including Holyhead Breakwater, and the rock headlands of Morawelon and Penrhos. The Isle of Anglesey provides shelter towards the north and east.
Geomorphology	To the west the coast is rocky and hard and shows slow ongoing erosion of shore platforms and undermining of steep cliff faces. This produces the characteristic crenulated coastline, where hydrodynamic forces have exploited localised weaknesses in the hard lithology. Traeth Penrhos is sandy bay with a gravel upper beach, which is held between rocky outcrops.

Wave Climate	This is a highly enclosed frontage, which is only exposed to waves from the north. The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest, Faber Maunsell (2006) confirmed this direction and found a 1:50 year offshore significant wave height of approximately seven metres.
Erosion and Flood Risks	Holyhead Station is at risk of flooding, as are several other properties in the town. There is a small area of flood risk behind Traeth Penrhos which would affect the beach road.
Sediment Dynamics	The Holyhead Breakwater acts as an effective barrier to the movement of sediment to and from the west. There is some sediment exchange between Penrhos beach and the Alaw estuary. This may be associated with a slow depletion in Penrhos as material migrates behind the Stanley embankment.
Structures and Defences	Around Holyhead there are numerous structures and defences. The main breakwater extends for about 2.5km providing shelter the harbour. There are combination of seawalls, revetments and older breakwaters within Holyhead harbour. The Stanley Embankment which connects Holy Island to mainland Anglesey is an important control on tidal flows and sediment movement. There is also a seawall at the Toll House Tea Rooms at the western end of the embankment.
Historical and Future Shoreline Evolution	This section of the coast is relatively stable at present, and should remain so if the major structures of Holyhead port are maintained. In the future accelerated sea level rise will tend to submerge the hard rock intertidal areas, allowing larger waves to attack the cliffs above and behind them. The rocks here are hard, and so this will have little noticeable effect on the recession rate. The beach at Penrhos Bay will be pushed back by the rising sea level. If this is prevented by backing structures then the beach will be partially submerged, and overall steepening of the littoral zone should be expected. This may lead to loss of beach material, which would migrate into the Alaw estuary.

Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database.

C.1.38 Unit 38 – Afon Alaw to Trwyn y Gader

Description	This unit includes the west facing frontage of Anglesey north of Holyhead. It extends from the outlet of the Afon Alaw to the headland of Trwyn y Gader. The coast is largely undeveloped. The estuary of the Alaw is described in the Estuaries Assessment.
Geology and Physical Controls	The physical controls on this frontage include Holy Island and Holyhead breakwater. These provide some protection against wave attack, particularly to the southern half of the frontage. The various headlands and rocky outcrops along this coast provide additional protection. Notably the rocky protrusion between Penrhyn and Creigiau Cliperau plays an important role in holding beaches on either side of it, and the Trwyn y Gader headland provides shelter from northerly conditions. The bedrock here is Cambrian metamorphic up to Trefadog, where it gives way to volcanic rock. In the bays this is overlain by clays.
Geomorphology	The shoreline at the south of this unit is formed of generally soft sediment. The clay shoreline of the Alaw estuary gives way to a soft rock shoreline and dunes further to the north. Penial Dowyn is an erodible soft rock headland with sandy beaches of to the north (Porth Penrhyn-mawr) and south. The coast between Porth Dryw and Creigiau Cliperau is hard rock shoreline that holds beaches to the north and south. The remainder of the unit is comprised of hard or soft rock cliffs and outcrops with shingle beaches or rock platforms in the intertidal zone. Where there are softer geological formations sandy bays have formed. The hard rock areas show slow ongoing erosion of shore platforms and undermining of steep cliff faces leading to intermittent cliff failures. This produces a characteristic indented coastline, formed by hydrodynamic exploitation of localised weaknesses in a generally hard lithology. At Porth-Tywyn-mawr a sandy pocket beach has formed between the rock outcrops at Creigiau Cliperau and Porth Defaid. The backshore is formed of soft clay cliffs, which are vulnerable to erosion. Defences in the form of demolition rubble has been placed along the toe of the cliff in the past to slow the rate of erosion. Porth Trefadog and Porth Trywn are also sandy pocket beachs between rock outcrops, with clay cliff backshores, which are vulnerable to erosion.

	Porth Swtan is the most northerly of the sandy pocket bays within this unit. The backshore is formed of cliffs consisting of a matrix of volcanic ash and mud.
Wave Climate	The nearest relevant wave climate shown by the original SMP was derived from Meteorological Office European Waters Wave Model for a position off the North Llŷn Peninsula (4.86°W,53.00°N). This shows a predominant wave direction from the southwest and south-southwest, Faber Maunsell (2006) confirmed this direction and found a 1:50 year offshore significant wave height in the region of seven metres.
Erosion and Flood Risks	Rates of recession have not been quantified along this coast, however erosion has been noted at Porth Trefadog and Porth-Tywyn-mawr. In addition the soft cliffs south of Penrhyn and at Porth Swtan are vulnerable. Areas in the south of this unit are low lying and may be vulnerable to flooding.
Sediment Dynamics	The southern extent of this unit runs into the estuary of the Afon Alaw (which is described in the Estuaries Assessment). The estuary has trapped the large volumes of sediments found there. Generally there is little beach interaction between the bays due to a combination of the relatively sheltered aspect of this coast, and its rocky indented form. The rock promontory between Porth Dryw and Creigiau Cliperau acts as a barrier to sediment escaping from the sandy bays to either side (Porth Penrhy-Mawr and Poth Tywym Mawr). The rock headland at the north of the unit also acts as a barrier between this unit and the northern shoreline of the island. The sandy bays of Poth Tywyn-mawr, Porth Trefadog, Porth Trywn and Porth Swtan are effectively self-contained, sediment is trapped within them by their flanking rock outcrops.
Structures and Defences	*some defences to protect Twyn Gwyn, Bordlasan Fawr and Porth Penrhyn Mawr by local landowners in the past.* *At Porth Trefadog linear defences have been built to protect against further erosion.*

Historical and Future Shoreline Evolution	This shoreline has been relatively stable over the last century. In the future accelerated sea level rise will tend to submerge the hard rock intertidal areas, allowing larger waves to attack the cliffs above and behind them. Where the rock is very hard this will have little noticeable effect on the recession rate, but along the soft rock areas within this unit the accelerated recession should be expected. Beaches will tend to retreat, where they are free to do so. Where they are bounded on their landward side, they will tend to be partially submerged by the rising sea level, and so littoral steepening should be expected.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database. Faber Maunsell (2006), Trearddur Bay Coastal Study, Project Appraisal report, for Anglesey County Council May 2006. 58 Pages.

C.1.39 Unit 39 – Trwyn y Gader to Trwyn Eilian

Description	This unit covers the rocky north coast of Anglesey between the headlands of Trwyn y Gader and Trwyn Eilian. This 20km of coast includes the settlements of Cemaes, Porthllechog and Amlwch, the Wylfa nuclear power station and Amlwch Port.
Geology and Physical Controls	Most of this coast is composed of hard rock. It is highly indented and the various headlands and hard points provide important local control. Trwyn Cemlyn protects a barrier beach and lagoon within Cemlyn Bay. Trwyn y Penrhyn and Trwyn y Parc protect Traeth Mawr. Ogof Goch protects the Porthllechog frontage in Bull Bay. The bedrock here is composed of Cambrian mudstones. Softer deposits overly this at Cemlyn Bay, Cemaea Bay, Porth Wen and Porth Llechog. The cliffs at Llanbadrig are composed of soft clay.
Geomorphology	The shoreline is almost entirely comprised of hard rock cliffs with either gravel beaches or hard rock platforms forming the intertidal zone. These areas show slow ongoing erosion of shore platforms and undermining of steep cliff faces leading to intermittent cliff failures. This produces a characteristic indented coastline, formed by hydrodynamic exploitation of localised weaknesses in a generally hard lithology. Where the softer geological formations do occur, inlets or bays have been created such as at Cemlyn Bay, Cemaea Bay, Porth Wen and Porth Llechog. Cemlyn Bay is deeply indented from the cliff line; a crescent shaped gravel beach has formed across the bay from material eroded from the outer sections of the bay. Behind this a brackish lagoon has emerged. Cemaes Bay is a collection of several small bays situated between Wylfa Head and Llanbadrig Point, that are separated by hard rock outcrops. At Porth Wen there is a small beach within the bay. Porth Llechog is predominately a rocky shoreline, but there is a small sand and shingle beach in the lee of the headland of Ogof Goch. At Amlwch the natural hard rock shoreline has been altered to provide shelter within the natural inlet by the building of breakwaters.

	Porth Eilian is a deeply indented by that is affected by waves that are focussed into the bay by Trwyn Eilian. There is a small beach, which is now backed by defences, that protect the road behind.
Wave Climate	The nearest offshore wave climate described by the original SMP was derived from the Meteorological office European Waters Wave Model for a position off the north east of Ynys Mon (4.06°W,53.50°N). This shows a wide distribution of wave directions, with but with a predominant westerly origin. There are also significant contributions from between the northwest and southwest.
Erosion and Flood Risks	The soft clay cliffs at Llanbadrig are vulnerable to erosion. There are areas of flood risk associated with the rivers that discharge at Porth y Felin and Amlwch. At Amlwch this threatens numerous properties and some industrial works.
Sediment Dynamics	There is no sediment flux across the boundaries of this unit. There is little alongshore sediment transport within this unit, the beach sediments are generated by local erosion. Cemlyn Bay and Cemaes Bay are so indented that they are effectively isolated from the shores around them.
Structures and Defences	At Wlyfa Power Station was built for materials and supplies to be transported to and from the power station by sea. There is also a small sea wall associated with the jetty. Defences in Cemaes Bay comprise seawalls and a revetment. At Amlwch two breakwaters have been built to create a harbour in the natural inlet. There are also small seawalls at Bull Bay and Porth Eilian
Historical and Future Shoreline Evolution	The predominant hard rock in this unit retreats slowly. The Cemlyn shingle barrier has remained stable over the past century. To the east of the Cemaes Bay cliffs overlain by boulder clay are eroding but without serious problems. The deeply indented bay at Porth Eilian has a history of erosion. In the future accelerated sea level rise will tend to submerge the hard rock intertidal area, allowing larger waves to attack the cliffs above and behind them. Where the rock is very hard this will have little noticeable effect on the recession rate, but along the numerous soft rock areas within this unit the accelerated recession should be expected. Vulnerable areas include Porthllechog, Porth Eilian, Cemaes Bay, and Cemlyn Bay.

	The beaches would continually adjust towards a position of dynamic equilibrium, the rate of which would be dictated by sea-level rise. Where constrained on the landward side, this is likely to lead to beach steepening. The Cemlyn barrier is likely to roll back, where it is free to do so, under accelerated sea level rise. The steep hinterland behind the valley could ultimately control the extent to which the barrier migrates landward and any flooding that may take place.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database.

C.1.40 Unit 40 – Trwyn Eilian to Ynys Moelfre

Description	This unit extends south from Trwyn Eilian to Ynys Moelfre and comprises the northern half of the east facing coast of Anglesey. It is a relatively undeveloped frontage; the only buildings close to the coastline are at Moryn and Portobello. Within this unit is the estuary of Traeth Dulas, which is described in the Estuaries Assessment.
Geology and Physical Controls	The bedrock geology varies along this coast. At the north it is Ordovician slate. The underlying geology below Traeth Lligwy comprises red sandstone of the Lower Devonian Siegenian period. The geology to the south comprises carboniferous limestone. Clay exposures are found at Dulas Bay and Lligwy Bay. The limestone of Moelfre is also interspersed with cliffs of boulder clay. The main physical controls are the headlands and associated rock cliffs at the north and south of the frontage. In addition the rock outcrops of Craig y Sais south of Dulas Bay, Graig Ddu and Trwyn Porth-y-Mor in the middle of the frontage also act to control the sandy bays.
Geomorphology	The rocks in the northern half of this section are hard, and are fronted by steep rocky shore platforms. These areas show slow ongoing erosion of shore platforms and undermining of steep cliff faces leading to intermittent cliff failures. This produces a characteristic indented coastline, formed by hydrodynamic exploitation of localised weaknesses in a generally hard lithology. The softer clay that fronts the southern half of this section has allowed the formation of gravel, boulder and cobble deposits on the foreshore, such as at Porthygichiaid and Porth Heiygen. At Dulas Bay and Lligwy Bay soft clay cliffs and sand dunes front low-lying hinterland. These bays are believed to have developed their current form through siltation within the mouths of the drowned valleys of the Afon Goch and the Afon Lligwy following the last glaciation. The spit extending south across Dulas Bay effectively protects the Traeth Dulas estuary from significant wave exposure. The estuary is described in the Estuaries assessment. South of Traeth Lligwy the shoreline returns to rock cliffs until the end of the unit at Ynys Moelfre.

Wave Climate	This unit is exposed to the relatively small waves propagating from the north and northeast. It is well protected against westerly waves. The Traeth Lligwy Coastal Management Review (Bullen Consultants, 2003) derived an offshore wave climate for this area using four years of data (1996 – 2000) from the nearest point in the Met Office European Waters Wave Model. This showed a predominant wave direction of west to south west. Only 20% of wind generated waves and less that 15% of swell generated waves are from the north to east quadrant. The Futurecoast database describes inshore wave conditions at Moelfre. The dominant wave direction was found to be quite broad, from 330° to 090°. Wave heights of up to 2.75m were found from between 0° and 030°.
Erosion and Flood Risks	The soft cliffs north of Portobello are eroding, but this is not putting properties at risk. The only areas of flood risk are associated with the floodplains of the Afon Goch and the Afon Lligwy.
Sediment Dynamics	The boundary headlands of Trwyn Eilian and Ynys Molfre form effective barriers to alongshore sediment transport into or out of this unit. The net longshore drift within this frontage is southeast towards the Menai Straits, although there is evidence of some tide induced drift reversals. It is likely that finer sediment from the cliffs to the north of Dulas Bay are transported south into the bay. The estuaries assessment found that the Traeth Dulas estuary is probably at full capacity in terms of sediment storage. It may therefore act as a weak source of fine material.
Structures and Defences	There are only some small private defences in this unit, including a seawall at Pen-y-parc.
Historical and Future Shoreline Evolution	Historic rates of recession have not been quantified along this section of coast. In the future accelerated sea level rise will tend to submerge the hard rock intertidal area, allowing larger waves to attack the cliffs behind them. Where the rock is very hard this will have little noticeable effect on the recession rate, but along the clay frontages, accelerated recession should be expected.

	The beaches and dunes of Traeth yr Ora and Traeth Lligwy appear to be stable, but toe erosion will probably increase as water levels more frequently come into contact with the backshore. Dune volume loss would encourage their landward migration.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Bullen Consultants Ltd. (2003b) Traeth Lligwy Coastal Management Review, report for the Isle of Anglesey County Council, December 2003, 61 pages. The Futurecoast database.

C.1.41 Unit 41 – Ynys Moelfre to Trwyn Penmon

Description	This unit extends south from Ynys Moelfre to the edge of the Menai Strait at Trwyn Penmon. The coast is relatively developed, and includes the settlements of Moelfre, Benllech and Red Wharf Bay, as well as several smaller developments. Conditions in the Menai Strait are described in the Estuaries Assessment.
Geology and Physical Controls	Most of the coastal exposures are limestone with some granite and glacial till on the north-facing section. The bedrock in this unit forms a 'v' with its peaks at the boundary headlands (Ynys Moelfre and Trwyn Penmon) and its trough close to Croesfryn. This shape provides shelter to the central portion of the unit, which, as a result, is an area of deposition. At smaller scales local headlands act to trap numerous beaches, including Traeth Bychan (between Penrhyn y Gell and Penrhyn) and the beaches at Molfre.
Geomorphology	The geomorphic features of this unit include hard and soft cliffs and embayed beaches of various sizes and sediments. The largest feature here is Traeth-coch, or Red Wharf Bay, which is an extensive intertidal sandflat extending between Trwyn Dwlban and Mor Awelon. The hard rock areas show slow ongoing erosion of shore platforms and undermining of steep cliff faces leading to intermittent cliff failures. This produces a characteristic indented coastline, formed by hydrodynamic exploitation of localised weaknesses in a generally hard lithology. The northern end of this unit between Ynys Moelfre and Traeth Bychan is comprised of hard rock outcrops. At Moelfre there is a gravel beach with rock outcrops. Traeth Bychan is a relatively recessed embayment orientated to the northeast, as a result it is only exposed to wave action in infrequent conditions. Wave action is concentrated towards the south of the bay where a shingle upper storm beach has formed. To the south of Traeth Bychan the shoreline is comprised of softer and more erodible cliffs. At Traeth Benllech the soft rock cliffs drop down to the mouth of the Afon Marchogion and then rise again to the headland of Trwyn Dwlban. There is a broad intertidal zone consisting mostly of sand.

	The east-facing section of Red Warf Bay is characterised by rock outcrops to the north of the Red Warf Bay village. To the south the land elevation falls and the rock disappears. The channel of the Afon Nodwydd runs parallel to this section of the shoreline and enters the bay east of Croesfryn. The north facing section of Red Warf Bay appears to be the product of siltation of the drowned valley of the Afon Nodwydd following the last glaciation. There is a raised beach below the glacial till deposited at the end of the glacial phase. The upper areas of the beach have risen above the intertidal zone and saltmarsh has begun to develop in these inner areas providing a natural defence to the shoreline. The rest of the beach is a combination of sandy deposits overlying compressed sand and stones. East of Red Warf Bay the shoreline is mostly comprised of hard rock cliffs until the end of this unit at Trwyn Penmon. The intertidal zone is comprised of a combination of gravel beaches and rock platforms. In some locations softer geology has led to the formation of small bays such as at Pen y Chwarel.
Wave Climate	This unit is exposed to the relatively small waves propagating from the north and northeast. It is well protected against westerly waves. The Traeth Lligwy Coastal Management Review (Bullen Consultants, 2003) derived an offshore wave climate for this area using four years of data (1996 – 2000) from the nearest point in the Met Office European Waters Wave Model. This showed a predominant wave direction of west to south west. Only 20% of wind generated waves and less that 15% of swell generated waves are from the north to east quadrant. The Futurecoast database describes inshore wave conditions at Moelfre. The dominant wave direction was found to be quite broad, from 330° to 090°. Wave heights of up to 2.75m were found from between 0° and 030°.
Erosion and Flood Risks	There are areas of erosion along this frontage but no significant risks. There is a risk of flooding within river valleys at Moelfre, at Benllech (the Afon Marchogion) and at Red Warf Bay (the Afon Nodwydd). In addition the low lying land behind Red Warf Bay is at risk of flooding.

Sediment Dynamics	Ynys Moelfre prevents significant volumes of sediment entering the unit from the north. The general direction of drift within the unit is towards the south, and material may also be brought in from offshore. Sediments clearly tend to become trapped in Red Wharf Bay. Traeth Bychan is sufficiently indented that is can be considered to be relatively self-contained. Eroding cliffs to the south of Traeth Bychan contribute material to Benllech Sands. The headland of Trwyn Dwlban present a partial, but fairly ineffective barrier to the net southwards movement of sediment.
Structures and Defences	At Moelfre the defences maintain the highway and village infrastructure and comprise several seawalls. There is a small seawall and revetment at Traeth Bychan, and a small revetment at Penrhyn Point. There are also seawalls at Bennlech protecting the road and properties. Within Red Wharf Bay there are also several seawalls.
Historical and Future Shoreline Evolution	Rates of shoreline change have not been quantified in this area. In the future accelerated sea level rise will tend to submerge the hard rock intertidal areas, allowing larger waves to attack the cliffs above and behind them. Where the rock is very hard this will have little noticeable effect on the recession rate, but along the soft rock area south of Penrhyn, accelerated recession should be expected. There is evidence of beach erosion north of Red Warf Bay Village suggesting that the river channel may be encroaching nearer to the shoreline. The shoreline at Traeth Benllech is relatively stable apart from the currently defended frontage at Benllech, and no significant changes are thought to occur. Traeth Bychan is vulnerable to erosion by waves from the north east but such conditions are rare. The effects of accelerated sea level rise within Traeth Bychan would be erosion of the lower sand foreshore and rollback of the upper sand and gravel beaches. The steep cliffs behind would control the ultimate landward position of the barrier beach. The sandy bay at Benllech would also retreat to a position of dynamic equilibrium. Erosion of the lower foreshore and rollback of the intertidal zone and upper beach

	would produce a low and wide barrier beach. Increased volatility of the sand barrier is likely but the steep cliffs behind would control the limit of landward migration. Under accelerated sea level rise the sands of Red Wharf Bay would tend to be submerged and retreat landward. Areas of foreshore that contain shingle would also rollback to produce a shingle barrier and steeper and narrower beach. Areas of dune erosion would be expected.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database. Bullen Consultants Ltd. (2003b) Traeth Lligwy Coastal Management Review, report for the Isle of Anglesey County Council, December 2003, 61 pages.

C.1.42 Unit 42 – Bangor to Penmaen-bach Point

Picture: Conwy Morfa, with Llandudno and the Great Orme	
Description	This unit extends northeast from Bangor at the mouth of the Menai Straits to Penmaen-bach Point. The frontage here is fairly developed, and for around half of its length, from Llanfairfechan to Penmaen-bach Point it is backed by a railway and the A55 road. Bangor Harbour is situated close to the western boundary. The Menai Strait and the Conwy estuary are described in the Estuaries Assessment.
Geology and Physical Controls	This frontage is protected by the eastern edge of Anglesey and by Great Orme's Head, to the northeast. Flows through the Menai Strait influence sediment transport. The docks at Porth Penrhyn are the most westerly physical control on the morphology of this unit. The mouth of the Afon Ogwen acts to control sediment movement to the west. Between Llanfairfechan and Penmaen-bach Point the shoreline is controlled by artificial defences apart from the rock outcrops at Pen-y-Clip and Penmaen-bach Point. Most of the underlying geology here is mudstone with igneous intrusions at Llanfairfechan and Penmaen-bach Point. Ash and conglomerates make up the bedrock in the eastern section.

Geomorphology	Between Penrhyn Castle and Llanfairfechan the foreshore is a massive intertidal zone of boulders and loose rocks, which covers nearly the whole area of the north-eastern entrance to the Menai Strait. To the east of Lafan Sands the foreshore is sand and shingle, which also extends into the offshore zone, and almost meets with the Dutchman Bank, an offshore mud and sandbank. Immediately behind the foreshore is a low-lying area several hundred metres in width, beyond which rises gently sloping lowland with steeply rising hinterland about a kilometre from the shore. Between Penmaenmawr and Penmaen Bach Point the frontage comprises a glacial till filled embayment within a steeply sloping hinterland, which forms massive headlands of resistant igneous rock at its extremities, Pen-y-Clip and Penmaen bach. Between these headlands is a soft promontory at Dwygyfylchi. Much of the intermediate coastline comprises simple cliffs composed of weak sandy strata and reaching heights of approximately 25m. A shingle foreshore overlies a flat sand lower foreshore backed by a storm ridge and, at Dwygyfylchi, a clay bank.
Wave Climate	This unit is protected from wave attack by Anglesey, the mainland and Great Orme's Head. It is exposed to waves from the north and East. Moreover the extensive tidal flats in much of this unit limit the size of those waves that do enter the area.
Erosion and Flood Risks	Areas of flood risk are associated with the Afon Ogwen, Aber Ogwen, Coed Gyfynys, the mouth of the Afon Aber, and Llanfairfechan close to the valley of Afon Ddu. There is a small risk associated with the Afon Gyrach.
Sediment Dynamics	The shoreline between Porth Penrhyn and Llanfairfechan has developed as a result of movement of sediment from offshore dividing at Pen-y-Clip and moving towards the Menai Straits by wave and tidal action. The outfall of the Afon Ogwen forms a partial barrier to further westwards movement of material from offshore. There is also likely to be some minor transfer of material across the head of the docks at Porth Penrhyn to and from the straits. It may be that erosion of the clay cliffs north of Beaumaris on Anglesey may reach the shoreline between the Afon Ogwen and Llanfairfechan. There is also evidence of a weak westerly drift of material across this section of the shoreline. Pen-y-Clip appears to be a drift divide influenced by wave direction and interaction with Ynys Mon, which separates the unit into two sections with respect to sediment movement. Between Pen-y-Clip and Penmaen-bach Point some material is transported eastwards and around the headland into the Conwy Estuary.

Structures and Defences	There are sea walls that protect the Penrhyn Estate; however several of these have reached the end of their useful life. The shoreline between the mouth of the Nant-y-Felin-Fach and Pen-y-Clip the shoreline is controlled by artificial defences protecting the railway and main road which runs parallel to the coast. At Pen-y-Clip the defences are replaced by rock. Beyond Pen-y-Clip the artificial defences protecting the railway and main road resume until the end of the unit.
Historical and Future Shoreline Evolution	West of Penmaenmawr the foreshore levels have been lowering, perhaps due to the tidal scour. The defences at Llanfairfechan and to the east between the headlands of Pen-y-Clip and Penmaen-bach Point are in advance of the natural position of the shoreline. In conjunction with the natural drift they are causing beach erosion. Waves bringing sediment to the Llanfairfechan combine with the orientation of the sea wall west of Pen-y-Clip to produce an edge wave that moves sediment westwards lowering the beach. From 1963 to 1976, foreshore erosion at Penmaenmawr was coupled with an increase in backshore width. No further change of either the foreshore or backshore had occurred until the 1980's when the construction of the A55 trunk road required additional coastal defences at Penmaenmawr including advancing the promenade seaward. This interrupted the drift of upper beach shingle and consequently caused erosion updrift at Dwygyfylchi. A gradual decrease in foreshore width and only a minor increase in backshore has since taken place. The influence of sea level rise on this frontage is particularly uncertain because of its effect on the already high tidal flows through the Menai Strait. This is discussed in more detail in the Estuaries Assessment.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. Conwy Estuary Managed Re-Alignment Study (Faber Maunsell, 2006) Conwy Tidal Flood Risk Assessment (HR Wallingford, 2004-07) The Futurecoast database.

C.1.43 Unit 43 – Conwy Estuary to Great Orme's Head

Description	This unit extends from the mouth of the Conwy estuary to Great Orme's Head. The coast here is quite developed, including the golf course of the North Wales Golf Club, the western frontage of Llandudno, and the suburb of Gogarth. Conwy Estuary is described in the Estuaries Assessment.
Geology and Physical Controls	Great Orme is composed of Carboniferous Limestone, which is fringed by boulder clay. The Great Orme is linked to the mainland by an old tombolo, behind which is Ordovican mudstone. The main physical control on this frontage is the peninsula of Great Orme's Head. To a lesser extent the three rock breakwaters between Tremlyd Point and the northern end of the Pen Morfa frontage act to maintain the beaches there. The eastern part of Anglesey also acts as an important control.
Geomorphology	The frontage from the mouth of the Conwy estuary to Great Orme, is fronted by the extensive Conwy Sands. On the Great Orme the intertidal area reduces and steepens, and the foreshore becomes coarser being comprised of cobbles and boulders. Llandudno is built on a large tombolo formed behind Great Orme.
Wave Climate	The Great Orme provides shelter to Pen Morfa and the Conwy Estuary from wave directions north and east. The unit is also protected from directions west and west-northwest by Anglesey. As a result the unit is largely protected from wave attack.
Erosion and Flood Risks	The road between Llandudno and Gogarth runs along the coast, and has been protected with structures. Fishtail groynes have been used to stabilise the Llandudno beach. Much of Llandudno is low lying and may be vulnerable to coastal flooding.
Sediment Dynamics	There is sediment exchange between this frontage and the Conwy Estuary. The Great Orme's Head provides a very effective barrier to the movement of sediment to the east. Longshore transport carries material south from Great Orme Head to the east bank of Conwy Bay. The boulder clay cliffs located to the south of Great Ormes Head, once provided a supply of material to the fronting beach and the beaches downdrift, but now this is insufficient to prevent beach lowering along the seawall.

Structures and Defences	The Pen Morfa frontage is controlled by numerous artificial defences. Three shore-connected rock breakwaters and associated beach nourishment scheme front a seawall and stepped concrete revetment, which protect the majority of west Llandudno. A timber revetment with rock toe protects the dune frontage north of Deganwy. Various ad-hoc defences have been constructed around the Great Orme Head, including some at the toe, particularly to protect the boulder clay cliffs on the south west face
Historical and Future Shoreline Evolution	Prior to the construction of breakwaters and beach recharge, beach levels at Llandudno were falling. During the latter half of the 20th Century, coastal defences have caused an increase in backshore width, but foreshore levels have continued to fall. The rock filled timber revetment between Deganwy and Cerrig Duon has since reduced erosion that was taking place since 1970. The boulder clay cliffs on the Great Orme are only marginally stable, and in the past have been subject to erosion. However they have a very low recession potential. Under accelerated sea level rise they will retreat at a faster rate. The resulting increase in landslides will release additional sediment release into the local system.
Information Sources	Conwy County Borough Council (2002) Ynys Enlli to Great Orme Head, Llandudno Shoreline Management Plan: Stage 2 Final Draft Plan Document. The Futurecoast database.

Annex III – Coastal Defences

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Final
9T9001

Area	Section	Sub	Var	Rev	Defence ID	Name	Location	Description	Classification	Type	Length (m)	NFCDD Asset Reference	Last Inspection Date	Defence Integrity	Defence Residual Life	Owner	Grid Reference (Start)	Grid Reference (End)
PEM	A	A1	0	0	1167	Dale Point cliff	Dale	hard low cliff well vegetated above with road running out to Dale Fort.	hard/natural	Cliff			10-Mar-09	Fair	>50		179792205614	182462205065
PEM	A	B1	0	0	1210	Westdale Bay	Marloes	clay cliff in saddle between St Annes Head and the rock behind Dale. Exposed in the bay as a steep cliff.	soft/natural	Cliff			10-Mar-09	Moderate	>50		179903205924	179792205614
PEM	A	B2	0	0	1209	Hookses	Marloes	hard rock cliff with clay overburden coastal slope.	hard/natural	Cliff			10-Mar-09	Fair	>50		178875206612	179903205924
PEM	A	B3	0	0	1208	Marloes sands	Marloes	Massive eroding rock cliffs to wide sandy beach. Cliff face divided by sections of outcropping harder rock.	hard/natural	Cliff			10-Mar-09	Moderate	>50		177152207521	178875206612
PEM	B	A1	0	0	1207	Martins Haven cliffs	Martins Haven	hard rock cliffs	hard/natural	Cliff			09-Mar-09	Fair	>50		176033109148	177152207521
PEM	B	A2	0	0	1206	Martins haven beach	Martins Haven	shingle beach at end of track. Used for Skomer ferry	soft/natural	Beach			09-Mar-09	Fair	>50	NT	176109109166	176033109148
PEM	B	B1	0	0	1313	Musselwick cliffs	St Brides	hard rock cliffs.	hard/natural	Cliff			09-Mar-09				180151210923	176109109166
PEM	B	B2	0	0	1311	Church wall	St Brides	continuous masonry wall of varying section along the crest of the shingle storm beach wityhin the haven. Concrete ramp crossing over wall providing vehicle access to beach. Small stream flowing through culvert in wall. Land behind generally a low valle	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	private	180189210913	180151210923
PEM	B	B3	0	0	1312	Low cliffs	St Brides	Low red sandstone cliffs with red clay overburden. Eroding slightly but not significantly. Foreshore is rock with some local stone shingle against base of cliffs.	hard/natural	Cliff			09-Mar-09				180257211004	180255210984
PEM	B	B4	0	0	1310	Cliff Cottage wall	St Brides	Small section of masonry wall infilling between sections of rock within the shelter of St Brides Haven. Acting to support access road to cliff Cottages.	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	Private	180254211008	180257211004
PEM	B	B5	0	0	1309	Ripperston cliffs	St Brides	low craggy cliffs	hard/natural	Cliff			09-Mar-09	Fair	0-1		181949212804	180254211008
PEM	B	B6	0	0	1308	Borough Head Cliffs	St Brides	high cliffs with coastal slope	hard/natural	Cliff			09-Mar-09	Fair	>50		185220212597	181949212804
PEM	B	C1	0	0	1349	Rook's bay cliffs	Little Haven	hard rock cliffs	hard/natural	Cliff			09-Mar-09	Fair	>50		185649212933	185220212597
PEM	B	C2	0	0	1348	Headland protection	Little Haven	Interlocking concrete block revetment at the crest of the cliff providing toe protection against spray and overtopping to landmark feature.	hard/man-made	Revetment			09-Mar-09	Fair	10-50		185649212933	185644212941
PEM	B	C3	0	0	1347	south cliff	Little Haven	Hard rock cliff forming the southern side of the haven. Pathway to crest of cliff leading out to headland.	hard/natural	Cliff			09-Mar-09	Moderate	>50		185647212928	185649212933
PEM	B	C4	0	0	1346	Swan wall	Little Haven	c	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	185683212930	185647212928
PEM	B	C5	0	0	1345	Slipway	Little Haven	substantial concrete slipway from road through shingle bankk down beach.	hard/natural	Slipway			09-Mar-09	Moderate	10-50	PCC	185686212929	185672212950
PEM	B	C6	0	0	1344	block wall	Little Haven	x	hard/man-made	Sea Wall			09-Mar-09	Poor	10-50	PCC	185723212970	185703212923
PEM	B	D1	0	0	1155	Settlands Cliffs	Broad Haven (N)	Hard rock cliffs. Cliffs cut back further along central frontage between two harder headlands. Road running along crest of slope.	hard/natural	Cliff			09-Mar-09	Moderate	10-50		186010213510	185723212970
PEM	B	D10	0	0	1147	Hotel promenade wall south	Broad Haven (N)	Concrete encased masonry wall with concrete apron and butresses. Beach in fron t is sand. Promenade area above to road.	hard/man-made	Masonry Wall			09-Mar-09	Poor	5-10	private	186083213787	186082213746
PEM	B	D11	0	0	1146	Hotel promenade wall north	Broad Haven (N)	Dressed block masonry wall with old concretye crest over northern half and more modern masonry faced crest over southern section. Wall constructed some 15m infront of the natural line of the shingle on the frontage and is fronted by sand. The area behi	hard/man-made	Sea Wall			09-Mar-09	Poor	1-5	Private	186088213807	186083213787
PEM	B	D12	0	0	1145	old road wall	Broad Haven (N)	Short section of masonry wall from return of hotel promenade wall protecting the road and tiing into the new stepped road wall.	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186099213824	186094213808
PEM	B	D13	0	0	1144	central road wall	Broad Haven (N)	Stepped sea wall with and upper masonry crest and sheet piled toe. Constructed of tipped fill material it was proposed that the wall be constructed with back support piles. This is understood to to be the construction adopted. The wall is constructed to	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186142213958	186099213824
PEM	B	D14	0	0	1143	Haroldston Bridge and wall	Broad Haven (N)	masonry wall with Haroldston stream culverted under road and through wall in pipe. Rocks placed to northern side of culvert to control scour by stream. Shingle bank to front of wall giving on to sand beach. Masonry contol tower to south of pipe construct	hard/man-made	Masonry Wall			09-Mar-09	Moderate	10-50	PCC	186147213973	186144213952

Area	Section	Sub	Var	Rev	Defence ID	Name	Location	Description	Classification	Type	Length (m)	NFCDD Asset Reference	Last Inspection Date	Defence Integrity	Defence Residual Life	Owner	Grid Reference (Start)	Grid Reference (End)
PEM	B	D15	0	0	1142	North road wall	Broad Haven (N)	masonry wall with a concrete toe behind a low shingle bank giving way to a wide sand beach. The main road into Broad haven runs immediately behind the wall. The wall is situated at the effective crest of the shingle bank. At the northern end the wall i	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186148214029	186142213975
PEM	B	D16	0	0	1141	slipway wall	Broad Haven (N)	x	hard/man-made	Sea Wall			09-Mar-09	Poor	10-50	PCC	186141214045	186147214033
PEM	B	D17	0	0	1140	north steppped wall	Broad Haven (N)	stepped concrete seawall with grassed slope above to road. Wall tied into rock cliff to north and to old slipway wall to south. Wall understood to be founded on the rubble (concrete blocks of previous defence.	hard/man-made	Sea Wall			09-Mar-09	Fair	10-50	PCC	186115214167	186141214167
PEM	B	D2	0	0	1154	third south wall	Broad Haven (N)	mass concrete wall founded to rock but underpinned due to undermining. Wall fronted by wide sandy beach. Wall ties into hard rock cliff to south. Behind the wall is a clay and soft rock slope very susceptable to erosion. The slope is quite badly scared	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186021213530	186010213510
PEM	B	D3	0	0	1153	second south wall	Broad Haven (N)	Concrete seawall infill between older wall to the south and rock outcrop. Founded to rock. Sand beach in front although formerly very stoney. Clay and soft rock behind, with road rising over hill behind.	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186019213550	186021213530
PEM	B	D4	0	0	1152	south outcrop	Broad Haven (N)	Rock outcrop. Rock is very friable capable of being eroded by both water action and human feet. Rock extends forward of main defence line. Softer areas of cliff behind as rock dips landward.	hard/natural	Cliff			09-Mar-09	Moderate	>50		186018213569	186019213550
PEM	B	D5	0	0	1151	First south wall	Broad Haven (N)	Concrete sea wall with a reveted splash protection above, to clay bank with road behind. Beach to wall is gnerally sand with narrow upper layer of large cobbles.	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186038213561	186018213569
PEM	B	D6	0	1	1156	rock wall	Broad Haven (N)	Rock revetment built at a very steep angle to soft clay cliff. Road rises behind cliff. Revetment extends around the seaward face of the cliff and then returns up the beach to the top of the slipway.	hard/man-made	Revetment			09-Mar-09	Fair	10-50	PCC	186051213597	186038213561
PEM	B	D7	0	0	1150	south slipway	Broad Haven (N)	Concrete slipway to beach	hard/man-made	Slipway			09-Mar-09	Moderate	10-50	PCC	186057213600	186039213605
PEM	B	D8	0	0	1149	grass bank revetment	Broad Haven (N)	Very steep rock revetment to face of formerly eroding clay bank. Road behind bank. Shiongle bank to toe of rock.	hard/man-made	Revetment			09-Mar-09	Moderate	10-50	PCC	186073213663	186059213606
PEM	B	D9	0	0	1148	road wall south	Broad Haven (N)	Masonry wall with shingle bank in front to sand beach. Road behind. Concrete access ramps over a short section of the wall and a square culvert carries a stream through the defence.	hard/man-made	Sea Wall			09-Mar-09	Moderate	10-50	PCC	186082213746	186073213663
PEM	B	E1	0	0	1267	Haroldston Cliffs	Nolton Haven	hard rock cliffs	hard/natural	Cliff			10-Mar-09	Fair	>50		186146216902	186115214167
PEM	B	E2	0	0	1266	Druidston Haven	Nolton Haven	Slightly recessed rock cliff with wide sand beach backed by a shingle storm bank. Properetyies set well back from the coast and two gullys flowing through cliff line in centre of bay.	hard/natural	Cliff			10-Mar-09	Fair	>50		186068217308	186146216902
PEM	B	E3	0	0	1265	Longlands cliff	Nolton Haven	hard cliffs of geological interest.	hard/natural	Cliff			10-Mar-09	Fair	>50		185956218602	186068217308
PEM	B	E4	0	0	1264	road wall	Nolton Haven	varioous sections of masonry wall to edge of steam and retaining road. Some old tank trap type defences to fron of wall.	hard/man-made	Sea Wall			10-Mar-09	Moderate	10-50	PCC	185962218587	185956218602
PEM	B	E5	0	0	1263	Bridge and channel wall	Nolton Haven	Concrete culvert to stream with a masonry wall retaining shingle bank and acting to train stream to the south. Masonry wall appears to be constructed of dressed stone but this may front a concrete core. There are some large stones slightly seaward of t	hard/man-made	Sea Wall			10-Mar-09	Moderate	10-50	PCC	185953218600	185950218586
PEM	B	E6	0	0	1262	natural bank	Nolton Haven	area of natural shingle bank between the slipway and the bridge over the stream. 20m wide berm at the crest of the beach acting as a carpark and giving way to a shingle storm bank and then to sand shingle to sand lower beach.	soft/natural	Shingle			10-Mar-09	Fair	10-50		185926218603	185950218595
PEM	B	E7	0	0	1261	slipway	Nolton Haven	Concrete slipway extending from roam acrross the wide upper berm of the beach and down the beach. The concrete slab is of the order of 150 to 200mm thick, laid apparently on the beach.	hard/man-made	Slipway			10-Mar-09	Fair	5-10		185926218603	185911218580
PEM	B	E8	0	0	1260	Clay bank	Nolton Haven	3 to 4 m high clay bank with lower berm and clay toe set approximately 1.5m above high tide. (no tide debris visible on berm.) There is a covering of dune and sand above the clay. Some erosion of lowewr toe and at northern end adjacent to rock cliffs. Th	soft/man-made	Bank			10-Mar-09	Moderate	10-50	private	185846218599	185915218596
PEM	B	F1	0	0	1259	Maidenhall Cliffs	Newgale	Relatively hard cliff	hard/natural	Cliff			01-Mar-09	Fair	>50		185396220672	185846218599

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PEM	B	F10	0	0	1250	BRYN y Mor	Newgale	hard cliffs with weaker areas of clay.	hard/natural	Cliff			01-Mar-09	Fair	>50		184220222882	184651222411
PEM	B	F11	0	0	1249	penycwm rock	Newgale	Stone palced across the path of the stream to fill eroding valley. Stone covers previous gabion defence.	hard/man-made	Embankment			01-Mar-09	Fair	5-10	Private	184651222411	184651222411
PEM	B	F2	0	0	1258	cliff bank	Newgale	soft clay cliffs at crest of shingle bank. Road above cliffs. Shingle bank runs out as harder cliffs protrude over the foreshore.	soft/natural	Cliff			01-Mar-09	Fair	>50		185296221018	185396220672
PEM	B	F3	0	0	1257	South wood bank	Newgale	natural shingle bank infront of wide valley. River culverted through bank in centre of valley.	soft/natural	Embankment			01-Mar-09	Fair	10-50		185209221243	185296221018
PEM	B	F4	0	0	1256	Sibbernock Point	Newgale	friable rock cliff supporting road and reinforced in palces by sections of masonry. Road supported by a conrete edge beam. Rock toe is well down the shingle bank and is exposed to direct wave attack.	hard/natural	Cliff			01-Mar-09	Moderate	10-50	PCC	185296221018	185396220672
PEM	B	F5	0	0	1255	Sibbernock wall	Newgale	masonry wall at crest of shingle bank retaining relatively soft friable material under road.	hard/man-made	Sea Wall			01-Mar-09	Fair	10-50	PCC	185161221353	185174221315
PEM	B	F6	0	0	1254	carpark bank	Newgale	continuous shingle bank from last record but with car park behind. Bank allowed to move more naturally and has developed a broader crest..	soft/natural	Embankment			01-Mar-09	Fair	10-50		184987221799	185209221243
PEM	B	F7	0	0	1253	mian bank	Newgale	Natural shingle bank continous along frontage.	soft/natural	Embankment			01-Mar-09	Moderate	10-50		184785222207	184987221799
PEM	B	F8	0	0	1252	bridge section	Newgale	natural shingle bank with small retaining wall behind to stop shingle movement onto road. Bank is slightly wider than further southg as material is retained by bridge.	soft/natural	Embankment			01-Mar-09	Moderate	>50		184756222291	184785222207
PEM	B	F9	0	0	1251	stream bank	Newgale	Natural shingle embankment with river behind. Low lying car park and clay cliffs inland of river. Shingle bank part of long continuous shingle frontage.	soft/natural	Embankment			01-Mar-09	Moderate	10-50		184651222411	184747222338
PEM	B	G1	0	0	1307	Lochvane cliff	Solva	hard rock cliff	hard/natural	Cliff			01-Mar-09				180458224157	184220222882
PEM	B	G10	0	0	1299	main quay	Solva	4.5m high masonry quay wall to soft harbour bed.	hard/man-made	Sea Wall			01-Mar-09	Fair	5-10	Private	180275224153	180310224177
PEM	B	G11	0	0	1298	boat house quay	Solva	concrete encasement of old concrete stepped quay.	hard/man-made				01-Mar-09	Moderate	10-50	Private	180145224110	180160224109
PEM	B	G12	0	0	1297	end slipway	Solva	concrete encasement to old masonry slipway.	hard/man-made	Slipway			01-Mar-09	Fair	10-50	Private	180145224110	180142224097
PEM	B	G2	0	0	1306	kiln beach	Solva	sand shingle beach backed by lime kilns	soft/natural	Beach			17-Apr-09	Fair	>50	NP	180570224227	180458224157
PEM	B	G4	0	0	1305	cliff	Solva	hard rock cliff	hard/natural	Cliff			01-Mar-09				180582224269	180570224227
PEM	B	G5	0	0	1304	river wall	Solva	Similar revetment to SOL A8 but set at a slightly gentler slope on seaward side of the stream.	hard/man-made	Revetment			01-Mar-09	Fair	10-50	NP	180609242298	180582224269
PEM	B	G6	0	0	1303	walk wall	Solva	Pitched block revetment constructed steeper than natural angle of repose. Relies on interlocking to remain stable. Size of strone reduces further upstream.	hard/man-made	Revetment			01-Mar-09	Moderate	10-50	NP	180317224214	180605224312
PEM	B	G6	1	0	1314	Carpark Slipway	Solva	Concrete slipway	hard/man-made	Slipway			01-Mar-09	Fair	10-50	Private	180528224298	180515224274
PEM	B	G7	0	0	1302	Gap reclamation.	Solva	Made ground with tipping of hardcore over larger stone and rubble. Tipping extends beyond the line of the adjacent wall.	soft/man-made	Embankment			01-Mar-09		10-50	Private	180310224177	180321224194
PEM	B	G8	0	0	1301	old quay	Solva	old masonry quay wall constructed in large blocks with a concrete capping.	hard/man-made	Sea Wall			01-Mar-09	Fair	10-50	Private	180160224109	180235224119
PEM	B	G9	0	0	1300	stepped block wall	Solva	Stepped wall constructed from masonry blocks with a concrete screed to crest of each step. Dry stone construction. 2m wide walkway above wall with mooring bolts and backed by old masonry wall and natural rock face.	hard/man-made	Sea Wall			01-Mar-09	Fair	10-50	Private	180236224117	180275224153
PEM	B	H1	0	0	1279	Trelerw cliffs	Porthclais	hard rock cliffs	hard/natural	Cliff			01-Mar-09	Fair	>50		174260223925	180142224097
PEM	B	H10	0	0	1286	stepped moorings	Porthclais	stepped sea wall just within the entrance of Porthclais.	hard/man-made	Sea Wall			01-Mar-09	Moderate	10-50	private	174189224048	174188224039
PEM	B	H2	0	0	1293	breakwater	Porthclais	large masonry block breakwater with more recent stepped inner face and old masonry arm pointing upriver, enclosing mooring area.	hard/man-made	Breakwater			01-Mar-09	Poor	5-10	Private	174260223925	174225223930
PEM	B	H3	0	0	1292	stepped wall	Porthclais	Stepped wall made of large block stone with concrete screed above each step.	hard/man-made	Sea Wall			01-Mar-09	Fair	10-50	Private	174264223924	174248223961
PEM	B	H4	0	0	1291	fisherman's path	Porthclais	Rock cliff with an intertidal path to breakwater. Pipe in concrete surround running along flat area of rock.	hard/natural	Cliff			01-Mar-09	Fair	>50	Private	174185224115	174264223924
PEM	B	H5	0	0	1290	east kiln wall	Porthclais	old masonry wall in front of lime kilns leading to slipway at seaward end.	hard/man-made	Sea Wall			01-Mar-09	Moderate	10-50	Private	174080224206	174138224169
PEM	B	H6	0	0	1289	east river wall	Porthclais	Masonry wall to river bank with concrete toe. Concrete toe undermined.	hard/man-made	Masonry Wall			01-Mar-09	Poor	10-50	Private	174080224206	174101241999
PEM	B	H7	1	0	1294	road slipway	Porthclais	Concrete slipway to river. Gated	hard/man-made	Slipway			01-Mar-09			private	174069224198	174091224190

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PEM	B	H7	0	1	1295	slipway wall	Porthclais	Dividing wall between slipway and river. Constructed of large grouted stone, with gras on top. Both undermining and voiding evident. Concrete slipway to side identified as separate unit.	hard/man-made	Breakwater			01-Mar-09	Moderate	10-50	Private	174078224200	174091224194
PEM	B	H8	0	0	1288	west cliff	Porthclais	natural hard cliff forming cove.	hard/natural	Cliff			01-Mar-09	Fair	>50		174188224039	174117224153
PEM	B	H9	0	0	1287	west quay wall	Porthclais	masonry wall with minor underpinning in places. Underpining has been undermined. Stone river bed infront of wall and grass area to lime kilns behind.	hard/man-made	Sea Wall			01-Mar-09	Fair	10-50		174117224153	174069224198
PEM	C	A1	0	0	1280	Ramsay sound	St Justinian's	hard cliff	hard/natural	Cliff			01-Mar-09		>50		173331226819	174188224039
PEM	C	A2	0	0	1296	life boat station	St Justinian's	masonry lifeboat station and old slipways. Now built over by new station and larger slipway.	hard/man-made	Lifeboat Station			01-Mar-09	Moderate	5-10	RNLI	172359225207	172346225204
PEM	C	B1	0	0	1338	clay cliffs	Whitesands Bay	eroding clay cliffs	soft/natural	Cliff			01-Mar-09	Moderate	>50		173355226997	173331226819
PEM	C	B2	0	0	1337	Rescue station revetment	Whitesands Bay	Pitched rock revetment constructed from the mid height point of the shingle bank which runs across valley. The size of the rock relies upon the tight interlocking created by the pitching to resist possibly very high exposure. Car park and resue station	hard/man-made	Revetment			01-Mar-09	Good	10-50		173342227155	173354227050
PEM	C	B2	1	0	1342	South slipway	Whitesands Bay	Concrete slipway through defence with rock to either side down length of slipway	hard/man-made	Slipway			01-Mar-09	Fair	10-50	Private	173369227106	173349227105
PEM	C	B3	0	0	1336	stream wall	Whitesands Bay	Masonry seawall on concrete footing with shingle bank to front. Footing very shallow. Constructed to crest of beach across valley. Stream is culverted through wall scouring a channel in front. Concrete slipway to southern side of wall. Separate s;ipway	hard/man-made	Sea Wall			01-Mar-09	Moderate	10-50		173362227179	173365227164
PEM	C	B3	1	0	1341	north slipway	Whitesands Bay	Concrete slipway	hard/man-made	Slipway			01-Mar-09	Moderate	10-50	Private	173364227163	173342227155
PEM	C	B4	0	0	1340	north shingle bank	Whitesands Bay	natural shingle bank to the northern end of the whitesands valley. Part of a shingle bank streatching across the lower end of this valley running from rock headland to clay clifs in the south. Shingle bank in this length is backed by natural clay.	soft/natural	Bank			17-Apr-09	Fair	>50		173341227246	173355226997
PEM	C	B5	0	0	1339	hard cliffs	Whitesands Bay	hard rock cliffs	hard/natural	Cliff			01-Mar-09	Fair	>50		173341227246	173331226819
PEM	D	A1	0	0	1138	St David's head cliffs	Aber Eiddy	Natural sloping cliffs	hard/natural	Cliff			01-Mar-09	Fair	>50		179730231218	173341227246
PEM	D	A2	0	0	1139	slipway	Aber Eiddy	Concrete slipway running down parallel to crib defence. Supported by cribwork timbers.	hard/man-made	Slipway			01-Mar-09	Moderate	5-10	PCC	179732231276	179729231261
PEM	D	A3	0	0	1137	Sleeper wall	Aber Eiddy	Porous wall retaining steeply placed light rock. Wall comprising bull head rail piles with a concrete coping. Timber sleepers bolted to front face. Sleepers retein rock whilke still creating a surface through which waves can dissapate. The wall is const	hard/man-made	Sea Wall			01-Mar-09	Moderate	5-10	PCC	179881231392	179730231218
PEM	D	B1	0	0	1343	Porthgian west cliffs	Ynys Barry	natural hard rock cliffs with coves and inlets.	hard/natural	Cliff			28-Feb-09	Fair	>50	PCC	181358232622	179730231218
PEM	D	B2	0	0	1285	southern breakwater	Porthgain	Masonry root to breakwater with additional length of concrete and brick. Head of breakwater runs below low water.	hard/man-made	Breakwater			28-Feb-09	Moderate	5-10		181365232570	181358232622
PEM	D	B3	0	0	1284	Seaward quay wall	Porthgain	Masonry and brick wall built into natural rock outcrop.	hard/man-made	Sea Wall			11-Feb-09	Poor	10-50		181365232570	181370232570
PEM	D	B4	0	0	1283	South side wall	Porthgain	red brick quay wall beneath hoppers.	hard/man-made	Sea Wall			28-Feb-09	Fair	10-50		181370232570	181409232528
PEM	D	B5	0	0	1282	Southern head wall	Porthgain	Brick and concrete quay wall to head of harbour	hard/man-made	Sea Wall			28-Feb-09	Moderate	10-50		181453232556	181427232569
PEM	D	B6	0	0	1281	central jetty	Porthgain	concret encased jetty extending from the head of the heabour. Red brick head to jetty. Stream flows out through a large outfall pipe at the root of the jetty. The jetty retains a sandy beach to the northern side. The southern area enclosed appears to ha	hard/man-made	Breakwater			28-Feb-09	Moderate	5-10		181453232556	181427232569
PEM	D	B7	0	0	1278	slipway and wall	Porthgain	Red brick sea wall at head of harbour with a gently sloping sand beach infront. Beach is a thin veneer of fine mud and sand over rock. Concrete slipway runs down to low water.	hard/man-made	Sea Wall			28-Feb-09	Moderate	10-50		181456232558	181453232556
PEM	D	B8	0	0	1277	east cliff	Porthgain	hard rock cliff in the lee of east breakwater.	hard/natural	Cliff			28-Feb-09	Fair	>50		181411232629	181460232560
PEM	D	B9	0	0	1276	east breakwater	Porthgain	masonry and concrete breakwater to mouth of Porthgain harbour. Believed to be founded to rock exposed at lowest spring tides.	hard/man-made	Breakwater			28-Feb-09	Moderate	10-50	PCC	181390232632	181411232629
PEM	D	C1	0	0	1275	Porthgain east cliff	Porthgain	Hard rock cliff	hard/natural	Cliff			28-Feb-09	Fair	>50	PCC	183300232450	181390232632

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PEM	D	C2	0	0	1329	Trefin bay cliff	Trefin	soft friable rock cliffs above harder rock toe and with boulder clay. Main road run along top of cliff. Cliff subject to land slips due to erosion of cliff in the splash zone.	soft/natural	Cliff			28-Feb-09	Poor	10-50	PCC	183365232472	183300232450
PEM	D	C3	0	0	1136	Trefin cliff	Abercastle	rock cliff with small bays. Generally deep overburden of boulder clay especially around Abercastle. Lime kiln on cliff in Abercastle bay	hard/natural	Cliff			28-Feb-09	Fair	>50		185257233650	183365232472
PEM	D	C4	0	0	1135	sea wall	Abercastle	1m high concrete wall retaining coastal slope at top of beach. Wall tie into rock at seaward end.	hard/man-made	Sea Wall			28-Feb-09	Moderate	10-50	PCC	185269233652	185257233650
PEM	D	C5	0	0	1134	slipway	Abercastle	concretye slip to crest of beach. Masonry wall to edge by hardstanding. Buildings to other side.	hard/man-made	Slipway			28-Feb-09	Fair	10-50	PCC	185272233641	195268233650
PEM	D	C6	0	0	1133	head wall	Abercastle	Concrete wall at crest of beach retaining hardstanding between beach and stream.	hard/man-made	Sea Wall			28-Feb-09	Moderate	10-50	PCC	185262233655	185285233677
PEM	D	C7	0	0	1132	river wall	Abercastle	low concrete wall to toe of cliff on northern side of bay where the stream flows out.	hard/man-made	Sea Wall			28-Feb-09	Moderate	10-50	PCC	185300233670	185320233680
PEM	D	D1	0	0	1328	Mathry - Mynydd Morfa	Tremarchog	Hard rock cliffs with clay overburden.	hard/natural	Cliff			28-Feb-09	Fair	>50	PCC	188297234590	185300233670
PEM	D	D2	0	0	1327	Tregwent beach	Tremarchog	Substantial shingle bank in front of low lying valley. Beach very cuspate. Larger material to southern end under clay cliffs.	soft/natural	Embankment			28-Feb-09	Fair	10-50	PCC	288297234590	288122234436
PEM	D	D3	0	0	1326	Tregwent beach cliff	Tremarchog	rapidly eroding clay cliff. Cobbled beach infront. Beach very cuspate and showing significant segregation along length. Large material infront of this section of eroding cliff.	soft/natural	Cliff			28-Feb-09	Poor	10-50	PCC	288340234722	288300234635
PEM	D	D4	0	0	1325	Pen Deudraeth	Tremarchog	Low hard rock headland overlain by deep deposits of boulder clay. Boulder caly rich in cobble size particals and being eroded in palces.	hard/natural	Hard Rock Headland			28-Feb-09	Fair	>50	PCC	288424235015	288297234590
PEM	D	D5	0	0	1324	Tregwent farm bay	Tremarchog	Substantial shingle bank infront of lowlying valley. Small stream cuts through bank at northern end.	soft/natural	Embankment			28-Feb-09	Fair	>50	PCC	288425235133	288424235015
PEM	D	D6	0	0	1323	Dandy cliffs	Tremarchog	Lower hard rock cliff overlain by deep deposits of boulder clay. Boulder caly rich in cobble size particals and being eroded in palces.	hard/natural	Cliff			28-Feb-09		>50	PCC	187845236576	188425235133
PEM	E	A1	0	0	1204	Strumble Head Cliffs	Fishguard	Massive hard rock cliffs.	hard/natural	Cliff			27-Feb-09	Fair	>50		195440239442	187845236576
PEM	E	A10	0	0	1196	main slip	Fishguard	concrete slipway, patially sheetpiled to sides and end. Constructed as part of redevelopment of the Parrog area. 7.5m wide. Toe to sheet pile at -6.1 at seaward end and -4.86 at landward end. Only partially piled on eastbreakwater side.	hard/man-made	Slipway			27-Feb-09	Good	10-50	PCC	294788238002	294833238014
PEM	E	A12	0	0	1195	boat house revtment	Fishguard	Rock revetment to reclainmed land in corner of Fishguard Harbour. Bedstone toe and bund to 1m below bed level. Fill material retained within geotextile comprises crushed material from Stena port development, carpark surfacing and broken concrete waste.	hard/man-made	Revetment			27-Feb-09	Good	10-50	PCC	294860237970	294788238002
PEM	E	A13	0	0	1194	East breakwater inner face	Fishguard	c	hard/man-made	Breakwater			27-Feb-09	Moderate	10-50	stena	294860237970	295498238274
PEM	E	A14	0	0	1193	east breakwater round head	Fishguard	Rock mound head to the East breakwater. Rock down to low water has been concreted. The light structure is steel and concrete. Rock slope extends down some 12m to the harbour bed. The bed deepens quicly beyond the end of the structure.	hard/man-made	Breakwater			27-Feb-09	Fair	10-50	Stena	195498238274	195442238230
PEM	E	A15	0	0	1192	East breakwater outer face	Fishguard	steeply pitched stone face to rubble core breakwater. Shallower gradient of rock at toe of structure. Believed to have been constructed over a four year period (1908 to 1912) by end tipping. The outer end of the breakwater is slightly less steep with a l	hard/man-made	Breakwater			27-Feb-09	Moderate	10-50	Stena	294860237970	295498238274
PEM	E	A16	0	0	1191	Low dune	Fishguard	sweeping beach into East Breakwater, creating an area of low dune or grassy scrub in corner. Frontage appears very stable with little erosion	soft/man-made	Dunes			27-Feb-09	Fair	>50	PCC	294858237624	294820237952
PEM	E	A17	0	0	1190	Fishguard beach groyne 3	Fishguard	Timber groyne	hard/man-made	Groynes			27-Feb-09		10-50	PCC	294848237851	194898237871
PEM	E	A18	0	0	1189	Fishguard beach groyne 2	Fishguard	Timber groyne	hard/man-made	Groynes			27-Feb-09	Fair	10-50	PCC	294894237780	294750237813
PEM	E	A19	0	0	1188	Fishguard beach groyne 1	Fishguard	Timber groyne	hard/man-made	Groynes			27-Feb-09	Fair	10-50	PCC	294591237706	295003237752
PEM	E	A2	0	0	1203	North breakwater outer face	Fishguard	Massive concrete block revetment over concrete revetment to high crest wall.	hard/man-made	Breakwater			27-Feb-09	Moderate	10-50	Stena	295440239442	296255239083
PEM	E	A20	0	0	1187	Fishguard beach Flag revetment	Fishguard	Beach crest rock revetment tending to be steep and more exposed at southern end but becoming more slack to north. Paved area behind revetment at southern end running to grass at north. Beach relatively steep and stabilised by groynes.	hard/man-made	Revetment			27-Feb-09	Moderate	5-10	PCC	294982237471	294858237624
PEM	E	A21	0	0	1186	Fishguard beach river works	Fishguard	concrete scour protection extending across upper foreshore with concrete wall to north side. Wall acts to defelect flows and to retain a small beach to the north. Foreshore generally scree, swept clean by stream.	hard/man-made	River structures			27-Feb-09	Poor	5-10		294983237671	294999237677

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PEM	E	A22	0	0	1185	Fishguard beach river wall	Fishguard	various short lengths of differrent construction making up a flood embankment at the entrance to the stream and providing predominately flood protection to the properties to the south.	hard/man-made	Embankment			27-Feb-09	Moderate	10-50	Private	294982237671	294986237672
PEM	E	A23	0	0	1184	Fishguard beach south revetment	Fishguard	rip rap revetment to earth banks defending gardens and property. Shingle beach infront of revetment appears to be stable.	hard/man-made	Embankment			27-Feb-09	Moderate	10-50	Private	295036237617	294988237658
PEM	E	A3	0	0	1202	Fisherman's quay	Fishguard	vertical concrete breakwater and slipway. Provides limited sheltered mooring and access for fishermen. Used principally for tenders and loading for boats moored out in the harbour. Pedestrian access only via footbridge.	hard/man-made	Breakwater			27-Feb-09			PCC	294871238525	294897238510
PEM	E	A4	0	0	1201	North breakwater inner face	Fishguard	Riprap protection to innerface of breakwater and roadway.	hard/man-made	Breakwater			27-Feb-09	Moderate	10-50	Stena	295492239383	296255239083
PEM	E	A5	0	0	1200	port quay	Fishguard	Concrete quay wall.	hard/man-made	Quay Wall			27-Feb-09	Fair	10-50	Stena	295138238775	295392239252
PEM	E	A6	0	0	1199	port revetment	Fishguard	Pitched stone revetment to port development area.	hard/man-made	Revetment			27-Feb-09	Fair	10-50	Stena	294688238118	294834238463
PEM	E	A8	0	0	1198	old slipway	Fishguard	concrete slipway sloping down the side of the old pitched revetment.	hard/man-made	Slipway			27-Feb-09	Moderate	10-50	PCC	294688238118	294722238101
PEM	E	A9	0	0	1197	old revetment	Fishguard	steep pitched revetment with loose rock toe.	hard/man-made	Revetment			27-Feb-09	Fair	10-50	PCC	294833238014	294688238118
PEM	E	B1	0	0	1360	Penyraber	Lower Town Fishguard	Hard rock cliffs with steep near vertical face at sea level. Highly relflective.	hard/natural	Cliff			27-Feb-09	Fair	>50	PCC	196045237213	195036237617
PEM	E	B10	0	0	1351	outer quay	Lower Town Fishguard	Masonry inner face to breakwater. Large masonry coping to block pavier crest.	hard/man-made	Breakwater			27-Feb-09	Fair	10-50	PCC	196084237448	196107237447
PEM	E	B11	0	0	1350	outer breakwater	Lower Town Fishguard	Pitched and grouted masonry revetment to seaward face of breakwatrer, with steps against rock cliff and slipway further along revetment. Large masonry bl;ock crest wall. Structure defines limit of quay and provides protection to harbour. Toe of revetmen	hard/man-made	Breakwater			27-Feb-09			PCC	196130237459	196084237474
PEM	E	B2	0	0	1359	slope toe revetment	Lower Town Fishguard	stone pitched revement supporting pathway around southern side of harbour and possibly acting as toe to cloastal slope.	hard/man-made	Revetment			27-Feb-09	Moderate	10-50	PCC	196177237181	196045237213
PEM	E	B3	0	0	1358	boat park revetment	Lower Town Fishguard	pitched stone revetment with dwarf crest wall, above shingle beach at entrance to river.	hard/man-made	Revetment			27-Feb-09	Fair	10-50	Private	196256237186	196222237213
PEM	E	B3	1	0	1363	Boat club slipway	Lower Town Fishguard	Concrete slipway to boat park	hard/man-made	Slipway			27-Feb-09	Fair	10-50	Private	196221237203	196218237213
PEM	E	B4	0	0	1357	boat park wall	Lower Town Fishguard	masonry faced concrete retaining wall, with some rock to upstream end.	hard/man-made	Sea Wall			27-Feb-09	Moderate	10-50	Private	196250237168	196256237186
PEM	E	B5	0	0	1356	Riverbank	Lower Town Fishguard	rip rap stone toe to river bank.	hard/man-made	Revetment			27-Feb-09	Fair	10-50	private	196248237140	196250237168
PEM	E	B6	0	0	1355	Gun wall	Lower Town Fishguard	Heavily pressure grouted wall constructed from large randomly placed stone.	hard/man-made	Sea Wall			27-Feb-09	Moderate	10-50	PCC	196294239255	196269237164
PEM	E	B7	0	0	1354	Gun wall	Lower Town Fishguard	masonry wall with concrete toe. Road behind to properties.	hard/man-made	Sea Wall			27-Feb-09	Moderate	10-50	PCC	196303237311	196294237255
PEM	E	B8	0	0	1353	Old quay wall inner	Lower Town Fishguard	Masonry quay wall constructed from large random masonry blocks. Blocks at the base tend to be larger. Wall heavily pointed. Soft harbour bed infront of wall. Road way of paviers at crest giving on to properties. Split into three sections.	hard/man-made	Quay Wall			27-Feb-09	Good	10-50	PCC	196107237447	196184237372
PEM	E	B8	1	0	1361	Old quay wall centre	Lower Town Fishguard	Masonry quay wall constructed from large random masonry blocks. Blocks at the base tend to be larger. Wall heavily pointed. Soft harbour bed infront of wall. Road way of paviers at crest giving on to properties. Split in to 3 sections	hard/man-made	Sea Wall			27-Feb-09	Bad	5-10	PCC	196184237372	196233237353
PEM	E	B8	2	0	1362	Old quay wall outer	Lower Town Fishguard	Masonry quay wall constructed from large random masonry blocks. Blocks at the base tend to be larger. Wall heavily pointed. Soft harbour bed infront of wall. Road way of paviers at crest giving on to properties. Split in to 3 sections	hard/man-made	Sea Wall			27-Feb-09	Moderate	5-10	PCC	196233237353	196277237314
PEM	E	B9	0	0	1352	Quay wall 1	Lower Town Fishguard	random masonry quay wall. Large masonry coping to paviers of quay side road. Properties immediatly behind. Toe of wall and harbour bed exposed at low water. Quay ending at slipway (element 4 below)	hard/man-made	Quay Wall			27-Feb-09	Fair	10-50	PCC	196107237447	196184237372
PEM	E	C1	0	0	1274	Dinas west cliffs	Pwllgwaelod	Hard rock cliff to low water. Some small coves. Cliffs very steep at sealevel around towards Fishguard. Reflection off the cliffs can cause significant increase in wave energy within Fishguard harbour (doubling wave heights at the Stena Quay and causing	hard/natural	Cliff			27-Feb-09	Fair	>50	PCC	200481239875	196130237459
PEM	E	C2	0	0	1273	revetment 2	Pwllgwaelod	Light stone pitched revetment. Shallow toe in to sand beach. Road and car park above. Some properties set back from defence withi valley.	hard/man-made	Revetment			27-Feb-09	Moderate	5-10	PCC	200467239953	200481239875
PEM	E	C3	0	0	1272	slipway	Pwllgwaelod	Concrete slab slipway through revetment.	hard/man-made	Slipway			27-Feb-09	Moderate	10-50	PCC	200490239892	200476239893

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PEM	E	C4	0	0	1271	revetment 1	Pwllgwaelod	pitched light stone revetment (0.5 t) to clay slope fronting a valley through to Cwm Eglys. Revetment only shallowly toe to beach. Stream running through revetment at northern end. Concrete steps from road to beach.	hard/man-made	Revetment			27-Feb-09	Poor	1-5	PCC	200468239953	200481239875
PEM	E	C5	0	0	1270	north cliff	Pwllgwaelod	light ptiched rock toe below clay cliff. Sand beach infront.	hard/man-made	Revetment			27-Feb-09	Fair	10-50	PCC	200449239977	200467239953
PEM	F	A1	0	0	1165	Dinas Head	Cwm yr Eglwys	natural hard cliffs with overlying softer coastal slope.	hard/natural	Cliff			27-Feb-09	Fair	>50	NT	201519240157	200449239977
PEM	F	A10	0	0	1158	corner wall	Cwm yr Eglwys	concrete seawall with a masonry face, extending below sand beach level and believed to be founded to rock. Naroow concrete path above wall. Steep clay cliff behind showning signs of former erosion but now well vegetated. Road to top of cliff. Steps at n	hard/man-made	Sea Wall			27-Feb-09	Fair	10-50		201535240024	201530240039
PEM	F	A11	0	0	1157	road wall	Cwm yr Eglwys	Concrete stepped sea wall with masonry face to vertical section above steps. Rock foreshore. Concrete steps constructed onto rock. Wall slightly curved in plan (convex).	hard/man-made	Sea Wall			27-Feb-09	Fair	10-50	PCC	201623240031	201535240024
PEM	F	A3	0	0	1164	Infill wall 2	Cwm yr Eglwys	Slate wall infill in major gap in rock outcrop. Concrete coping. Important feature in reducing exposure of walls to centre and northern end of frontage.	hard/man-made				27-Feb-09	Moderate	10-50	PCC	201514240165	201519240157
PEM	F	A4	0	0	1163	Infill walls 1	Cwm yr Eglwys	small section of slate wall infill in rock gullies. Concrete coping above wall.	hard/man-made	Sea Wall			27-Feb-09	Fair	10-50	PCC	201510240166	201514240165
PEM	F	A6	0	0	1162	House wall 2	Cwm yr Eglwys	High masonry wall as integral part of property wall. Healthy sand beach infront underlain by rock scar. Small stream cascads on to beach at souhtern end of wall. The wall ties into the rock cliff at the northern end.	hard/man-made	Sea Wall			27-Feb-09	Poor	10-50	Private	201486240160	201509240162
PEM	F	A7	0	0	1161	house wall 1	Cwm yr Eglwys	masonry wall to garden at end of church yard wall. Concrete toe to wall.	hard/man-made	Sea Wall			27-Feb-09	Moderate	10-50	Private	201491240119	201491240136
PEM	F	A8	0	0	1160	churchyard wall	Cwm yr Eglwys	Masonry wall underpinned by sloping concrete slab toe. Wall constructed oin slate placed horizontally. Coping formed by vertically placed slate. Area behind is the old church yard but has been grassed over as an amenity area. The ruins of the old church	hard/man-made	Sea Wall			27-Feb-09	Bad	10-50		211506240071	201491240119
PEM	F	A9	0	0	1159	masonry wall	Cwm yr Eglwys	old masonry seawall, underpinned with a concrete toe, to sand beach. Concrete deck above wall becoming wider at northern end. Deck backed by low concrete retaining wall to grass bank and road.	hard/man-made	Sea Wall			27-Feb-09	Moderate	5-10	PCC	201530240039	201511240072
PEM	F	A9	1	0	1166	church wall slipway	Cwm yr Eglwys	Narrow concrete slipway between walls.	hard/man-made	Slipway			27-Feb-09	Fair	10-50	PCC	201494240067	201517240069
PEM	F	B1	0	0	1248	Dol-rhedyn cliffs	Newport Bay South	natural hard cliffs with intertidal rock scar platform	hard/natural	Cliff			27-Feb-09	Fair	>50	PCC	201623240031	202512239530
PEM	F	B2	0	0	1247	Fforest Bay bridge wall	Newport Bay South	Low slate retaining toe wall at crest of shingle beach. Wall curves into stream at the centre of the beach and acts as support for timber bridge.	hard/man-made	Sea Wall			27-Feb-09	Fair	10-50	NP	202512239530	202512239562
PEM	F	B3	0	0	1246	Fforest Bay Beach	Newport Bay South	shingle beach with grass bank behind.	soft/natural	Other			27-Feb-09	Fair	>50	PCC	202512239530	202612239538
PEM	F	B4	0	0	1245	cliff	Newport Bay South	Hard rock cliffs with small inlets. Toe of cliff to low water.	hard/natural	Cliff			27-Feb-09	Fair	>50	PCC	202612239538	204725239779
PEM	F	C1	0	0	1244	Coastal slope	Newport Parrog	stoney clay cliff	soft/natural	Cliff			09-Feb-09	Fair	>50	PCC	204829239741	204725239779
PEM	F	C10	0	0	1235	Village wall 1	Newport Parrog	Slate wall, constructed with vertical slates. Largert stone toe which appears to be part of foundations. Slate has been surfaced pointed. The crest of the wall is approximately 700m above the walkway behind. The crest has been supported behind by concre	hard/man-made	Sea Wall			17-Apr-09	Moderate	10-50		205036239645	205001239656
PEM	F	C11	0	0	1234	field wall	Newport Parrog	Slate wall, generally with slates placed vertically but including and area in the centre of the wall where the slates are more conventionally placed horizontally. Some larger stone blocks along the toe of the wall. The crest of the wall is grassed over t	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50		205108239635	205043239638
PEM	F	C2	0	0	1243	gabion bankwork	Newport Parrog	Gabion encasement of the stoney clay coasatal slope. The toe of the wall is above normal high water. The gabions have been built upon a thin concrete screed toe, which is itself place on the rock scar. There is some undermining of the concrete toe.	hard/man-made	Gabions			09-Feb-09	Moderate	5-10		204837239738	204832238741
PEM	F	C3	0	0	1242	brick wall	Newport Parrog	Various sections of brick or block encasement of the soft clay cliff. Founded to the rock scar foreshore.	hard/man-made	Revetment			09-Feb-09	Poor	5-10		204857239725	204840239936
PEM	F	C4	0	0	1241	Upper village clay bank	Newport Parrog	Well vegetated stony clay bank above rock scar foreshore. Some erosion of the bank.	soft/natural	Cliff			09-Feb-09	Moderate	10-50	private	204880239730	204857239725

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PEM	F	C5	0	0	1240	Upper village terraces	Newport Parrog	An arrangement of masonry walls with concrete infills separated by concrete tracks and grass strips built against the clay coastal slope. Lowest wall, and concrete track infront, founded to rock scar. The scar continues to low water.	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50	private	204905239721	204880239730
PEM	F	C6	0	0	1239	carpark	Newport Parrog	Natural rock scar foreshore extending to above normal highwaters. Upper platform of rock partially concreted over to create a private carpark and boat storage area. This area is vulnerable to wave action on storms and high tides. The rock continues abo	hard/natural	Cliff			09-Feb-09	Fair	10-50	private	204937239708	204902239711
PEM	F	C7	0	0	1238	pink house wall	Newport Parrog	masonry wall constructed on rock foreshore and acting as garden wall to property. Garden at effectively the same level as the toe of the wall. Wall reducedin height and an access cut through to timber fence and gate half way along wall. Toe of wall with	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50	private	204969239678	204959239696
PEM	F	C8	0	0	1237	Village slips wall	Newport Parrog	short section of slate wall between two slipways. Wall constructed of vertical slate. Slipways constructed of concrete overlying masonry.	hard/man-made	Sea Wall			09-Feb-09	Poor	10-50		204989239672	204979239682
PEM	F	C9	0	0	1236	Village wall 2	Newport Parrog	Slate wall with sloping lowersection down to beach level. Crest wall backed by larger amasonry blocks. Wall runs to a slipway. The wall has been heavily pointed, surface pointing.	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50		205005239654	205001239655
PEM	F	D1	0	0	1233	south slipway	Newport Parrog	Concrete and masonry slipway and dry vertical slate side wall. Side wall has a lower vertical slate kerb retaining rock.	hard/man-made	Slipway			09-Feb-09	Moderate	5-10	Private	205125239630	205167239637
PEM	F	D10	0	0	1223	parrog rear wall	Newport Parrog	Vertical slate wall, originally built dry but rebuilt and grouted in 1995. Little exposure to tide, only on highest tides. Marsh infront and retaining higher ground of the parrog behind.	hard/man-made	Sea Wall			09-Feb-09	Good	10-50	National Parks	205234239686	205292239697
PEM	F	D11	0	0	1222	marsh wall	Newport Parrog	various small masonry walls often overgrown, surrounding the area of marsh behind the parrog. Marsh area only overtopped on high spring tides. Area used for keeping boats but also of environmental interest.	hard/man-made	Sea Wall			09-Feb-09	Poor	5-10	Private	205205239649	205222229630
PEM	F	D2	0	0	1232	Red House wall	Newport Parrog	Vertical slate wall with rock toe to front over a muddy sandy shingly beach. Grass mound behing with properties.	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50	Private	205131239633	205128239638
PEM	F	D3	0	0	1231	Shelter wall	Newport Parrog	Vertical slate lower wall face shallow pointed in places with a rock toe. Concrete deck berm above lower wall with more recent masonry wall (possibily rc masonry faced wall) to rear. Beach infront tends to be sandy.	hard/man-made				09-Feb-09	Moderate	10-50		205152239689	205131239633
PEM	F	D4	0	0	1230	slipway	Newport Parrog	Masonry and concrete slipway between masonry walls, with short section of sloping masonry face behind main walls.	hard/man-made	Slipway			11-Jan-06	Fair	10-50	PCC	205167239684	205156239692
PEM	F	D5	0	0	1228	Boat club front wall	Newport Parrog	Vertical slate wall with breeze block coping. Protected by rock revetment over half the length (see variation NPPB4/1).	hard/man-made				09-Feb-09	Poor	5-10	Private	205172239725	205154239692
PEM	F	D5	1	0	1229	boat club front wall	Newport Parrog	Vertical slate wall with breeze block coping. Variation to main length with rock revetment placed as emergency works in 1994 to northern 40 m of wall.	hard/man-made	Sea Wall			09-Feb-09	Moderate	10-50	Private	205172239725	205154239692
PEM	F	D6	0	0	1227	boatclub side wall	Newport Parrog	slate faced reinforced concrete wall, reconstructed against original vertical slate dry wall. Narrow path above to boat club building. Rock toe placed to reduce scour.	hard/man-made	Sea Wall			09-Feb-09	Good	10-50	Private	205197239696	205167239727
PEM	F	D7	0	0	1226	Parrog front wall	Newport Parrog	vertical slate wall. Orighinally constructed dry but recently grouted and pointed. Rock placed to toe of wall to reduce wave overtopping and scour, especially as wall is now solid. Wall returns in to boat launching area.	hard/man-made	Sea Wall			09-Feb-09	Good	10-50	National Parks	205198239760	205205239715
PEM	F	D8	0	0	1225	Parrog side wall	Newport Parrog	High vertical slate wall, substantially rebuilt over the eastern length and generally rebuilt, pressure grouted and pointed over the whole length. Steps constructed as part of the 1995 enhancement. Front face swept by waves and sea bed reflects this in	hard/man-made	Sea Wall			09-Feb-09	Good	10-50	National Parks	205307239752	205198239760
PEM	F	D9	0	0	1224	Parrog end wall	Newport Parrog	Vertical slate wall substantially rebuilt and grouted in 1995. Retaining recreational area of parrog and providing access to sandy muddy beach.	hard/man-made	Sea Wall			17-Apr-09	Good	10-50	National Parks	205272239697	205314239701
PEM	F	E1	0	0	1221	South bank	Nyfer estuary	Narrow salt marsh with mature vegetation, giving way to wide expanse of mud flats. Land rises behind with trees and some residential areas.	soft/natural	Marsh			09-Feb-09	Fair	>50	Private	205222229630	206199239448
PEM	F	E2	0	0	1220	South Abutment	Nyfer Estuary	Pitched stone revement to road and southern abutment to bridge. Channel bed is mud with little or no salt marsh. Possibly more exposed on this southern side of the river.	hard/man-made	Revetment			09-Feb-09	Fair	10-50	PCC	206199239448	206214239457
PEM	F	E3	0	0	1219	North Abutmnet	Nyfer estuary	Pitched stone revement to road and abutment of bridge. Relatively sheltered by saltings and mud.	hard/man-made	Revetment			09-Feb-09	Fair	10-50	PCC	206290239569	206258239513

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PEM	F	E4	0	0	1218	Bridge marsh north	Nyfer Estuary	Salt marsh extending aproximately 50m into estuary, running to higher ground behind. One property directly behind marsh.	soft/natural	Marsh			09-Feb-09	Moderate	>50	PCC	206158239624	206258239513
PEM	F	E5	0	0	1217	North bank	Nyfer Estuary	Clay cliff to north bank of estuary. Minor private protection works undertaken to individual properties.	soft/natural	Cliff			09-Feb-09	Fair	>50	PCC	205217240022	206158239624
PEM	F	F1	0	0	1216	Rear dune face	Newport Sands	Rear face of dunes to inner estuary. Debris indicates that tide reaches toe of dune. Beach steeping on this rear face.	soft/natural	Dunes			09-Feb-09	Fair	>50	PCC	205165240054	205217240022
PEM	F	F2	0	0	1215	The Bennet	Newport Sands	Relatively high dune reducing in level towards southern end. Dune as a spit forming across the entrance to the Nyfer estuary. Some fencing to toe of dune. Limited new growth of dune only at spit end.	soft/natural	Dunes			09-Feb-09	Moderate	1-5	PCC	205404240453	205387240488
PEM	F	F3	0	0	1269	Slipway	Newport Sands	Concrete slipway with rock shoulder.	hard/man-made	Slipway			09-Feb-09	Moderate	10-50	PCC	205396240494	205934240492
PEM	F	F4	0	0	1268	Central revetment	Newport Sands	Pitched stone revetment with building behind. Sandy beach over clay.	hard/man-made	Revetment			09-Feb-09	Moderate	10-50	PCC	205437240522	205404240513
PEM	F	F5	0	0	1214	Slipway	Newport Sands	Concrete slipway with rock to either shoulder	hard/man-made	Slipway			09-Feb-09	Moderate	10-50	PCC	205406240523	205408240516
PEM	F	F6	0	0	1213	Car park revetment	Newport Sands	Pitched stone revetment with carpark behind. Sand beach over clay. Several streams cut across beach eroding beach by 0.5m in places. Streams run under defence.	hard/man-made	Revetment			09-Feb-09	Moderate	10-50	PCC	205420240562	205405240536
PEM	F	F7	0	0	1212	North revetment	Newport Sands	Random placed rock revetment, with dune behind. Sand veneer over clay beach infront. Works believed to be toed into beach.	hard/man-made	Revetment			09-Feb-09	Fair	10-50	PCC	205451240641	205420240562
PEM	F	F8	0	0	1211	North cliff	Newport Sands	steep eroding sandy clay cliff with fractured rock content. Dune scrub and golf course behind. Probably overlying harder rock of the coast to the north.	soft/natural	Cliff			09-Feb-09	Moderate	>50	PCC	205437240649	205451240641
PEM	G	A1	0	0	1205	Cell Howel	Moylgrove	Rock cliff with softer erodable material forming coastal slope above.	hard/natural	Cliff			09-Feb-09		>50	Private	211025245622	205437240649
PEM	G	A2	0	0	1181	gabion wall	Moylgrove	gabion toe wall to clay bank. Rock placed against seaward end to resist local wave scour. Foreshore is shingle and clay with some exposed scar.	hard/man-made	Gabions			08-Feb-09			PCC	211036245631	211025245622
PEM	G	A4	0	0	1180	Ceibwr bay bank	Moylgrove	sloping clay cliff down to stream and narrow shingle beach	soft/natural	Cliffs			08-Feb-09			Private	211010245633	210993245677
PEM	G	A5	0	0	1179	Ceibwr footbridge	Moylgrove	Rock revement as edge protection to each side of footbridge.	hard/man-made	Revetment			08-Feb-09			National Parks	211026245615	211042245615
PEM	G	A6	0	0	1178	Ceibwr beach	Moylgrove	Shingle beach to Ceibwr bay. Backed by footpath and scrub. Stream cuts through to south of beach. Typical steepening storm beach with stranded material at crest.	soft/natural	Shingle			08-Feb-09	Fair	>50	PCC	211039245634	211072245693
PEM	G	B1	0	0	1177	Cemaes Head west	Moylgrove	steep rock cliff with erodable coastal slope above.	hard/natural	Cliff			08-Feb-09			Private	211072245693	213118250139
PEM	H	A1	0	0	1322	Cemaes Head	Teifi	Extensive hard rock cliff with minor areas of softer area. Erodable coastal slope above.	hard/natural	Cliff			08-Feb-09			Private	214375249153	213118250139
PEM	H	A2	0	0	1321	Cei bach jetty	Teifi	masonry and concrete jetty enclosing boat house and launchind area. Root of jetty to rock outcrop and jetty believed to be founded to rock.	hard/man-made	Jetty			08-Feb-09	Moderate	10-50	Private	214375214984	214375249153
PEM	H	A3	0	0	1320	boat house	Teifi	Masonry wall and masonry boat house with slipway. Retaining high steep clay bank	hard/man-made	Sea Wall			08-Feb-09	Moderate	10-50	private	214374249147	214392249052
PEM	H	A4	0	0	1170	Trwyn-yr ofchfa bay	Teifi	Clay cliffs sloping down to a rock scar foreshore. Cliffs eroding slowly. Some sand and shingle to beach. Wooded coastal slope above cliff.	soft/natural	Cliffs			08-Feb-09	Moderate	>50		214977248854	214374249147
PEM	H	B1	0	0	1169	Trwyn Carreg-ddu	Teifi	Rock headland	hard/natural	Hard Rock Headland			08-Feb-09	Fair	>50		214977248642	214977248854
PEM	H	B2	0	0	1168	trwyn Carreg-ddu	Teifi	Clay cliffs sloping down to embryo dunes and sand beach.	soft/natural	Cliff			08-Feb-09	Moderate	>50		215087248712	214977248854
PEM	H	B3	0	0	1317	Poppit Houses wall	Teifi	Low masonry wall bound by grass and partially buried, situated behind low dune area. Trackway and houses behind. Stream running through wall and dunes.	hard/man-made	Masonry Wall			08-Feb-09	Good	10-50	Private	215216248642	215087248712
PEM	H	B4	0	0	1315	Poppit Dunes	Teifi	Relatively low but extensive dune, having developed as Poppit spit during 20th.C. Some areas of embryo dune but generally steep faced. Some minor rock protection (see variation). Fronted by Poppit sands, a wide sand bank across the estuary.	soft/natural	Dunes			10-Jan-06	Moderate	10-50		215869248242	215087248712
PEM	H	B4	1	0	1316	Local protection to dune	Teifi	Local protection to properties in dunes	hard/man-made	Revetment			08-Feb-09	Fair	10-50	Private	215757248440	215715248486
PEM	H	C1	0	0	1335	Webley wall	Teifi	Low revetment to edge of road. Saltings to front.	hard/man-made	Revetment			08-Feb-09	Moderate	10-50	PCC	215908247962	215810248077
PEM	H	C2	0	0	1331	Saltings	Teifi	Wide saltings backed by rising land. Heavily cracked.	soft/natural	Saltings			08-Feb-09	Moderate	>50	PCC	216307247600	215908247962
PEM	H	C3	0	0	1334	Private wall	Teifi	Masonry wall above scree, shingle foreshore.	hard/man-made	Sea Wall			08-Feb-09	Poor	10-50	Private	216402247368	216307247600
PEM	H	C4	0	0	1333	Rock headland	Teifi	Low rock headland to estuary.	hard/natural	Rock			08-Feb-09	Fair	>50	PCC	216375246982	216402247368

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PEM	H	C5	0	0	1332	Cliff	Teifi	Clay bank to edge of estuary. Firm scree foreshore with saltings.	soft/natural	Bank			08-Feb-09	Moderate	>50	PCC	216375246982	216402247368
PEM	H	D1	0	0	1319	Boat wall	Teifi	Old masonry wall to edge of low bank. Heavily vegetated bank to road. Mud and isolated patches of saltings to generally shingly intertidal area. Area used for mooring small boats.	hard/man-made	Sea Wall			08-Feb-09	Poor	1-5	PCC	216347246912	216375246982
PEM	H	D10	0	0	1171	St Dogmeal's river bank	Teifi	Relatively steep but well vegetated river bank. Intertidal mud flats in front down to channel.	soft/natural	Cliff			08-Feb-09	Fair	>50	Private	216224246077	216641246042
PEM	H	D10	1	0	1330	Wicks slip	Teifi	Concrete slipway over upper saltmarsh.	hard/man-made	Slipway			08-Feb-09	Fair	10-50	Private	216224246077	216641246042
PEM	H	D2	0	0	1318	Pumpstation	Teifi	Grouted slate revement to edge of pumping station. Subject to some tide action.	hard/man-made	Revetment			08-Feb-09	Fair	10-50	Welsh Water	216335246924	216347246912
PEM	H	D3	0	0	1183	Roadwall	Teifi	Masonry road wall to intertidal area of shingle and mud. Stream running out under road at mid (lowest point of foreshore. Vegetation to either end of wall. Wall apparently constructed in three levels: lowest level being over the lowest central section	hard/man-made	Sea Wall			08-Feb-09	Moderate	10-50	PCC	216336246750	216325246916
PEM	H	D4	0	0	1182	slipway	Teifi	Concrete slipway running across shingle sandy mud foreshore.	hard/man-made	Slipway			08-Feb-09	Moderate	10-50	PCC	216342246806	216368246830
PEM	H	D5	0	0	1176	landing stage revetment	Teifi	Low rock revement with recreational area and road behind. Foreshore is mud with sand and shingle. Landing stage with concrete steps are situated in cenre of revement.	hard/man-made	Revetment			08-Feb-09	Fair	10-50	PCC	216370246754	216352246822
PEM	H	D6	0	0	1175	garden wall	Teifi	Dressed slate wall to gardens. Shingly mudy intertidal area to river channel.	hard/man-made	Sea Wall			08-Feb-09	Moderate	1-5	Private	216379246560	216370246754
PEM	H	D7	0	0	1174	Garden walls	Teifi	Masonry wall to private gardens. Relatively wide intertidal mud to river channel.	hard/man-made	Sea Wall			08-Feb-09	Moderate	10-50	Private	216379246560	216370246754
PEM	H	D8	0	0	1173	River bank	Teifi	Well vegetated rock cliff with residential area behind.	hard/natural	Cliff			08-Feb-09	Fair	>50	Private	216562246044	216379246560
PEM	H	D9	0	0	1172	Barn revetment	Teifi	Light stone revetment where river cuts into bank. Vegetation over upper mud flats to either side of reveted area	hard/man-made	Revetment			08-Feb-09	Moderate	10-50	Private	216621246029	216562246044
CER	A	A01	0	0	171	Quay Wall	Cardigan	Masonry blockwork quay wall within the tidal estuary of the Afon Teifi	hard/man-made	Sea Wall	180		14-Sep-07			Ceredigion District Council	217700245870	217580245950
CER	A	A02	0	0	373	Quay wall at car park	Cardigan	Gabion wall caped by concrete coping. Wall forms boundary to quay front car park.	hard/man-made	Sea Wall	100		14-Sep-07			Ceredigion District Council	217580245950	217500246020
CER	A	A03	0	0	170	Cementry Quay Wall	Cardigan	Gabion wall within tidal recahes of the Afon Teifi	hard/man-made	Gabions	180		14-Jun-04	Moderate	10	Ceredigion District Council	217500246020	217310246080
CER	A	B01	0	0	386	Teifi Estuary river banks	Cardigan	Gently rising soil river banks along the Teifi Estuary. River bank alos protected by saltings and mudflats	soft/natural	Other	3100	102IA90330401C01	14-Jun-04			Ceredigion District Council	217310246080	216900248200
CER	A	C01	0	0	387	Coronation Drive	Cardigan	Along theis stretch of the Teifi Estuary the bank has been strengthend to support and prevent erosion of the B4548 highway	hard/man-made	Sea Wall	20	102IA90330401C01	14-Sep-07			Ceredigion District Council	216900248200	216880248210
CER	A	C02	0	0	388	Coronation Drive	Cardigan	Sloping masonry and concrete wall providing stability and erosion protection for coronation drive	hard/man-made	Sea Wall	60	102IA90330401C01	14-Jun-04	Moderate	15	Ceredigion District Council	216880248210	216820248240
CER	A	C03	0	0	389	Coronation Drive	Cardigan	sloping masonry/concrete wall with concretetoe on gabion foundation. Wall provides support and erosion protection for coronation drive	hard/man-made	Sea Wall	260	102IA90330401C01	14-Sep-07			Ceredigion District Council	216820248240	216600248420
CER	A	C04	0	0	390	Coronation Drive	Cardigan	Buttressed masonry and concrete wall providing support and erosion protection for coronation drive	hard/man-made	Sea Wall	50	102IA90330401C01	14-Sep-07			Ceredigion District Council	216600248420	216560248450
CER	A	C05	0	0	391	Coronation Drive	Cardigan	Gabion wall providing support and erosion protection for coronation drive	hard/man-made	Sea Wall	60	102IA90330401C01	14-Sep-07			Ceredigion District Council	216506248450	216520248480
CER	A	C06	0	0	392	Concrete Ramp	Cardigan	Mass concrete ramp providing access to estuary, there is a short section of rock armour stacked adjacent to the ramp to the west	hard/man-made	Other	8	102IA90330401C01	14-Sep-07			?	216520248480	216515248485
CER	A	C07	0	0	393	Pen yr Ergyd Sailing Club	Gwbert	Low soil bank with relatively high sand foreshore. New bank of cobbles/sand/earth man made in front of natural bank	hard/man-made	Other	150	102IA90330401C01	14-Sep-07			Private	216515248485	216450248530
CER	A	C08	0	0	341	Pen Yr Ergyrd Slipway	Gwbert	Random masonry wall either side of concrete slipway	hard/man-made	Sea Wall		102IA90330401C01	14-Sep-07			Private	216300248550	216240248530
CER	A	C09	0	0	281		Pen yr Egryd Peninsula		hard/man-made	Revetment	250	102IA90330401C01	14-Sep-07			Private	216240248530	216000248460
CER	A	D01	0	0	353	A487(T) road - right bank	Cardigan	Bridge abutment protection	hard/man-made	Revetment	20		19-May-04	Good	30	Ceredigion District Council	218218245984	218200245992
CER	A	D02	0	0	365	Saltings	Cardigan	Saltings in front of set back river bank	soft/natural	Other	20		19-May-04	Good		Ceredigion District Council	218200245992	218163245978
CER	A	D03	0	0	364	Hospital Wall	Cardigan	Stone masonry wall	hard/man-made	Sea Wall	50		19-May-04	Good	25	?	218163245978	218093245965
CER	A	D04	0	0	367	Church Wall	Cardigan	Stone masonry wall with vegetation growing through it	hard/man-made	Sea Wall	20		19-May-04	Poor	10	?	218093245965	218075245972
CER	A	D05	0	0	369	Gabions to car park	Cardigan	Gabion wall retaining car park above	hard/man-made	Gabions	50		19-May-04	Good	20	?	218075245972	218011245963
CER	A	D06	0	0	368	Slipway to car park	Cardigan	Concrete slipway	hard/man-made	Other	10		19-May-04	Moderate	15	?	218011245963	217996245965
CER	A	D07	0	0	374	Stone masonry wall	Cardigan	Stone masonry wall	hard/man-made	Sea Wall	20		19-May-04	Moderate	15	?	217996245965	217977245964
CER	A	D08	0	0	375	Stone masonry wall	Cardigan	Dry stone masonry wall	hard/man-made	Sea Wall	20		19-May-04	Poor	10	?	217977245964	217964245954
CER	A	D09	0	0	376	Stone masonry wall	Cardigan	Flat stone masonry wall	hard/man-made	Sea Wall	40		19-May-04	Poor	10	?	217964245954	217927245943
CER	A	D10	0	0	377	Slipway	Cardigan	Concrete slipway	hard/man-made	Other	10		19-May-04	Moderate	15	?	217927245943	217910245946
CER	A	D11	0	0	378	Stone masonry wall	Cardigan	Stone masonry wall	hard/man-made	Sea Wall	40		19-May-04	Poor	10	?	217910245946	217847245904

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CER	A	D12	0	0	379	Stone masonry wall	Cardigan	Stone masonry wall	hard/man-made	Sea Wall	50		14-Sep-07			?	217847245904	217783245853
CER	A	E01	0	0	380	A487(T) road – Left bank	Cardigan		hard/man-made	Revetment	30		19-May-04	Good	30	Ceredigion District Council	218192245859	218163245857
CER	A	E02	0	0	381	Gabion wall – Left bank	Cardigan	Gabion wall	hard/man-made	Gabions	150		19-May-04	Good	25	Ceredigion District Council	218163245857	217966245867
CER	A	E03	0	0	382	Slipway – Left bank	Cardigan	Concrete slipway	hard/man-made	Other	10		19-May-04	Moderate	15	Ceredigion District Council	217966245867	217961245865
CER	A	E04	0	0	383	Gabion wall – Left bank	Cardigan	Gabion wall	hard/man-made	Gabions	50		19-May-04	Moderate	25	Ceredigion District Council	217961245865	217866245793
CER	A	E05	0	0	384	Stone masonry wall – Left bank	Cardigan	Stone masonry wall with concrete parapet beam supporting footpath	hard/man-made	Sea Wall	30		19-May-04	Moderate	20	Ceredigion District Council	217866245793	217815245780
CER	A	E06	0	0	385	Stone masonry wall – Left bank	Cardigan	Stone masonry wall to house building	hard/man-made	Sea Wall	20		19-May-04	Moderate	15	Ceredigion District Council	217815245780	217789245784
CER	B	A01	0	0	282	Pen Yr Ergyd Peninsula	Gwbert	Accreting cobble peninsula at Pen Yr Egyrd	soft/natural	Other	150	102IA90330501C01	17-Sep-07			Ceredigion District Council	216000248620	216000248620
CER	B	A02	0	0	394	Pen yr Ergyd	Gwbert	Peninsula protected by 7 rock groynes (one recently built) plus a rock armour revetment extending from A03.	hard/man-made	Groynes	200	102IA90330501C01	14-Sep-07			Cyngor Sir Ceredigion	216000248620	216110248850
CER	B	A03	0	0	395	Pen yr Ergyd Rock Revetment	Gwbert	rock armour revetment to soil bank	hard/man-made	Revetment	80	102IA90330501C01	14-Sep-07			Ceredigion District Council	216110248850	216180248930
CER	B	A04	0	0	396	Gwbert Rock Revetment	Gwbert	rock armour revetment at base of stabilised soil slope	hard/man-made	Revetment	300	102IA90330501C01	14-Sep-07			Ceredigion District Council	216180248930	216220249260
CER	B	B01	0	0	283	Cliffs from Gwbert to Traeth Y Mwnt	Gwbert to Traeth Y Mwnt	High rocky cliffs with isolated cobbly bays, between Gwbert and Traeth Y Mwnt	hard/natural	Cliff	6100	102IA90340101C01	06-Apr-93	Good		Ceredigion District Council	216220249260	219400251860
CER	C	A01	0	0	284	Traeth Y Mwnt	Traeth Y Mwnt	High eroding and slipped cliff above sandy cove	soft/natural	Cliff	90	102IA90340201C01	14-Jun-04		15	National Trust	219400251860	219400251950
CER	D	A01	0	0	286	Cliffs from Traeth Y Mwnt to Aberporth	Traeth Y Mwnt to Aberporth	High rocky cliffs with isolated cobbley bays	hard/natural	Cliff	7000	102IA90350101C01	06-Apr-93			Ceredigion District Council	219400251950	225700251595
CER	E	A01	0	0	287	Masonry step block at Traeth Dolwen	Aberporth, Traeth Dolwen	Decorative curved masonry step block at wetern end of Traeth Dolwen Bay	hard/man-made	Other	15	102IA90350201C01	14-Jun-04	Moderate	15	Ceredigion District Council	225700251595	225700251580
CER	E	A02	0	0	397	Slipway	Aberporth to Traeth Dolwen	masonry and concrete slipway down to beach. Ramp constructred from masonry side wall and a concrete deck combinging with stream outlet	hard/man-made	Other	30	102IA90350201C01	14-Sep-07			Ceredigion District Council	225700251580	225690251560
CER	E	A03	0	0	398	Unprotected grass slope	Aberpoth to Traeth Dolwen	sloping grassed bank from road down to beach level. Slope generally stable with only minor erosion at toe. Gabion to over beach partly exposed in stream land slip stabilised with 15m timber retaining wall	hard/man-made	Other	35	102IA90350201C01	14-Sep-07			Ceredigion District Council	225690251560	225725251560
CER	E	A04	0	0	399	Traeth Dolwen Seawall	Aberporth to Traeth Dolwen	Reinforced concrete seawall	hard/man-made	Sea Wall	35	102IA90350201C01	14-Sep-07			Ceredigion District Council	225725251560	225760251540
CER	E	B01	0	0	400	Cliffs between bays at Aberporth	Aberporth	Rocky cliffs between Traeth Dolwen and Traeth Dyffryn	hard/natural	Cliff	240	102IA90350201C01	29-May-98	Moderate	10-50	Ceredigion District Council	225760251540	225860251430
CER	E	C01	0	0	401	Reinforced concrete seawall - West side of river channel	Aberporth, Traeth Dyffryn	High reinforced concrete seawall adjacent to river mouth. Wall supports and provodes erosion protection for main road through aberporth	hard/man-made	Sea Wall	30	102IA90350201C01	14-Sep-07			Ceredigion District Council	225860251430	225870251390
CER	E	C02	0	0	506	Masonry river channel wall	Aberporth to Traeth Dyffryn	Masonry wall forming eastern boundary of river channel. Wall backed by boat ramp down to beach and main road trough Aberporth	hard/man-made	Sea Wall	15	102IA90350201C01	14-Sep-07			Ceredigion District Council	225870251390	225880251395
CER	E	C03	0	0	403	Boat Ramp	Aberporth, Traeth Dyffryn	Ramp for boat access from main road to foreshore. Ramp deck formed from concrete.	hard/man-made	Other	5	102IA90350201C01	14-Jun-04	Moderate	10	Ceredigion District Council	225880251395	225885251395
CER	E	C04	0	0	404	Rock armour revetment and berm	Aberporth, Traeth Dyffryn	Rock armour revetment and berm at toe of soil coastal slope	hard/man-made	Other	90	102IA90350201C01	14-Sep-07			Ceredigion District Council	225885251395	225975251440
CER	E	C05	0	0	405	Main reinforced concrete seawall	Aberporth, Traeth Dyffryn	Reinforced concrete seawall with stepped apron at foot of soil coastal slope	hard/man-made	Sea Wall	55	102IA90350201C01	14-Sep-07			Ceredigion District Council	225975251440	226010251480
CER	E	D01	0	0	288	Cliffs for Aberporth to Tresaith	Aberporth	High rocky cliffs	hard/natural	Cliff	2400	102IA90350301C01	14-Jun-04			Ceredigion District Council	226010251480	227770251515
CER	F	A01	0	0	289	Rock armour at Tresaith	Tresaith	Rock aromour revetment at the toe of the coastal slope	hard/man-made	Revetment	90	102IA90350401C01	14-Sep-07			Ceredigion District Council	227770251515	227845251565
CER	F	A02	0	0	407	Tresaith Seawall	Tresaith	Reinforced concrete seawall with stepped apron	hard/man-made	Sea Wall	45	102IA90350401C01	14-Sep-07			Ceredigion District Council	227845251565	227885251595
CER	G	A01	0	0	290	Cliffs from Treath Saith to Traeth Penbryn	Treath Saith to Traeth Penbryn	High rocky cliffs	hard/natural	Cliff	1600	102IA90350501C01	14-Jun-04				227885251595	229010252300
CER	G	B01	0	0	291	Traeth Penbryn River Mouth	Traeth Penbryn	The river mouth at Traeth Penbryn has formed a gap in the cliffs. The access road to the beach terminates at this gap.	hard/man-made	Other	50	102IA90350601C01	14-Jun-04	Moderate	20+	National Trust	229010252300	229420252730
CER	H	A01	0	0	292	Cliffs from Traeth Penbryn to Llangranog	Traeth Penbryn to Llangranog	High rock cliffs with occasional isoalted sandy bays	hard/natural	Cliff	2600	102IA90350701C01	14-Jun-04			Ceredigion District Council	229420252730	230975254160
CER	H	B01	0	0	294	Boat Ramps	Llangranog	2 concrete boat ramps and a stream outfall at western end of Llangranog adjacent to cliffs	hard/man-made	Other	7	102IA90360201C01	14-Sep-07			Ceredigion District Council	230975254160	230980254165
CER	H	B02	0	0	408	Llangranog Frontage	Llangranog	Grouted cobble apron/revetment to cncrete pavement at road level	hard/man-made	Revetment	100	102IA90360201C01	14-Sep-07			Ceredigion District Council	230980254165	231090254215
CER	H	B03	0	0	409	Seafront Café	Llangranog	low wall fronting beach front café	hard/man-made	Other	30	102IA90360201C01	14-Sep-07			Ceredigion District Council / Private	231090254215	231100254220
CER	H	C01	0	0	295	Cliffs north of Llangranog	Llangranog	High rocky cliffs with some small isolated bays but no real beaches	hard/natural	Cliff	1600	102IA90360301C01	14-Sep-07			Ceredigion District Council	231100254220	231500255750
CER	I	A01	0	0	296	Cliffs between Ynys Lochtyn and Cwmtydu	Cliffs between Ynys Lochtyn and Cwmtydu	High rocky cliff faces with some small isdolated bays, but with no real beaches	hard/natural	Cliff	5800	102IA90370101C01	25-Feb-93	Moderate		Ceredigion District Council	231500255750	235560257520
CER	I	B01	0	0	297	Cwmtydu Seawall	Cwmtydu	Reinforced concrete wave wall and revetment fronting car park and road at Cwmtydu	hard/man-made	Sea Wall	100	102IA90370201C01	14-Sep-07			Ceredigion District Council	235560257520	235640257540
CER	I	C01	0	0	298	Cliffs east fo New Quay	Cwmtydu to New Quay Head	High rocky cliff faces with some small isolated sandy bays	hard/natural	Cliff	4600	102IA90370301C01	26-Feb-93			Ceredigion District Council	235640257540	238750260480

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CER	J	A01	0	0	299	East Cliff Face	New Quay Head	Wathered rock cliff face with several metres of soil overburden	hard/natural	Cliff	300	102IA90380101C01	14-Jun-04	Moderate	12	Ceredigion District Council / Private	238750260480	238900260200
CER	J	A02	0	0	410	Outfall Bunker	New Quay Head	masory encasement of outfall M.H.	hard/man-made	Other	15	102IA90380101C01	14-Jun-04	Poor	5	Ceredigion District Council	238900260200	238900260185
CER	J	A03	0	0	411	Traeth-y-Dolau	New Quay	Rock revetment, berm and acces ramp at the toe of soil coastal slope	hard/man-made	Revetment	120	102IA90380101C01	14-Jun-04	Fair	18	Ceredigion District Council	238900260185	238970260115
CER	J	A04	0	0	412	Traeth-y-Dolau East Cliff	New Quay	Rock cliff face capped by soil overburden and a variety of masonry walls and private properties	hard/man-made	Other	50	102IA90380101C01	14-Jun-04	Moderate	10	Ceredigion District Council / Private	238920260115	239015260130
CER	J	A05	0	0	300	Seaward Side, Stone Pier	Newquay Harbour	Stone Pier formed from masonry revetment with concrete facing in places and rock aromour toe at distal end, revetment topped by masonry wave wall.	hard/man-made	Other	160	102IA90380201C01	14-Sep-07			Ceredigion District Council	239015260130	239165260140
CER	J	B01	0	0	413	Harbour Side, Stone Pier	New Quay Harbbour	Inner face of stone pier	hard/man-made	Other	200	102IA90380201C01	14-Sep-07			Ceredigion District Council	239165260140	239020260090
CER	J	B01	1	0	414	Jetty	New Quay	Working jetty at end of the old stone pierprotected by rock on the east side	hard/man-made	Sea Wall	35	102IA90380201C01	12-Sep-97	Fair	>50	Ceredigion District Council	239155260130	239165260100
CER	J	B02	0	0	415	Inner harbour seawalls	New Quay Harbour	Masonry and concrete reatining walls on cliff face of New Quay inner harbour	hard/man-made	Sea Wall	140	102IA90380201C01	14-Jun-04	Moderate	8-10	Ceredigion District Council	239010260090	238990259950
CER	J	B03	0	0	416	RNLI Tractor Ramp	New Quay Harbour	Masory blockwork retaining wall fronting RNLI tractor ramp	hard/man-made	Sea Wall	90	102IA90380201C01	14-Jun-04	Moderate	10	Ceredigion District Council / RNLI	238990259950	239035259885
CER	J	B04	0	0	417	RNLI Station	New Quay Harbour	RNLI station with steel piled launching ramp	hard/man-made	Other	25	102IA90380201C01	14-Jun-04	Good	20+	RNLI	239035259885	239020259870
CER	J	B05	0	0	418	Penpolion Jetty	New Quay Harbour	The origincal jetty was constructed from large masonry blockwork, this was encased in erinforced concrete in 1984, the jetty also has rock armouring on it's seaward side	hard/man-made	Other	70	102IA90380201C01	14-Sep-07			Ceredigion District Council	239035259900	239095259870
CER	J	B06	0	0	419	South End Wall	New Quay Harbour	Low masory blockwork wall at base of cliffs	hard/man-made	Sea Wall	60	102IA90380201C01	14-Jun-04	Moderate	10	Ceredigion District Council	239020259870	239020259810
CER	J	C01	0	0	301	Rock Cliffs South of New Quay	Newquay Bay		hard/natural	Cliff	300	102IA90380301C01	14-Jun-04	Fair	10	Ceredigion District Council	239020259810	239300259520
CER	J	C02	0	0	420	New Quay Bay Cliffs	New Quay Bay	Wooded soil clifff faces showing signs of slipping and erosion.	soft/natural	Cliff	580	102IA90380301C01	14-Jun-04	Poor	1	Private	239300259520	239880259500
CER	J	C03	0	0	421	Ramp	New Quay Bay	Concrte ramp for wehicle access to foreshore	hard/man-made	Other	10	102IA90380301C01	14-Jun-04	Poor		Private	239880259500	239890259505
CER	J	C04	0	0	422	Cliffs West of Llanina Point	New Quay Bay	Near vertical soil cliffs with many signs of slippage and erosion	soft/natural	Cliff	650	102IA90380301C01	14-Jun-04	Bad	0	Ceredigion District Council	239890259505	240460259900
CER	K	A01	0	0	302	Llanina Point	Little Quay Bay	Reinfirced concrete terminal structure with rock filled steel crib groyne at mouth of Afon Llethi river	hard/man-made	Sea Wall	40	102IA90390101C01	14-Sep-07			Ceredigion District Council	240460259900	240500259200
CER	K	A02	0	0	423	Llanina Point Headland	Little Quay Bay	Heavily wooded low soil cliffs fronting beach, 15m of gabions and rock protection at Afon Llethi outfall	soft/natural	Cliff	40	102IA90390101C01	14-Sep-07			Ceredigion District Council	240500259200	240540259930
CER	K	A03	0	0	424	Llanina Point Headland	Litle Quay Bay	rock armour revetement to toe of unstable soil cliff	hard/man-made	Revetment	70	102IA90390101C01	14-Jun-04	Moderate	10	Ceredigion District Council	240540259930	240610259920
CER	K	A04	0	0	425	Cribwork Groyne Field	Little Quay Bay	In additon to the rock armour revetment the Llanina Point Headland is also protecte by a combination of steel breastworks and groynes	hard/man-made	Groynes	90	102IA90390101C01	14-Sep-07			Ceredigion District Council	240610259920	240630259850
CER	K	B01	0	0	426	Cei Beach Bay	Little Quay Bay	Heavily wooded low soil cliffs fronting beach	soft/natural	Cliff	280	102IA90390101C01	14-Jun-04			Ceredigion District Council	240630259850	240900259760
CER	K	C01	0	0	303	Cei Bach Access Road	Cei Bach	timber groynes fronting bitmac access road, seaward of egde of road protected by rock armour	hard/man-made	Groynes	65	102IA90390201C01	14-Sep-07			Ceredigion District Council	240900259760	240965259760
CER	K	C02	0	0	427	Cei Bach Mid Span	Cei Bach	Timber groyne field fronting rock revetment and beach access road	hard/man-made	Groynes	75	102IA90390201C01	14-Sep-07			Ceredigion District Council	240965259760	241030259760
CER	K	C03	0	0	429	Cei Bach - Concrete Hardstanding	Cei Bach	concrte hardstanding area at base of cliffs. Concrete fronted by rock armour and timber groyne field	hard/man-made	Groynes	55	102IA90390201C01	14-Sep-07			Ceredigion District Council	241030259760	241085259760
CER	K	D01	0	0	430	Cliffs north of Cei Bach	Cei Bach	Soft cliff face with a sandy beach, possibly made of boulder clay	soft/natural	Cliff	100	102IA90390301C01	14-Jun-04			Ceredigion District Council	241085259760	241170259780
CER	K	D02	0	0	431	Cliffs south of Glifach-yr-Halen	Little Quay Bay	High rocky cliffs with small shingle beaches	hard/natural	Cliff	2500	102IA90400101C01	12-Sep-97	Poor	10-50	Ceredigion District Council	241085259760	243260261250
CER	L	A01	1	0	305	West Cliffs	Gilfach yr Halen	Steeply sloping rocky cliffs with eooded soil overburden slipped at many locations and is being eroded	hard/natural	Cliff	230	102IA90400101C01	01-Mar-93	Poor	5	Ceredigion District Council	243260261250	243520261350
CER	L	A01	2	0	305	West Cliffs	Gilfach yr Halen	Steeply sloping rocky cliffs with eooded soil overburden slipped at many locations and is being eroded	hard/natural	Cliff	230	102IA90400101C01	01-Mar-93	Poor		Ceredigion District Council	243260261250	243520261350
CER	L	B01	0	0	432	East Cliff	Gilfach-yr-Halen	High cobbly soil cliffs with cobble/shingle beaches	soft/natural	Cliff	300		12-Sep-97	Fair	10-50	Ceredigion District Council	243520261350	243700261550
CER	L	C01	0	0	433	Ffos Y Ffin Cliffs	Ffos Y Ffin	High rocky cliffs with variable thickness soil overburden. Cliffs generally eroding and fronted by small cobble beaches.	hard/natural	Cliff	1600	102IA90400101C01	12-Sep-97	Fair	>50	Ceredigion District Council	243700261550	244900262580
CER	L	D01	0	0	306	South Beach	Aberaeron	High rocky cliffs with variable soil overburden, cliffs fronted by narrow cobble beach and overburden showing serious signs of slippage and erosion	soft/natural	Cliff	300	102IA90400201C01	14-Jun-04	Moderate	20	Ceredigion District Council	244900262580	245180262590
CER	L	D02	1	0	307	South Beach	Aberaeron	Timber groynes ronting high soil cliff faces, toe of cliffs protected by rock armour	hard/man-made	Groynes	200	102IA90400202C01	14-Jun-04	Moderate	15	Ceredigion District Council	245180262590	245300262770
CER	L	D02	2	0	307	South Beach	Aberaeron	Timber groynes ronting high soil cliff faces, toe of cliffs protected by rock armour	hard/man-made	Groynes	200	102IA90400202C01	14-Jun-04	Poor	11	Ceredigion District Council	245180262590	245300262770
CER	L	D03	0	0	308	South Beach	Aberaeron	timber groynes fronting shingle bank, beach protected on northern end by Aberaeron South Pier	hard/man-made	Groynes	300	102IA90400203C01	16-Jun-04	Moderate	3-5	Ceredigion District Council	245300262770	245430263000

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CER	L	E01	2	0	434	South Pier	Aberaeron	Masonry blockwork pier on south side of Afon Aeron,. Pier forms entrance to harbour.	hard/man-made	Other	120	102IA90410101C01	14-Jun-04	Poor	10	Ceredigion District Council	245430263000	245495262975
CER	L	E01	1	0	434	South Pier	Aberaeron	Masonry blockwork pier on south side of Afon Aeron,. Pier forms entrance to harbour.	hard/man-made	Other	120	102IA90410101C01	14-Jun-04	Poor	5	Ceredigion District Council	245430263000	245495262975
CER	L	F01	0	0	435	South Pier Inner Harbour Return Wall	Aberaeron	Return wall of south pier, constructed from masonry blockwork with thick concrete coping/deck slab used as a mooring point	hard/man-made	Sea Wall	50	102IA90410101C01	14-Jun-04	Fair	15	Ceredigion District Council	245495262975	245460262930
CER	L	F02	0	0	436	Dock Bach	Aberaeron	Reinforced concrete harbour wall plus Reinforced concrete launcing ramp	hard/man-made	Sea Wall	50	102IA90410101C01	14-Jun-04	Fair	15	Ceredigion District Council	245460262930	245490262900
CER	L	F03	0	0	437	Bell Vue Terrace river wall	Aberaeron	Grouted masonry river wall with occasional reinforced concrete underpinning	hard/man-made	Sea Wall	140	102IA90410101C01	14-Jun-04	Moderate	10	Ceredigion District Council	245586262875	245700262820
CER	L	F03	1	0	438	F03(a) Vulcan Place Harbour Wall	Aberaeron	Sheet pile toe, concrte base, masonry/concrete wall	hard/man-made	Sea Wall	100	102IA90410101C01	14-Jun-04	Good	20	Ceredigion District Council	245490262900	245586262875
CER	L	F04	0	0	439	Aberaeron Spending Beach	Aberaeron	Shingle/cobble spending beach for wave activity within Aberaeron Harbour. Rock armour revetment to protect promenade.	soft/natural	Other	20	102IA90410101C01	14-Jun-04	Fair	20	Ceredigion District Council	245700262820	245720262830
CER	L	F05	0	0	440	South Bank Picnic Area	Aberaeron	Shingle/cobble bank on south side of Afon Aeron	soft/man-made	Embankment	80	102IA90410101C01	14-Jun-04	Moderate	7	Ceredigion District Council	245720262830	245800262830
CER	L	F06	0	0	441	North Side River Wall	Aberaeron	Masonry river wall at rear of private housing	hard/man-made	Sea Wall	65		15-Mar-09	Moderate	10	Ceredigion District Council / Private	245810262840	245750262860
CER	L	F07	0	0	442	Pwll Cam	Aberaeron	The outer erosion protection of Pwll Cam is formed from a rock armour revetment, the inner walls are formed from reinforced concrete reatining walls	hard/man-made	Revetment	100		14-Jun-04	Fair	15	Ceredigion District Council	245750262860	245685262890
CER	L	F08	0	0	443	Afon Aeron North Wall	Aberaeron	High masonry river wall fronting road and private housing. Wall suffered major collapse in 1990.	hard/man-made	Sea Wall	190	102IA90410103C01	14-Jun-04	Fair	15	Ceredigion District Council	245680262890	245520262990
CER	L	F09	0	0	444								12-Sep-97	Moderate	10-50	Ceredigion District Council	245520262990	245510263010
CER	L	G01	0	0	312	Aberaeron North Beach 2009 defences	Aberaeron	New defences being constructed at Aberaeron North Beach (2009). This includes a rock revetment for the entiore frontage, 8 timber grouynes and one rock groyne.	hard/man-made	Revetment	630	102IA90420101C01	16-Sep-09	Good		Ceredigion District Council	245510263010	245630263110
CER	M	A01	0	0	445	Cliffs south of Aberarth	Aberaeron to Aberarth	Low soil cliffs fronted by cobble beach	soft/natural	Cliff	1500	102IA90420201C01	16-Jun-04			Ceredigion District Council	246220263470	247650263850
CER	M	B01	0	0	446	Aberarth Breastworks	Aberarth	Previously eroding soft cliff now protected by Bull Head Rail Breastwork filled with rock armour and ronted by timber groyne field.	hard/man-made	Other	253	102IA90420201C01	17-Sep-07			Ceredigion District Council	247650263850	247840264020
CER	M	B02	0	0	447	Afon Arth Training Wall	Aberarth	Afon Arth training wall constructed from bull head ring cribwork with rock armour fill. There is a timber groyne which is attached at the landward end, to the crib groyne.	hard/man-made	Other	60	102IA90420201C01	14-Sep-07			Ceredigion District Council	247840264020	247880264080
CER	M	B03	0	0	448	Aberath east river training arm	Aberarth	Timber river wall acting as east bank training arm for Afon Arth. There is a small amount of rock armour at the end of the timber wall.	hard/man-made	Sea Wall	30	102IA90420201C01	14-Sep-07			Ceredigion District Council	247860264010	247880264030
CER	M	B04	0	0	449	North Seawall	Aberarth	Reinforced concrete retaining wall as seawall/floodwall	hard/man-made	Sea Wall	60	102IA90420201C01	14-Sep-07			Ceredigion District Council	247880264030	247920264080
CER	M	C01	0	0	450	Cliffs north of Aberarth	Aberarth	High rock cliffs with narrow cobbley beaches, part of the fomrtage is boulder clay cliffs that are eroding.	hard/natural	Cliff	2900	102IA90420301C01	14-Jun-04			Ceredigion District Council	247920264080	249830265750
CER	N	A01	0	0	451	Cliffs south of Llanon	Llanon	low soil cliffs fronting wide coibble beaches with isolated sandy areas	soft/natural	Cliff	600	102IA90420301C01	14-Jun-04			Ceredigion District Council	249830265750	250180266310
CER	N	A02	0	0	452	Cliffs south of Llanon	Llanon	Concrete mark pictured and should be used to monitoring erosion. Falling farm fences caused by cliff erosion.	soft/natural	Other	340	102IA90420401C01	14-Jun-04			Ceredigion District Council	250180266310	250450266500
CER	N	A03	0	0	453	Cliffs at Llanon	Llanon	Low soil cliffs fronted by wide cobble beaches with isolated sandy area. Stabilisation of foreshore aided by barnacle deposits	soft/natural	Cliff	900	102IA90420401C01	14-Jun-04			Ceredigion District Council	250450266500	250960267550
CER	N	A04	0	0	454			low soil cliffs north of Llanon. Liffs fronted by wide cobble beaches and backed by non-developed pasture land	soft/natural	Cliff	600	102IA90420401C01	14-Jun-04			Ceredigion District Council	250450266500	250960267550
CER	O	A01	0	0	318	Cliffs north of Llanon	Llanon	low soil cliffs fronted by stable cobble banks, with wide cobble beaches	soft/natural	Other	70	102IA90420501C01	14-Jun-04			Ceredigion District Council	251220268150	251850268390
CER	O	B01	0	0	455	Cliffs south of Llanrhystud	Llanon to Llanrhystud	eroding soil cliffs fronted by wide cobble beaches with isolated sandy stretches	soft/natural	Cliff	650	102IA90420501C01	14-Jun-04			Ceredigion District Council	251850268390	252350268850
CER	O	C01	0	0	456	Coast south of Llanrhystud	Llanrhystud	Cobble bank fronting low lying grassland, cobble bank fronted by wide stretch of sandy beach	soft/natural	Other	580	102IA90420501C01	14-Jun-04			Ceredigion District Council	252350268850	252460269380
CER	O	C02	1	0	457	Coast south of River	Llanrhystud	cobble bank fronting holiday caravan park. Bank fronted by wide sandy beach	soft/natural	Other	280	102IA90420501C01	14-Jun-04			Ceredigion District Council	252460269380	252500269640
CER	O	C02	0	0	457	Coast south of River	Llanrhystud	cobble bank fronting holiday caravan park. Bank fronted by wide sandy beach	soft/natural	Other	280	102IA90420501C01	14-Jun-04	Moderate	10	Ceredigion District Council	252460269380	252500269640
CER	O	C03	0	0	458	Morfa Frontage	Llanrhystud	Cobble bank at mouth of Afon Wyre. Bank fronted by cobbleyy beach, and backed by holiday caravan park	soft/natural	Other	160	102IA90420501C01	14-Jun-04			Ceredigion District Council	252500269640	252560269770
CER	O	D01	0	0	459	Cliffs north of Llanrhystud	Llanrhystud	soil cliffs on north side of the Afon Wyre. Cliffs fronted by cobble bech and backed by open grassland	soft/natural	Cliff	1300	102IA90420601C01	14-Jun-04			Ceredigion District Council	252560269770	253500270780
CER	P	A01	0	0	460	Cliffs south of Aberystwyth	Llanrhystud to Aberystwyth	High rocky cliffs with isolated cobbley and sandy bays	hard/natural	Cliff	9600	102IA90430101C01	29-May-98	Fair	10-50	Ceredigion District Council	253500270780	257680279620
CER	Q	A01	0	0	321	Tan y Bwlch Beach	Aberystwyth	Gradually rising cobbley beach / becoming sandy northwards. Beach fronted by low soil bank and backed by grasslands.	soft/natural	Other	550	102IA90440101C01	14-Jun-04		8	Ceredigion District Council	257680279620	258020280040

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CER	Q	A02	0	0	322	Tan y Bwlch Breastwork	Aberystwyth	Reinforced concrete seawall and deck. Seawall porevets erosion of cobble bank opposite bend in Afon Ystwyth	hard/man-made	Sea Wall	100	102IA90440101C02	14-Jun-04	Moderate	10	Ceredigion District Council	258020280040	258020280140
CER	Q	A03	0	0	323	North end of Tan y Bwlch beach	Aberystwyth	Cobble bank with access road, fronted by gradually rising cobble beach. Bank backed by Afon Ystwyth river channel	soft/natural	Other	450	102IA90440101C03	14-Jun-04			Ceredigion District Council	258020280140	257960280580
CER	Q	A04	0	0	461	South Pier Breastwork - Tan y-Bwlch	Aberystwyth	Erosion protection adjacent to the south side of the south pier. Protection frpmer from 3 bull head ring piled walls with rock armour infill. Walls being perpendicular to pier and parallell to beach.	hard/man-made	Other	120	102IA90440101C03	14-Jun-04	Moderate	10	Ceredigion District Council	257960280580	257870280730
CER	Q	B01	0	0	324	Old stone pier - south side	Aberystwyth	Stone pier forms the southern training arm for the Ystwyth and Rheidol rivers. Thus prooviding protection for the whole of Aberystwyth Harbour. It is constructed from masonry blockwork and has a variety of toe protections.	hard/man-made	Other	140	102IA90440201C01	14-Jun-04	Fair	15	Ceredigion District Council	257870280730	257780280820
CER	Q	B02	0	0	462	Old stone pier - north side	Aberytwyth	The original masonry blockwork of the old stone pier has been encased in eriforced concrete on the north side.	hard/man-made	Other	150	102IA90440201C01	14-Jun-04	Fair	15	Ceredigion District Council	257780280820	257900280740
CER	Q	B03	0	0	463	Inner end of old stone pier	Aberystwyth	The inner end of the Old Stone Pier has not been encased and the original masonry construction remains exposed	hard/man-made	Other	100	102IA90440201C01	14-Jun-04	Fair	15	Ceredigion District Council	257900280740	257970280690
CER	Q	C01	0	0	464	Masonry river wall - east side	Aberystwyth	Masonry blockwork river wall - as well as its coast protection beneifts this wall also provides support to Pen yr Angor road and bridge	hard/man-made	Sea Wall	50	102IA90440201C01	14-Jun-04	Moderate	10	Ceredigion District Council	257980280700	257990280750
CER	Q	C02	0	0	465	Boat House bank at Pen yr Angor	Aberystwyth	Low soil bank fronting main highway and boat house. Bank directly opposite main harbour entrance, therefore exposed to wave action and eroding	soft/natural	Other	150	102IA90440201C01	14-Jun-04	Poor	5	Ceredigion District Council	257990280750	258010280910
CER	Q	C03	0	0	467	Pen yr Angor walls	Aberystwyth	Masonry blockwork wall with timber fendering fromting private housing	hard/man-made	Sea Wall	80		14-Jun-04	Poor	5	Ceredigion District Council	258010280910	258060280960
CER	Q	C04	0	0	468	Marina Wall South	Aberystwyth	marina walls	hard/man-made	Revetment	240		14-Jun-04	Fair	20	Ceredigion District Council	258066280960	258180281150
CER	Q	C05	0	0	154	Marina North	Aberystwyth	Marina walls	hard/man-made	Revetment	120		14-Jun-04	Fair	20	Ceredigion District Council	258180281150	258130281250
CER	Q	C06	0	0	469	Marina Slipway	Aberytwyth	Boast slipway	hard/man-made	Other	100		14-Jun-04	Fair	20	Ceredigion District Council	258130281250	258230281290
CER	Q	D01	0	0	470	Town Quay, Harbour Side North End	Aberystwyth	Masonry harbour wall at north end of Town Quay. Its distal end forms the western entrance wall to 'The Gap' inner harbour.	hard/man-made	Sea Wall	30		14-Jun-04	Moderate	17	Ceredigion District Council	258090281270	258070281240
CER	Q	D02	0	0	471	Towwn Quay Harbour Side Mid Length	Aberystwyth	Masory harbour wall to harbour side of town quay, wall formed from small masory blocks, severa; have become dislodged causing voiding of main body.	hard/man-made	Sea Wall	130		14-Jun-04	Poor	3	Ceredigion District Council	258070281240	258040281120
CER	Q	D03	0	0	472	Town Quay Harbour Side South End	Aberystwyth	The outer length of the original masonry blockwork has been encased in reinforced concrete in 1986	hard/man-made	Sea Wall	120		14-Jun-04	Fair	20+	Ceredigion District Council	258040281120	258000281000
CER	Q	D04	0	0	473	Town Quay Ramp	Aberystwyth	Reinforced concrte acess ramp from town quay to harbour	hard/man-made	Other	30		14-Jun-04	Fair	20+	Ceredigion District Council	258000281000	257980280980
CER	Q	D05	0	0	474	Town Quay Harbour Side South End	Aberystwyth	Distal end of Town Quay, Harbour Side wall formed from large masonry blockwork	hard/man-made	Sea Wall	30		14-Jun-04	Moderate	20+	Ceredigion District Council	257980280980	257970280950
CER	Q	D06	0	1	475	Timber Jetty	Aberystwyth	Timber jetty as southern extension of Town Quay. Seaward side of jetty protecte by concrete foundations to original jetty and andditional rock armouring	hard/man-made	Other	150	102IA90440201C01	14-Jun-04	Moderate	10	Ceredigion District Council	257970280950	257920280950
CER	Q	D06	0	0	475	Timber Jetty	Aberystwyth	Timber jetty as southern extension of Town Quay. Seaward side of jetty protecte by concrete foundations to original jetty and andditional rock armouring	hard/man-made	Other	150	102IA90440201C01	14-Jun-04	Moderate	20+	Ceredigion District Council	257970280950	257920280950
CER	Q	E01	0	0	476	Tow Quay - Seaward Side Southern End	Aberystwyth	Squared masory blockwork wall with reinforced cncrete underpinning. Wall cracked in places but generaly in good condition.	hard/man-made	Sea Wall	80	102IA90440201C01	14-Jun-04	Bad	0	Ceredigion District Council	257920280950	257970281040
CER	Q	E02	0	0	477	Town Quay - Seaward Side North End	Aberystwyth	Along the length of this frontage the masonry blockwork of has been replaced bey mass concrete blockwork	hard/man-made	Sea Wall	200	102IA90440201C01	14-Jun-04	Poor	5	Ceredigion District Council	257970281040	258020281240
CER	Q	E03	0	0	478	South Marine Terrace - South End	Aberystwyth	The original masonry wall along South Marin Terrace has been replace by a reinforced concrete retaining wall with masonry facing.	hard/man-made	Sea Wall	38	102IA90440201C01	14-Jun-04	Moderate	16	Ceredigion District Council	258020281240	258010281275
CER	Q	E04	0	0	479	South Marine Terrace	Aberystwyth	Small randomly coursed masory blockwork wall with massive caping ston. Wall in poor condition when exspoed	hard/man-made	Sea Wall	100	102IA90440201C01	14-Jun-04	Moderate	16	Ceredigion District Council	258010281275	257970281370
CER	Q	E05	1	0	480	South Marine Terrace	Aberystwyth	Squared masory blockwork seawall founded on bedrock. Also groynes	hard/man-made	Sea Wall	273	102IA90440201C01	14-Jun-04	Poor	5	Ceredigion District Council	257970281370	257840281610
CER	Q	E05	0	0	480	South Marine Terrace	Aberystwyth	Squared masory blockwork seawall founded on bedrock. Also groynes	hard/man-made	Sea Wall	273	102IA90440201C01	14-Jun-04	Fair	20+	Ceredigion District Council	257970281370	257840281610
CER	Q	F01	0	0	481	Seawall opposite Univeristy College	Aberystwyth	Squared masonry blockwork wall founded on bedrock	hard/man-made	Sea Wall	336	102IA90450101C01	14-Jun-04	Moderate	12	Ceredigion District Council	257840281610	258130281780

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CER	Q	F02	0	0	482	Marine Terrace Seawall (South End)	Aberystwyth	Squared masonry blockwork seawall with reinforced concrete underpinning / apron and concrete groynes	hard/man-made	Sea Wall	270	102IA90450201C01	14-Jun-04	Poor	10	Ceredigion District Council	258130281780	258300281990
CER	Q	F03	0	0	326	Band Stand	Aberystwyth	Protection over this length rpovided by reinforced cocnrete seawall supporting Band Stand on Marin Terrace	hard/man-made	Sea Wall	10	102IA90450201C01	14-Jun-04	Poor	10	Ceredigion District Council	258300281990	258310282010
CER	Q	F04	0	0	483	Marin Terrace seawall (North End)	Aberystwyth	Squared masonry blockwork seawall	hard/man-made	Sea Wall	260	102IA90450201C01	14-Jun-04	Poor	10	Ceredigion District Council	258310282010	258310282270
CER	Q	F04	1	0	483	Marin Terrace seawall (North End)	Aberystwyth	Squared masonry blockwork seawall	hard/man-made	Sea Wall	260	102IA90450201C01	14-Jun-04	Moderate	13	Ceredigion District Council	258310282010	258310282270
CER	Q	F05	0	0	484	Victoria Terrace Ramp	Aberystwyth	Protection formed by a reinforced concrete ramp fronting a concrete seawall. Frontage also protected by groyne field	hard/man-made	Other	30	102IA90450201C01	14-Jun-04	Moderate	10	Ceredigion District Council	258310282270	258310282300
CER	Q	F06	0	0	485	Victoria Terace Seawall	Aberystwyth	Squared masonry blockwork seawall with steel sheet piling, reinforced concrete apron. This length of seawall rebuilt in 1938 following collapse of orignial wall. Frotnage also protected by groyne field.	hard/man-made	Sea Wall	120	102IA90450201C01	14-Jun-04	Moderate	12	Ceredigion District Council	258310282300	258310282420
CER	Q	F07	0	0	486	Victoria Terrace Sea Wall (North End)	Aberystwyth	Squared masonry blockwork sewall with steel sheet piling toe, seawall replaced originall waall which collapsed in 1938. Frontage also protected by groyne field.	hard/man-made	Sea Wall	51	102IA90450201C01	14-Jun-04	Moderate	12	Ceredigion District Council	258310282420	258320282470
CER	Q	F08	0	0	488	North Extension to Victoria Terrace	Aberystwyth	Reinforced concrete seawall with bull head rail pile fondation and masonry facing. Also groynes	hard/man-made	Sea Wall	42	102IA90450201C01	14-Jun-04	Moderate	12	Ceredigion District Council	258320282470	258290282510
CER	Q	G01		0	327	Constitution Hill	Aberystwyth	High rocky cliffs fronted by narrow beaches at low tide. Cliffs generally eroding and backed by grassland	hard/natural	Cliff	1200	102IA90460101C01	23-Mar-93			Ceredigion District Council	258290282510	258730283540
CER	R	A01	0	0	489	South Cliff stabilisation work	Clarach	Tomprevent furtehr erosion and insability along a gap in the cliffs a concrete stub wall was built. This wall is butressed and faced with cobbles	hard/man-made	Sea Wall	5	102IA90460101C01	14-Jun-04			Ceredigion District Council	258730283540	258735283540
CER	R	A02	0	0	490	South Cliffs	Clarach	High rocky cliffs backed by scrubland and forestry	hard/natural	Cliff	30	102IA90460101C01	14-Jun-04			Ceredigion District Council	258735283540	258750288360
CER	R	B01	0	0	328	Cobble wall at south end	Clarach	Low cobble wall at foot of cliffs of unsubstantial construction and offering little protection	hard/man-made	Sea Wall	5	102IA90460201C01	14-Jun-04	Moderate	10	Ceredigion District Council	258750288360	258750283605
CER	R	B02	0	0	329	Caravan Park Wall	Clarach	concrete block wall on concrete foundation	hard/man-made	Sea Wall	20	102IA90460202C01	14-Jun-04	Moderate	10	Private	258750283605	258750283625
CER	R	B03	0	0	491		Clarach	Mortared cobble facing to soil embankment. Front face protected by ligtweight plywood timbers.	hard/man-made	Sea Wall		102IA90460202C01	14-Jun-04	Poor	8	Private	258750283625	258750283640
CER	R	B04	0	0	493	Public house seawall	Clarach	vertical concrte seawall fronting public house	hard/man-made	Sea Wall	30	102IA90460202C01	14-Jun-04	Moderate	10	Ceredigion District Council / Private	258750283640	258750283670
CER	R	B05	0	0	494	Timber Breastwork Clarach	Clarach	Breastworks formed from close fitting timbers backed by soil embankemnt	hard/man-made	Sea Wall	100	102IA90460202C01	14-Jun-04	Poor	5	Ceredigion District Council / NRA	258750283670	258730283750
CER	R	B06	0	0	495	Clarach Breastworks north end	Clarach	Redundant timber breastworks fronting soil bank	hard/man-made	Sea Wall	220	102IA90460202C01	14-Jun-04			Ceredigion District Council / NRA	258730283750	258700283940
CER	R	B07	0	0	496	Afon Clarach Estuary	Clarach	Rock armour protection to the banks of the Afon Clarach	hard/man-made	Other	25	102IA90460202C01	14-Jun-04			Ceredigion District Council / NRA	258700283940	258700283950
CER	R	B08	0	0	330	North Bank	Clarach	Low soil bank fronting car parking areas	soft/natural	Other	100	102IA90460203C01	14-Jun-04			Ceredigion District Council	258700283950	258660284050
CER	R	B09	0	0	497	North End Wall	Clarach	Seawall formed from steel sheet piling with concrete capping deck. Abrasion and rusting of the piles has seriously wekened the defence	hard/man-made	Sea Wall	40	102IA90460203C01	14-Jun-04	Moderate	8	Private	258660284050	258640284100
CER	R	B10	0	0	498	Commercial buildings	Clarach	Seaward face of beach front commerciaal propertyforms coastal protection	hard/man-made	Sea Wall	15	102IA90460203C01	14-Jun-04	Fair	10	Private	258640284100	258635284115
CER	R	B11	0	0	499	Commercial Buildings	Clarach	Protection formed from concrete blockwork wall of beach front commercial property	hard/man-made	Sea Wall	5	102IA90460203C01	22-Jan-98	Fair	10-50	Private	258635284115	258633284112
CER	R	C01	0	0	331	Cliffs form Clarach to Wallog	North of Clarach	High rocky cliffs with occasional eroded cobbley bays. Cliffs backe by open grass amd scrubland	hard/natural	Cliff	1500	102IA90460301C01	14-Jun-04			Ceredigion District Council	258633284112	258820285580
CER	S	A01	0	0	332	South Cliffs	Wallog	High Stable Rock Cliffs	hard/natural	Cliff	100	102IA90460401C01	14-Jun-04			Ceredigion District Council	258820285580	259000285620
CER	S	A02	0	0	500	Seawall and spit	Wallog	High masonry seawall at base of cliffs and private housing	hard/man-made	Sea Wall	100	102IA90460401C01	14-Sep-07			Ceredigion District Council	259000285620	259040285700
CER	S	A03	0	0	501	River Outfall	Wallog	The stream at Wallog exits viaa gap in the cliffs. At either side of this gap are stable rock cliffs, and spanning the gap is a poorly maintained masonry bridge.	hard/man-made	Sea Wall	50	102IA90460401C01	14-Jun-04	Poor	10	Ceredigion District Council	259040285700	259040285750
CER	S	A04	0	0	333	Cliffs from Wallog to Borth	Wallog to Borth	High rocky cliffs fronted by occasional isolated cobbley bays	hard/natural	Cliff	3100	102IA90460501C01	14-Jun-04			Ceredigion District Council	259040285750	260200288560
CER	T	A01	0	0	15	Trwyn Pellaf Cliffs	Borth	High rocky cliffs at southern end of Borth. Cliffs fronted by rocky outcrops and narrow cobble beaches	hard/man-made	Cliff	55	101IA90470101C01	14-Jun-04			Ceredigion District Council	260200288560	260660288830
CER	T	B01	0	0	16	Seawall south of RNLI ramp	Borth	Low concrete seawall at crest of cobble bank. Beach aslo maintained by groyne field.	hard/man-made	Sea Wall	160	101IA90470201C01	14-Jun-04	Moderate	15	Ceredigion District Council	260660288830	260800288970
CER	T	C01	0	0	502	Breastwork north of RNLI ramp	Borth	Timber breastwork and coping with bull head rail piling and concrete armour block. Breastwork located at crest of cobble bank, beach also maintained by groyned field.	hard/man-made	Sea Wall	220	101IA90470201C01	14-Sep-07			Ceredigion District Council	260800288970	260800289210

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CER	T	C02	0	0	17	Lower timber breastwork	Borth	Timber breastwork and coping with bull head rail piled support. Main breastworks backed by a variety of additional timber breastworks fronting private housing. Beach also maintained by groyne field	hard/man-made	Other	730	101IA90470202C01	17-Sep-07			Ceredigion District Council	260800289210	260800289940
CER	T	C03	0	0	19	Promenade Breastworks	Borth	Breastwork formed from timber piles and planking with reinforced concrete coping. Main piles tied back to reinforced concrete anchor beam. Main protection provided by high cobble bank Beach allso maintained by groyne field	hard/man-made	Sea Wall	1050	101IA90470203C02	14-Jul-07			Ceredigion District Council	260800289940	260760290950
CER	T	C04	0	0	20	Golf Course breastworks (south end)	Borth	Coast protection formed from two lines of timber breastworks. Breastworks upported by bull head rail piles, which are also tied together by bull head rails. Breastworks infilled with cobbles to form promenade. Frontage also protected by timber groyne fie	hard/man-made	Sea Wall	160	101IA90470301C01	14-Jul-09			Ceredigion District Council	260760290950	260760291110
CER	T	C05	0	0	503	Golf Course Breastwork Mid Section	Borth	Protection formd by oter breastworks with inner reinforced concrete retaioning wall. Breastworks formed from timber planking and coping fixed to bull head rail piles Frontage also protected by timber groyne field	hard/man-made	Sea Wall	500	101IA90470301C01	14-Sep-07			Ceredigion District Council	260760291110	260680291610
CER	T	C06	0	0	504	Golf Course Breastworks (North End)	Borth	Protection formed from timber breastworks fixed to bullhead rail piles and anchored to piled reinforced concrete block. Frontage aslo protected by timber groyne field.	hard/man-made	Sea Wall	1000	101IA90470301C01	14-Sep-07			Ceredigion District Council	260680291610	260550292600
CER	T	C07	0	0	505	Ynyslas Breastworks	Borth	Single line timber breatworks fixed by timber piles. Forntage also protected by timber groynes	hard/man-made	Sea Wall	160	101IA90470301C01	14-Sep-07			Ceredigion District Council	260550292600	260530292780
CER	T	D01	0	0	22	Dune frontage north of Borth	Borth	North of groyne field the coastis protected by sodft natural defences of a high cobble bund and stabilised dune frontage	soft/natural	Dunes	2200	101IA90470401C01	14-Jun-04			Ceredigion District Council	260530292780	260800295000
GWY	A	2	0	0	606		Glandyfi Wall & Pitching	Coast Protection			340		01-Jan-01				269440296940	269000296720
GWY	A	3	0	0	709	Afon Dovey Sch.4 Bdy.	Afon Dovey Sch.4 Bdy.				80						269400297900	269480297900
GWY	A	4	0	0	708	Clay / Silt Shore from Gogarth to Dovey Jcn.	Gogarth to Dovey Jcn.	Soft Natural Coast			2300						267200297680	269400297900
GWY	A	5	0	0	737	Goch to Gogarth Seawall	Fron Goch to Gogarth		hard/man-made	Sea Wall	700		01-Jan-93			Railtrack/Town or Community Council	266700297200	267200297680
GWY	A	6	0	0	707	Hard rock outcrop at Fron Goch	Fron Goch	Hard Natural Coast	hard/natural	Cliff	400						266400297170	266700297200
GWY	A	7	0	0	738	Goch Seawall	Goch, Afon Dyfi		hard/man-made	Sea Wall	340		01-Jan-93	Fair	10-50	Railtrack/Town or Community Council	266060297220	266400297170
GWY	A	8	0	0	739	Pont Eidal Seawall	Pont Eidal		hard/man-made	Sea Wall	200		01-Jan-93		>50	Railtrack	265860297140	266060297200
GWY	A	9	0	0	740	Pont Eidal Seawall	Pont Eidal		hard/man-made	Sea Wall	120		01-Jan-93	Moderate	10-50	Railtrack/Town or Community Council	265640297100	265750297110
GWY	A	10	0	0	706	Hard rock outcrop at Pont Eidal	Pont Eidal	Hard Natural Coast	hard/natural	Cliff	180						265480297070	265640297100
GWY	A	11	0	0	741	Pont Eidal Seawall	Pont Eidal				340		01-Jan-93	Good	10-50	Railtrack/Town or Community Council	265160296920	265480297070
GWY	A	12	0	0	705	Hard rock outcrop at Aber Tafol Tunnel	Aber Tafol Tunnel	Hard Natural Coast	hard/natural	Cliff	250						264930296870	265160296920
GWY	A	13	0	0	742	Seawall Trefri to Aber Tafol	Trefri to Aber Tafol				1820		01-Jan-93	Good	10-50	Railtrack/Town or Community Council	263300296320	264930296870
GWY	A	14	0	0	704	Hard rock outcrop at Trefri	Trefri	Hard Natural Coast	hard/natural	Cliff	170						263130296320	263300296320
GWY	A	15	0	0	743	Seawall Brineithin	Brineithin		hard/man-made	Sea Wall	140		01-Jan-93	Fair	10-50	Railtrack/Town or Community Council	262860296240	263130296320
GWY	A	16	0	0	703	Hard rock outcrop at Bryneithin	Bryneithin	Hard Natural Coast	hard/natural	Cliff	140						262720296240	262860296240
GWY	A	17	0	0	747	Bryneithyn Seawall	Bryneithyn		hard/man-made	Sea Wall	50		01-Jan-93	Fair	10-50	Railtrack/Town or Community Council	262670296240	262720296240
GWY	A	18	0	0	702	Hard rock outcrop at Penhelig	Penhelig	Hard Natural Coast	hard/natural	Cliff	100						262570296220	262670296240
GWY	A	19	0	0	780	Penhelig Seawall	Penhelig		hard/man-made	Sea Wall	70	1011113750101R02	01-Sep-90	Fair	10-50	Cyngor Gwynedd Council	262250296060	262570296220

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GWY	A	20	0	0	701	Hard rock outcrop at Penhelig	Penhelig	Hard Natural Coast	hard/natural	Cliff	150						262120296070	262250296060
GWY	A	21	0	0	779	Penhelig Seawall	Penhelig		hard/man-made	Sea Wall	100	1011113750101R02	01-Sep-90	Moderate	10-50	Private	262020296110	262120296070
GWY	A	22	0	0	1068	Coast Protection at Aberdyfi	Aberdyfi	Coast Protection			430	1011113750101R02					261690296000	262020296110
GWY	A	23	0	0	778	Aberdyfi Seawall	Aberdyfi		hard/man-made	Sea Wall	220	1011113750101R02	01-Sep-90	Fair	>50	Cyngor Gwynedd Council	261410295940	261500295980
GWY	A	24	0	0	777	Aberdyfi Harbour Wharf Steel Piling	Aberdyfi Harbour Wharf	steel piling	hard/man-made	Sea Wall	125		01-Sep-90	Moderate	10-50	Cyngor Gwynedd Council	261340295930	261410295940
GWY	A	25	0	0	776	Aberdyfi Carpark Seawall	Aberdyfi Carpark		hard/man-made	Sea Wall	190	101IA90480101C01	01-Sep-90	Fair	10-50	Cyngor Gwynedd Council	261150295950	261340295930
GWY	A	26	0	0	1067	Sand Dunes at Aberdyfi Dunes Golf Course	Aberdyfi Dunes Golf Course	Soft Natural Coast	soft/natural	Dunes	2340	101IA90490101C01					259300296800	261150295950
GWY	A	27	0	0	700	Penllyn Dunes and Shingle Bank	Penllyn	Soft Natural Coast	hard/natural	Dunes	2500	101IA90490101C01					258500299300	259300296800
GWY	A	28	0	0	1066	Penllyn Revetment	Penllyn	Sea Defence EA defences so NFCDD superceeds	hard/man-made	Revetment	550						258090299790	258500299300
GWY	A	29	0	0	775	Seawall at Tywyn, Neptune Villa	Tywyn, Neptune Villa	Concrete seawall and apron, and steel piling Gwynedd Costal Structures Register Ref: 2402/010 and 2402/020	hard/man-made	Other	300	101IA90490201C01	01-Jan-10			Cyngor Gwynedd Council	257970300060	258090299790
GWY	A	30	0	0	774	Tywyn Warwick Place Seawall and Steel Piling	Tywyn Warwick Place	Rock seawall and steel piling Gwynedd Costal Structures Register Ref: 2402/030 and 2402/040	hard/man-made	Other	85	101IA90490201C01	01-Jan-10			Cyngor Gwynedd Council	257910300120	257970300060
GWY	A	31	0	0	772	Tywyn Warwick Place Revetment	Tywyn Warwick Place				40	101IA90490201C01				Cyngor Gwynedd Council	257910300170	257910300120
GWY	A	32	0	0	773	Tywyn Main Promenade	Tywyn Main Promenade	Masonry seawall, concrte revetment, tell piles and timber groynes Gwynedd Costal Structures Register Ref: 2402/050 and 2402/060	hard/man-made	Other	420	101IA90490202C01	01-Jan-10			Cyngor Gwynedd Council	257750300560	257910300170
GWY	A	33	0	0	771	Sandilands Promenade Mixed Defences	Sandilands Promenade	Concrete seawall and revetment, Gwynedd Costal Structures Register Ref: 2402/070 and 2402/080, two sections of promenade at Plas Edwards and Bryn y Mor, 2402/090 the sliipway at Sanilands Road and 2402/10 the North Promenade	hard/man-made	Sea Wall	925	101IA90490203C01	01-Jan-10			Cyngor Gwynedd Council	257350301390	257750300560
GWY	A	34	0	0	770	Sandilands Promenade Revetment	Sandilands Promenade		hard/man-made	Revetment	65	101IA90490203C01	01-Sep-90		10-50	Cyngor Gwynedd Council	257330301450	257350301390
GWY	A	35	0	0	748	Rock Embankment	North Tywyn area	rock embankment	hard/man-made	Embankment	800	101IA90490301C02	01-Jan-93	Fair	>50	Private	256780302420	257210301650
GWY	A	36	0	0	1065	Shingle Bank at Aber Dysynni	Aber Dysynni	Soft Natural Coast	soft/natural	Embankment	800	101IA90490302C01					256100303160	256780302420
GWY	A	37	0	0	1063	Shingle Bank at the Afon Dysynni estuary mouth	Afon Dysynni estuary mouth	Soft Natural Coast	soft/natural	Embankment	80						256100303160	256180303340
GWY	A	38	0	0	699	Clay / Silt Shore at Morfa Gwyllt	Morfa Gwyllt	Soft Natural Coast	soft/natural	Groynes	2300						258100302300	256100303160
GWY	A	39	0	0	698	Sea Defence Embankment at Morfa Camp	Morfa Camp	Sea Defence	hard/man-made	Embankment	575						258500302600	258100302300
GWY	A	40	0	0	697	Sea Defence Embankment at Rhyd y garnedd	Rhyd y garnedd	Sea Defence	hard/man-made	Embankment	750						259100302500	258500302600
GWY	A	41	0	0	696	Sea Defence Embankment at Ynys Las, Afon Dysynni	Ynys Las, Afon Dysynni	Sea Defence	hard/man-made	Embankment	200						259400302500	259100302500
GWY	A	42	0	0	695	Sea Defence Embankment at Ynysymaengwyn	Ynysymaengwyn	Sea Defence	hard/man-made	Embankment	880						259800302900	259400302500
GWY	A	43	0	0	694	Sea Defence Embankment at Pen y Wern	Pen y Wern	Sea Defence	hard/man-made	Embankment	100						259700303000	259800302900
GWY	A	44	0	0	693	Sea Defence Embankment at Pont Dysynni	Pont Dysynni	Sea Defence	hard/man-made	Embankment	1500						259900303800	259700303000
GWY	A	45	0	0	1064	Clay / Silt Shore at Broadwater, Afon Dysynni	Broadwater, Afon Dysynni	Soft Natural Coast Clay / Silt Shore	soft/man-made	Other	5500						256180303340	259900303800
GWY	A	46	0	0	1062	Clay Cliffs at Tonfanau Head	Tonfanau Head	Soft Natural Coast	soft/man-made	Cliff	1200	101IA90500101C01					256180304500	256100303360
GWY	A	47	0	0	749	Rock Revetment	Tonfanau Clay Cliff		hard/man-made	Revetment	440	101IA90500101C01	01-Jan-93	Moderate	10-50	Railtrack	256320304920	256180304500
GWY	A	48	0	0	1061	Clay Cliffs at Tonfanau	Tonfanau	Soft Natural Coast	soft/natural	Cliff	520	101IA90500101C01					256400305420	256320304920
GWY	A	49	0	0	1060	Hard Rock CLiffs at Ogof Owain	Ogof Owain	Hard Natural Coast	hard/natural	Cliff	400	101IA90500101C01					256630305860	256400305420
GWY	A	50	0	0	1059	Hard Rcok Cliffs at Felin Fraenan	Felin Fraenan	Hard Natural Coast	hard/natural	Cliff	75	101IA90500101C01					256660305930	256630305860
GWY	A	51	0	0	1058	Clay Cliffs at Llangelynin	Llangelynin	Soft Natural Coast			2800	101IA90500101C01					257620308400	256660305930
GWY	A	52	0	0	1057	Hard cliffs at Rola	Rola	Hard Natural Coast	hard/natural	Cliff	200	101IA90500101C01					257720308560	257620308400
GWY	A	53	0	0	1056	Clay Cliffs at Gors Wen	Gors Wen	Soft Natural Coast	soft/natural	Cliff	200	101IA90500101C01					257850308750	257720308560
GWY	A	54	0	0	1055	Gors Wen area Sea Defence	Gors Wen	Sea Defence			1650	101IA90500201C01					259120310220	257850308750

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GWY	A	55	0	0	1069	Clay Cliffs at Llwyngwri	Llwyngwril	Soft Natural Coast	soft/natural	Cliff	120	101IA90500301C01					259240310300	259120310220
GWY	A	56	0	0	692	Clay Clifs at Llwyngwril	Llwyngwril	Clay Cliff	soft/natural	Cliff	230	101IA90500301C01					259420310480	259240310300
GWY	A	57	0	0	1054	Clay Cliffs at Gwastadgoed	Gwastadgoed	Soft Natural Coast	soft/natural	Cliff	750	101IA90500301C01					259940311080	259420310480
GWY	A	58	0	0	1053	Hard Natural Coast at Pont Caletawr	Pont Caletawr	Hard Natural Coast Hard Rock Outcrop	hard/natural	Other	230	101IA90500301C01					260090311230	259940311080
GWY	A	59	0	0	750	Masonry Seawall at Friog	Friog Cliff Works		hard/man-made	Sea Wall	1020	101IA90500301C01	01-Jan-93	Moderate	10-50	Railtrack	261100311980	260090311230
GWY	A	60	0	0	36	Fairbourne seawall and emabnkment	Fairbourne	The seaward face consists of a shingle beach and the landward face is an earth embankment with a concrete/ masonry wall built on the crest to meet up to the design level . Wall ties in to high ground (sand dunes) at mouth of Afon Mawddach. Gwynedd Costal	hard/man-made	Groynes	2402.7	101IA90510101C01	01-Jan-10			Environment Agency	261140314390	261100311980
GWY	A	61	0	0	1051	Dunes at Ro Wen Spit	Ro Wen Spit	Soft Natural Coast	soft/natural	Dunes	800	101IA90510201C01					261650315080	261140314390
GWY	A	62	0	0	691	Clay / Silt Shore at Fairbourne Railway	Fairbourne Railway (Estuary)	Soft Natural Coast Clay / Silt Shore Gwynedd Costal Structures Register Ref: 2404/020, Penryn Point Slipway	soft/natural	Other	1200		01-Jan-10				261100313900	261650315080
GWY	A	63	0	0	689	Sea Defence Embankment at Fairbourne	Fairbourne	Sea Defence	hard/man-made	Embankment	2750						262800314300	261100313900
GWY	A	64	0	0	690	Hard Natural Coast at Fegla Fawr	Fegla Fawr	Hard Natural Coast Hard Rock Outcrop	hard/natural	Other	350						263100314900	262800314300
GWY	A	65	0	0	688	Sea Defence at Mawddach Terrace	Mawddach Terrace	Sea Defence EA defence, NFCDD superceeds Welsh Office	hard/man-made	Sea Wall	100	1010913050101L04					263200314900	263100314900
GWY	A	66	0	0	687	Arthog Station	Arthog	Sea Defence EA defence, NFCDD superceeds Welsh Office	hard/man-made	Embankment	150	1010913050101L12					263400315100	263200314900
GWY	A	67	0	0	686	Sea Defence at Fegla Fach	Fegla Fach	Sea Defence EA defence, NFCDD superceeds Welsh Office	hard/man-made	Embankment	250	1010913050101L13					263600315400	263400315100
GWY	A	68	0	0	685	Sea Defence at Fegla Fach	Fegla Fach	Sea Defence	hard/man-made	Embankment	1250						264000314800	263600315400
GWY	A	69	0	0	684	Arthog Embankment	Arthog	Sea Defence EA Defences so NFCDD Superceeds Welsh Office	hard/man-made	Embankment	800	1010913080101R02					264600314600	264000314800
GWY	A	70	0	0	683	Clay / Silt Shore from Penmaenpool to Arthog	Penmaenpool to Arthog	Soft Natural Coast Clay / Silt Shore	soft/natural	Other	7900						269300318400	264600314600
GWY	A	71	0	0	682	Coast Protection at Penmaenpool	Penmaenpool	Coast Protection	hard/man-made		220						269500318500	269300318400
GWY	A	72	0	0	681	Afon Mawddach (Toll Bridge)	Afon Mawddach		hard/man-made	Other	20						269500318520	269500318500
GWY	A	73	0	0	680	Sea Defence Embankment from Borthwnog to Penmaenpool	Borthwnog to Penmaenpool	Sea Defence	hard/man-made	Embankment	1140						268500319000	269500318520
GWY	A	74	0	0	679	Cliffs at Rhuddallt	Rhuddallt	Hard Natural Coast	hard/natural	Cliff	820						267650318800	268500319000
GWY	A	75	0	0	678	Sea Defence Embankment at Bontddu	Bontddu	Sea Defence	hard/man-made	Embankment	330						267300318700	267650318800
GWY	A	76	0	0	677	Clay / Silt shore Bontddu	Bontddu	Soft Natural Coast Clay / Silt shore	soft/natural	Other	420						267000318600	267300318700
GWY	A	77	0	0	676	Sea Defence Embankment at Farchynys	Farchynys	Sea Defence	hard/man-made	Embankment	850						266500318000	267000318600
GWY	A	78	0	0	675	Hard natural coast at Farchynys	Farchynys	Hard Natural Coast	hard/natural	Cliff	900						265900317700	266500318000
GWY	A	79	0	0	674	Sea Defence Embankment at Farchynys	Farchynys	Sea Defence	hard/man-made	Embankment	60						265800317700	265900317700
GWY	A	80	0	0	673	Clay / Silt shore at Farchynys	Farchynys	Soft Natural Coast Clay / Silt shore	soft/natural	Other	530						265500317600	265800317700
GWY	A	81	0	0	672	Sea Defence Embankment at Caerdeon	Caerdeon	Sea Defence	hard/man-made	Embankment	450						265300317900	265500317600
GWY	A	82	0	0	671	Clay / Silt shore at Glandwr Hall	Glandwr Hall	Soft Natural Coast Clay / Silt shore	soft/natural	Other	2150						263500317250	265300317900
GWY	A	83	0	0	1050	Afon Dwynant (highway wall)	Afon Dwynant	Coast Protection	hard/man-made	Sea Wall	500						263180316870	263500317250
GWY	A	84	0	0	1049	Glan Y Mawddach (highway wall)	Glan Y Mawddach	Coast Protection	hard/man-made	Sea Wall	1300						262620315700	263180316870
GWY	A	85	0	0	769	Coes Faen Sewall	Coes Faen		hard/man-made	Sea Wall	50		01-Oct-90	Moderate	10-50	Private	262550315650	262620315700
GWY	A	86	0	0	768	Coes Faen Seawall and revetment	Coes Faen	Masonry seawall and revetment	hard/man-made	Groynes	120		01-Oct-90	Fair	10-50	Private	262460315640	262550315650
GWY	A	87	0	0	1048	Porth Aberamffra 2 (highway wall)	Porth Aberamffra	Coast Protection	hard/man-made	Sea Wall	250	1010913050101R02					262240315730	262460315640
GWY	A	88	0	0	1047	Porth Aberamffra 1 (highway wall)	Porth Aberamffra	Coast Protection Gwynedd Costal Structures Register Ref: 2405/010, 2405/020 and 24050/30 Variable crest level, minimum 4.13m minimum	hard/man-made	Sea Wall	65	1010913050101R02	01-Jan-10				262220315670	262240315730

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GWY	A	89	0	0	1046	Cliffs at Porth Aberamffra	Porth Aberamffra	Hard Natural Coast	hard/natural	Cliff	300	1010913050101R02					261980315480	262220315670
GWY	A	90	0	0	752	Barmouth Bridge Approach	Barmouth	masonry revetment and seawall	hard/man-made	Other	140	1010913050101R02	01-Jan-93	Fair	>50	Railtrack/Town or Community Council	261840315540	261980315480
GWY	A	91	0	0	670	Cliffs at Railway Tunnel, Barmouth	Railway Tunnel, Barmouth	Hard Natural Coast	hard/natural	Cliff	80	1010913050101R02					261760315540	261840315540
GWY	A	92	0	0	751	Barmouth Railway Embankment	Barmouth				140	1010913050101R02	01-Jan-93	Moderate	10-50	Railtrack/Town or Community Council	261640315540	261760315540
GWY	A	93	0	0	767	Barmouth Harbour Seawall	Barmouth Harbour	Gwynedd Costal Structures Register Ref: 2405/040, 2405/050, 2405/060, 2405/070	hard/man-made	Sea Wall	240	1010913050101R01	01-Jan-10			Cyngor Gwynedd Council	261450315400	261640315540
GWY	A	94	0	0	766	Barmouth Inner Harbour Seawall and Revetment	Barmouth	Concrete seawall and masonry revetment Gwynedd Costal Structures Register Ref: 2405/080., 2405/090, 2405/100, 2405/110, 2405/120, 2405/130, 3405/140	hard/man-made	Other	200		01-Jan-10			Cyngor Gwynedd Council	261310315550	261450315400
GWY	A	95	0	0	765	Ynys Y Brawd Causeway B'water	Ynys Y Brawd	concrte breakwater	hard/man-made	Breakwater	15	101IA90520101C01	01-Sep-90	Moderate	5-10	Cyngor Gwynedd Council	261320315550	261310315550
GWY	A	96	0	0	764	Barmouth Promenade Central	Barmouth	Concrete seawall and revetment, and steel piles Gwynedd Costal Structures Register Ref: 2405/150, 2405/160, 2405/170 and 2405/180. Promenade with three concrete slipways	hard/man-made	Other	1050	101IA90520101C01	01-Jan-10			Cyngor Gwynedd Council	260560316550	261320315550
GWY	A	97	0	0	763	Barmouth Promenade North	Barmouth	Concrete seawall, masonry revetment, and steel piles. Also timber groynes. Gwynedd Costal Structures Register Ref: 2405/190, 2405/200 Promenade and slipway	hard/man-made	Other	750	101IA90520102C01	01-Jan-10			Cyngor Gwynedd Council	260260317240	260560316550
GWY	A	98	0	0	762	Barmouth Promenade North	Barmouth	A concrete seawall and revetment, with a masory wall. Frontage is also protected by groynes infront of th other defences on the beach. Gwynedd Costal Structures Register Ref: 2405/210 and 2405/220	hard/man-made	Other	35	101IA90520102C01	01-Jan-10			Cyngor Gwynedd Council	260280317260	260260317240
GWY	A	99	0	0	746	Llanaber Seawall 4	Llanaber		hard/man-made	Sea Wall	410	101IA90520201C01	01-Jan-93	Fair	10-50	Railtrack/Town or Community Council	260070317590	260280317260
GWY	A	100	0	0	745	Llanaber Seawall 3	Llanaber		hard/man-made	Sea Wall	380	101IA90520201C01	01-Jan-93	Moderate	10-50	Railtrack/Town or Community Council	259890317930	260070317590
GWY	A	101	0	0	744	Llanaber Seawall 2	Llanaber		hard/man-made	Other	270	101IA90520201C01	01-Jan-93	Moderate	10-50	Railtrack/Town or Community Council	258790318200	259890317930
GWY	A	102	0	0	753	Llanaber Seawall 1	Llanaber	clay embankment and rock revetment	hard/man-made	Other	890	101IA90520201C01	01-Jan-93	Fair	10-50	Railtrack/Town or Community Council	259570318810	258790318200
GWY	A	103	1	0	1045	Reprofiled Shingle Bank at Sunnysands South	Sunnysands South	Sea Defence Ea Defence so NFCDD superceeds Welsh Office	hard/man-made	Embankment	1350	101IA90520303C01					259180319440	259570318810
GWY	A	103	2	0	44	CEUNANT EGRYN SHINGLE BANK	SOUTH OF SUNNYSIDE CARAVAN PARK	Shingle bank to south of Sunnysands Caravan Park offers some protection to low quality agricultural land. Shingle is currently re-profiled by Agency following storms consideration given to a managed retreat schemeprotect south flank of caravan park.	soft/man-made	Other	909.5	101IA90520303C01				Environment Agency	258800319860	259180319440
GWY	A	104	0	0	783	Sunnysands, cobble revetment	Sunnysands		hard/man-made	Revetment	700	101IA90520304C01	01-Sep-90	Fair	>50	Private	258420320440	258800319860
GWY	A	105	0	0	1044	Sea Defence in Barmouth Bay	Barmouth Bay	Sea Defence Unsure what it is	hard/man-made		840	101IA90520305C01					258150320920	258420320440
GWY	A	106	0	0	782	Islwarffordd, Rock Revetment	Islwarffordd		hard/man-made	Revetment	170	101IA90520305C01	01-Sep-90	Poor	10-50	Private	258000321100	258150320920
GWY	A	107	0	0	711	Shingle Bank at Islawarffordd	Islawarffordd north	Soft Natural Coast	soft/natural	Embankment	120	101IA90520305C01					257900321220	258000321100
GWY	A	108	0	0	781	Barmouth Bay Holiday Village, Rock Revetment	Barmouth Bay Holiday Village		hard/man-made	Revetment	120	101IA90520305C01	01-Sep-90	Fair	>50	Private	257820321300	257900321220
GWY	A	109	0	0	1043	Sand Dunes at Morfa Dyffryn	Morfa Dyffryn	Soft Natural Coast	soft/man-made	Dunes	5040	101IA90520401C01					255050326100	257820321300
GWY	A	110	0	0	1042	Clay Cliffs at Mochras (Shell Island)	Mochras (Shell Island)	Soft Natural Coast	soft/natural	Cliff	1500	101IA90530101C01					256210327350	255050326100
GWY	A	111	0	0	669	Sea Defence Embankment at Shell Island	Shell Island	Sea Defence	hard/man-made	Embankment	200						256420327500	256210327350
GWY	A	112	0	0	668	Sea Defence Embankment at Shell Island	Shell Island	Sea Defence	hard/man-made	Embankment	220						256640327490	256420327500
GWY	A	113	0	0	667	Clay/Silt Shore at Shell Island	Shell Island	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	1100	101IA90530101L02					255950326700	256640327490
GWY	A	114	0	0	666	Sea Defence Embankment at Shell Island	Shell Island	Sea Defence	hard/man-made	Embankment	220	101IA90530101L02					255800326600	255950326700
GWY	A	115	0	0	665	Clay/Silt Shore at Shell Island	Shell Island	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	200	101IA90530101L02					255750326420	255800326600

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GWY	A	116	0	0	1131	Sea Defence Embankment at Shell Island	Shell Island	Sea Defence	hard/man-made	Embankment	50	101IA90530101L02					255750326370	255750326420
GWY	A	117	0	0	1130	Clay/Silt Shore at Shell Island	Shell Island	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	75	101IA90530101L02					255700326300	255750326370
GWY	A	118	0	0	1129	Sea Defence Embankment at Shell Island	Shell Island	Sea Defence	hard/man-made	Embankment	200	101IA90530101L02					255800326010	255700326300
GWY	A	119	0	0	1128	Clay/Silt Shore at R.A.E.	R.A.E.	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	1050	101IA90530101L02					256500326650	255800326010
GWY	A	120	0	0	1127	Sea Defence Embankment at R.A.E.	R.A.E.	Sea Defence	hard/man-made	Embankment	410	101IA90530101L02					256780326870	256500326650
GWY	A	121	0	0	1126	Clay/Silt Shore on the Afon Artro	Afon Artro	Soft Natural Coast	soft/natural	Other	400						256900327210	256780326870
GWY	A	122	0	0	1125	Sea Defence Embankment, Afon Artro	Afon Artro	Sea Defence	hard/man-made	Embankment	2340						258100326900	256900327210
GWY	A	123	0	0	1124	Clay/Silt Shore at Llanbedr	Llanbedr	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	350						258400327100	258100326900
GWY	A	124	0	0	1123	Sea Defence Embankment at Sarn Hir	Sarn Hir	Sea Defence	hard/man-made	Embankment	880						258000327720	258400327100
GWY	A	125	0	0	1122	Clay/Silt Shore at Pensarn	Pensarn	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	500						257700328200	258000327720
GWY	A	126	0	0	1121	Sea Defence Embankment in the Afon Artro Estuary	Afon Artro Estuary	Sea Defence	hard/man-made	Embankment	140						257600328200	257700328200
GWY	A	127	0	0	1120	Sea Defence Embankment in the Afon Artro Estuary	Afon Artro Estuary	Sea Defence	hard/man-made	Embankment	160						257360328100	257600328200
GWY	A	128	0	0	1119	Sea Defence in the Afon Artro Estuary	Afon Artro Estuary	Sea Defence	hard/man-made	Embankment	550						257000328100	257360328100
GWY	A	129	0	0	1118	Clay/Silt Shore in the Afon Artro Estuary	Afon Artro Estuary	Soft Natural Coast Clay/Silt Shore	soft/natural	Other	600						256650327620	257000328100
GWY	A	130	0	0	761	Revetment and piling at Bar Newydd	Bar Newydd	Steel piles and a masonry revetment	hard/man-made	Other	140	101IA90530201C01	01-Sep-90	Moderate	10-50	Cyngor Gwynedd Council	256750327720	256650327620
GWY	A	131	0	0	760	Embankment at Llandanwg	Llandanwg	Gwynedd Costal Structures Register Ref: 2407/010 Slipway at Llandanwg	hard/man-made	Embankment	600	101IA90530201C01	01-Jan-10			Cyngor Gwynedd Council	256800328350	256750327720
GWY	A	132	0	0	759	Seawall at Llandanwg 3	Llandanwg		hard/man-made	Sea Wall	30	101IA90530201C01	01-Sep-90	Moderate	10-50	Private	256800328380	256800328350
GWY	A	133	0	0	758	Seawall at Llandanwg 2	Llandanwg		hard/man-made	Sea Wall	200	101IA90530201C01	01-Sep-90	Fair	>50	Private	256840328580	256800328380
GWY	A	134	0	0	1041	Llandanwg	Llandanwg	Soft Rock Natural Coast	soft/natural	Other	350	101IA90530201C01					256950328880	256840328580
GWY	A	135	0	0	754	Harlech Cliff Works/Sea Wall	Harlech	Concete seawall and apron with a rock revetment	hard/man-made	Other	900	101IA90530201C01	01-Jan-93	Poor	10-50	Railtrack/Town or Community Council	257380329690	256950328880
GWY	A	136	0	0	1117	Dunes at Morfa Harlech	Morfa Harlech	Soft Natural Coast	soft/natural	Dunes	9000	101IA90540101C01					257100335300	257380329690
GWY	A	137	0	0	1116	Clay/ Silt Shore at Treath Bach	Treath Bach	Soft Natural Coast Clay/ Silt Shore	soft/natural	Other	650						257750335250	257100335300
GWY	A	138	0	0	1115	Clay/ Silt Shore at Glan y Morfa	Glan y Morfa	Soft Natural Coast Clay/ Silt Shore	soft/man-made	Other	800						257300334450	257750335250
GWY	A	139	0	0	52	Rollover embankment at Glan Mor Farm, Morfa Harlech	Glan Mor Farm, Morfa Harlech	Rollover embankment, consisting of a section of concrete 1m square blocks,	hard/man-made	Other	1451	101IA90550101C01				Environment Agency	257860335090	257300334450
GWY	A	140	0	0	1039	Clay/ Silt Shore at Treath Bach	Treath Bach	Soft Natural Coast Clay/ Silt Shore	soft/natural	Other	2700						260000335500	257860335090
GWY	A	141	0	0	1114	Sea Defence at Afon y Glyn	Afon y Glyn	Sea Defence	hard/man-made		500						260620334900	260000335500
GWY	A	142	0	0	1113	Sea Defence Embankment at Glan y Wern	Glan y Wern	Sea Defence	hard/man-made	Embankment	350						260850334600	260620334900
GWY	A	143	0	0	1112	Clay/ Silt Shore at Glan y Wern	Glan y Wern	Soft Natural Coast Clay/ Silt Shore	soft/natural	Other	350						260650334900	260850334600
GWY	A	144	0	0	1038	Sea Defence at Glastreath	Glastreath	Sea Defence			3300						261660337310	260650334900
GWY	A	145	0	0	1111		Briwet Bridge South Approach	Sea Defence			930						261900338210	261660337310
GWY	A	146	0	0	1110		Afon Dwyryd Sch.4 Bdy.				220						261870338390	261900338210
GWY	A	147	0	0	1109		Briwet Bridge North Approach	Sea Defence			130						261830338520	261870338390
GWY	A	148	0	0	1108	Clay/ Silt Shore at Penrhyndeudreath	Penrhyndeudreath	Soft Natural Coast Clay/ Silt Shore	soft/natural	Other	900						261200338750	261830338520
GWY	A	149	0	0	1107	Sea Defence at Penrhyndeudreath	Penrhyndeudreath	Sea Defence	hard/man-made		750						260700338390	261200338750
GWY	A	150	0	0	1106	Clay/ Silt Shore at Minffordd	Minffordd	Soft Natural Coast Clay/ Silt Shore	soft/natural	Other	500						260300338130	260700338390
GWY	A	151	0	0	1037	Hard rock coast at Castledeudraeth	Castledeudraeth	Hard Natural Coast	hard/man-made	Other	1680						258960337090	260300338130
GWY	A	152	0	0	757	Portmeirion revetment and seawall	Portmeirion	rock revetment and masonry seawall	hard/man-made	Other	30		01-Sep-90	Fair	>50	Private	258940337070	258960337090
GWY	A	153	0	0	1033	Hard rock coast east of Portmeirion	Portmeirion	Hard Natural Coast	hard/natural	Other	30						258950337030	258940337070
GWY	A	154	0	0	756	Portmeirion Sewall 1	Portmeirion		hard/man-made	Sea Wall	185		01-Sep-90	Fair	>50	Private	258900336850	258950337030
GWY	A	155	0	0	1032	Rock outcrops at Trwynypenrhyn	Trwynypenrhyn	Soft Rock outcrops	hard/natural	Other	1700	101IA90550201C01					258420337750	258900336850

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GWY	A	156	1	0	755	Embankment and rock revetment at Boston Lodge	Glaslyn Estuary	Clay embankment and rock revetment	hard/man-made	Other	110		01-Sep-90	Moderate	10-50	Private	258410337860	258420337750
GWY	A	158	2	0	54	Porthmadog Cob : Sea wall / embankment	Porthmadog Cob	Porthmadog cob carries both the main A497 highway and also the Ffestiniog railway. The EA are responsible for the front face rock armour carrying out replenishing works in Winter 2000. Shared responsibility between EA and Local Authority.	hard/man-made	Other	1394.6	101IA90550301C01				Environment Agency	257200338380	258410337860
GWY	A	200	0	0	607		Shipyard Ynys-Las	Coast Protection			400		01-Jan-82			Private	261660293160	261620293560
GWY	B	157	0	0	715	Ffestiniog Railway	Porthmadog	Coast Protection Unknown defence type	hard/man-made		340	101IA90550401C01					256970338150	257200338380
GWY	B	158	1	0	714	Porthmadoc Harbour East	Porthmadoc	Coast Protection Unknown defence type	hard/man-made		380	101IA90550401C01					257090338470	256970338150
GWY	B	158	2	0	56	Cob Crwn, Porthmadog, Rock Armour	Cob Crwn, Porthmadog	Environment Agency so NFCDD applies	hard/man-made	Revetment	410.7	101IA90550401L01				Environment Agency	257077338564	257108338958
GWY	B	159	0	0	712		Afon Glaslyn	boundary			40						257060338500	257090338470
GWY	B	160	0	0	713	Porthmadoc Harbour West	Porthmadoc	Coast Protection Unknown defence type Gwynedd Costal Structures Register Ref: 2408/010, 2408/020 and 2408/030 Harbour walls and slipway	hard/man-made	Sea Wall	270	101IA90550401C01	01-Jan-10				256900338300	257060338500
GWY	B	161	0	0	1075	Portmadoc Harbour Approach	Portmadoc	Coast Protection Unknown defence type	hard/man-made		750	101IA90550401C01					256810337680	256900338300
GWY	B	162	0	0	1026	Borth-y-Gest Cliffs	Borth-y-Gest	Hard Natural Coast	hard/natural	Cliff	230	101IA90550501C01					256630337670	256810337680
GWY	B	163	0	0	825	Traeth Borth-y-Gest	Traeth Borth-y-Gest	Gwynedd Costal Structures Register Ref: 2408/040 Revetment	hard/man-made	Revetment	380	101IA90550501C01	01-Jan-10			Private	256550337370	256630337670
GWY	B	164	0	0	1074	Borth-y-Gest Cliffs	Borth-y-Gest	Hard Natural Coast	hard/natural	Cliff	270	101IA90550501C01					256350337240	256550337370
GWY	B	165	0	0	1073	Garreg Goch Cliffs	Garreg Goch	Hard Natural Coast	hard/natural	Cliff	950	101IA90550501C01					255500336880	256350337240
GWY	B	166	0	0	824	Carreg Samson Revetment	Carreg Samson	Gwynedd Costal Structures Register Ref: 2408/050 Revetment and slipway	hard/man-made	Revetment	280	101IA90550501C01	01-Jan-10			Cyngor Gwynedd Council	255400336650	255450336900
GWY	B	167	0	0	1072	Dunes at Morfa Bychan	Morfa Bychan	Soft Natural Coast Gwynedd Costal Structures Register Ref: 2408/060 Slipway	soft/natural	Dunes	1800	101IB90560101C01	01-Jan-10				253800336760	255420336630
GWY	B	168	0	0	1071	Dunes at Black Rock Sands	Black Rock Sands	Soft Natural Coast	soft/natural	Dunes	1180	101IB90560101C01					252850337420	253800336760
GWY	B	169	0	0	830	Black Rock Sands Revetment	Black Rock Sands		hard/man-made	Revetment	110	101IB90560101C01	01-Jan-95	Bad	10-50	Cyngor Gwynedd Council	252920337270	253020337230
GWY	B	170	0	0	1070	Dunes at Black Rock Sands	Black Rock Sands	Soft Natural Coast	soft/natural	Dunes	200	101IB90560101C01					252530337460	252760337490
GWY	B	171	0	0	1025	Graig Dhu Cliffs	Graig Dhu	Hard Natural Coast	hard/natural	Cliff	450	101IB90560201C01					252130337400	252530337460
GWY	B	172	0	0	1024	Shingle Bank at Criccieth	Criccieth	Soft Natural Coast	soft/natural	Embankment	1400	101IB90560201C01					250910338040	252130337400
GWY	B	173	0	0	1023	Clay Cliffs at Criccieth	Criccieth	Soft Natural Coast	soft/natural	Cliff	300	101IB90560202C01					250650338060	250930338040
GWY	B	174	0	0	823	Criccieth East Revetment	Criccieth	Gwynedd Costal Structures Register Ref: 2409/010 Revetment and breastwork	hard/man-made	Revetment	130	101IB90560301C01	01-Jan-10			Cyngor Gwynedd Council	250540338080	250620338060
GWY	B	175	0	0	822	Criccieth East Seawall and Groynes	Criccieth	Seawall fronted by timber groynes Gwynedd Costal Structures Register Ref: 2409/020	hard/man-made	Sea Wall	250	101IB90560301C01	01-Jan-10			Cyngor Gwynedd Council	250280338060	250540338080
GWY	B	176	0	0	821	Criccieth Revetment	Criccieth		hard/man-made	Revetment	100	101IB90560301C01	01-Oct-94			Cyngor Gwynedd Council	250180338030	250280338060
GWY	B	177	0	0	820	Criccieth Seawall and Revetment	Criccieth	Gwynedd Costal Structures Register Ref: 2409/030 Revetment	hard/man-made	Sea Wall	100	101IB90560301C01	01-Jan-10			Cyngor Gwynedd Council	250160337940	250180338030
GWY	B	178	0	0	819	Criccieth Breakwater	Criccieth Breakwater	Concrete breakwater and masonry seawall Gwynedd Costal Structures Register Ref: 2409/050 and 2409/060	hard/man-made	Other	90	101IB90560301C01	01-Jan-10			Cyngor Gwynedd Council	250120337860	250160337940
GWY	B	179	0	0	818	Criccieth Cliff Seawall	Criccieth Cliff	Gwynedd Costal Structures Register Ref: 2409/060 Crib Wall	hard/man-made	Gabions	90	101IB90560301C01	01-Jan-10			Cyngor Gwynedd Council	250050337750	250120337860
GWY	B	180	0	0	1022	Criccieth Castle Cliffs	Criccieth Castle	Hard Natural Coast	hard/natural	Cliff	280	101IB90560301C01					249870337670	250050337750
GWY	B	181	0	0	817	Criccieth West sewall and groynes	Criccieth West	Concrete seawall and timber groynes Gwynedd Costal Structures Register Ref: 2409/070, 2409/080, 2409/090, 2409/100, 2409/110.	hard/man-made	Other	420	101IB90560302C01	01-Jan-10			Cyngor Gwynedd Council	249450337630	249870337670

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GWY	B	182	0	0	1021	Clay Cliffs at Muriau	Muriau	Soft Natural Coast	soft/natural	Cliff	760	101IB90560401C01					248490337500	249450337630
GWY	B	183	0	0	1020	Dunes at the Afon Dwyfor	Afon Dwyfor Area	Soft Natural Coast	soft/natural	Dunes	400	101IB90560401C01					248000337300	248490337500
GWY	B	184	0	0	1019	Sea Defence Embankment at Aberkin	Aberkin	Sea Defence	hard/man-made	Embankment	500	101IB90560401C01					247860337210	248000337300
GWY	B	185	0	0	1018	Sea Defence at Embankment at Glanllynnau	Glanllynnau	Sea Defence	hard/man-made	Embankment	1300	101IB90560402C01					247800337300	247860337210
GWY	B	186	0	0	1017	Sea Defence at Glanllynnau	Glanllynnau	Sea Defence Part EA defence, thisd NFCDD ref is the non ea part	hard/man-made		3000	101IB90560402C01					246200337300	247800337300
GWY	B	187	0	0	1016	Clay Cliffs at Afon Dwyfor	Afon Dwyfor Area	Soft Natural Coast			800	101IB90560404C01					245570337280	246200337300
GWY	B	188	0	0	784	Afon Wen defences	Afon Wen	Rock revetment, clay embankment and concrete seawall.	hard/man-made	Other	1360	101IB90560404C01	01-Jan-93			Railtrack	244200337140	245570337280
GWY	B	189	0	0	1015	Clay Cliffs at Afon Wen	Afon Wen	Soft Natural Coast	soft/natural	Cliff	460	101IB90560501C01					243820336780	244200337140
GWY	B	190	0	0	816	Butlins Holiday Camp embankment and piling	Butlins Holiday Camp	Rock embankment, steel piling and timber groynes	hard/man-made	Other	240	101IB90560501C01	01-Oct-94			Private	243750336560	243820336780
GWY	B	191	0	0	1014	Clay Cliffs Pen-y-chain	Pen-y-chain	Soft Natural Coast	soft/natural	Cliff	770	101IB90560501C01					243540335770	243750336560
GWY	B	192	0	0	1013	Pen-y-chain Cliffs	Pen-y-chain	Hard Natural Coast	hard/natural	Cliff	900	101IB90560501C01					243290335320	243540335770
GWY	B	193	0	0	1012	Clay Cliffs at Morfa Abererch	Morfa Abererch	Soft Natural Coast	soft/natural	Cliff	1660	101IB90570101C01					241580335680	243290335320
GWY	B	194	0	0	69	Dune replenishment at Abererch	Abererch sands Holiday village	Badly eroded dune system. Currently being monitored to determine extent. On-going replenishing works (chestnut fencing). Effective crest level inputted from SDS 1999.	soft/man-made	Other	713.8	101IB90570102C01				Environemnt Agency	239700335800	241580335680
GWY	B	195	0	0	70	Rock and timber armour between Abererch holiday park and Pwllheli	Abererch holiday park to Pwllheli	Rock and timber armour for sand dunes. Environment Agency so NFCDD applies	hard/man-made	Other		101IB90570102C02				Environment Agency	238520335300	239700335800
GWY	B	196	0	0	1009	Dunes at Glan-y-Don East	Glan-y-Don East	Coast Protection Gwynedd Costal Structures Register Ref: 2410/010 Slipway	soft/natural	Dunes	620	101IB90570201C01	01-Jan-10				238510334660	238520335200
GWY	B	197	0	0	815	Glan-y-Don West Revetment	Glan-y-Don West	Gwynedd Costal Structures Register Ref: 2411/010 Revetment	hard/man-made	Revetment	340		01-Jan-10			Cyngor Gwynedd Council	238420334600	238510334660
GWY	B	198	0	0	814	Pwllheli Marina Revetment	Pwllheli Marina	Gwynedd Costal Structures Register Ref: 2411/020, 2411/030, 2411/040, 2411/050	hard/man-made	Revetment	650		01-Jan-10			Cyngor Gwynedd Council	238200335110	238420334600
GWY	B	199	0	0	813	Pwllheli Station Seawall	Pwllheli Station	Gwynedd Costal Structures Register Ref: 2411/060, 2411/070, 2411/080	hard/man-made	Sea Wall	900		01-Jan-10			Cyngor Gwynedd Council	237500334940	238200335110
GWY	B	200	0	0	1008	Pwllheli Cob Mawr	Pwllheli	Sea Defence	hard/man-made	Embankment	470						237580334760	237500334940
GWY	B	201	0	0	812	Pwllheli Inner Harbour Revetment	Pwllheli Inner Harbour	Gwynedd Costal Structures Register Ref: 2411/090 and 2411/100 Rip Rap Revetments	hard/man-made	Revetment	950		01-Jan-10			Cyngor Gwynedd Council	237630334600	237580334760
GWY	B	202	0	0	811	Pwllheli Harbour South Beach Seawall	Pwllheli Harbour South Beach	Gwynedd Costal Structures Register Ref: 2411/100	hard/man-made	Revetment	200		01-Oct-94			Cyngor Gwynedd Council	237880334450	237670334500
GWY	B	203	0	0	810	Morfa Garreg North West Embankment	Morfa Garreg North West	Gwynedd Costal Structures Register Ref: 2411/100	hard/man-made	Revetment	230		01-Jan-10			Cyngor Gwynedd Council	238100334520	237880334450
GWY	B	204	0	0	809	Morfa Garreg North East Revetment	Morfa Garreg North East	Gwynedd Costal Structures Register Ref: 2411/110, 2411/120 and 2411/130 Revetemnt with set back wall abd slipway	hard/man-made	Revetment	200		01-Jan-10			Cyngor Gwynedd Council	238270334410	238100334520
GWY	B	205	0	0	808	Pwllheli Lifeboat Station Seawall	Pwllheli Lifeboat Station	Gwynedd Costal Structures Register Ref: 2411/140, 2411/150, 2411/160	hard/man-made	Sea Wall	700		01-Jan-10			Cyngor Gwynedd Council	238840334600	238270334410
GWY	B	206	0	0	807	Pwllheli Spit Rock Embankment	Pwllheli Spit	Gwynedd Costal Structures Register Ref: 2411/170 Terminal Groyne	hard/man-made	Embankment	600	101IB90570301C03	01-Jan-10			Cyngor Gwynedd Council	238650334240	238840334600
GWY	B	207	0	0	1007	Dunes at Morfa Garreg South	Morfa Garreg South	Soft Natural Coast	soft/natural	Dunes	900	101IB90570301C01					237750334210	238650334240
GWY	B	208	0	0	829	Pwllheli Promenade Seawall and Groynes	Pwllheli Promenade		hard/man-made	Sea Wall	1000	101IB90570301C01	01-Oct-94			Cyngor Gwynedd Council	236750334020	237750334210
GWY	B	209	0	0	1006	Dunes at Pwllheli Golf Course	Pwllheli Golf Course	Soft Natural Coast	soft/natural	Dunes	860	101IB90570301C01					235920333760	236750334020
GWY	B	210	0	0	828	Pwllheli Golf Course Revetment	Pwllheli Golf Course		hard/man-made		400	101IB90570401C01	01-Oct-94			Cyngor Gwynedd Council	235540333600	235920333760
GWY	B	211	0	0	1005	Dunes at Traeth Crugan	Traeth Crugan	Soft Natural Coast	soft/natural	Dunes	750	101IB90570402C01					234900333300	235540333600
GWY	B	212	0	0	77	Carreg y Defaid Sea Defence	Between Pwllheli & Llanbedrog	Environment Agency so NFCDD applies	hard/man-made	Revetment	1145.4	101IB90570403C01				Environment Agency	234160332760	234900333300
GWY	B	213	0	0	1003	Carreg y Defaid Cliffs	Carreg y Defaid	Hard Natural Coast	hard/natural	Cliff	500	101IB90570501C01					234020332340	234160332760
GWY	B	214	0	0	1002	Clay Cliffs at Llanbedrog	Llanbedrog	Soft Natural Coast	soft/natural	Cliff	1320	101IB90570501C01					233180331300	234020332340
GWY	B	215	0	0	1001	Tan-y-mynydd Cliffs	Tan-y-mynydd	Hard Natural Coast	hard/natural	Cliff	1600	101IB90570601C01					232910330280	233180331300
GWY	B	216	0	0	1000	Dunes at The Warren	The Warren	Soft Natural Coast	soft/natural	Dunes	1400	101IB90570601C01					231820329320	232910330280
GWY	B	217	0	0	999	Dunes at Abersoch	Abersoch	Soft Natural Coast	soft/natural	Dunes	530	101IB90570601C01					231530328880	231820329320

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GWY	B	218	0	0	998	Abersoch Cliffs	Abersoch	Hard Natural Coast	hard/natural	Cliff	400	101IB90570701C01					231400328460	231530328880
GWY	B	219	0	0	806	Abersoch Seawall	Abersoch	Gwynedd Costal Structures Register Ref:2413/010 Seawall	hard/man-made	Sea Wall	120	101IB90570701C01	01-Jan-10			Private	231300328330	231400328460
GWY	B	220	0	0	805	Afon Soch Revetment	Afon Soch		hard/man-made	Revetment	110	101IB90570701C01	01-Oct-94			Private	231270328240	231300328330
GWY	B	221	0	0	804	Abersoch Jetty Seawall	Abersoch		hard/man-made	Sea Wall	90	101IB90570701C01	01-Oct-94			Private	231630328340	231540328330
GWY	B	222	0	0	997	Abersoch Cliffs	Abersoch	Hard Natural Coast	hard/natural	Cliff	600	101IB90570801C01					231740328080	231630328340
GWY	B	223	0	0	996	Dunes at Porth Fawr	Porth Fawr	Soft Natural Coast Gwynedd Costal Structures Register Ref: 2413/020 Slipway	soft/natural	Dunes	820	101IB90570801C01	01-Jan-10				231510327320	231740328080
GWY	B	224	0	0	827	Porth Fawr Revetment	Porth Fawr	Gwynedd Costal Structures Register Ref: 2413/030	hard/man-made		110	101IB90570801C01	01-Jan-10			Cyngor Gwynedd Council	231510327190	231510327320
GWY	B	225	0	0	995	Dunes at Porth Fawr	Porth Fawr	Soft Natural Coast	soft/natural	Dunes	190	101IB90570801C01					231540327000	231510327190
GWY	B	226	0	0	826	Porth Fawr seawall and groynes	Porth Fawr	Gwynedd Costal Structures Register Ref: 2413/040 Seawall	hard/man-made	Sea Wall	820	101IB90570801C01	01-Jan-10			Cyngor Gwynedd Council	231710326590	231540327000
GWY	B	227	0	0	803	Machroes main defences	Machroes	Concrete revtement and seawall, shingle apron and timber groynes. Gwynedd Costal Structures Register Ref: 2413/050 and 2413/060	hard/man-made	Other	190	101IB90570801C01	01-Jan-10			Private	231850326520	231710326590
GWY	B	228	0	0	994	Machroes Cliffs	Machroes	Hard Natural Coast	hard/natural	Cliff	200	101IB90570801C01					232040326440	231850326520
GWY	B	229	0	0	802	Machroes Revetment	Machroes	Gwynedd Costal Structures Register Ref: 2413/070 revetment	hard/man-made	Revetment	160	101IB90570801C01	01-Jan-10			Private	232220326450	232040326440
GWY	B	230	0	0	993	Penrhyn Du Cliffs	Penrhyn Du	Hard Natural Coast	hard/natural	Cliff	160	101IB90570801C01					232330326590	232220326450
GWY	B	231	0	0	801	Penrhyn Du Seawall	Penrhyn Du		hard/man-made	Sea Wall	80	101IB90570801C01	01-Oct-94			Private	232380326660	232330326590
GWY	B	232	0	0	992	St. Tudwals Cliffs	St. Tudwals	Hard Natural Coast	hard/natural	Cliff	3400	101IB90570901C01					231740324800	232380326660
GWY	B	233	0	0	991	Clay Cliffs at Porth Ceiriad	Porth Ceiriad	Soft Natural Coast	soft/natural	Cliff	600	101IB90580101C01					231150324840	231740324800
GWY	B	234	0	0	990	Mynydd Gilan Cliffs	Mynydd Gilan	Hard Natural Coast	hard/natural	Cliff	5700	101IB90580201C01					229100325460	231150324840
GWY	B	235	0	0	989	Clay Cliffs at Porth Neigwl	Porth Neigwl	Soft Natural Coast	soft/natural	Cliff	300	101IB90580301C01					228940325690	229100325460
GWY	B	236	0	0	988	Clay Cliffs at Porth Neigwl	Porth Neigwl	Soft Natural Coast	soft/natural	Cliff	1020	101IB90580301C01					228220326420	228940325690
GWY	B	237	0	0	987	Clay Cliffs at Porth Neigwl	Porth Neigwl	Soft Natural Coast	soft/natural	Cliff	540	101IB90580301C01					227810326800	228220326420
GWY	B	238	0	0	986	Clay Cliffs at Porth Neigwl	Porth Neigwl	Soft Natural Coast	soft/natural	Cliff	4100	101IB90580301C01					224090328350	227810326800
GWY	B	239	0	0	985	Clay Cliffs at Treheli	Treheli	Soft Natural Coast	soft/natural	Cliff	420	101IB90580401C01					223870327960	224090328350
GWY	B	240	0	0	984	Cliffs at Rhiw	Rhiw	Hard Natural Coast	hard/natural	Cliff	8500	101IB90580401C01					221440325960	223870327960
GWY	B	241	0	0	983	Cliffs at Llanfaelrhys	Llanfaelrhys	Hard Natural Coast	hard/natural	Cliff	5000	101IB90580401C01					218580325840	221440325960
GWY	B	242	0	0	982	Clay Cliffs at Aberdaron	Aberdaron	Soft Natural Coast	soft/natural	Cliff	920	101IB90580501C01					217740326240	218580325840
GWY	B	243	0	0	800	Aberdaron Revetment and Seawall 3	Aberdaron	concete revetment and masonry seawall, with rock Gwynedd Costal Structures Register Ref: 2414/010 and 2414/020 seawall and revetment	hard/man-made	Other	340	101IB90580501C01	01-Jan-10			Cyngor Gwynedd Council	217390326300	217740326240
GWY	B	244	0	0	799	Aberdaron Revetment and Seawall 2	Aberdaron	concete revetment and masonry seawall Gwynedd Costal Structures Register Ref: 2414/030, 2414/040 and 2414/050 seawalsl	hard/man-made	Other	280	101IB90580501C01	01-Jan-10			Cyngor Gwynedd Council	217200326420	217390326300
GWY	B	245	0	0	981	Clay Cliffs at the Afon Daron	Afon Daron	Soft Natural Coast	soft/natural	Cliff	100	101IB90580501C01					217090326390	217200326420
GWY	B	246	0	0	798	Aberdaron revetment and seawall	Aberdaron	rock revetment and masonry seawall Gwynedd Costal Structures Register Ref:2414/060	hard/man-made	Other	250	101IB90580501C01	01-Jan-10			Cyngor Gwynedd Council	216760326310	217090326390
GWY	B	247	0	0	980	Uwch Mynydd Cliffs	Uwch Mynydd	Hard Natural Coast	hard/natural	Cliff	6800	101IB90580601C01					214240326340	216760326310
GWY	B	248	0	0	979	Anelog Cliffs	Anelog	Hard Natural Coast	hard/natural	Cliff	4600	101JA90590101C01					216520329820	214240326340
GWY	B	249	0	0	978	Clay Cliffs at Porth Oer	Porth Oer	Soft Natural Coast	soft/natural	Cliff	250	101JA90590101C01					216740330120	216520329820
GWY	B	250	0	0	977	Cliffs at Llangwnnadl	Llangwnnadl	Hard Natural Coast	hard/natural	Cliff	6600	101JA90590101C01					220040334160	216740330120

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GWY	B	251	0	0	976	Clay Cliffs at Traeth Penllech	Traeth Penllech	Soft Natural Coast	soft/natural	Cliff	700	101JA90590301C01					220570334720	220040334160
GWY	B	252	0	0	975	Cliffs at Penrhyn Melyn	Penrhyn Melyn	Hard Natural Coast	hard/natural	Cliff	4200	101JA90590301C01					222980337440	220570334720
GWY	B	253	0	0	974	Clay Cliffs at Towyn	Towyn	Soft Natural Coast	soft/man-made	Cliff	420	101JA90590301C01					223300337700	222980337440
GWY	B	254	0	0	973	Cliffs at Penrhyn Cwmistir	Penrhyn Cwmistir	Hard Natural Coast	hard/natural	Cliff	4700	101JA90590301C01					227800341920	223300337700
GWY	B	255	0	0	972	Clay Cliffs at Porth Dinllaen	Porth Dinllaen	Soft Natural Coast	soft/natural	Cliff	300	101JA90600101C01					227620341600	227800341920
GWY	B	256	0	0	797	Porth Dinllaen West Seawall and Breakwater	Porth Dinllaen	Masonry seawall, rock embankment and rock breakwater	hard/man-made	Other	180	101JA90600101C01	01-Oct-94			Private	227560341460	227620341600
GWY	B	257	0	0	971	Clay Cliffs at Porth Dinllaen	Porth Dinllaen	Soft Natural Coast	soft/natural	Cliff	330	101JA90600101C01					227690341110	227560341460
GWY	B	258	0	0	970	Clay Cliffs at Porth Dinllaen	Porth Dinllaen	Soft Natural Coast	soft/natural	Cliff	580	101JA90600101C01					228150340850	227690341110
GWY	B	259	0	0	796	Porth Dinllaen Revetment	Porth Dinllaen	Gwynedd Costal Structures Register Ref: 2416/010 Revetment	hard/man-made	Revetment	80	101JA90600101C01	01-Jan-10			Cyngor Gwynedd Council	228220340830	228150340850
GWY	B	260	0	0	795	Porth Dinllaen seawalls and revetment	Porth Dinllaen	Concrete seawall and revetment with another masonry wall Gwynedd Costal Structures Register Ref: 2416/020	hard/man-made	Other	100	101JA90600101C01	01-Jan-10			Cyngor Gwynedd Council	228310340820	228220340830
GWY	B	261	0	0	794	Porth Dinllaen revetment	Porth Dinllaen	Gwynedd Costal Structures Register Ref: 2416/030 Armourstone Revetment	hard/man-made	Revetment	900	101JA90600101C01	01-Jan-10			Cyngor Gwynedd Council	229220340910	228310340820
GWY	B	262	0	0	969	Clay Cliffs at Porth Dinllaen	Porth Dinllaen	Soft Natural Coast	soft/natural	Cliff	300	101JA90600101C01					229470341040	229220340910
GWY	B	263	0	0	968	Hard Rock Cliffs at Penrhyn Nefyn	Penrhyn Nefyn	Hard Natural Coast	hard/natural	Cliff	400	101JA90600101C01					229620340990	229470341040
GWY	B	264	0	0	793	Nefyn Pier	Nefyn	Concete breakwater and revetment with a wave deflection wall. Gwynedd Costal Structures Register Ref: 2416/040	hard/man-made	Other	50	101JA90600201C01	01-Jan-10			Cyngor Gwynedd Council	229660340960	229620340990
GWY	B	265	0	0	792	Nefyn Port Seawall	Nefyn Port		hard/man-made	Sea Wall	180	101JA90600201C01	01-Oct-94			Private	229670340820	229660340960
GWY	B	266	0	0	791	Nefyn Sewall 2	Nefyn	Gwynedd Costal Structures Register Ref: 2416/050	hard/man-made	Sea Wall	400	101JA90600201C01	01-Jan-10			Cyngor Gwynedd Council	230050340740	229670340820
GWY	B	267	0	0	790	Nefyn Seawall	Nefyn	Gwynedd Costal Structures Register Ref: 2416/060 Masonry Seawall	hard/man-made	Sea Wall	160	101JA90600201C01	01-Jan-10			Cyngor Gwynedd Council	230210340780	230050340740
GWY	B	268	0	0	789	Nefyn rock Revetement	Nefyn	Gwynedd Costal Structures Register Ref: 2416/070 Rock Revetment	hard/man-made	Revetment	90	101JA90600201C01	01-Jan-10			Cyngor Gwynedd Council	230320340840	230210340780
GWY	B	269	0	0	967	Clay Cliffs at Nefyn	Nefyn	Soft Natural Coast	soft/natural	Cliff	2000	101JA90600201C01					231780342020	230320340840
GWY	B	270	0	0	966	Hard Rock Cliffs at Penrhyn Bodeilas	Penrhyn Bodeilas	Hard Natural Coast			200	101JA90600301C01					231930342200	231780342020
GWY	B	271	0	0	965	Clay Cliffs at Porth Pistyll	Porth Pistyll	Soft Natural Coast	soft/natural	Cliff	1900	101JA90600301C01					233180343500	231930342200
GWY	B	272	0	0	964	Hard Rock Cliffs at Penrhyn Glas	Penrhyn Glas	Hard Natural Coast	hard/natural	Cliff	800	101JA90600301C01					233830343860	233180343500
GWY	B	273	0	0	963	Clay Cliffs at Porth y Nant	Porth y Nant	Soft Natural Coast	soft/natural	Cliff	2200	101JA90600301C01					234870345550	233830343860
GWY	B	274	0	0	710	Hard rock cliffs from Trefor to Trwyn y Gorlech	Trefor to Trwyn y Gorlech	Hard Natural Coast	hard/natural	Cliff	3100	101JA90600301C01					237250347450	234870345550
GWY	B	275	0	0	788	Trefor seawall and rock embankment	Trefor	Rock embankment and masory seawall Gwynedd Costal Structures Register Ref:2417/010 and 2417/020 Rubble Revetment and dock breakwater	hard/man-made	Other	210	101JA90600301C01	01-Jan-10			Private	237490347430	237250347450
GWY	B	276	0	0	787	Trefor Pier	Trefor	Masonry seawalls and a rock apron Gwynedd Costal Structures Register Ref: 2417/030, 2417/040, 2417/050, 2417/060 and 2417/070 Dock Seawalls	hard/man-made	Other	180	101JA90610101C01	01-Jan-10			Cyngor Gwynedd Council	237480347380	237490347430
GWY	B	277	0	0	962	Shingle Bank and Clay Cliffs at Clynnog	Clynnog	Soft Natural Coast	soft/natural	Cliff	7000	101JA90610201C01					242530351470	237480347380
GWY	B	278	0	0	786	Aberdesach seawall	Aberdesach	masonry seawall and cobble apron	hard/man-made	Other	200	101JA90610301C01	01-Jan-92			Private	242550351690	242530351470
GWY	B	279	0	0	961	Shingle Bank and Clay Cliffs at Cae Morfa Farm	Cae Morfa Farm	Soft Natural Coast	soft/natural	Cliff	1000	101JA90610401C01					242910352470	242550351690
GWY	B	280	0	0	960	Dunes at Pontlyfni	Pontlyfni	Soft Natural Coast	soft/natural	Dunes	500	101JA90620101C01					243230353000	243060352490

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GWY	B	281	0	0	785	Pontlyfni revetment and seawall	Pontlyfni	Rock revetment and masonry seawall	hard/man-made	Other	110	101JA90620101C01	01-Jan-92			Private	243520354620	243060352490
GWY	B	282	0	0	959	Clay / Silt Shore at Maes Mawr	Maes Mawr	Soft Natural Coast Clay / Silt Shore	soft/natural	Other	1640	101JA90620101C01					243410354510	243230353000
GWY	B	283	0	0	958	Sea Defence Embankment at Ynys Fach	Ynys Fach	Sea Defence	hard/man-made	Embankment	300	101JA90620102C01					243400354770	243410354510
GWY	C	284	0	0	957	Sea Defence at Caerloda	Caerloda	Sea Defence	hard/man-made		1000	101JA90620101C01					243540355800	243400354770
GWY	C	285	0	0	956	Clay Cliffs at Dinas Dinlle Hillfort	Dinas Dinlle Hillfort	Soft Natural Coast	soft/natural	Cliff	730	101JA90620103C01					243600356530	243540355800
GWY	C	286	1	0	102	Dinas Dinlle Sea Wall	Dinas Dinlle	Environment Agency so NFCDD applies	hard/man-made	Sea Wall	511.2	101JA90620201C01				Environment Agency	243600356530	243570356995
GWY	C	286	2	0	103	Morfa Dinlle Embankment	Morfa Dinlle	Environment Agency so NFCDD applies	hard/man-made	Embankment	1369.4	101JA90620202C01				Environment Agency	243570356995	243170358300
GWY	C	287	0	0	954	Dunes and Shingle Bank at Morfa Dinlle Airfield	Morfa Dinlle Airfield	Soft Natural Coast	soft/natural	Dunes	1200	101JA90620301C01					242980359240	243190358160
GWY	C	288	0	0	953	Dunes at Morfa Dinlle Warren	Morfa Dinlle Warren	Soft Natural Coast	soft/natural	Dunes	2300	101JA90620301C01					244130361000	242980359240
GWY	C	289	0	0	952	Coast Protection at Fort Belan	Fort Belan	Coast Protection	hard/man-made		380	101JC90710101L01					244170360900	244130361000
GWY	C	290	0	0	951	Clay / Silt Shore at Warren Farm	Warren Farm	Soft Natural Coast Clay / Silt Shore	soft/natural	Other	2000	101JC90710101L01					243900359980	244170360900
GWY	C	291	0	0	159	Foryd Embankment	East of Dinas Dinlle airport	Environment Agency so NFCDD applies	hard/man-made	Embankment	2921.6	101JC90710101L02				Environment Agency	244770358000	243900359980
GWY	C	292	0	0	949	Clay / Silt Shore at Foryd Bay East	Foryd Bay East	Soft Natural Coast Clay / Silt Shore	soft/natural	Other	1200	101JC90710101C01					245290358830	244770358000
GWY	C	293	0	0	863	Bonc Foryd Seawall	Bonc Foryd		hard/man-made	Sea Wall	100	101JC90710101C01	01-Oct-94			Private	245430358900	245290358830
GWY	C	294	0	0	862	Hen Foryd Revetment	Hen Foryd		hard/man-made	Revetment	110	101JC90710101C01	01-Oct-94			Private	245530358970	245430358900
GWY	C	295	0	0	948	Clay / Silt Shore at Afon Gwyrfrai	Afon Gwyrfrai	Soft Natural Coast Clay / Silt Shore	soft/natural	Other	500	101JC90710101C01					245360359400	245530358970
GWY	C	296	0	0	947	Sea Defence Embankment at Morfa Cwta	Morfa Cwta	Sea Defence	hard/man-made	Embankment	110	101JC90710101C01					245390359530	245360359400
GWY	C	297	0	0	946	Sea Defence Embankment at Morfa Cwta	Morfa Cwta	Sea Defence	hard/man-made	Embankment	120	101JC90710101C01					245340359670	245390359530
GWY	C	298	0	0	945	Clay / Silt Shore at Cefnynysoedd	Cefnynysoedd	Soft Natural Coast	soft/natural	Other	900	101JC90710101C01					245400360550	245340359670
GWY	C	299	0	0	944	Sea Defence Embankment at Cynifry	Cynifry	Sea Defence	hard/man-made	Embankment	300	101JC90710101C01					245360360870	245400360550
GWY	C	300	0	0	943	Shingle Bank at Plas-isaf	Plas-isaf	Soft Natural Coast	soft/natural	Embankment	700	101JC90710101C01					245510361450	245360360870
GWY	C	301	0	0	861	Ty Calch Seawall and Apron	Ty Calch		hard/man-made	Sea Wall	100	101JC90710101C01	01-Oct-94			Private	245560361550	245510361450
GWY	C	302	0	0	942	Shingle Bank at Ysgubor Isaf	Ysgubor Isaf	Soft Natural Coast	soft/natural	Embankment	200	101JC90710101C01					245700361700	245560361550
GWY	C	303	0	0	860	Ysgubor Isaf Seawall and Apron	Ysgubor Isaf		hard/man-made	Sea Wall	300	101JC90710101C01	01-Oct-94			Cyngor Gwynedd Council	245990361840	245700361700
GWY	C	304	0	0	941	Shingle Bank at Porth Lleidog	Porth Lleidog	Soft Natural Coast	soft/natural	Embankment	130	101JC90710101C01					246120361870	245990361840
GWY	C	305	0	0	859	Porth Lleidog Revetment and Embankment	Porth Lleidog	Concrete embankment and blockwork revetment	hard/man-made	Other	280		01-Oct-94			Cyngor Gwynedd Council	246300362090	246120361870
GWY	C	306	0	0	940	Shingle Bank at Golf Club, Gwynedd	Golf Club, Gwynedd	Soft Natural Coast	soft/natural	Embankment	400	101JC90710101C01					246680362360	246300362090
GWY	C	307	0	0	858	Coed Helen Gabion Seawall	Coed Helen		hard/man-made	Gabions	750	101JC90710101C01	01-Oct-94			Private	247380362700	246680362360
GWY	C	308	0	0	857	Coed Helen Seawall	Coed Helen		hard/man-made	Sea Wall	230	101JC90710101C01	01-Oct-94			Private	247650362600	247380362700
GWY	C	309	0	0	856	Caernarfon Harbour West Seawall	Caernarfon Harbour West		hard/man-made	Sea Wall	270		01-Oct-94			Private	247840362510	247650362600
GWY	C	310		0	854	Caernarfon Front Seawall	Caernarfon Front		hard/man-made	Sea Wall	400	101JC90710201C01	01-Oct-94			Private	248000363280	247710362650
GWY	C	311	0	0	855	Caernarfon Harbour East Seawall	Caernarfon Harbour East		hard/man-made	Sea Wall	650		01-Oct-94			Private/Town or Community Council	247710362650	248190362150
GWY	C	312	0	0	939	Afon Seiont	Afon Seiont	Soft Natural Coast Unknown???	soft/natural		700						248190362150	247840362510
GWY	C	313	0	0	716	Victoria Dock Coast Protection	Victoria Dock	Coast Protection Unknown defence type Gwynedd Costal Structures Register Ref: 2418/010, 2418/020, 2418/030 and 2418/040	hard/man-made		450		01-Jan-10				248000363280	247750363050
GWY	C	314	0	0	853	Safeway, Caernarfon Revetment and Seawall	Safeway, Caernarfon	Rock revetment and concrete seawall Gwynedd Costal Structures Register Ref: 2418/050, 2418/060, 2418/070 and 2418/080	hard/man-made	Other	350	101JC90710201C01	01-Jan-10			Cyngor Gwynedd Council	248300363480	248000363280
GWY	C	315	0	0	852	Cae-gwyn Seawall	Cae-gwyn	Gwynedd Costal Structures Register Ref: 2418/090 Seawall	hard/man-made	Sea Wall	500	101JC90710201C01	01-Oct-94			Unitary Council	248450363920	248300363480
GWY	C	316	0	0	938	Cliffs at Waterloo Port West	Waterloo Port West	Hard Natural Coast	hard/natural	Cliff	250	101JC90710201C01					248600364070	248450363920

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GWY	C	317	0	0	851	Waterloo Port Seawall	Waterloo Port		hard/man-made	Sea Wall	500	101JC90710201C01	01-Oct-94			Private	248900364480	248600364070
GWY	C	318	0	0	937	Rock Cliffs at Parciau	Parciau	Hard Natural Coast	hard/natural	Cliff	1950	101JC90710201C01					250110365950	248900364480
GWY	C	319	0	0	850	Plas Menai Seawall	Plas Menai		hard/man-made	Sea Wall	200	101JC90710201C01	01-Oct-94			Private	250220366100	250110365950
GWY	C	320	0	0	936	Rock Cliffs at Llanfair Hall	Llanfair Hall	Hard Natural Coast	hard/natural	Cliff	2100	101JC90710201C01					251980367200	250220366100
GWY	C	321	0	0	867	Dinorwic Boat Yard Revetment and Seawall	Dinorwic Boat Yard	Rock revetment and masomry seawall	hard/man-made	Other	300		01-Sep-94			Cyngor Gwynedd Council	252240367360	251980367200
GWY	C	322	0	0	866	Dinorwic Front Seawalls	Dinorwic Front	Gwynedd Costal Structures Register Ref: 2419/010, 2419/020, 2419/030, 2419/040, 2419/050 and 2419/060	hard/man-made	Sea Wall	220	101JC90710201C01	01-Jan-10			Cyngor Gwynedd Council	252360367550	252240367360
GWY	C	323	0	0	849	Dinorwic Dock Seawall	Dinorwic Dock		hard/man-made	Sea Wall	500	101JC90710201C01	01-Sep-94			Private	252550367840	252360367550
GWY	C	324	0	0	848	Dinorwic Harbour Seawall	Dinorwic Harbour		hard/man-made	Sea Wall	300	101JC90710201C01	01-Sep-94			Private	252550367860	252550367840
GWY	C	325	0	0	847	Plas Dinorwic Seawall	Plas Dinorwic		hard/man-made	Sea Wall	170	101JC90710201C01	01-Sep-94			Private	252470368100	252550367860
GWY	C	326	0	0	846	Vaynol Park Seawall	Vaynol Park		hard/man-made	Sea Wall	3000	101JC90710301C01	01-Sep-94			Private	253560370650	252470368100
GWY	C	327	0	0	935	Clay Cliffs from the Britannia Bridge to Vaynol Wood	Britannia Bridge to Vaynol Wood	Soft Natural Coast	soft/natural	Cliff	630	101JC90710301C01					254150370850	253560370650
GWY	C	328	0	0	868	Britannia Bridge Seawall	Britannia Bridge		hard/man-made	Sea Wall	115	101JC90710301C01	01-Oct-94			Private	254260370910	254150370850
GWY	C	329	0	0	934	Clay Cliffs at Treborth Hall	Treborth Hall	Soft Natural Coast	soft/natural	Cliff	1370	101JC90710301C01					255520371230	254260370910
GWY	C	330	0	0	845	Menai Bridge West Side Seawall	Menai Bridge West Side		hard/man-made	Sea Wall	80	101JC90710301C01				Private	255600371250	255520371230
GWY	C	331	0	0	1031	Clay Cliffs at the Menai Bridge	Menai Bridge	Soft Natural Coast			120	101JC90710301C01					255670371320	255600371250
GWY	C	332	0	0	844	Menai Bridge Seawall	Menai Bridge		hard/man-made	Sea Wall	600	101JC90710301C01				National Power	255740371350	255670371320
GWY	C	333	0	0	605	Menai Bridge	Menai Bridge		hard/man-made	Sea Wall	1100					Private	255740371350	255670371320
GWY	C	334	0	0	1030	Clay Cliffs at Menai Bridge	Menai Bridge	Soft Natural Coast	soft/natural	Cliff	80	101JC90710301C01					255810371380	255740371350
GWY	C	335	0	0	843	Menai Bridge East Side Seawall	Menai Bridge East Side		hard/man-made	Sea Wall	120	101JC90710301C01				Private	255910371440	255810371380
GWY	C	336	0	0	933	Clay Cliffs at Upper Bangor	Upper Bangor	Soft Natural Coast	soft/natural	Cliff	1900	101JC90710301C01					257420372580	255910371440
GWY	C	337	0	0	842	Upper Bangor Seawall	Upper Bangor		hard/man-made	Sea Wall	120	101JC90710301C01	01-Oct-94			Private	257520372600	257420372580
GWY	C	338	0	0	932	Clay Cliffs at Upper Bangor	Upper Bangor	Soft Natural Coast	soft/natural	Cliff	320	101JC90710301C01					257760372800	257520372600
GWY	C	339	0	0	841	Garth Revetment and Seawall	Garth	rock revetment and concrete seawall	hard/man-made	Other	190	101JC90710301C01	01-Oct-94			Private	257900372900	257760372800
GWY	C	340	0	0	931	Clay Cliffs at Garth	Garth	Soft Natural Coast	soft/natural	Cliff	330	101JC90710301C01					258010373000	257900372900
GWY	C	341	0	0	840	Garth Seawall	Garth		hard/man-made	Sea Wall	180	101JC90710301C01	01-Oct-94			Private	258180373100	258010373000
GWY	C	342	0	0	930	Clay Cliffs from New Pier to Garth	New Pier to Garth	Soft Natural Coast	soft/natural	Cliff	250	101JC90710301C01					258410373200	258180373100
GWY	C	343	0	0	839	Hirael Beach and Pier Seawall	Hirael Beach and Pier		hard/man-made	Sea Wall	250	101JC90720101C01	01-Oct-94			Private	258540373020	258410373200
GWY	C	344	0	0	838	Garth Jetty Seawall	Garth Jetty		hard/man-made	Sea Wall	200	101JC90720101C01	01-Oct-94			Cyngor Gwynedd Council	258550373000	258540373020
GWY	C	345	0	0	837	Bangor Boat Yard Defences	Bangor Boat Yard	Concrete seawall, steel seawall and revetment blockwork	hard/man-made	Other	200	101JC90720101C01	01-Oct-94			Private	258610372940	258550373000
GWY	C	346	0	0	836	Bangor Water Works Revetment	Bangor Water Works		hard/man-made	Revetment	150	101JC90720101C01	01-Oct-94			Unknown	258630372900	258610372940
GWY	C	347	0	0	865	Beach Road, Bangor Seawall	Beach Road, Bangor	Gwynedd Costal Structures Register Ref: 2420/010 and 2420/020 Gabion Seawall	hard/man-made	Sea Wall	230	101JC90720101C01	01-Jan-10			Cyngor Gwynedd Council	258780372700	258630372900
GWY	C	348	0	0	835	Beach Road, Bangor Seawall	Beach Road, Bangor	Gwynedd Costal Structures Register Ref: 2420/030, 2420/040, 2420/050 and 2420/060 Masonry Seawalls	hard/man-made	Sea Wall	190	101JC90720101C01	01-Jan-10			Private	258930372600	258780372700
GWY	C	349	0	0	929	Clay Cliffs at the Afon Cegin	Afon Cegin	Soft Natural Coast	soft/natural	Cliff	220	101JC90720101C01					259140372630	258930372600
GWY	C	350	0	0	834	Port Penrhyn Harbour Seawall	Port Penrhyn Harbour		hard/man-made	Sea Wall	1300	101JC90720101C01	01-Oct-94			Private	259160373150	259140372630
GWY	C	351	0	0	928	Port Penrhyn East	Port Penrhyn East	Soft Natural Coast @BELIEVE HAS CHANGED			300						259330372900	259160373150
GWY	C	352	0	0	833	Port Penrhyn East Revetment	Port Penrhyn East		hard/man-made	Revetment	170	101JC90720201C01	01-Oct-94			Private	259400372740	259330372900
GWY	C	353	0	0	927	Clay / Silt Shore at the Penrhyn Estate	Penrhyn Estate	Soft Natural Coast	soft/natural	Other	470	101JC90720201C01					259760372800	259400372740
GWY	C	354	0	0	832	Penrhyn Estate Seawall	Penrhyn Estate		hard/man-made	Sea Wall	1750	101JC90720201C01	01-Sep-94			Private	261040372170	259760372800

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GWY	C	355	0	0	864	Afon Ogwen Embankment	Afon Ogwen	cant find this on the maps	hard/man-made	Embankment	70		01-Sep-94			Private	261100372160	261040372170
GWY	C	356	0	0	926	Clay Cliffs at the Ogwen Estuary	Ogwen Estuary	Soft Natural Coast	soft/natural	Cliff	210	101JC90720201C01					261270372290	261100372160
GWY	C	357	0	0	831	Chapel Ogwen Revetment	Chapel Ogwen		hard/man-made	Revetment	200	101JC90720201C01	01-Sep-94			Private	261440372380	261270372290
YNM			0	0	108	MALLTRAETH EMBANKMENT	Malltraeth, Afon Cefni	Grassed embankment with some stone pitching to seaward face Improved at Newborough end in 1981. Effective crest level derived from SDS 1999. Reviewed by ASM April 09.	hard/man-made	Embankment	1637.1	101JB90640103C01	12-Aug-98	Fair	>50	Environment Agency		
YNM	A	1	0	0	1082	Cliffs at Menai Bridge West	Menai Bridge West	Hard Natural Coast	hard/natural	Cliff	100	101JB90700301C01					255520371500	255430371550
YNM	A	2	0	0	869	Seawall at Church Island	Church Island (1)		hard/man-made	Sea Wall	700	101JB90700301C01	01-Sep-94			Private	255430371550	255230371800
YNM	A	3	0	0	1083	Hard Natural Coast at Church Island	Church Island	Hard Natural Coast	hard/natural	Other	150	101JB90700301C01					255230371800	255320371910
YNM	A	4	0	0	639	Revetment at Church Island	Church Island		hard/man-made	Revetment	100	101JB90700301C01	01-Sep-94			Unitary Council	255320371910	255250372000
YNM	A	5	0	0	1084	Cliffs at Llanfair P.G.	Llanfair P.G.	Hard Natural Coast	hard/natural	Cliff	2600	101JB90700401C01					255250372000	253180370980
YNM	A	6	0	0	870	Seawall at Llanfair P.G. Pier	Llanfair P.G. Pier		hard/man-made	Sea Wall	250	101JB90700401C01	01-Sep-94			Private	253180370980	253060370880
YNM	A	7	0	0	1085	Cliffs from Llanfair P.G. to Plas Newydd	Llanfair P.G. to Plas Newydd	Hard Natural Coast	hard/natural	Cliff	1850	101JB90700401C01					253060370880	252120369450
YNM	A	8	0	0	871	Seawall at Plas Newydd Landing	Plas Newydd Landing		hard/man-made	Sea Wall	20	101JB90700401C01				Private	252120369450	252120369450
YNM	A	9	0	0	1086	Cliffs from Plas Newydd to Moel-y-don	Plas Newydd to Moel-y-don	Hard Natural Coast	hard/natural	Cliff	1400	101JB90700401C01					252120369450	251810367920
YNM	A	10	0	0	872	Seawall at Moel-y-don	Moel-y-don		hard/man-made	Sea Wall	200	101JB90700401C01	01-Sep-94			Private	251810367920	251870367820
YNM	A	11	0	0	1087	Ciffs at Castell Gwylan	Castell Gwylan	Hard Natural Coast	hard/natural	Cliff	1900	101JB90700401C01					251870367820	250310367140
YNM	A	12	0	0	873	Seawall at Bryn Llwyd	Bryn Llwyd		hard/man-made	Sea Wall	300	101JB90700401C01	01-Sep-94			Private	250310367140	250050367010
YNM	A	13	0	0	1088	Cliffs from Bryn Llwyd to Llanidan	Bryn Llwyd to Llanidan	Hard Natural Coast	hard/natural	Cliff	220	101JB90700401C01					250050367010	249910366800
YNM	A	14	0	0	874	Seawall at Llanidan	Llanidan		hard/man-made	Sea Wall	130	101JB90700401C01	01-Sep-94			Private	249910366800	249820366700
YNM	A	15	0	0	1089	Cliffs at Brynciencyn	Brynciencyn	Hard Natural Coast	hard/natural	Cliff	2000	101JB90700401C01					249820366700	248150365580
YNM	A	16	0	0	875	Seawall and embankment from Barras to Mermaid Inn	Barras to Mermaid Inn	Ynys Mon database mentions masonry wall for 351m at Brynsiencyn, Sw Mor (SH 477,650) and 456m of masonry wall at Brynsiencyn,Mermaid Inn (SH 476,647)	hard/man-made	Sea Wall	1250	101JB90700401C01	01-Sep-94			Private	248150365580	247450364520
YNM	A	17	0	0	1090	Clifffs from the Mermaid Inn to Plas y-borth	Mermaid Inn to Plas-y-borth	Hard Natural Coast	hard/natural	Cliff	1200	101JB90700401C01					247450364520	246420363780
YNM	A	18	0	0	876	Seawall at Plas-y-borth	Plas-y-borth		hard/man-made	Sea Wall	550	101JB90700401C01	01-Sep-94			Private	246450363850	245950363570
YNM	A	19	0	0	1091	Clay Cliffs from Menaifron to Plas Penrhyn	Menaifron to Plas Penrhyn	Soft Natural Coast	soft/natural	Cliff	180	101JB90700401C01					245950363570	245780363550
YNM	A	20	0	0	877	Seawall at Penrhyn-bach	Penrhyn-bach		hard/man-made	Sea Wall	1600	101JB90700401C01	01-Sep-94			Private	245780363550	244800363640
YNM	A	21	0	0	1092	Rhuddagaer	Rhuddagaer	Sea Defence Ea defence so NFCDD superceeds the Welsh Office	hard/man-made	Embankment	240						244800363640	244670363800
YNM	A	22	0	0	1093	Soft Rock Cliffs at Afon Braint, Left Bank	Afon Braint, Left Bank	Hard Natural Coast	hard/man-made	Cliff	2100	101JB90700503C01					244670363800	244050364670
YNM	A	23	0	0	1094	Clay / silt shore on the Afon Braint, Right Bank	Afon Braint, Right Bank	Soft Natural Coast Clay / silt shore	soft/natural	Other	900						244050364670	243540363950
YNM	A	24	0	0	1095	Dunes at Traeth Abermenai	Traeth Abermenai	Soft Natural Coast	soft/natural	Dunes	4500	101JB90700504C01					243540363950	243930361550
YNM	A	25	0	0	878	Rock Armour at Braich Abermenai	Braich Abermenai	defence type is unknown, at Abermenai point Ynys Mon database details 200m of rock armour at Abermenai Point (SH 42944,61865)	hard/man-made	Revetment	700	101JB90630101C01				Private	243930361550	243300361770
YNM	A	26	0	0	1096	Dunes at Newborough Warren	Newborough Warren	Soft Natural Coast	soft/natural	Dunes	4800	101JB90630101C01					243300361770	239100363400
YNM	A	27	0	0	1097	Cliffs at Ynys Llanddwyn	Ynys Llanddwyn	Hard Natural Coast	hard/natural	Cliff	3000	101JB90640101C01					239100363400	239040363480
YNM	A	28	0	0	1098	Dunes at Traeth Penrhos	Traeth Penrhos	Soft Natural Coast	soft/natural	Dunes	2150	101JB90640101C01					239040363480	238320365500
YNM	A	29	0	0	1099	Cefni Saltmarsh	Cefni Saltmarsh	Soft Natural Coast Saltmarsh	soft/natural	Other	3600						238320365500	241160367330
YNM	A	30	0	0	1100	Malltreath Cob	Malltreath Cob	Sea Defence Ea defence so NFCDD superceeds the Welsh Office	hard/man-made	Embankment	1500						241160367330	240830368690
YNM	A	31	0	0	1101	Malltreath Tidal Sluices	Malltreath	Sea Defence, tidal sluices	hard/man-made	Other	100						240830368690	240780368750
YNM	A	32	0	0	879	Seawall and revetment at Malltreath	Malltreath		hard/man-made	Sea Wall	150	101JB90640104C01	01-Sep-94			Private	240780368750	240630368750

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YNM	A	33	0	0	1102	Clay / silt shore at Malltreath	Malltreath	Soft Natural Coast Clay / silt shore	soft/natural	Other	500	101JB90640104C01					240630368750	240220368480
YNM	A	34	0	0	880	Sewwall with apron at Malltreath	Malltreath		hard/man-made	Sea Wall	350	101JB90640104C01	01-Sep-94			Private	240220368480	239910368250
YNM	A	35	0	0	1103	Cliffsat Llangadwaladr	Llangadwaladr	Hard Natural Coast	hard/natural	Cliff	1300	101JB90640104C01					239910368250	239080367330
YNM	A	36	0	0	881	Sewall at Bodorgan Boat House	Bodorgan Boat House		hard/man-made	Sea Wall	300	101JB90640104C01	01-Sep-94			Private	239080367330	238920367140
YNM	A	37	0	0	1104	Cliffs form Bodorgan to Dinas-lwyd	Bodorgan to Dinas-lwyd	Hard Natural Coast	hard/natural	Cliff	2500	101JB90640104C01					238920367140	237680365300
YNM	A	38	0	0	1105	Cliffs from Dinas-lwyd to Yr Ebolion	Dinas-lwyd to Yr Ebolion	Hard Natural Coast	hard/natural	Cliff	700	101JB90640105C01					237680365300	237100365050
YNM	A	39	0	0	615	Dunes at Porth Twyn-mawr	Porth Twyn-mawr	Soft Natural Coast @also appears to be hard rock cliffs	soft/natural	Dunes	1300	101JB90640105C01					236780365050	236500365490
YNM	A	40	0	0	616	Dunes at Cwnigar Trefri	Cwnigar Trefri	Soft Natural Coast @also appears to be hard rock cliffs	soft/natural	Dunes	2400						236200365490	235830367490
YNM	A	41	0	0	617	Dunes at Aberffraw Sands	Aberffraw Sands	Soft Natural Coast	soft/natural	Dunes	1800	101JB90640106C01					235830367490	235600368930
YNM	A	42	0	0	882	Seawall at Aberffraw	Aberffraw	Ynys Mon database details 245m of masonry retaining wall	hard/man-made	Sea Wall	320		01-Sep-94			Private	235600368930	235420368600
YNM	A	43	0	0	618	Clay Cliffs at the Afon Ffraw	Afon Ffraw	Soft Natural Coast	soft/natural	Cliff	900						235420368600	235240367840
YNM	A	44	0	0	619	Cliffs at Llangwyfan-isaf	Llangwyfan-isaf	Hard Natural Coast	hard/natural	Cliff	6200	101JB90640201C01					235240367840	233200370600
YNM	A	45	0	0	620	Dunes at Porth Trecastell	Porth Trecastell	Soft Natural Coast	soft/natural	Dunes	200	101JB90640201C01					233200370600	233220370770
YNM	A	46	0	0	581	Cliffs in the Mynydd Mawr Area	Mynydd Mawr Area	Hard Natural Coast	hard/natural	Cliff	1050	101JB90640201C01					233220370770	233040371110
YNM	A	47	0	0	582	Soft Rock Cliffs at Porth Nobla	Porth Nobla	Hard Natural Coast	hard/natural	Cliff	180	101JB90640301C01					233040371110	233000371290
YNM	A	48	0	0	583	Rock platform at Ynys Sych	Ynys Sych	Hard Natural Coast Rock platform	hard/natural	Other	300	101JB90640301C01					233000371290	232900371550
YNM	A	49	0	0	584	Dunes at Porth y Tywod	Porth y Tywod	Soft Natural Coast	soft/natural	Dunes	700	101JB90640301C01					232900371550	232470372130
YNM	A	50	0	0	585	Dunes at Traeth Llydan	Traeth Llydan	Soft Natural Coast	soft/natural	Dunes	680	101JB90640301C01					232470372130	231920372500
YNM	A	51	0	0	586	Rock platform at Rhosneigr	Rhosneigr	Hard Natural Coast Rock platform Ynys Mon database details an unknown length of masonry / concrete seawall defence in this unit at Glan y Mor Road	hard/natural	Other	1050	101JB90640301C01					231920372500	231720373450
YNM	A	52	0	0	587	Dunes at Traeth Crigyll (RAF Valley)	Traeth Crigyll (RAF Valley)	Soft Natural Coast	soft/natural	Dunes	1200	101JB90640301C01					231720373450	230800374300
YNM	A	53	0	0	588	Dunes at Traeth Cwmyran (RAF Valley)	Traeth Cwmyran (RAF Valley)	Soft Natural Coast	soft/natural	Dunes	1300	101JB90640301C01					230800374300	229970375160
YNM	A	54	0	0	589	Clay / silt shore at Rhyd y Gari (Channel)	Rhyd y Gari (Channel)	Soft Natural Coast	soft/natural	Other	700	101JB90640301C01					229970375160	229750375350
YNM	A	55	0	0	590	Cliffs at Twyn Bryn-y-bar	Twyn Bryn-y-bar	Hard Natural Coast	hard/natural	Cliff	200	101JB90640401C01					229750375350	229380375160
YNM	A	56	0	0	591	Dunes at Traeth Llydan	Traeth Llydan	Soft Natural Coast	soft/natural	Dunes	600	101JB90640401C01					229380375160	228970375000
YNM	A	57	0	0	592	Cliffs at Porth Gorslwyn	Porth Gorslwyn	Hard Natural Coast	hard/natural	Cliff	1900	101JB90640401C01					228970375000	227490375060
YNM	A	58	0	0	593	Dunes and Shingle Bank at Borthwen	Borthwen	Soft Natural Coast	soft/natural	Embankment	250	101JB90640401C01					227490375060	227220375100
YNM	A	59	0	0	601	Seawall, apron and piling at Rhoscolyn	Rhoscolyn	Ynys Mon databse details a 140m reinforced concrete seawall	hard/man-made	Sea Wall	250	101JB90640401C01	01-Sep-94			Unitary Council/Private	227220375100	227100374900
YNM	A	60	0	0	594	Cliffs from Rhoscolyn to Porth Castell	Rhoscolyn to Porth Castell	Hard Natural Coast	hard/natural	Cliff	5200	101JB90640501C01					227100374900	225200378150
YNM	A	61	0	0	883	Seawall and revetment at Porth Diana Bay	Porth Diana Bay	masonry seawall and gabion revetment Ynys Mon database details a 61m masonry and mortar revtment at Porth Castell (SH 2527,7815)	hard/man-made	Sea Wall	120	101JB90640602C01	01-Sep-94			Private	225200378150	225300378270
YNM	A	62	0	0	884	Revetment at Porth Diana Bay	Porth Diana Bay	rock and gabion revetment Ynys Mon details 200m of reinforced conc: masonry & rock armour (SH, 2540,7825)	hard/man-made	Revetment	200	101JB90640602C01	01-Sep-94	Moderate	10-50	Unitary Council	225300378270	225390378350
YNM	A	63	0	0	885	Seawall at Porth Diana Bay	Porth Diana Bay	masonry seawall Ynys Mon details 45m of masonry seawall (SH 2543,7838	hard/man-made	Sea Wall	80	101JB90640603C01	01-Sep-94	Fair	>50	Unitary Council	225390378350	225420378400
YNM	A	64	0	0	595	Cliffs south of Trearddur	Trearddur Area	Hard Natural Coast			800	101JB90640603C01					225420378400	225660378580
YNM	A	65	0	0	602	Trearddur Bay	Trearddur Bay	@needs to be updated in line with new defence scheme, probably put it in as a new inspection Ynys Mon database details a 460m reinforced concrete and masonry seawall, and a reinforced concrete slipway for 28m (SH 254,791). In addion the database details	hard/man-made		600		01-Sep-94			Unitary Council	225660378580	225340379110

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YNM	A	66	0	0	1081	Cliffs from Treardur to Porth yr Arfon	Trearrdur to Porth yr Arfon		hard/natural	Cliff		101JB90640701C01					225340379110	224905379240
YNM	A	67	0	0	1080	Seawall at Porth y Arfon	Porth y Arfon		hard/man-made	Sea Wall	170	101JB90640701C01	01-Jan-09				224905379240	224770379253
YNM	A	68	0	0	1079	Cliffs from Porth yr Arfon to Porth y Post	Porth yr Arfon to Porth y Post		hard/natural	Cliff		101JB90640701C01					224770379253	224325379595
YNM	A	69	0	0	1078	Masonry wall at Porth y Post	Porth y Post		hard/man-made	Sea Wall	85	101JB90640701C01					224325379595	224285379660
YNM	A	70	0	0	596	Cliffs from Porth y Post to Porth Dafarch	Porth y Post to Porth Dafarch	Hard Natural Coast	hard/natural	Cliff	6200	101JB90640701C01					224285379660	223440379960
YNM	A	71	0	0	1076	Gabions at Porth Dafarch	Porth Dafarch	Ynys Mon database details 1) 12m of reno mattress & 18m of gabions. 2) masonry slipway, 4m wide and 9m long 3) 47m of masonry seawall protecting the highway	hard/man-made	Sea Wall	30						223440379960	223350380070
YNM	A	72	0	0	1034	Cliffs from Porth Dafarch to Porth y Gwin	Porth Dafarch to Porth y Gwin		hard/natural	Cliff		101JB90640701C01					223350380070	221120380000
YNM	A	73	0	0	597	Cliffs in South Stack Area	South Stack Area	Hard Natural Coast	hard/natural	Cliff	6400	101JB90640701C01					221120380000	221500384070
YNM	A	74	0	0	598	Cliffs at Porth Namarch	Porth Namarch	Hard Natural Coast	hard/natural	Cliff	3000	101JB90640701C01					221500384070	223550383810
YNM	A	75	0	0	599	Shigle Bank at Ynys Wellt Bay	Ynys Wellt Bay	Soft Natural Coast	soft/natural	Embankment	170	101JB90640701C01					223550383810	223640383700
YNM	A	76	0	0	886	Holyhead Breakwater	Holyhead	masonry breakwater with a concrete seawall	hard/man-made	Breakwater	120	101JB90650101C01	01-Sep-94			Private	223640383700	223760383700
YNM	A	77	0	0	717	Cliffs at Porth-y-felin Horse	Porth-y-felin Horse	Hard Natural Coast	hard/natural	Cliff	500	101JB90650101C01					223760383700	223950383260
YNM	A	78	0	0	887	Seawall at the Boathouse Hotel, Holyhead	Boathouse Hotel, Holyhead	masonry seawall	hard/man-made	Sea Wall	30	101JB90650101C01	01-Sep-94			Private	223950383260	224000383260
YNM	A	79	0	0	888	Embankment and seawall at Porth-y-felin Marina	Porth-y-felin Marina		hard/man-made	Embankment	280	101JB90650101C01	01-Sep-94			Private	224000383260	224140383410
YNM	A	80	0	0	889	Porth-y-felin Front	Porth-y-felin Front	masonry seawall Ynys Mon database mentions a 426m masonry/concrete seawall in this unit	hard/man-made	Sea Wall	550	101JB90650101C01	01-Sep-94			Private	224140383410	224640383300
YNM	A	81	0	0	890	Seawall at Mackenzie Landing Jetty	Mackenzie Landing Jetty		hard/man-made	Sea Wall	130	101JB90650101C01	01-Sep-94			Private	224640383300	224710383200
YNM	A	82	0	0	718	Cliffs at Ynys Halen	Ynys Halen	Hard Natural Coast	hard/natural	Cliff	300	101JB90650101C01					224710383200	224990383000
YNM	A	83	0	0	891	Seawall at Salt Island West	Salt Island West	masonry	hard/man-made	Sea Wall	550	101JB90650101C01	01-Sep-94			Private	224990383000	225250383390
YNM	A	84	0	0	892	Breakwater at Sealink Harbour & Pier	Sealink Harbour & Pier		hard/man-made	Breakwater	200	101JB90650101C01	01-Sep-94			Private	225250383390	225350383400
YNM	A	85	0	0	893	Revetment at Salt Island Hospital	Salt Island Hospital		hard/man-made	Revetment	200	101JB90650101C01	01-Sep-94			Private	225350383400	225350383400
YNM	A	86	0	0	894	Seawall at Salt Island East	Salt Island East		hard/man-made	Sea Wall	220	101JB90650101C01	01-Sep-94			Private	225330383180	225320382940
YNM	A	87	0	0	895	Old Harbour Breakwater	Old Harbour Breakwater		hard/man-made	Breakwater	250	101JB90650101C01	01-Sep-94			Private	225320382940	225290382900
YNM	A	88	0	0	896	Seawall at Holyhead Old Harbour	Holyhead Old Harbour	Also masonry floating pontoons at Holyhead Fish Dock (254,826)	hard/man-made	Sea Wall	2100	101JB90650101C01	01-Sep-94			Private	225290382900	225490382710
YNM	A	89	0	0	897	Seawall and revetment at South Pier	South Pier, Holyhead		hard/man-made	Sea Wall	110	101JB90650101C01	01-Sep-94			Private	225490382710	225490382600
YNM	A	90	0	0	719	Cliffs at Morawelon	Morawelon	Hard Natural Coast	hard/natural	Cliff	1550	101JB90650201C01					225490382600	226020381650
YNM	A	91	0	0	603	Embankment at Traeth Penrhos	Traeth Penrhos	Ynys Mon database details 450m of gabions	hard/man-made	Embankment	500	101JB90650201C01	01-Sep-94			Unitary Council	226020381650	226480381550
YNM	A	92	0	0	720	Dunes at Traeth Penrhos	Traeth Penrhos	Soft Natural Coast	soft/natural	Dunes	200	101JB90650201C01					226480381550	226610381680
YNM	A	93	0	0	721	Cliffs at Penrhos	Penrhos	Hard Natural Coast	hard/natural	Cliff	1550	101JB90650201C01					226610381680	227830381350
YNM	A	94	0	0	722	Cliffs at Beddmanarch Bay	Beddmanarch Bay	Hard Natural Coast	hard/natural	Cliff	800	101JB90650301C01					227830381350	227540380650
YNM	A	95	0	0	723	Beddmanarch Shingle Bank	Beddmanarch Shingle Bank	Soft Natural Coast	soft/natural	Dunes	200	101JB90650301C01					227540380650	227540380460
YNM	A	96	0	0	898	Seawall at the Toll House Tea Rooms	Toll House Tea Rooms, Stanley Embankment		hard/man-made	Groynes	200	101JB90650301C01	01-Sep-94			Private	227540380460	227600380360
YNM	A	97	0	0	604	Stanley Embankment	Stanley Embankment	Ynyns Mon database details 1000m of masonry and gabions, this suggests that the revetment recorded by the welsh office consists of gabions.	hard/man-made	Sea Wall	1020		01-Sep-94			Railtrack	227600380360	228500379860
YNM	A	98	0	0	724	Clay Cliffs at Newlands Park	Newlands Park	Soft Natural Coast	soft/natural	Cliff	1900	101JB90650401C01					228500379860	229500381250
YNM	A	99	0	0	1027	Clay / silt shore at the Afon Alaw	Afon Alaw	Soft Natural Coast Clay / silt shore	soft/natural	Other	4400						229500381250	229800381660
YNM	A	100	0	0	725	Sea defence embankment at at Twyn Gwyn	Twyn Gwyn	sea defence	hard/man-made	Embankment	10						229800381660	229800381670
YNM	A	101	0	0	726	Dunes at Twyn Gwyn	Twyn Gwyn	Soft Natural Coast	soft/natural	Dunes	980						229800381670	229380381100
YNM	A	102	0	0	727	Dunes at Twyn Gwyn	Twyn Gwyn	Soft Natural Coast	soft/natural	Dunes	1600	101JB90650501C01					229380381100	229440382440
YNM	A	103	0	0	600	Embankment at Bodlasan Fawr	Bodlasan Fawr		hard/man-made	Embankment	600	101JB90650501C01				Private	229440382440	229410383030

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YNM	A	104	0	0	728	Cliffs at Penial Dowyn	Penial Dowyn	Hard Natural Coast	hard/natural	Cliff	1100	101JB90650501C01					229410383030	228870383750
YNM	A	105	0	0	899	Embankment at Porth Penrhyn-mawr	Porth Penrhyn-mawr	rock embankment	hard/man-made	Embankment	230	101JB90650501C01	01-Sep-94			Private	228870383750	228730383920
YNM	A	106	0	0	729	Clifffs from Penrhyn to Tywyn Hir	Penrhyn to Tywyn Hir	Hard Natural Coast	hard/natural	Cliff	2250	101JB90660101C01					228730383920	228600384900
YNM	A	107	0	0	730	Dunes at Porth Tywyn Mawr	Porth Tywyn Mawr	Soft Natural Coast	soft/natural	Dunes	820	101JB90660201C01					228600384900	228980385530
YNM	A	108	0	0	731	Cliffs at Porth Defaid	Porth Defaid	Hard Natural Coast	hard/natural	Cliff	600	101JB90660201C01					228980385530	229160385970
YNM	A	109	0	0	900	Seawall and revetment at Porth Trefadog	Porth Trefadog		hard/man-made	Sea Wall	200	101JB90660201C01	01-Sep-94			Private	229160385970	229200386190
YNM	A	110	0	0	901	Rock Apron at Porth Trefadog	Porth Trefadog		hard/man-made	Other	50	101JB90660201C01	01-Sep-94			Private	229200386190	229140386240
YNM	A	111	0	0	1077	Revetment at Llanfaethlu,Carreg - y - Fran	Llanfaethlu,Carreg - y - Fran	Ynys Mon database details a gabion, mortar & concrete revetment 59m of concrete and 115m of gabions	hard/man-made	Revetment	175	101JB90660201C01					229325386840	229315387015
YNM	A	112	0	0	732	Shingle Bank at Porth Trwyn	Porth Trwyn	Soft Natural Coast @I do not believ the description of this unit	soft/natural	Embankment	2000	101JB90660201C01					229140386240	229670387850
YNM	A	113	0	0	733	Cliffs at Grugmor	Grugmor	Hard Natural Coast	hard/natural	Cliff	1500	101JB90660201C01					229670387850	229960389270
YNM	A	114	0	0	734	Dunes at Porth Swtan	Porth Swtan	Soft Natural Coast	soft/natural	Dunes	86	101JB90660201C01					229960389270	230100389385
YNM	A	115	0	0	1035	Revetment at Porth Swatan	Porth Swatan	masonry and rock armour revetment	hard/man-made	Revetment	28	101JB90660201C01					230100389385	230100389415
YNM	A	116	0	0	1036	Dunes at Porth Swtan	Porth Swatan	Soft Natural Coast	soft/natural	Dunes	86	101JB90660201C01					230100389415	230000389430
YNM	A	117	0	0	735	Cliffs from P. Swtan to Carmel Head	P. Swtan to Carmel Head	Hard Natural Coast	hard/natural	Cliff	4900	101JB90660301C01					230000389430	229770393110
YNM	A	118	0	0	736	Cliffs from Carmel Head to Trwyn Cendyn	Carmel Head to Trwyn Cendyn	Hard Natural Coast	hard/natural	Cliff	4900	101JB90670101C01					229770393110	233000393720
YNM	A	119	0	0	646	Shingle Bank at Cemlyn Bay	Cemlyn Bay	Soft Natural Coast	soft/natural	Embankment	1000	101JB90670201C01					233000393720	233640393220
YNM	A	120	0	0	647	Cliffs at Porth y Pistyll	Porth y Pistyll	Hard Natural Coast	hard/natural	Cliff	2400	101JB90670301C01					233640393220	234890394100
YNM	A	121	0	0	902	Seawall at Wylfa P.S. Jetty	Wylfa P.S. Jetty		hard/man-made	Sea Wall	10	101JB90670301C01	01-Sep-94			Nuclear Electric	234890394100	234890394100
YNM	A	122	0	0	648	Cliffs at Mynydd y Wylfa	Mynydd y Wylfa	Hard Natural Coast	hard/natural	Cliff	1550	101JB90670301C01					234890394100	235890394500
YNM	A	123	0	0	649	Cliffs from Porth Yr Ogof to Penrhyn	Porth Yr Ogof to Penrhyn	Hard Natural Coast	hard/natural	Cliff	2300	101JB90670301C01					235890394500	236930393700
YNM	A	124	0	0	903	Seawall at Cemaes Harbour and Front	Cemaes Harbour and Front	Ynys Mon database details a 250m masonry retaining wall / sea wall in this unit	hard/man-made	Sea Wall	450	101JB90670401C01	01-Sep-94			Private/Town or Community Council	236930393700	237300393550
YNM	A	125	0	0	645	Revetment and seawall at Cemaes Bay Beach	Cemaes Bay Beach		hard/man-made	Sea Wall	300	101JB90670401C01	01-Sep-94			Unitary Council	237300393550	237430393790
YNM	A	126	0	0	650	Clifffs from Cemaes Bay to Ogof Goch	Cemaes Bay to Ogof Goch	Hard Natural Coast	hard/natural	Cliff	9200	101JB90670501C01					237430393790	242600394360
YNM	A	127	0	0	904	Seawall at Porth Llechog	Porth Llechog	Ynys Mon database details a concrete / masonry slipway within this unit (5.4m wide) (SH 42500, 94340) and a 85m masonry seawall	hard/man-made	Sea Wall	20	101JB90670601C01	01-Sep-94			Private	242600394360	242600394310
YNM	A	128	0	0	651	Cliffs at Bull Bay	Bull Bay	Hard Natural Coast	hard/natural	Cliff	3000	101JB90670701C01					242600394310	244970393780
YNM	A	129	0	0	905	Seawall at Chemical Works, Amlwch	Chemical Works, Amlwch		hard/man-made	Sea Wall	150	101JB90670701C01	01-Sep-94			Private	244970393780	245050393660
YNM	A	130	0	0	906	Defences at Porth Amlwch	Porth Amlwch	Seawalls and breakwaters protecting the harbour at Amlwch. Yns Mon databse only states and unknown length of masonry / concrete, and also details the concrete slipway at the inner limit of the harbour (SH 449, 933)	hard/man-made	Sea Wall	800	101JB90670801C01	01-Sep-94			Private	245050393660	245140393530
YNM	A	131	0	0	652	Cliffs from P. Amlwch to P. Eilian	P. Amlwch to P. Eilian	Hard Natural Coast	hard/natural	Cliff	3000	101JB90670901C01					245140393530	247600392950
YNM	A	132	0	0	907	Seawall and apron at Porth Eilian	Porth Eilian	Ynys Mon database details 58m of maccaferri gabions at Llaneilian (SH 477,929) and a 22.7m concrete slipway	hard/man-made	Sea Wall	850	101JB90670901C01	01-Sep-94			Private	247600392950	247690392920
YNM	A	133	0	0	653	Cliffs from P. Eilian to Dulas Bay	P. Eilian to Dulas Bay	Hard Natural Coast Ynys Mon Databbse details 50m of gabions in this unit at Swnt (SH 517,868)	hard/natural	Cliff	6000	101JB90680101C01					247690392920	248600389460
YNM	A	134	0	0	654	Cliffs at Portobello Bay North	Portobello Bay North	Hard Natural Coast	hard/natural	Cliff	650	101JB90680101C01					248600389460	248250388950
YNM	A	135	0	0	908	Seawall and apron at Pen-y-parc	Pen-y-parc		hard/man-made	Sea Wall	110	101JB90680101C01	01-Sep-94			Private	248250388950	248190388870
YNM	A	136	0	0	655	Clay / silt shore at Treath Dulas	Treath Dulas	Soft Natural Coast	soft/natural	Other	1500	101JB90680201C01					248190388870	248250388130
YNM	A	137	0	0	909	Apron at Glan Treath	Glan Treath		hard/man-made	Other	300	101JB90680201C01	01-Sep-94			Private	248250388130	248500388300
YNM	A	138	0	0	656	Clay / silt shore at Portobello South	Portobello South	Soft Natural Coast	soft/natural	Other	750	101JB90680201C01					248500388300	248800388880

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YNM	A	139	0	0	657	Cliffs at Traeth-yr-Ora	Traeth-yr-Ora	Hard Natural Coast	hard/natural	Cliff	1600	101JB90680201C01					248800388880	249330387700
YNM	A	140	0	0	658	Dunes at Traeth Lligwy	Traeth Lligwy	Soft Natural Coast	soft/natural	Dunes	1000	101JB90680201C01					249330387700	249820387110
YNM	A	141	0	0	659	Cliffs at Moelfre Headland	Moelfre Headland	Hard Natural Coast	hard/natural	Cliff	2500	101JB90680201C01					249820387110	251550386580
YNM	A	142	0	0	644	Seawall at Moelfre Lifeboat Station	Moelfre LB Station		hard/man-made	Sea Wall	15	101JB90680301C01	01-Sep-94			Unitary Council	251550386580	251550386520
YNM	A	143	0	0	660	Cliffs at Porth Nigwyl	Porth Nigwyl	Hard Natural Coast	hard/natural	Cliff	300	101JB90680301C01					251550386520	251340386330
YNM	A	144	0	0	621	Seawall at Porth Moelfre	Porth Moelfre	Ynys Mon database details 45m of masonry / concrete seawall	hard/man-made	Sea Wall	200	101JB90680301C01	01-Sep-94			Private	251340386330	251270386300
YNM	A	145	0	0	661	Cliffs at Llanallgo	Llanallgo	Hard Natural Coast	hard/natural	Cliff	1400	101JB90680401C01					251270386300	251390385030
YNM	A	146	0	0	622	Seawall and revetment at Traeth Bychnan	Traeth Bychnan	Ynys Mon database details reinforced coincrete slipway in this unit	hard/man-made	Sea Wall	270	101JB90680501C01	01-Sep-94			Private	251390385030	251460384860
YNM	A	147	0	0	662	Cliffs at Bychnan Bay	Bychnan Bay	Hard Natural Coast	hard/natural	Cliff	900	101JB90680501C01					251460384860	251890384690
YNM	A	148	0	0	623	Revetment ant Penrhyn Point	Penrhyn Point		hard/man-made	Revetment	30	101JB90680501C01	01-Sep-94			Private	251890384690	251950384700
YNM	A	149	0	0	663	Cliffs from Penrhyn Pt. to Benllech	Penrhyn Pt. to Benllech	Hard Natural Coast	hard/natural	Cliff	2000	101JB90680601C01					251950384700	252240382750
YNM	A	150	0	0	624	Seawall at Traeth Benllech	Traeth Benllech		hard/man-made	Sea Wall	270	101JB90680601C01	01-Sep-94			Private	252240382750	252290382540
YNM	A	151	0	0	1028	Cliffs at Benllech Sand	Benllech Sand	Hard Natural Coast	hard/natural	Cliff	120	101JB90680601C01					252290382540	252360382480
YNM	A	152	0	0	664	Seawall at Benllech Sand	Benllech Sand	Coast Protection Seawall Ynys mon database details a masonry and reinforced concrete slipway.	hard/man-made	Sea Wall	150	101JB90680601C01					252360382480	252480382380
YNM	A	153	0	0	910	Cliffs from Benllech to Red Wharf Bay	Benllech to Red Wharf Bay	Hard Natural Coast	hard/natural	Cliff	1600	101JB90680601C01					252480382380	253140381420
YNM	A	154	0	0	643	Seawall and apron at Red Wharf Bay	Red Wharf Bay	Ynys Mon database details 220m of masonry seawall with a concrete toe	hard/man-made	Sea Wall	550	101JB90680701C01	01-Sep-94			Unitary Council	253140381420	252860380960
YNM	A	155	0	0	911	Clay / silt shore at Traeth-coch West	Traeth-coch West	Soft Natural Coast	soft/natural	Other	300	101JB90680701C01					252860380960	252700380730
YNM	A	156	0	0	625	Seawall and apron at Porth-llongdy-uchaf	Porth-llongdy-uchaf		hard/man-made	Sea Wall	200	101JB90680701C01	01-Sep-94			Private	252700380730	252610380550
YNM	A	157	0	0	912	Clay / silt shore at Traeth-coch West	Traeth-coch West	Soft Natural Coast	soft/natural	Other	400	101JB90680701C01					252610380550	252580380180
YNM	A	158	0	0	626	Seawall at Talgwyn	Talgwyn		hard/man-made	Revetment	470	101JB90680701C01	01-Sep-94			Private	252580380180	252960379900
YNM	A	159	0	0	913	Clay / silt shore at Traeth-coch East	Traeth-coch East	Soft Natural Coast	soft/natural	Other	4800	101JB90680701C01					252960379900	257380381160
YNM	A	160	0	0	914	Cliffs from Traeth-coch to Trwyn Du	Traeth-coch to Trwyn Du	Hard Natural Coast	hard/natural	Cliff	7600	101JB90680801C01					257380381160	264090381360
YNM	A	161	0	0	915	Cliffs from Trwyn Du to Porth Penmon	Trwy Du to Porth Penmon	Hard Natural Coast	hard/natural	Cliff	1100	101JB90690101C01					264090381360	263600380590
YNM	A	162	0	0	627	Seawall at Porth Penmon	Porth Penmon		hard/man-made	Sea Wall	50	101JB90690101C01	01-Sep-94			Private	263600380590	263550380570
YNM	A	163	0	0	916	Shingle Bank at Penmon Priory	Penmon Priory	Soft Natural Coast	soft/natural	Embankment	600	101JB90690101C01					263550380570	263030380330
YNM	A	164	0	0	628	Seawall and apron at Penmon Farm	Penmon Farm		hard/man-made	Sea Wall	50	101JB90690101C01	01-Sep-94			Private	263030380330	262990380290
YNM	A	165	0	0	917	Shingle Bank at Tan-y-ffron	Tan-y-ffron	Soft Natural Coast	soft/natural	Embankment	300	101JB90690101C01					262990380290	262950379980
YNM	A	166	0	0	629	Seawall and revetment at Tan-y-ffron	Tan-y-ffron	Ynys Mon database details 107m of masonry and concrete revtement at this unit	hard/man-made	Sea Wall	200	101JB90690101C01	01-Sep-94			Private	262950379980	262990379790
YNM	A	167	0	0	918	Cliffs at Trwyn-y-penrhyn	Trwyn-y-penrhyn	Hard Natural Coast	hard/natural	Cliff	350	101JB90690101C01					262990379790	262750379540
YNM	A	168	0	0	919	Penmon,Ty Ddewi Revetment	Trwyn-y-penrhyn	Coast Protection Ynys Mon databse details 196m of masonry / concrete revetment at this location	hard/man-made	Revetment	200	101JB90690201C01	01-Jan-09				262750379540	262540379520
YNM	A	169	0	0	630	Embankment and seawall at Pines	Pines	Ynys Mon database mentions 480m of Maccaferri Reno Mattresses & Gabions in this unit (SH 623,793)	hard/man-made	Embankment	500	101JB90690201C01	01-Sep-94			Private	262540379520	262200379220
YNM	A	170	0	0	1029	Cliffs at Lleiniog	Lleiniog	Hard Natural Coast	hard/natural	Cliff	100	101JB90690201C01					262200379220	262170379180
YNM	A	171	0	0	920	Gabion seawall at Lleiniog	Lleiniog	Coast Protection Ynys Mon database details 87m of gabions at this location (SH 621,791)	hard/man-made	Sea Wall	110	101JB90690201C01	01-Jan-09				262170379180	262100379080
YNM	A	172	0	0	921	Cliffs at Friars Bay	Friars Bay	Hard Natural Coast	hard/natural	Cliff	2000	101JB90690201C01					262100379080	261080377450
YNM	A	173	0	0	631	Seawall at Fryars	Fryars	Ynys Mon Database details 300m of masonry/concret revetment in this unit but the grid ref is worng	hard/man-made	Sea Wall	810	101JB90690201C01	01-Sep-94			Private	261080377450	261000376680
YNM	A	174	0	0	922	Cliffs at Coed Crwn-y-castell	Coed Crwn-y-castell	Hard Natural Coast	hard/natural	Cliff	350	101JB90690201C01					261000376680	260980376320
YNM	A	175	0	0	632	Seawall at Beaumaris Aquarium	Beaumaris Aquarium		hard/man-made	Sea Wall	70	101JB90690201C01	01-Sep-94			Unitary Council	260980376320	260960376240

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YNM	A	176	0	0	642	Seawall and revetment at Beaumaris Castle	Beaumaris Castle	Ynys Mon Database details 444m of masonry / Dytap precast conc: revet: blocks	hard/man-made	Sea Wall	480	101JB90700101C01	01-Sep-94			Unitary Council	260960376240	260650375910
YNM	A	177	0	0	608	Beaumaris Pier	Beaumaris	masonry seawall and structural timber pier 74m masonry101.50m timber & steel	hard/man-made	Sea Wall	74	101JB90700101C01	01-Jan-09				260650375910	260590375990
YNM	A	178	0	0	633	Seawall at Beaumaris Front	Beaumaris Front	Ynys Mon details 285m of masonry seawall	hard/man-made	Sea Wall	1120	101JB90700101C01	01-Sep-94			Private	260590375990	259810375340
YNM	A	179	0	0	641	Embankment at Gallows Point	Gallows Point	gabion embankment Ynys Mon details 600m of masonry revtement fronting the A545 at (SH 699,755)	hard/man-made	Embankment	620	101JB90700101C01	01-Sep-94			Unitary Council	259810375340	259620375130
YNM	A	180	0	0	640	Seawall and revetment at Gallows Point South	Gallows Point South	Ynys Mon Database Details 1) 360m of Gabions and 170m of Reno Mattresses 2) 174m of masonry / concrete revtement fronmting the A545	hard/man-made	Sea Wall	300	101JB90700201C01	01-Sep-94			Unitary Council	259620375130	259370374940
YNM	A	181	0	0	923	Cliffs at Coed Parc	Coed Parc	Hard Natural Coast	hard/natural	Cliff	1700	101JB90700201C01					259370374940	258070374060
YNM	A	182	0	0	634	Seawall at the Gazelle Hotel	Gazelle Hotel	Ynys Mon database details 60m of masonry seawall	hard/man-made	Sea Wall	100	101JB90700201C01	01-Sep-94			Private	258070374060	257980374010
YNM	A	183	0	0	924	Cliffs at Bryn Mel to Hafod Lon	Bryn Mel to Hafod Lon	Hard Natural Coast	hard/natural	Cliff	600	101JB90700201C01					257980374010	257480373700
YNM	A	184	0	0	635	Seawall at Hafod Lon	Hafod Lon		hard/man-made	Sea Wall	140	101JB90700201C01				Private	257480373700	257370373600
YNM	A	185	0	0	925	Cliffs at Llandeglan	Llandeglan	Hard Natural Coast			1100	101JB90700201C01					257370373600	256520373000
YNM	A	186	0	0	636	Seawall at Ynys Castell	Ynys Castell		hard/man-made	Sea Wall	500	101JB90700201C01	01-Oct-94			Private	256520373000	256080372840
YNM	A	187	0	0	637	Seawall and embankment from Ynys Castell to Ynys Gaint	Ynys Castell to Ynys Gaint	Ynys Mon database details a revetment consioting of gabions (100m) with a masonry abutment (50m) (SH 5600, 7280)	hard/man-made	Sea Wall	200	101JB90700301C01	01-Oct-94			Private	256080372840	256000372650
YNM	A	188	0	0	638	Seawall at Menai Bridge	Menai Bridge		hard/man-made	Sea Wall	1100	101JB90700301C01	01-Oct-94			Private	256000372650	255930372410
YNM	A	189	0	0	613	Gabions at A545, Menai Bridge	Menai Bridge	maccaferri gabions	hard/man-made	Sea Wall	35.5	101JB90700301C01	01-Jan-09				255930372410	255910372380
YNM	A	190	0	0	614	Seawall at Menai Bridge	Menai Bridge	Ynys Mon database details 140m of masonry seawall (SH 5570,7160)	hard/man-made	Sea Wall		101JB90700301C01	01-Oct-94				255910372380	255949371997
YNM	A	191	0	0	609	St George's Pier Menai Bridge	Menai Bridge	masonry,steel & steel encased with conc:	hard/man-made	Other		101JB90700301C01					255949371997	255949371997
YNM	A	192	0	0	610	Seawall at the Menai Bridge	Menai Bridge		hard/man-made	Sea Wall		101JB90700301C01	01-Oct-94			Private	255949371997	255815371815
YNM	A	193	0	0	611	Menai Bridge Slipway, Porth y Wrach	Menai Bridge	concrete slipway	hard/man-made	Other	60	101JB90700301C01					255815371815	255800371825
YNM	A	194	0	0	612	Seawall at the Menai Bridge	Menai Bridge	Ynys Mon database details a length of concret / masonry seawall at Prince's Pier, for 65m (SH 558, 718)	hard/man-made	Sea Wall		101JB90700301C01					255800371825	255740371600
CON	A	001	0	0	517	Glan-y-mor Elias (2)	Glan-y-Mor Elias	This section of frontage comprises a generally undefended soft shoreline with a low clay cliff. The length comprises a series of small embayments and associated local promontories. The shoreline has been reinforced in a number of places, particularly arou	soft/natural	Cliff	635		10-Jul-08				266132374079	266716374328
CON	A	002	0	0	518	Glan-y-mor Elias (1)	Glan-y-mor Elias	This section of frontage comprises an area of marsh with a shingle beach in front of it. The shingle beach continues westwards and forms a spit off the NW corner of the marsh. There is no evidence of material from the spit feeding the beaches to the west.	hard/man-made	Embankment	610		10-Jul-08		>20		266716374328	266952374891
CON	A	003	0	0	519	Bryn-y-neuadd Hospital	Bryn-y-neuadd	Defences along this section comprise a vertical pointed stone sea wall with a concrete capping with a promenade behind. The upper foreshore is groyned over the western part of this section, which forms a promontory on the shoreline. Here the beach width i	hard/man-made	Seawall	789		10-Jul-08				266952374891	267673375212
CON	A	004	0	0	520	Llanfairfechan Promenade	Llanfairfechan	Defences along this section comprise a vertical mass concrete wall with a recurved top section and concrete promenade behind. The foreshore is groyned across the whole length with a mixture of metal post with timber planks and mass concrete groynes. There	hard/man-made	Seawall	936		10-Jul-08				267673375212	268540375564
CON	A	005	0	0	521	Llanfairfechan	Llanfairfechan	Defences along this section comprise the first section of defences around the Pen-Y-Clip headland that provide protection to the North Wales railway line. The defences comprise a near vertical pointed stone faced wall with lower aprons that have been cons	hard/man-made	Seawall	1246		10-Jul-08				268540375564	269650376130

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CON	A	006	0	0	522	Avalanche Viaduct	Pen-y-clip	This section comprises a short length of frontage between sections of vertical stone faced wall where the Chester to Holyhead railway line is supported on a brick arched viaduct. The viaduct is supported on what appears to be a mass concrete footing that	hard/man-made	Seawall	162		10-Jul-08				269650376130	269805376176
CON	A	007	0	0	523	Avalanche West	Pen-y-clip	The defences along this section comprise what are thought to be the original defences - a near vertical pointed stone faced wall with lower pointed stone faced apron. The foreshore comprises a coarse upper area of cobblers and boulders abutting the defenc	hard/man-made	Seawall	122		10-Jul-08				269805376176	269925376197
CON	A	008	0	0	524	Pen-y-clip Headland	Pen-y-clip	Frontage comprises section of hard rock headland. Face of rock fractured in places with lumps having been broken off due to wave and water level impacts. The foreshore comprises a coarse upper area of cobbles and boulders abutting the defences. The lower	hard/natural	Cliff	168		10-Jul-08				269925376197	270084376252
CON	A	009	0	0	525	Avalanche East	Penmaenmawr	The defences along this section comprise what are thought to be the original defences - a near vertical pointed stone faced wall some 8-10 metres in height, which supports the railway track, partially in an open lattice structure. The foreshore comprises	hard/man-made	Seawall	386		10-Jul-08				270084376252	270470376250
CON	A	010	0	0	526	Penmaenmawr Quarry	Penmaenmawr	The defences along this section comprise a near vertical pointed stone faced wall some 5-6 metres in height. In the 19th century a jetty was situated along this section of frontage, which served the quarry above Penmaenmawr The foreshore comprises a coars	hard/man-made	Seawall	183		10-Jul-08				270470376250	270648376291
CON	A	011	0	0	527	Penmaenan, A 55 Trunk Road	Penmaenmawr	Defences comprise a sloping rock armour revetment that provides protection to the A55 trunk road and associated infrastructure. The structure over this section is generally in advance of shoreline to either side and exhibits two promontories at either end	hard/man-made	Revetment	505		10-Jul-08		>20		270648376291	271146376374
CON	A	012	0	0	528	Penmaenmawr Promenade (2)	Penmaenmawr	Backshore defences along this section comprise a reinforced vertical/stepped edge retaining wall to a bituminous surfaced promenade area. Primary defence is provided by mobile cobble/shingle upper beach. Lower beach is sand. There are concrete slipways ne	hard/man-made	Seawall	636		10-Jul-08				271146376374	271731376624
CON	A	013	0	0	529	Penmaenmawr Promenade (1)	Penmaenmawr	Backshore defences along this section comprise a reinforced concrete recurved edge wall to a bituminous surfaced promenade area. Primary defence is provided by mobile cobble/shingle upper beach. Lower beach is sand. This section of frontage is in advance	hard/man-made	Seawall	235		10-Jul-08				271731376624	271934376743
CON	A	014	0	0	530	Pen-y-Cae, A 55 Trunk Road		Defences comprise a sloping rock armour revetment that provides protection to the A55 trunk road and associated infrastructure. Approx. slope of revetment 1 in 2. There are a number of outfall structures built into the defences, which probably take roadwa	hard/man-made	Revetment	683		10-Jul-08		>20		271934376743	272535377067
CON	A	015	0	0	531	Penmaenmawr Gas Works (2)	Penmaenmawr	The defences along this section comprise an original vertical stone faced wall in front of which is a substantial sloping stone faced revetment. At the toe of the wall is a concrete toe beam/apron with rock armour boulders in front. The revetment, apron a	hard/man-made	Seawall	239		10-Jul-08				272535377067	272727377209
CON	A	016	0	0	532	Penmaenmawr Gas Works (1)	Penmaenmawr	The defences along this section comprise an original vertical reinforced concrete wall with a steep (2 in 1) sloping stone faced revetment, stone faced apron and vertical timber piles. The sloping section of revetment is missing from the central section o	hard/man-made	Seawall	194		10-Jul-08				272727377209	272877377332

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CON	A	017	0	0	533	Dwygyfylchi (4) / (3)	Dwygyfylchi	Defences comprise random placed armour blocks tipped in front of natural earth bank. Open stone access runs along crest of the structure behind which is an upper earth bank and the Chester to Holyhead railway to landward. At the eastern end of the frontag	hard/man-made	Revetment	379		10-Jul-08				272877377332	273186377551
CON	A	018	0	0	534	Dwygyfylchi (2)	Dwygyfylchi	There are no artificial defences across the section with a natural shingle beach providing protection to an easily eroded low lying, vegetated earth/sand bank and hinterland. The Afon Gyrach discharges onto the beach at the eastern end of the frontage. Th	soft/natural	Cliff	435		10-Jul-08				273186377551	273502377850
CON	A	019	0	0	507	Dwygyfylchi (1) - DC Treatment Works	Dwygyfylchi	Defences across this section comprise a sloping armour stone revetment protection to a clay cliff. The defences were erected to at the western This section of shoreline is an eroding promontory that has now been fixed The upper foreshore comprises a natur	hard/man-made	Revetment	517		10-Jul-08		>20		273502377850	273951378106
CON	A	020	0	0	508	Penmaen-bach West	Penmaen-bach	The defences along this section comprise a vertical stone faced wall with sloping stone faced revetment in front. No toe piles were observed at the time of the inspection. The remnants of a timber post and pile groyne field are visible across the frontage	hard/man-made	Seawall	513		10-Jul-08				273951378106	274378378390
CON	A	021	0	0	509	A 55 Trunk Road	Penmaen-bach	Short section of vertical masonry / stone faced retaining wall to eastbound lane of A55 trunk road around Penmaenbach headland. Wall is visibly founded on rock outcrop of headland at eastern end. Foreshore comprises upper shingle beach and lower sandy for	hard/man-made	Seawall	134		10-Jul-08				274378378390	274483378474
CON	A	022	0	0	510	Penmaen-bach Headland	Penmaen-bach	This section of shoreline is essentially a hard rock shoreline, with intermittent sections of retaining wall supporting the eastbound carriageway of the A55, constructed where the rock has eroded or broken away. All the sections of wall are founded on the	hard/natural	Cliff	549		10-Jul-08				274483378474	275031378443
CON	A	023	0	0	511	Penmaen-bach East	Penmaen-bach	The defences along this section comprise a vertical stone faced wall. The lower beach comprises sandy deposits, whilst the upper beach varies - coarse cobble and shingle at either end and sand in front of the central section.	hard/man-made	Seawall	264		10-Jul-08				275031378443	275270378330
CON	A	024	0	0	512	Conwy Morfa 3	Conwy	Coastal defence across this section is provided by the natural shoreline features which comprise, at the western end, a boulder clay cliff which quickly gives way to natural sand dunes fed from the inter-tidal zone on the approaches to the Conwy estuary.	soft/natural	Dunes	1333		10-Jul-08				275270378330	276442378965
CON	A	025	0	0	513	Conwy Morfa 2	Conwy	Coastal defence across this section is provided by the natural shoreline features which comprise a continuation of the natural dune belt to the west fed from the inter-tidal zone on the approaches to the Conwy estuary. Offset a few metres from the toe of	soft/natural	Dunes	493		10-Jul-08				276442378965	276793379311
CON	A	026	0	0	514	Conwy Morfa 1	Conwy	Coastal defence across this section is provided by the natural shoreline features which comprise a continuation of the natural dune belt from the west fed from the inter-tidal zone on the approaches to the Conwy estuary. The level of the dune decreases on	soft/natural	Dunes	761		10-Jul-08				276793379311	277489379004
CON	A	027	0	0	515	Conwy Marina	Conwy	The defences within this section comprise a rock revetment that forms the northern breakwater arm and the internal revetment to the Conwy Marina basin. The breakwater arm is a trapezoidal shaped “finger” with small rock armour facing. The rock armour appe	hard/man-made	Revetment	1200		10-Jul-08		>20		277489379004	277726378518

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CON	A	028	0	0	516	Conwy A55 Tunnel Portal West	Conwy	The defences within this section comprise a series of rock revetment facings to the natural soft shoreline, similar in construction to the rock armour revetment around the adjacent marina basin. The rock armour appears to have been placed at a gradient of	hard/man-made	Revetment	600		28-Aug-08		>20		277726378518	277567378272
CON	A	029	0	0	535	Conwy Marine Walk	Conwy	This section of defences runs from the bridge over the Afon Cadnant? around Bodlondeb Wood to the south side of the Conwy Town Wall, where it juts out into the estuary Defences comprise twin pointed stone faced walls with a narrow tarmacadamed footpath be	hard/man-made	Seawall	900		28-Aug-08				277567378272	278173377757
CON	A	030	0	0	536	Conwy Harbour	Conwy	The coastal defences around the harbour comprise two discrete sections. Over the northern half the defences comprise a small rear vertical masonry wall, with a small section of stepped revetment in front of it at the south end. In front of the wall the fo	hard/man-made	Seawall	281		28-Aug-08		>20		278173377757	278354377542
CON	A	031	0	0	537	Conwy Bridge West Abutment	Conwy	Rear wall forms lead in wall to abutments to Conwy Bridge rising in level from quay. Foreshore in front of wall is sheltered behind steel piled training wall to river channel as it passes under the bridge. General sand/mud foreshore with some coarser grav	hard/man-made	Seawall	67		28-Aug-08		>20		278354377542	278325377380
CON	A	032	0	0	538	Conwy Castle (Benarth Road)	Conwy	The defences along this section comprise a vertical mortared stone wall that acts as a retaining wall to the land behind. The wall appears to be founded on foreshore deposits and/or bedrock where it outcrops. The foreshore generally comprises sand/mud dep	hard/man-made	Seawall	260		28-Aug-08				278325377380	278565377279
CON	A	033	0	0	539	Benarth Lodge	Conwy	The defences along this section comprise a vertical mortared stone wall that acts as a retaining wall to the land behind. The wall appears to be founded on bedrock across the frontage The foreshore generally comprises sand/mud deposits with exposed bedroc	hard/man-made	Seawall	129		28-Aug-08				278565377279	278658377190
CON	A	034	0	0	540	Conwy River West shore	Conwy Estuary	There are no artificial defences to the shoreline across this section apart from some localised gabion retaining wall reinforcing the shoreline adjacent to isolated shoreline property(s) at Benarth-bach [13]. Bedrock outcrops on the foreshore at the downs	hard/man-made	Gabions	4790		28-Aug-08				278658377190	278660373630
CON	A	035	0	0	541	NRA Embankment	Conwy Estuary	Earth flood defence embankment along shoreline on west side of estuary. Embankment < 2.0 metres in height. Embankment positioned along edge of land. Riverside toe of embankment has been intermittently reinforced with small rock armour to prevent further e	hard/man-made	Embankment	2450		28-Aug-08				278660373630	278670371920
CON	A	036	0	0	542	Tal-y-cafn (4)	Conwy Estuary	Short length of undefended soft shoreline on western side of estuary immediately downstream of Tal-y-Cafn bridge (CP Act Schedule IV boundary). Localised remnants of stone and timber jetty/landing stage at downstream end. Narrow foreshore steeply shelves	soft/natural	other	136		28-Aug-08				278670371920	278560371840
CON	A	037	0	0	543	Tal-y-cafn (3)	Conwy Estuary	Defences comprise vertical stone faced walls immediately upstream of Tal-y-Cafn bridge (CP Act Schedule IV boundary). Narrow foreshore steeply shelves to channel and comprises generally sand and mud deposits.	hard/man-made	Seawall	148		28-Aug-08				278560371840	278635371755
CON	A	038	0	0	544	Tal-y-cafn (2)	Conwy Estuary	Section of frontage immediately downstream of Tal-y-Cafn bridge (CP Act Schedule IV boundary) on inside bend of river. Generally frontage comprises natural soft shoreline. Local attempt at sandbag wall to edge of shoreline in front of terraced properties	hard/man-made	Seawall	297		28-Aug-08				278635371755	278900371890

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CON	A	039	0	0	545	Tal-y-cafn (1)	Conwy Estuary	Defences comprise a vertical pointed stone wall that runs along the toe of the raised embankment on which the Conwy Valley railway line is situated. Narrow foreshore steeply shelves to channel and comprises generally sand and mud deposits. The upper fores	hard/man-made	Seawall	870		28-Aug-08				278900371890	279590372400
CON	A	040	0	0	546	Terrace Wood	Conwy Estuary	Defences described as a revetment in the Welsh Office survey but no defences evident from inspection. Possibly masked by vegetation growth. If so then revetment is probably providing defence to railway line. There are remnants of stone jetty/landing stage	hard/man-made	Revetment	331		28-Aug-08				279590372400	279610372730
CON	A	041	0	0	547	Trallwyn (3)	Conwy Estuary	There are no artificial defences to the shoreline identified across this section in the Welsh Office Coastal Defence Survey. During the inspection a close up of the shoreline, where there is a cable crossing of the estuary, identified a stone wall [56]. I	soft/natural	Cliff	1430		28-Aug-08				279610372730	278900373890
CON	A	042	0	0	548	Trallwyn (2)	Conwy Estuary	Short section of frontage, where defences have been constructed to protect foundations to railway. Defences appear to comprise sloping stone revetment. Foreshore apparently comprises sand and mud deposits with upper sections well vegetated.	hard/man-made	Revetment	108		28-Aug-08				278900373890	278840373980
CON	A	043	0	0	549	Trallwyn (1)	Conwy Estuary	Soft shoreline comprising low cliff. Evidence of some artificial protection to riverside face. Foreshore comprises sand and mud deposits with upper sections well vegetated.	soft/natural	Cliff	580		28-Aug-08				278840373980	278760374530
CON	A	044	0	0	550	Allor Moloch (2)	Conwy Estuary	Soft shoreline comprising marshland. Possible evidence of reinforcement along edge of railway foundations Foreshore comprises sand and mud deposits with upper saltmarsh.	soft/natural	other	630		28-Aug-08				278760374530	279190374990
CON	A	045	0	0	551	Allor Moloch (1)	Conwy Estuary	The defences along this length comprise generally a sloping stone faced revetment that provides protection to the foundations of the railway track that runs immediately behind the defences. At the northern end of the frontage there is a short section of v	hard/man-made	Revetment	240		28-Aug-08				279190374990	279360375160
CON	A	046	0	0	552	Carreg y Groes	Conwy Estuary	Clay cliff and rock headland at Carreg y Groes. No artificial defences Maps identify that the foreshore deposits in front of the defences largely comprise sands and mud.	soft/natural	cliff	567		28-Aug-08				279360375160	279835375470
CON	A	047	0	0	553	Llansantffraid	Conwy Estuary	Sloping stone/masonry revetment, approx 300mm thick, founded on clay core. Structure slope 1 in 2.5. Facing has been repaired with spray concrete from time to time. Approx 800mm high stone wall at crest. Whole structure supports railway track behind. 500	hard/man-made	Revetment	1260		28-Jul-08				279835375470	280230376660
CON	A	048	0	0	554	RSPB Nature Reserve	Conwy Estuary	Defences comprise sloping rubble stone revetment with horizontal unbound stone crest, used for access around RSPB reserve. D50 stone size typically 300-500mm. Defences protect land that was reclaimed from the estuary using spoil excavated from the Conwy T	hard/man-made	Revetment	1850		28-Jul-08		>20		280230376660	278902377730
CON	A	049	0	0	555	Conwy Road & Rail Bridge (1)	Conwy Estuary	This section of frontage comprises the upstream flank of the Conwy Cob. The defences comprise a sloping stone faced revetment with mortared joints. At the top of the slope is a small (est. 0.5m high) vertical concrete crest wall. Sections of the revetment	hard/man-made	Revetment	312		28-Aug-08				278902377730	278663377530
CON	A	050	0	0	556	Conwy Road & Rail Bridge (1) - Wharf	Conwy Estuary	This section comprises the western end of the upstream face to the Conwy Cob. Defences are a vertical stone faced wall. This area was used as a wharf for movement of materials to and from vessels. Old cranes are still visible on the crest. There is a narr	hard/man-made	Seawall	83		28-Aug-08				278663377530	278531377547

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CON	A	051	0	0	557	Conwy Bridge East Abutment	Conwy Estuary	Structure comprise the east side abutments to the three Conwy crossings -Telford's original crossing circa 1830, Stephenson's rail crossing, circa 1850 and the existing road crossing, circa 1950. Structures are vertical in profile and constructed from lar	hard/man-made	Seawall	53		28-Aug-08		>20		278531377547	278573377579
CON	A	052	0	0	558	Conwy Cob	Conwy Estuary	Vertical/battered face concrete and mortared stone faced retaining wall to downstream face of Conwy Cob. Wall is essentially linear in direction but with three number semi-circular buttresses along its length. Wide paved promenade area runs along crest. T	hard/man-made	Seawall	391		28-Jul-08				278573377579	278905377786
CON	A	053	0	0	559	A55 Tunnel Ramp	Conwy Estuary	Defences comprise interlocking concrete block revetment around land that was reclaimed for the eastern A55 tunnel portal. Porous blocks to revetment face with solid blocks on crest. Structure grade approx. 1 in 2. Structure interfaces to the downstream si	hard/man-made	Revetment	523		28-Jul-08				278905377786	278758378288
CON	A	054	0	0	560	Tywyn, BR Deganwy Pitching	Deganwy	Sloping stone/masonry revetment, approx 300mm thick, founded on clay core, as Network Rail defences at Glan Conwy. Facing has been repaired with spray concrete from time to time. Structure slope 1 in 2.5. Approx 1000mm high stone wall at crest. Whole leng	hard/man-made	Revetment	499		28-Jul-08		>20		278758378288	278437378670
CON	A	055	0	0	561	Deganwy Marina - South Wall	Deganwy	Defences at this location are presently under construction but will comprise a vertical sheet piled toe pile the majority of which will be buried below beach level, with a stone clad vertical concrete retaining wall above it. A stone scour apron will be p	hard/man-made	Seawall	47		28-Jul-08		>20		278437378670	278399378642
CON	A	056	0	0	562	Deganwy Harbour - South Breakwater	Deganwy	Defences at this location are presently under construction (2003). The proposed structure in final form will comprise a steel sheet curtain driven into the beach with a rock revetment abutting the piles on the inside of the basin and a rock scour mattress	hard/man-made	Revetment	141		28-Jul-08		>20		278399378642	278250378604
CON	A	057	0	0	563	Deganwy Quay Wall	Deganwy	The defence along this length is a near vertical timber structure (gradient 6:1), approximately 200 metres in length and orientated along a north-west/south-east axis that forms the external facing wall of the existing dock. The structure comprises verti	hard/man-made	Seawall	202		28-Jul-08				278250378604	278125378763
CON	A	058	0	0	564	Degnwy Marina - Outer Revetment	Deganwy	The frontage curves from north to south and is 250 metres long. The defences along this length comprise a sloping revetment, constructed from quarried stone blocks typically 100mm wide by 400/500mm long, laid side on. The depth of the blocks into the reve	hard/man-made	Revetment	246		28-Jul-08				278125378763	278073379003
CON	A	059	0	0	565	Deganwy Station Wall	Deganwy	The defences comprise a vertical stone faced wall with a sloping stone faced revetment in front of it. The joints between the blocks are mortared. The level at which the revetment interfaces with the vertical wall varies along the frontage, starting off a	hard/man-made	Seawall	299		28-Jul-08		>20		278073379003	277796379116
CON	A	060	0	0	566	Marine Crescent Deganwy	Deganwy	Primary coastal defence across the frontage is provided by the existing shingle and cobble beach, the width of which is at a minimum across the promontory in the shoreline where Marine Crescent is situated i.e. where the estuary channel is at its narrowes	hard/man-made	Seawall	417		28-Jul-08		>20		277796379116	277622379495
CON	A	061	0	0	567	Deganwy Promenade	Deganwy	This section of defences comprises a near vertical concrete sea wall with a concrete/tarmac surfaced promenade behind. The foreshore comprises a continuation of the upper shingle beach with a lower sand foreshore.	hard/man-made	Seawall	267		28-Jul-08				277622379495	277505379735
CON	A	062	0	0	568	Deganwy Shingle Bank	Deganwy	Short section of natural shingle bank with no artificial defences, which forms promontory on shoreline. Lower foreshore comprises sandy surface deposits.	soft/natural	Embankment	73		28-Jul-08				277505379735	277496379807

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CON	A	063	0	0	569	North Wales Golf Club (3)	North Wales Golf Club	Defences comprise a sloping timber breastwork revetment with an unbound surface access track running between the revetment and the low lying dunes behind. The revetment has been supplemented by small rock armour along its toe at the south end of the front	hard/man-made	Revetment	636		28-Jul-08				277496379807	277443380441
CON	A	064	0	0	570	North Wales Golf Club (2)	North Wales Golf Club	No formal coastal defences across this section of frontage. A small section of old concrete wall (<10 metres in length) abuts the north end of the adjacent timber revetment and some small rock boulders have been dumped along the toe of the dunes over a sh	hard/man-made	Revetment	284		28-Jul-08		>20		277443380441	277283380676
CON	A	065	0	0	571	Cerrig Duon Breakwater	North Wales Golf Club	Structure comprises cross shore fishtail (“Y” shaped) rock groyne. Beach comprises largely sandier deposits with some shingle across upper and lower sections of foreshore, becoming coarser further away from structure.	hard/man-made	breakwater	247		28-Jul-08				277283380676	277283380676
CON	A	066	0	0	572	North Wales Golf Club (1)	North Wales Golf Club	Naturally dune frontage with coastal defence function provided by recharged upper beach (1991/2). Natural upper surface deposits are largely mixed sand and shingle. Graded upper beach reinforcement introduced with sand on immediate north side of Cerrig Du	soft/natural	other	598		28-Jul-08				277283380676	277314381273
CON	A	067	0	0	573	West Shore Shingle Bank	Pen Morfa	Short section of natural shingle beach between dune frontage to south and formal sea wall to the north. No artificial defences, apart from a few individual blocks of armour demarcating the edge of adjacent car park.	soft/natural	other	306		28-Jul-08				277314381273	277293381728
CON	A	068	0	0	574	Lloyd St.Breakwater	Pen Morfa	Structure comprises cross shore fishtail (“Y” shaped) rock groyne. Upper beach to either side comprises mixture of sand and shingle deposits with lower sandy beach. The structure was built and beach levels were artificially recharged in front of the sea w	hard/man-made	breakwater	65		28-Jul-08				277293381728	277315381579
CON	A	069	0	0	575	Llandudno West Promenade	Pen Morfa	Primary defences comprise stepped concrete sea wall with integral promenade and rear wave return. Secondary and tertiary non coastal defence walls to landward in places. The natural surface deposits across the area are generally sand across the upper and	hard/man-made	Seawall	758		28-Jul-08				277315381579	276931382156
CON	A	070	0	0	576	Gogarth Breakwater	Pen Morfa	Structure comprises cross shore fishtail (“Y” shaped) rock groyne. Upper beach to either side comprises mixture of sand and shingle deposits with lower sandy beach. The structure was built and beach levels were artificially recharged in front of the sea w	hard/man-made	breakwater	264		28-Jul-08				276931382156	276900382213
CON	A	071	0	0	577	Gogarth Wall	Pen Morfa	Short section continuation of stepped concrete revetment as to south but with promenade only at south end and or rear vertical grouted stone faced wall. Damaged sections of steps were re-cast as part of West Shore scheme in 1991/2. This section of wall is	hard/man-made	Seawall	102		28-Jul-08				276900382213	276829382286
CON	A	072	0	0	578	Marine Drive	Pen Morfa to Gogarth	Section of vertical stone faced retaining wall to highway. The structure has been built over and between the natural rock outcrops and has been repaired, refaced and buttressed with reinforced intermittent concrete sections over the years. It is not a for	hard/man-made	Seawall	406		28-Jul-08				276829382286	276462382459
CON	A	073	0	0	579	Gogarth, Gt Orme	Gogarth	This section of frontage comprises a natural clay cliff at the base of which have been built an individual series of ad-hoc coastal defences comprising: · Armour stone boulders in formal walls and pushed up against the toe · Vertical stone faced walls · V	hard/man-made	Seawall	1254		28-Jul-08				276462382459	275455383207

Area	Section	Sub	Var	Rev	Defence ID	Name	Location	Description	Classification	Type	Length (m)	NFCDD Asset Reference	Last Inspection Date	Defence Integrity	Defence Residual Life	Owner	Grid Reference (Start)	Grid Reference (End)
CON	A	074	0	0	580	Great Ormes Head	Great Ormes Head	Frontage comprises hard rock (carboniferous limestone) headland. The foreshore comprises a coarse upper area of cobbles and boulders abutting the defences on the west facing side of the frontage - beach width decreases in a northerly direction. The lower	hard/natural	Cliff	5200		28-Jul-08				275455383207	278232383123

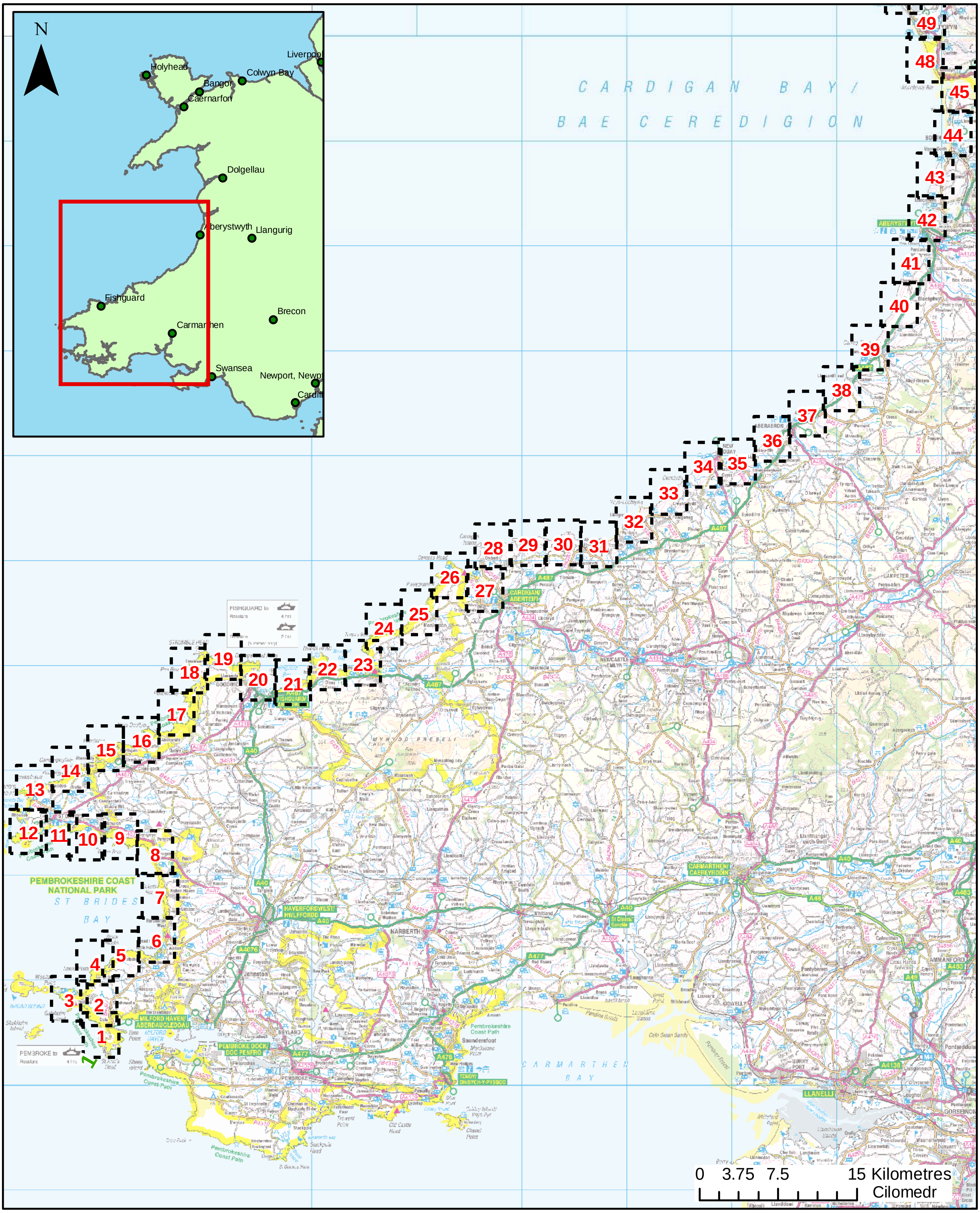
Annex IV – Baseline Scenarios Maps of Flood Risk & Erosion

November 2011
Final
9T9001

Shoreline Management Plan - West of Wales
Erosion and Flood Risk - Masterplan

Page/Tudalen 1 of/o 3

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Prif Gynllun



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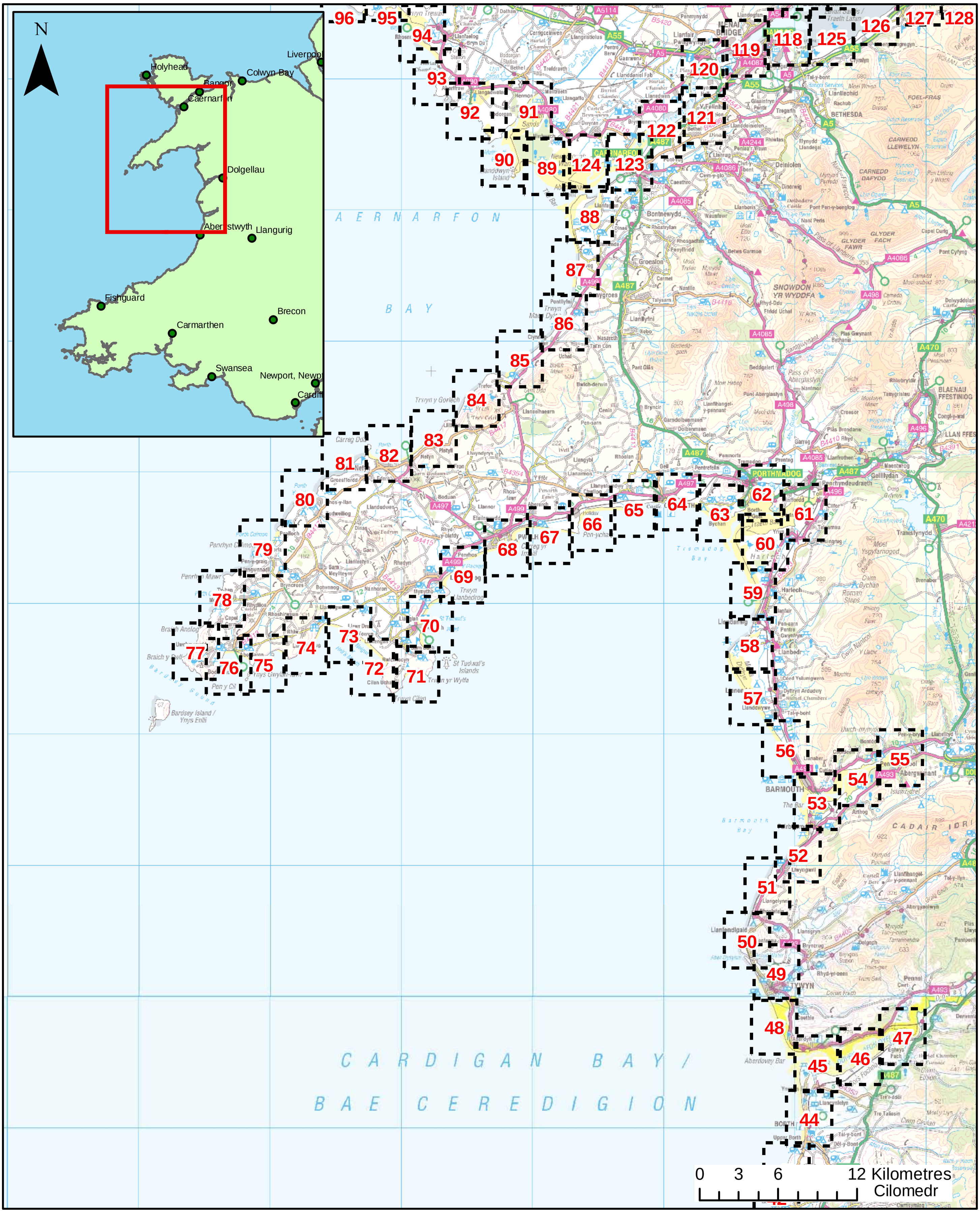
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - Masterplan

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Prif Gynllun

Page/Tudalen 2 of/o 3



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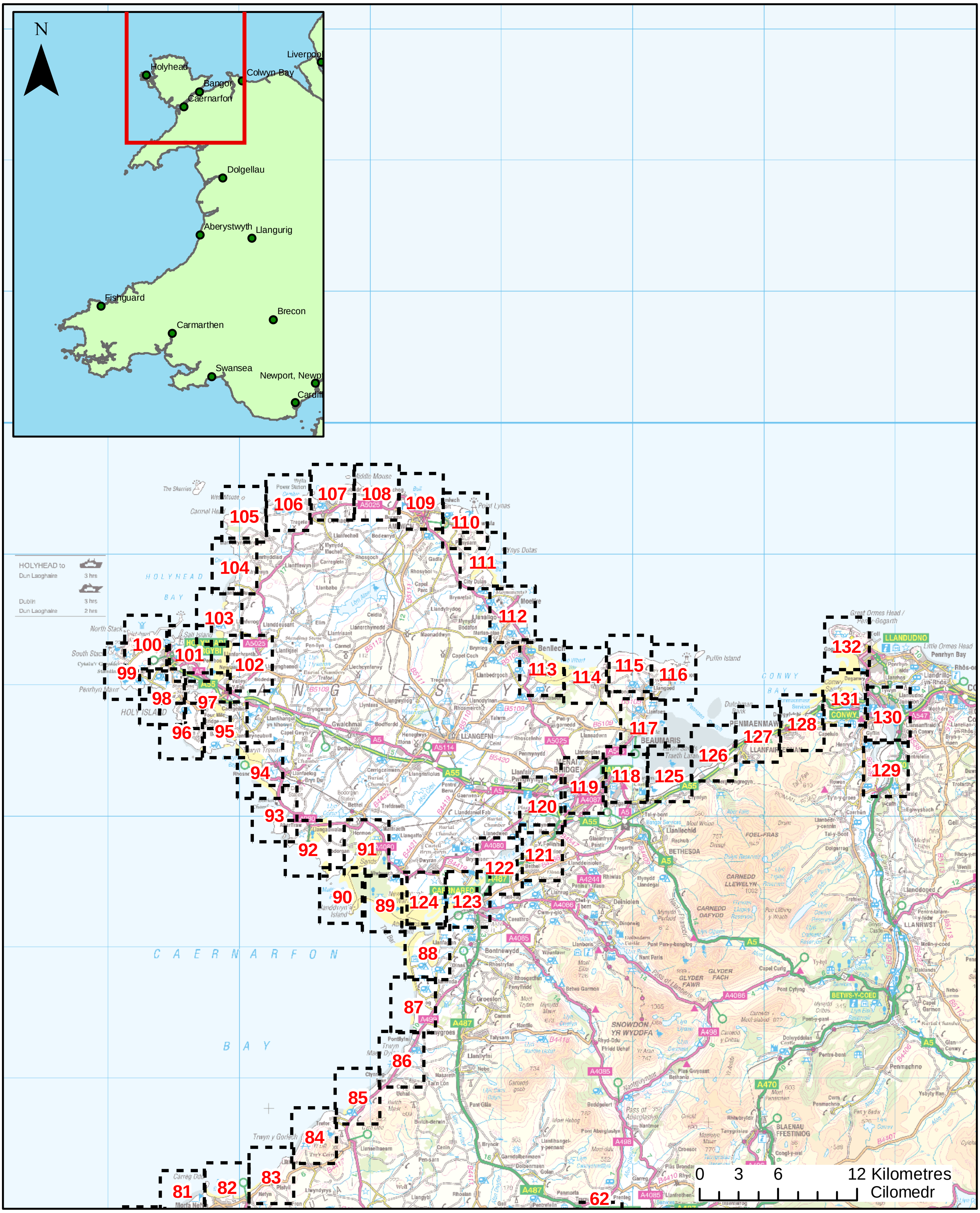
Erosion and Flood Risk - Masterplan

Page/Tudalen 3 of/o 3

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Prif Gynllun



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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 1

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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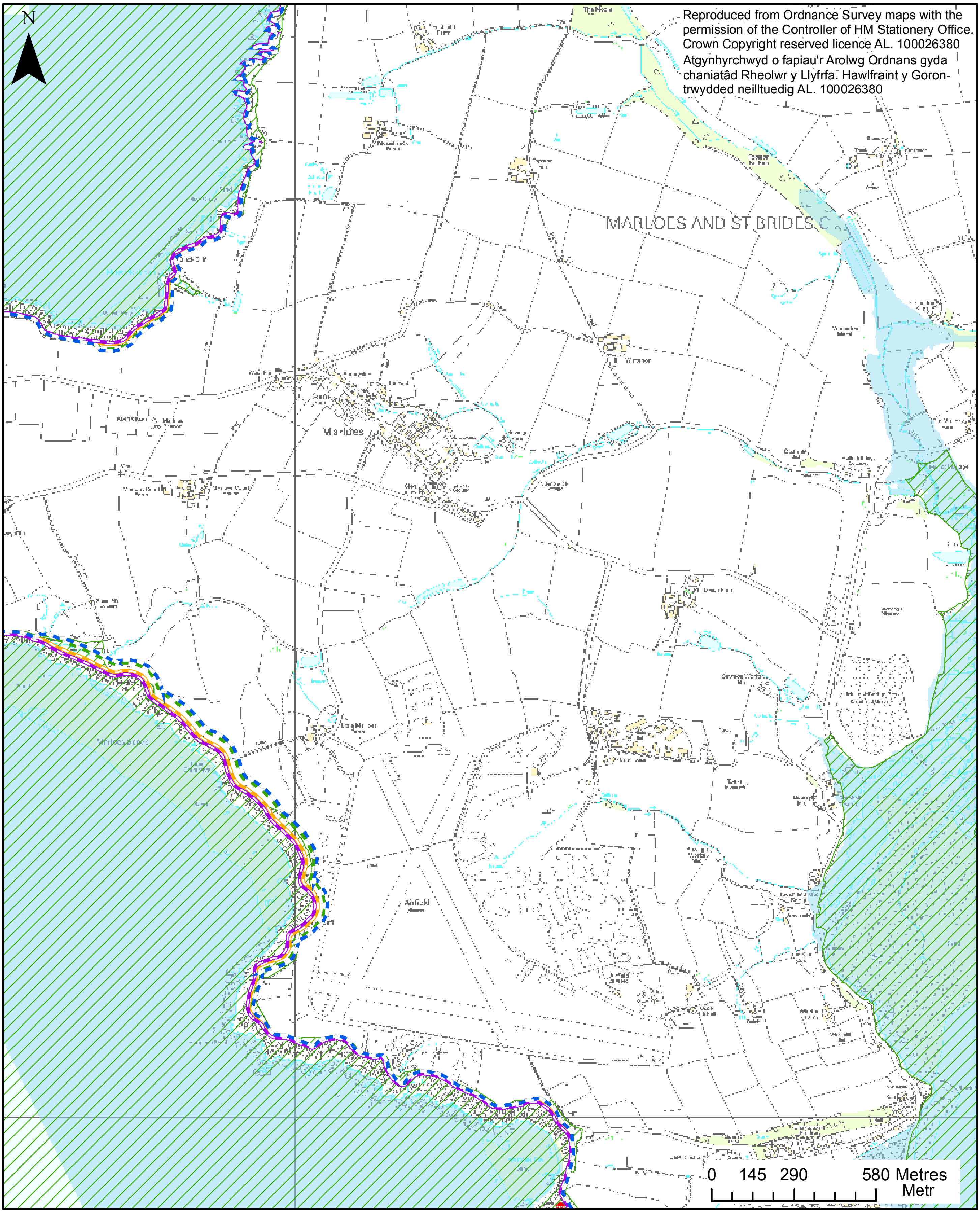
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 2

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 3

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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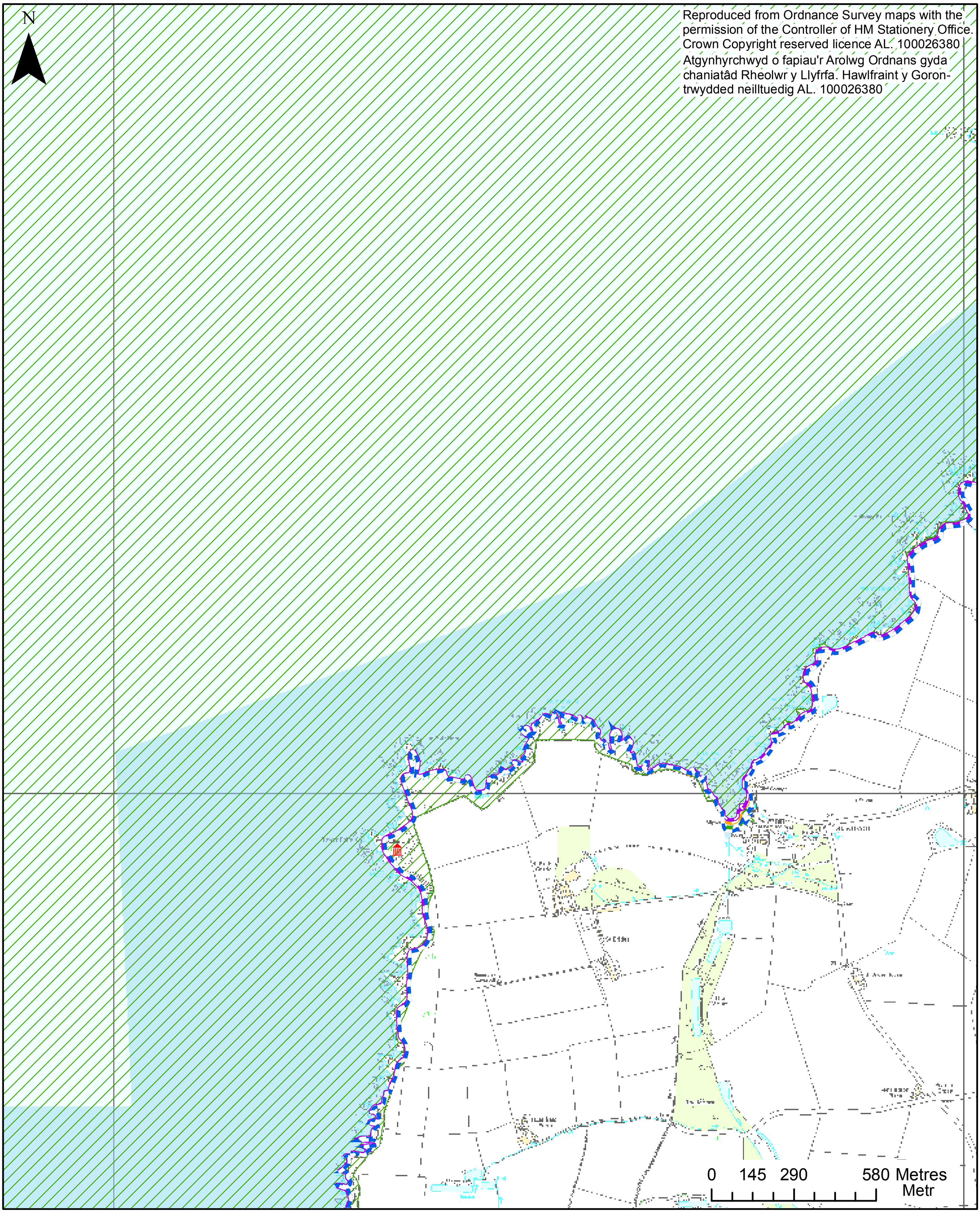
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 4

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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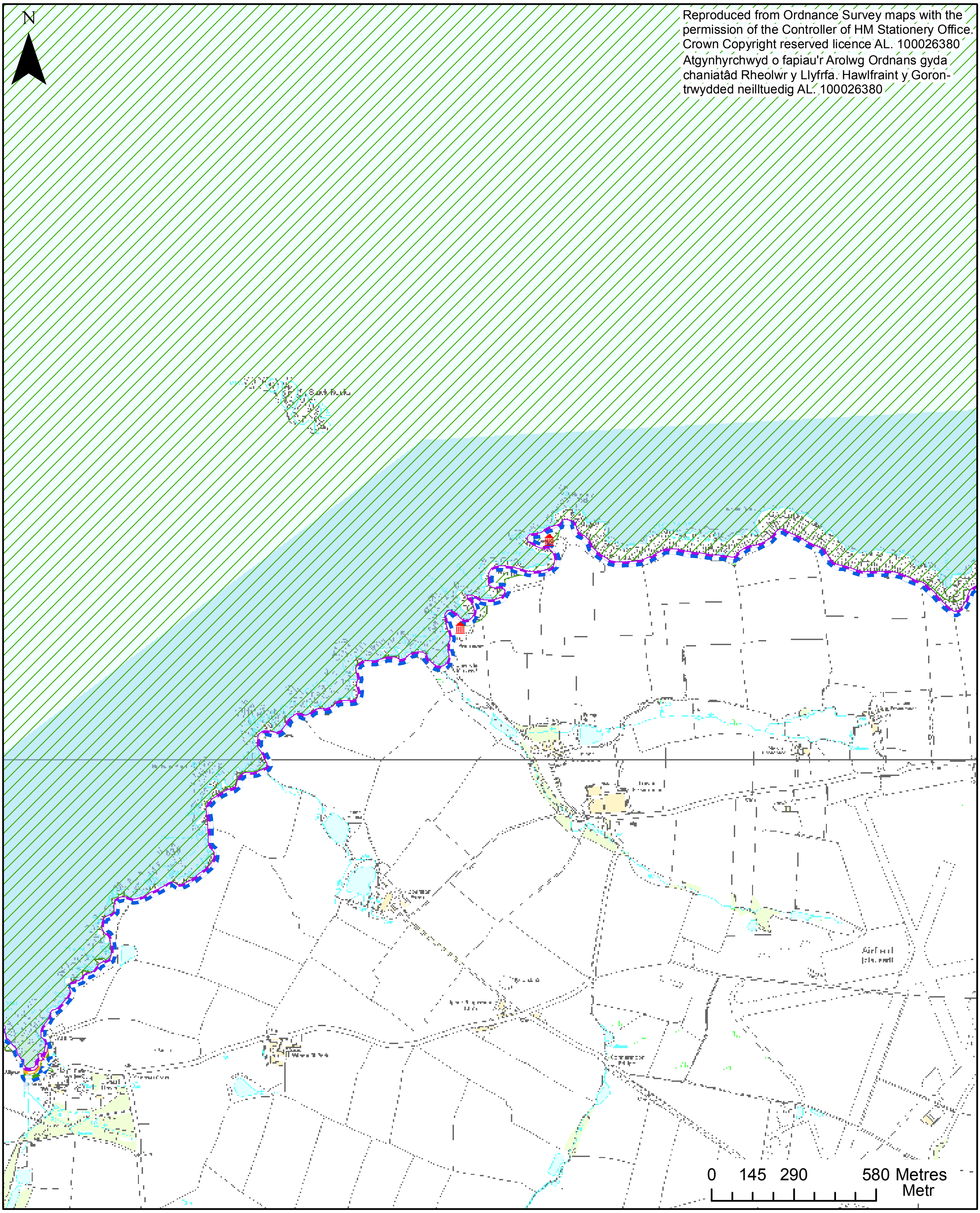
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 5



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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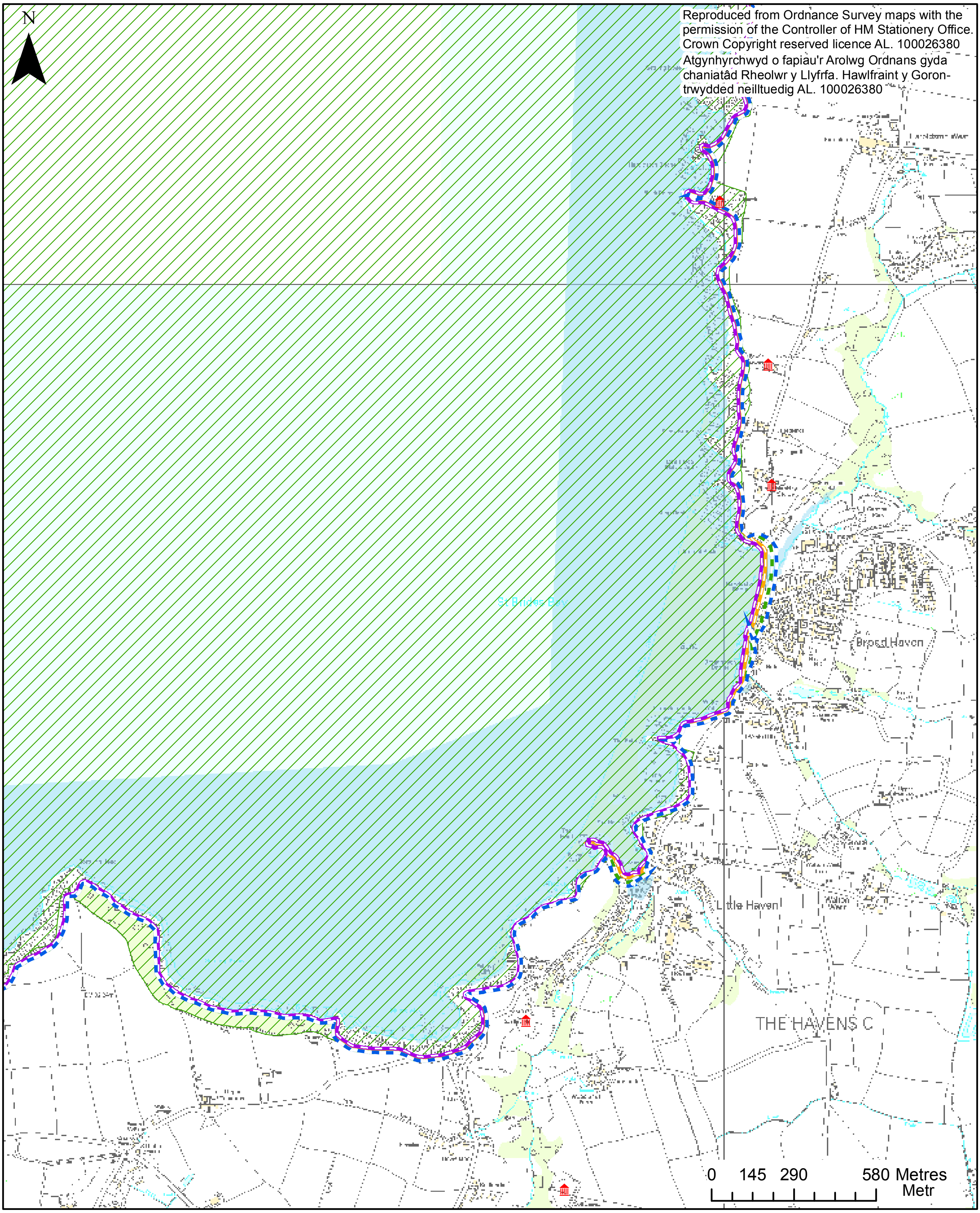
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 6



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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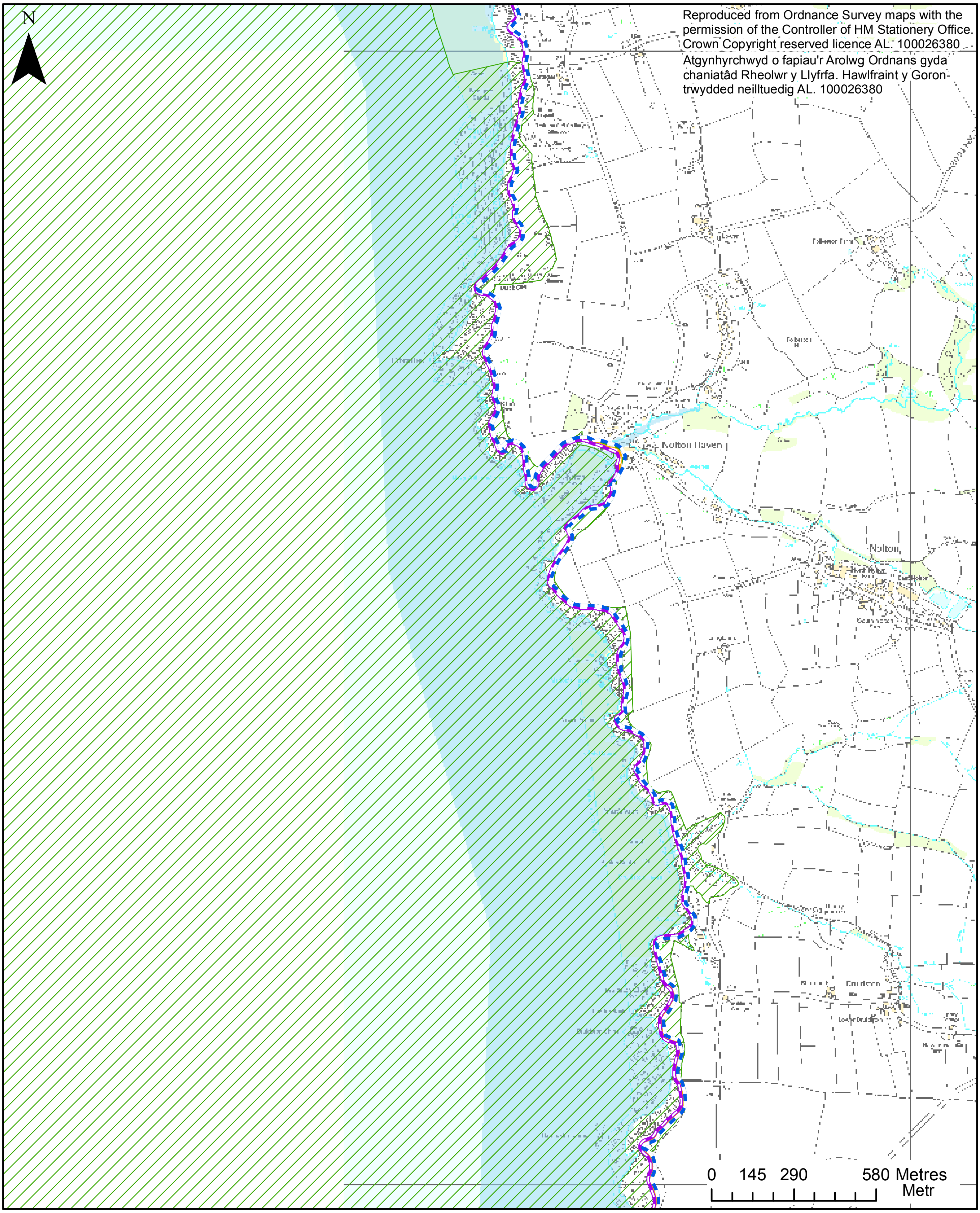
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 7

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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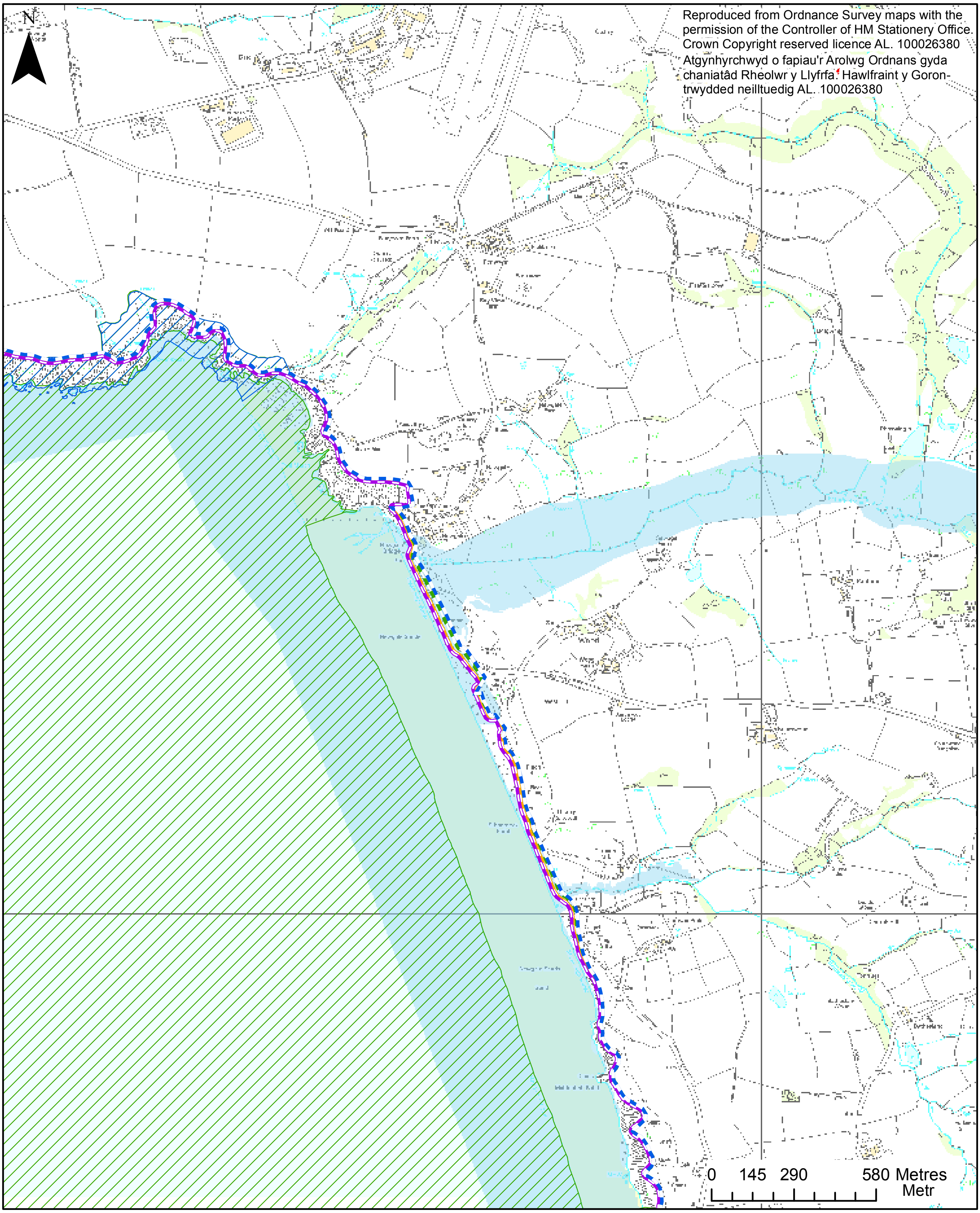
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 8

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 9

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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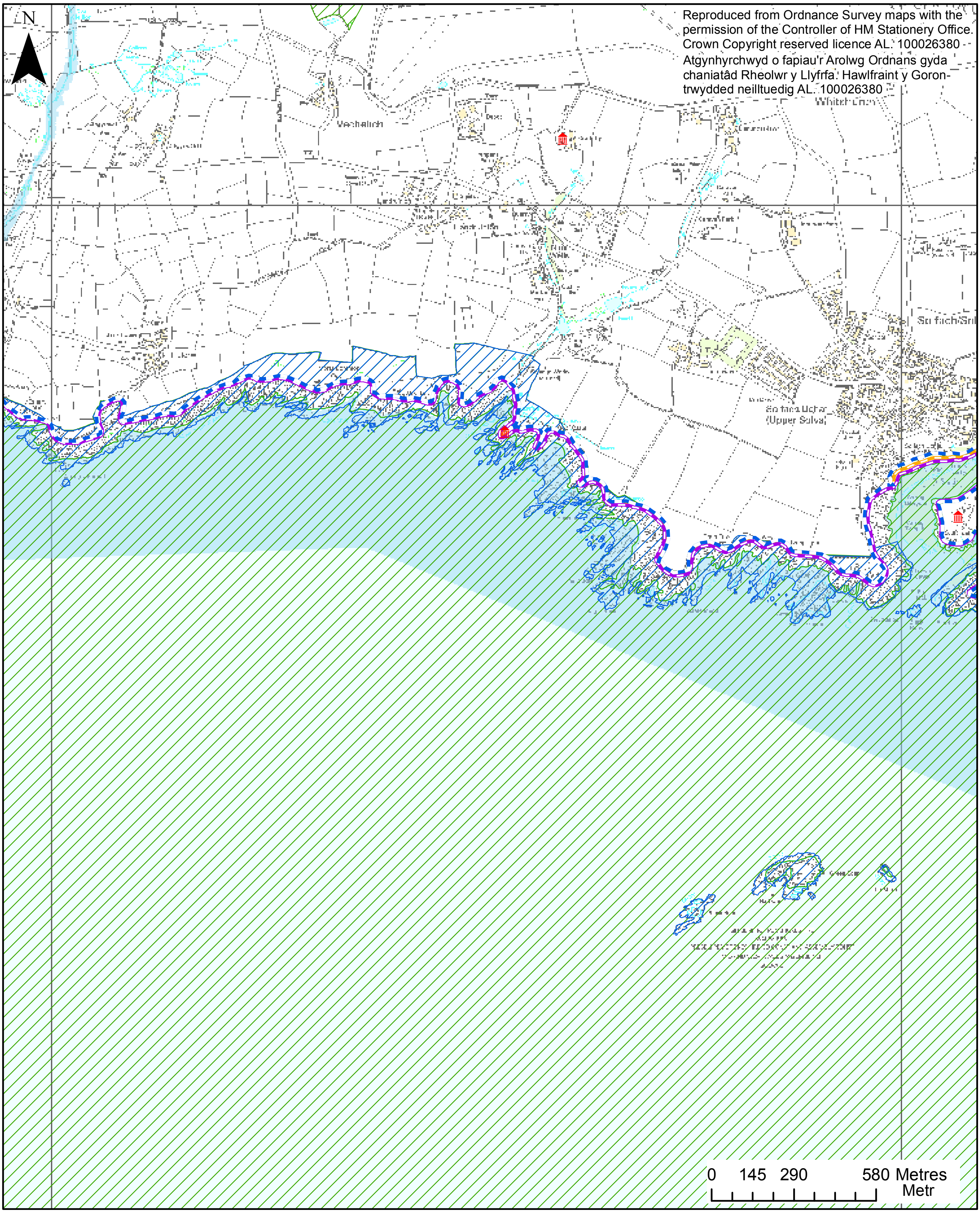
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 10

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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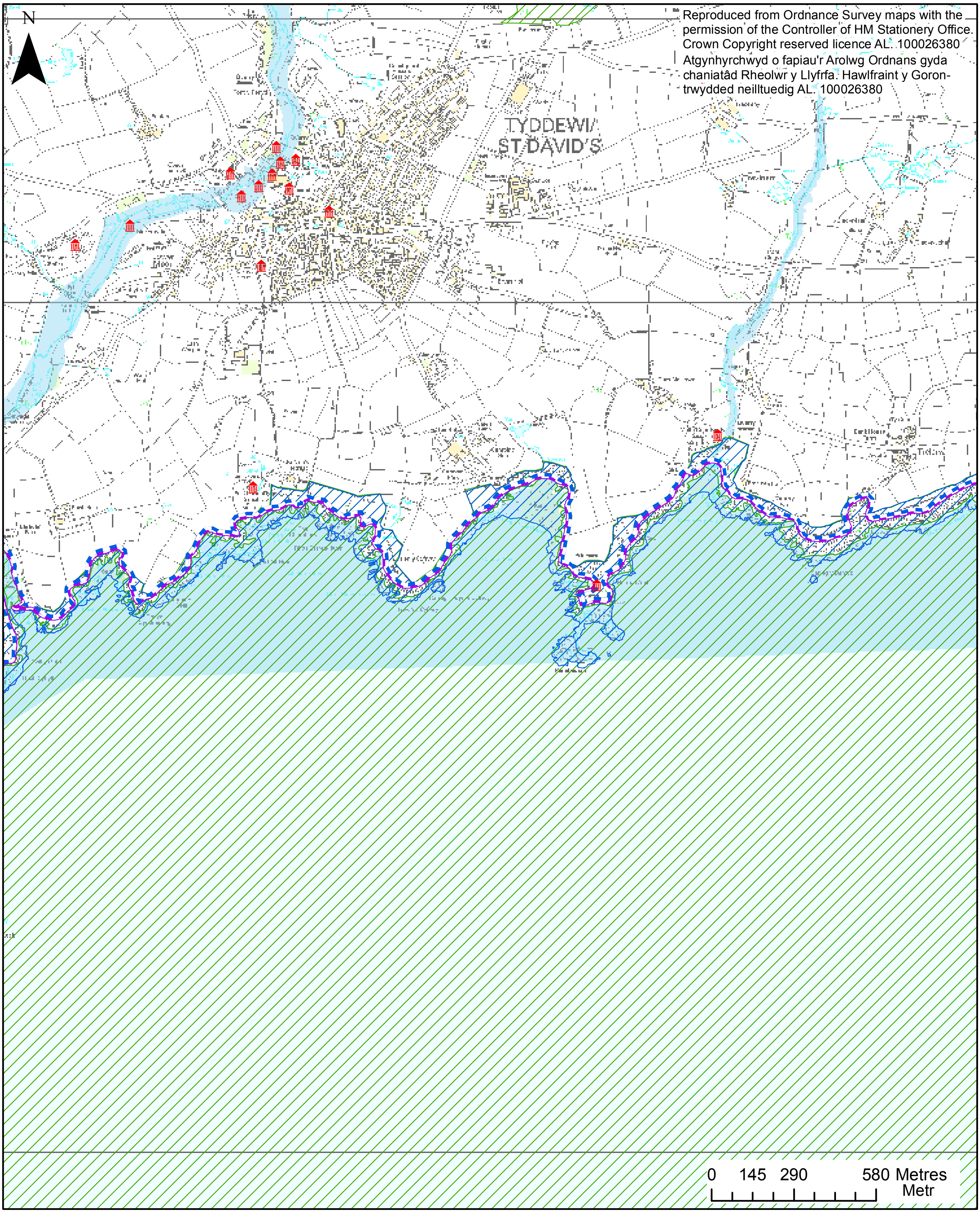
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 11



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▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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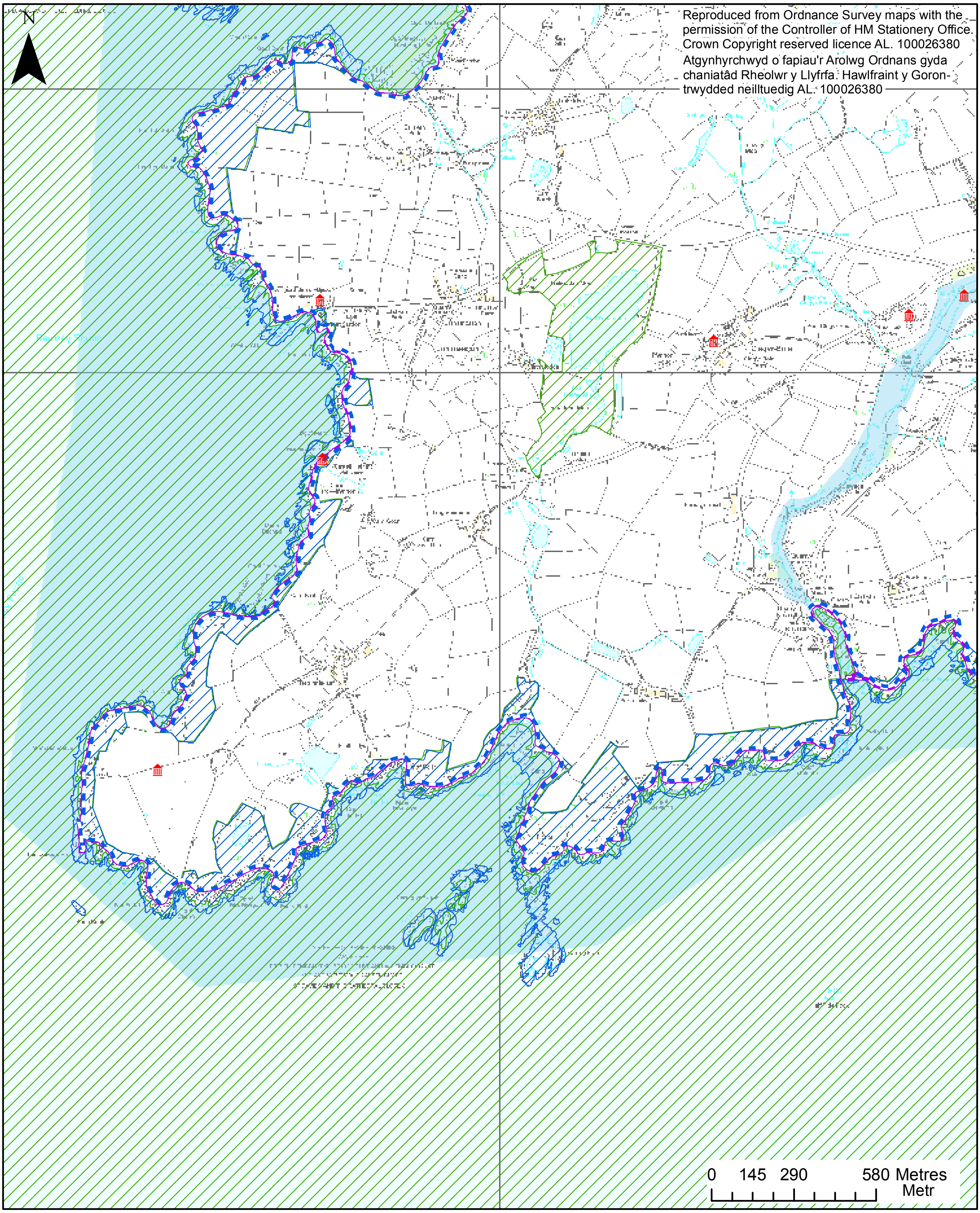
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 12



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▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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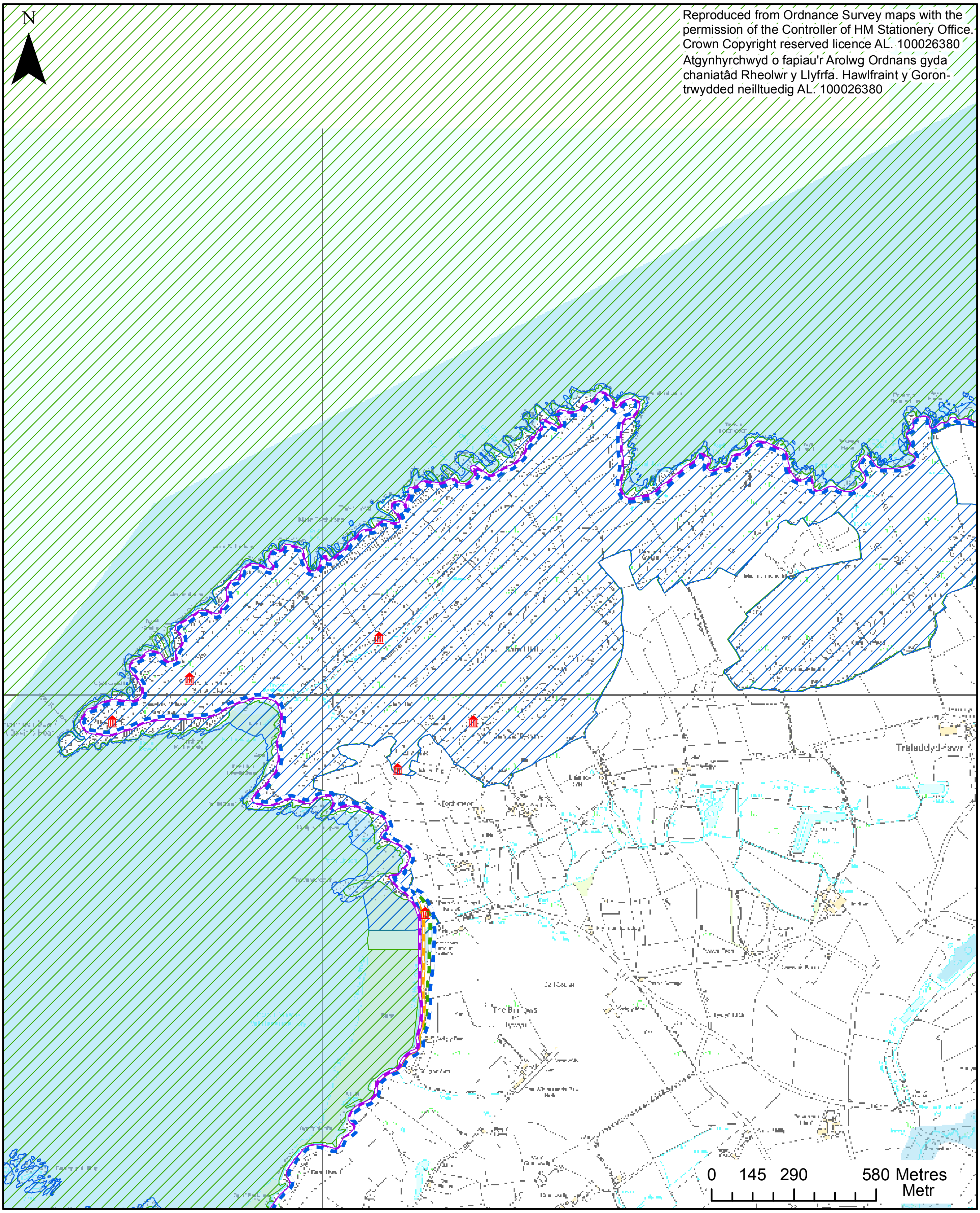
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 13

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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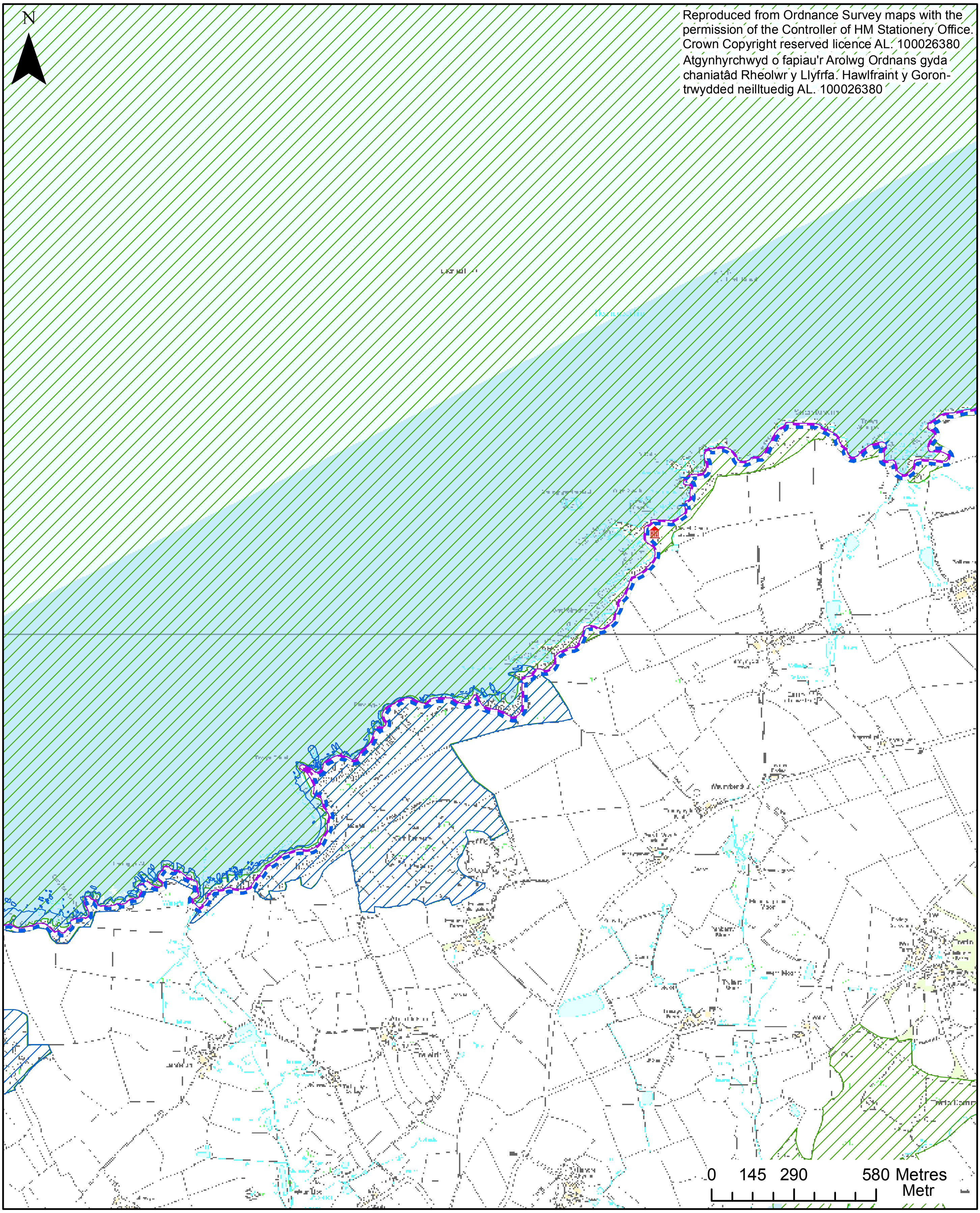
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 14



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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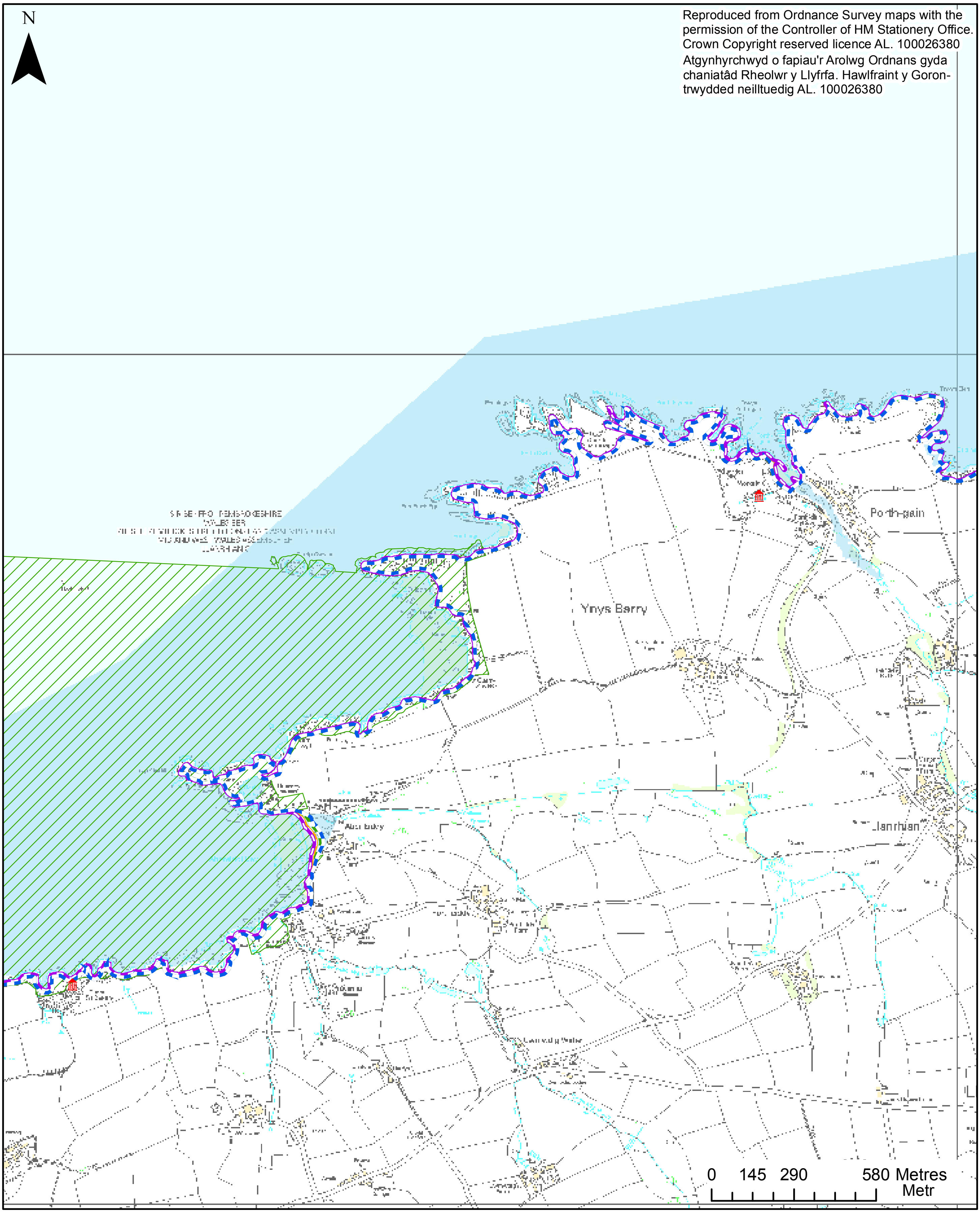
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 15



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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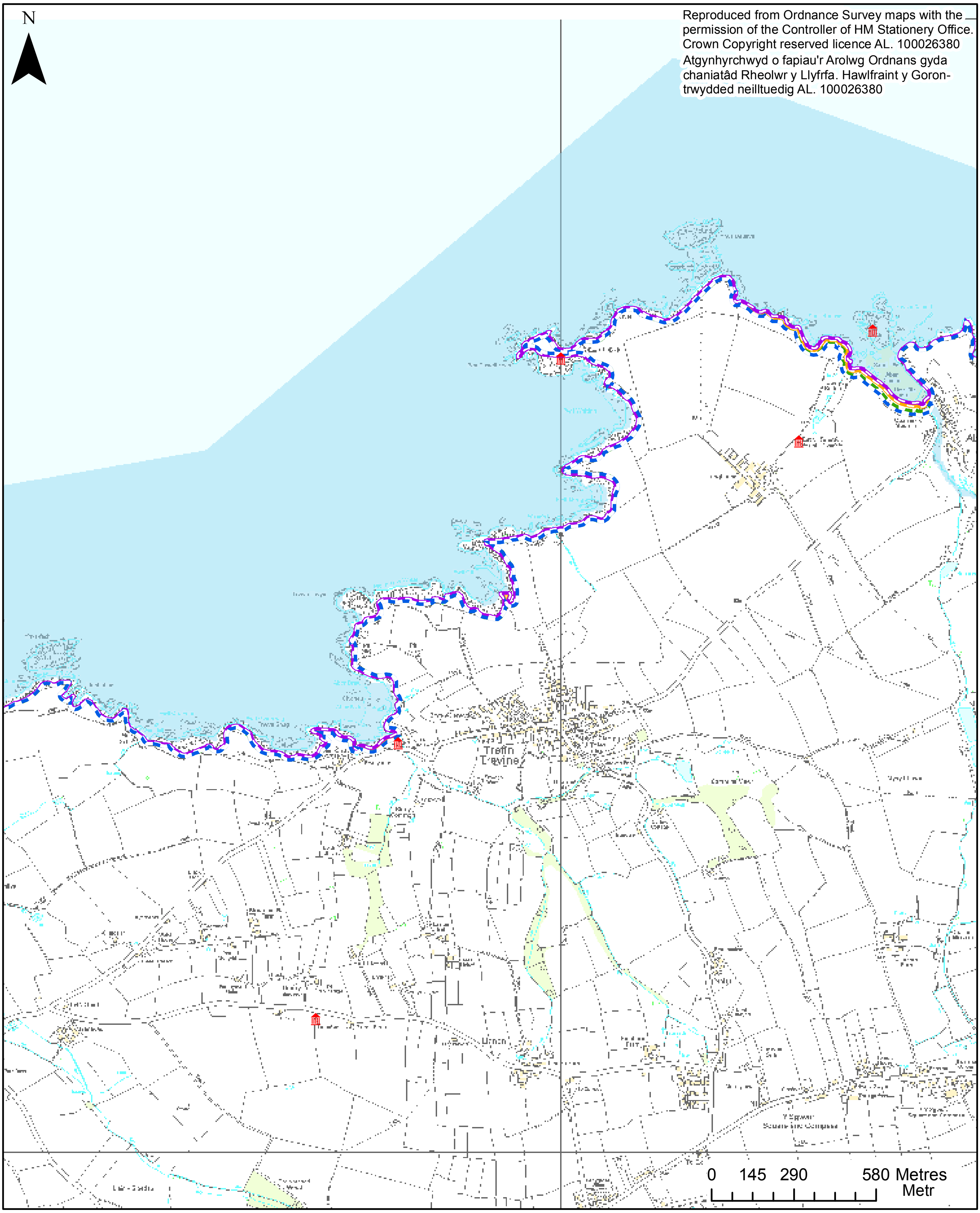
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 16



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▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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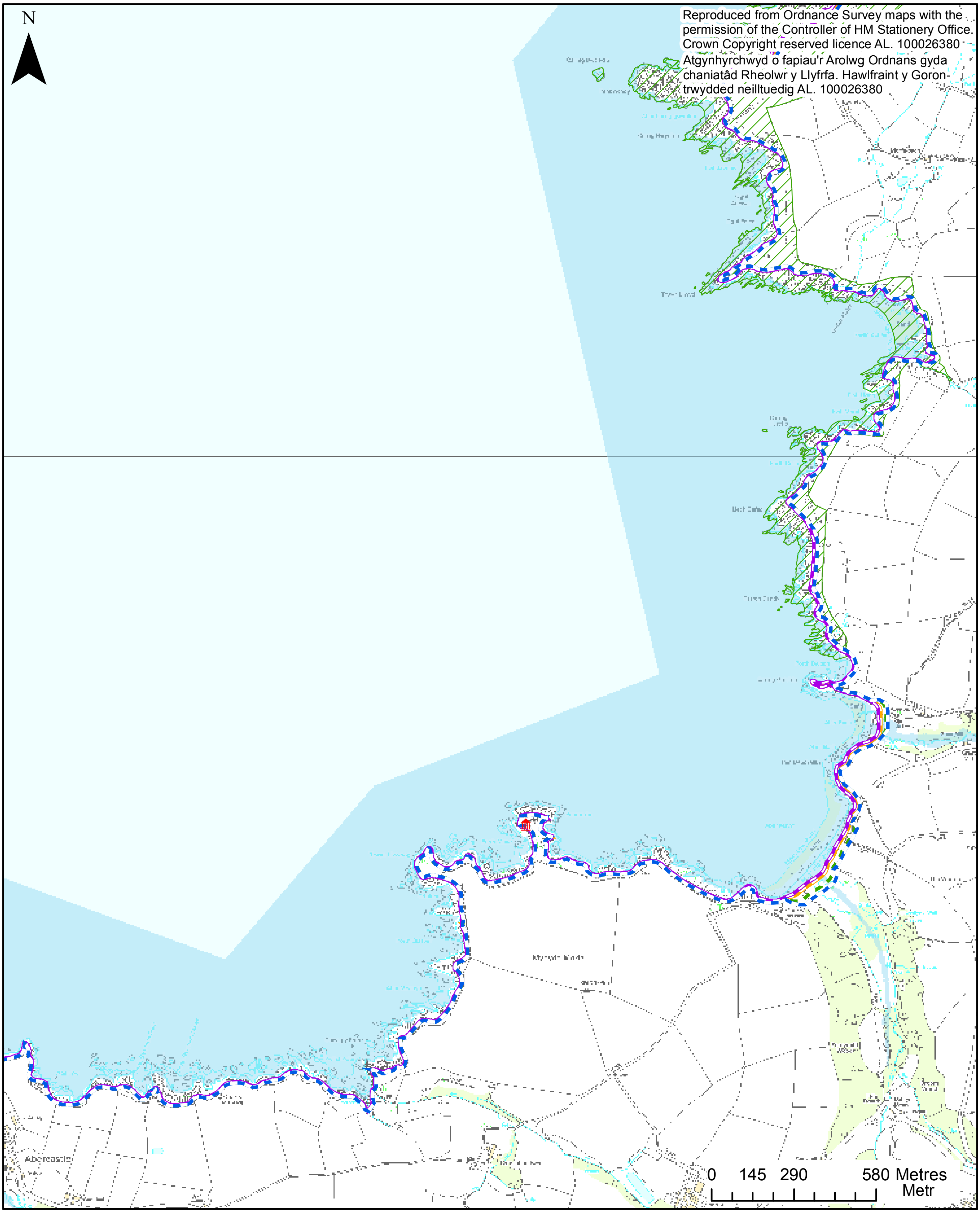
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 17



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▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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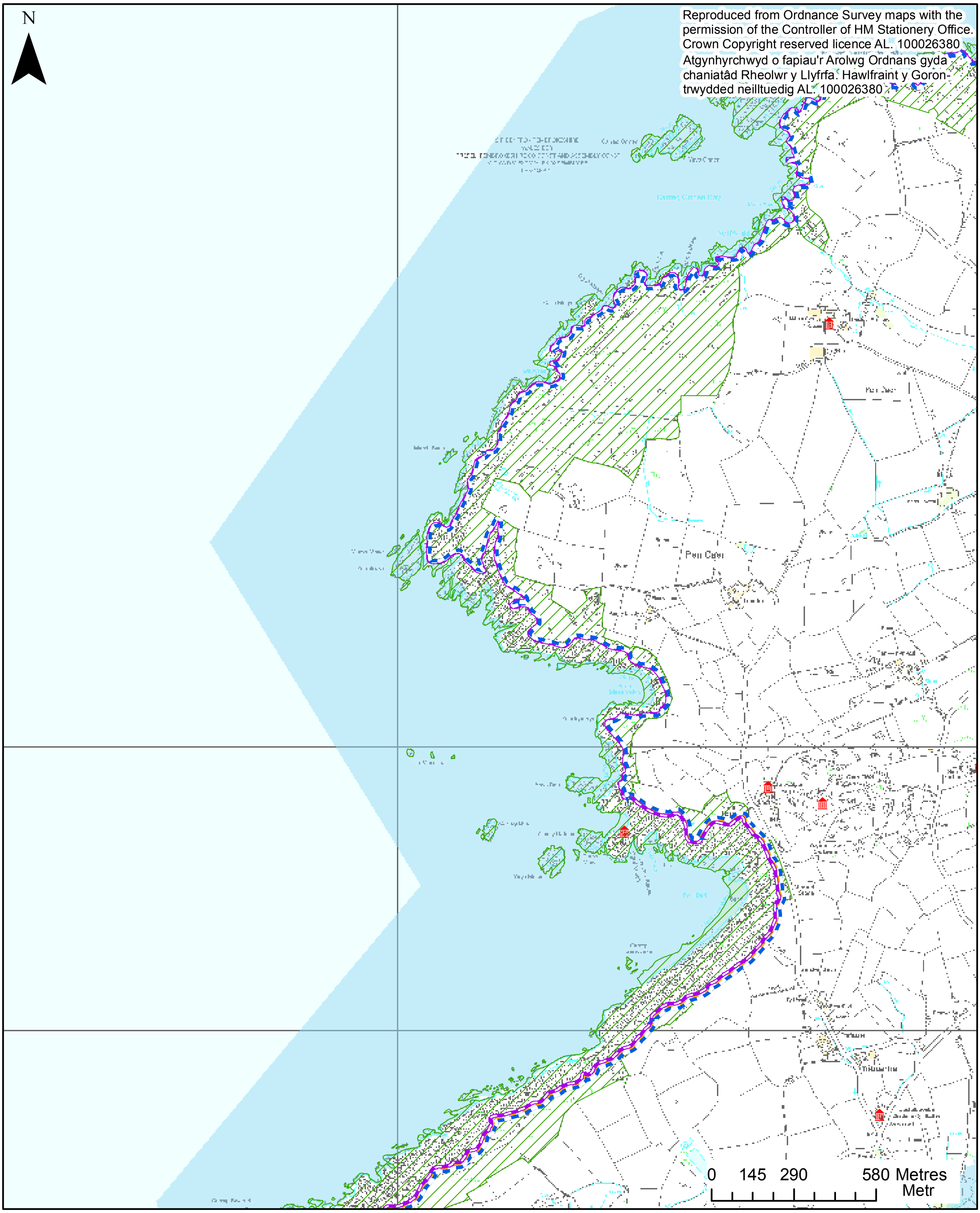
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 18

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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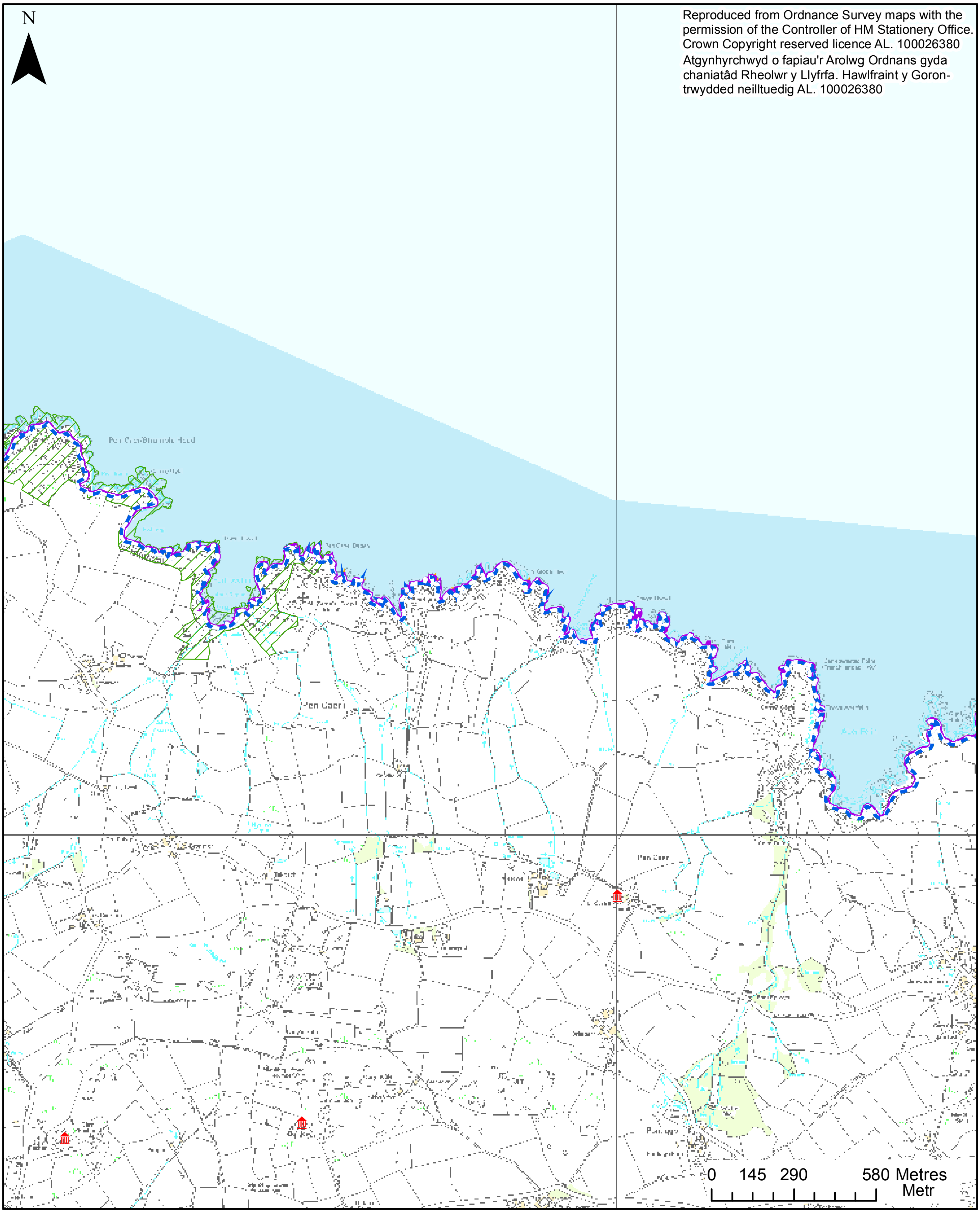
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 19

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 20

━	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
━	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
━	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
━	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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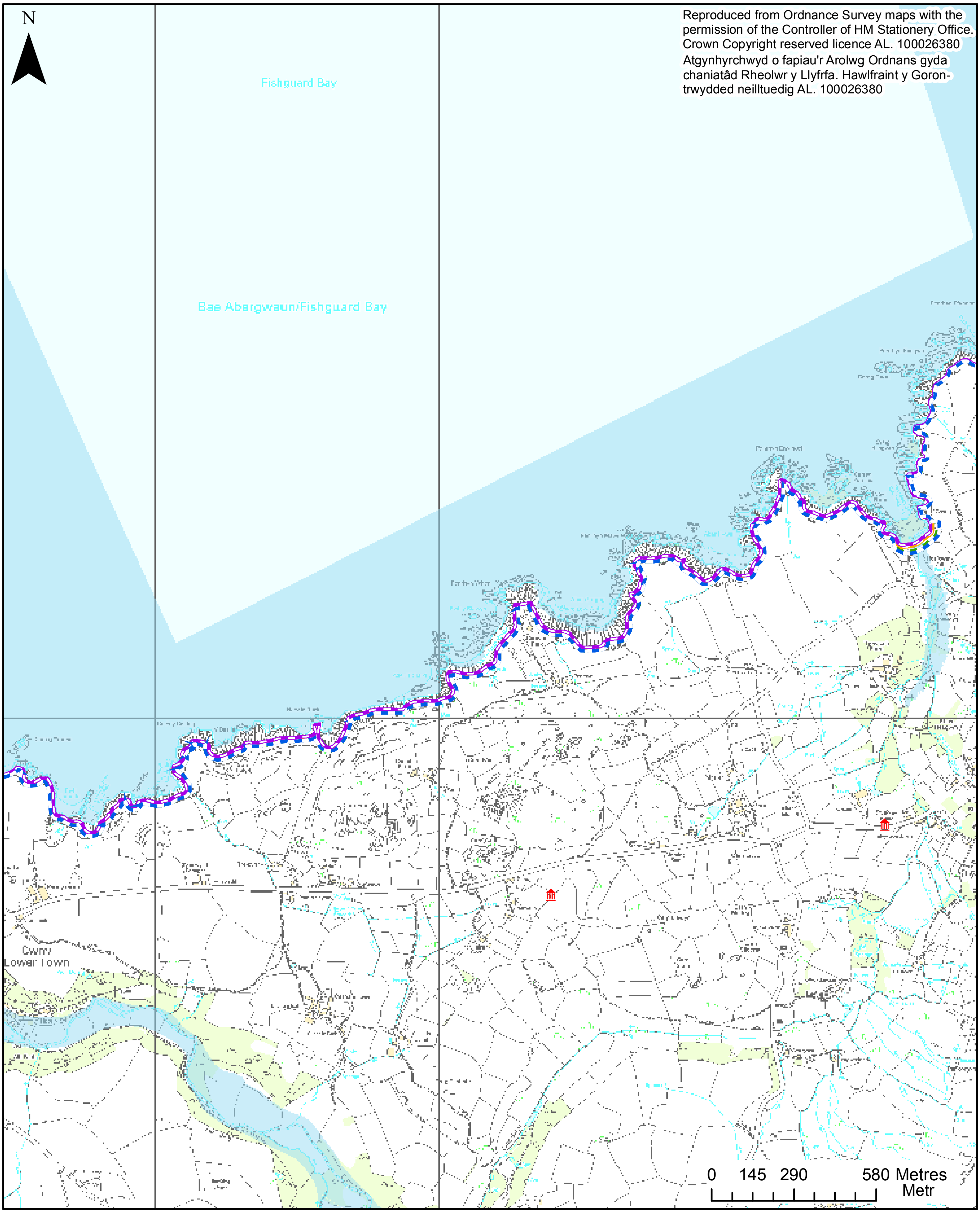
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 21

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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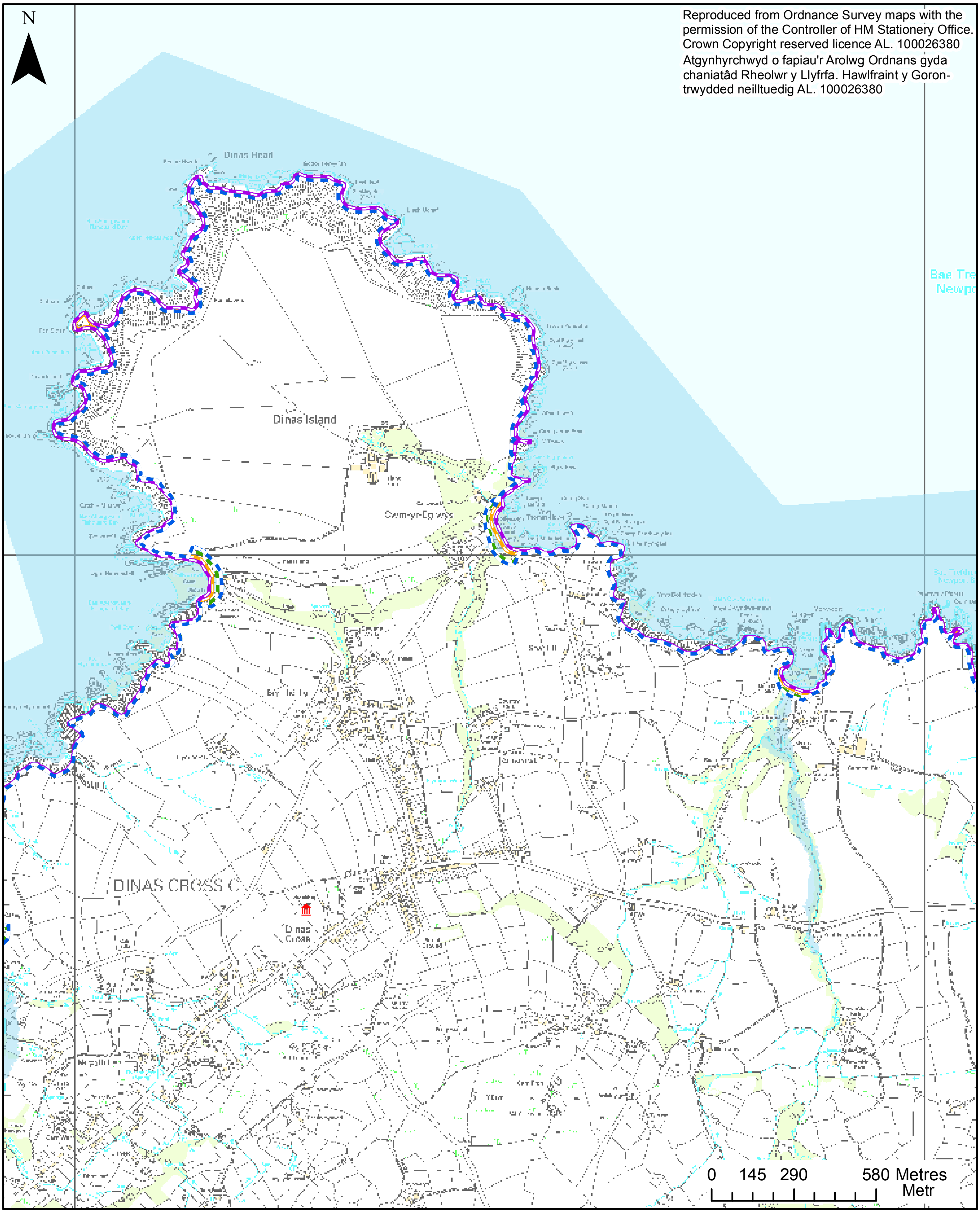
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 22

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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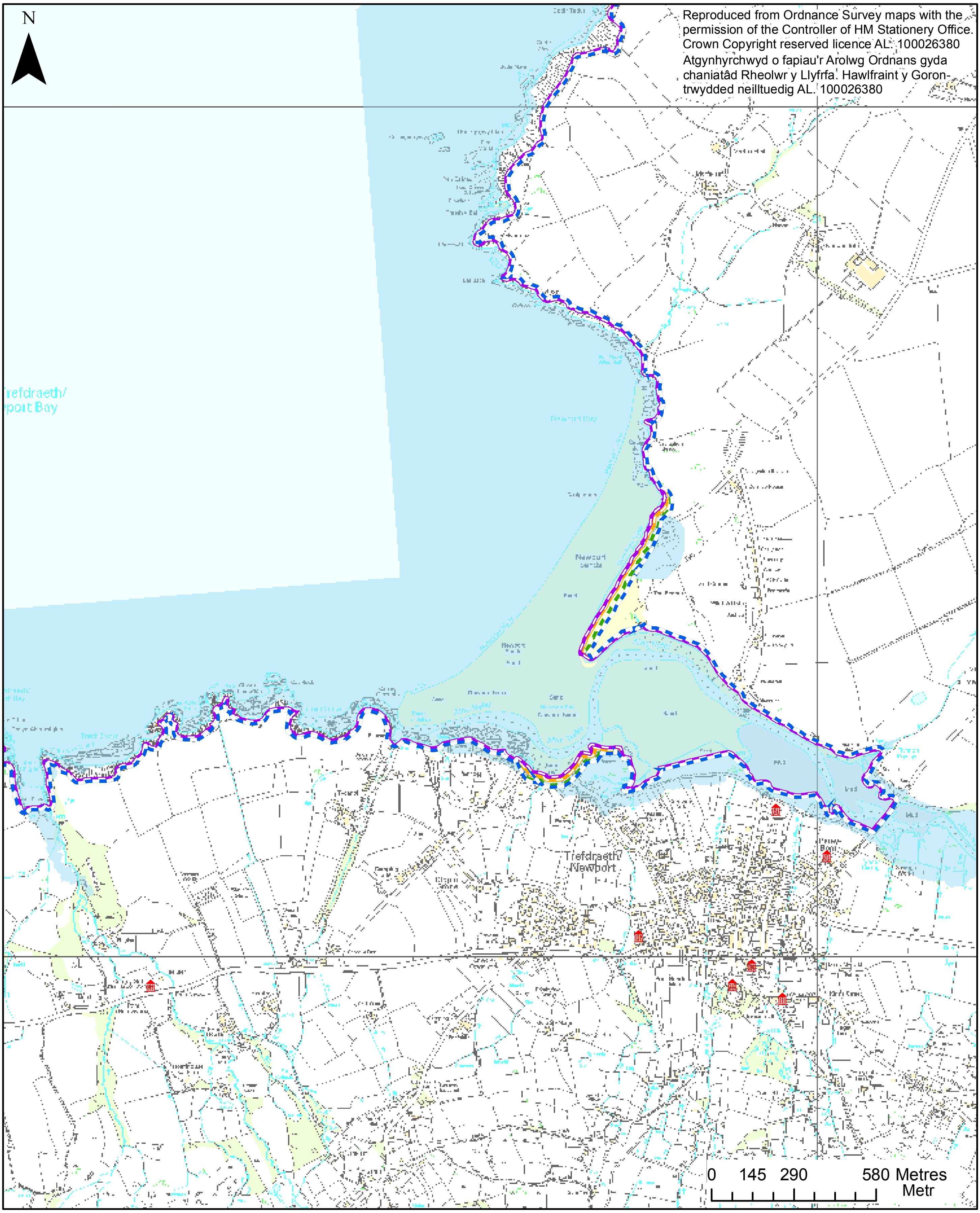
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 23

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 24

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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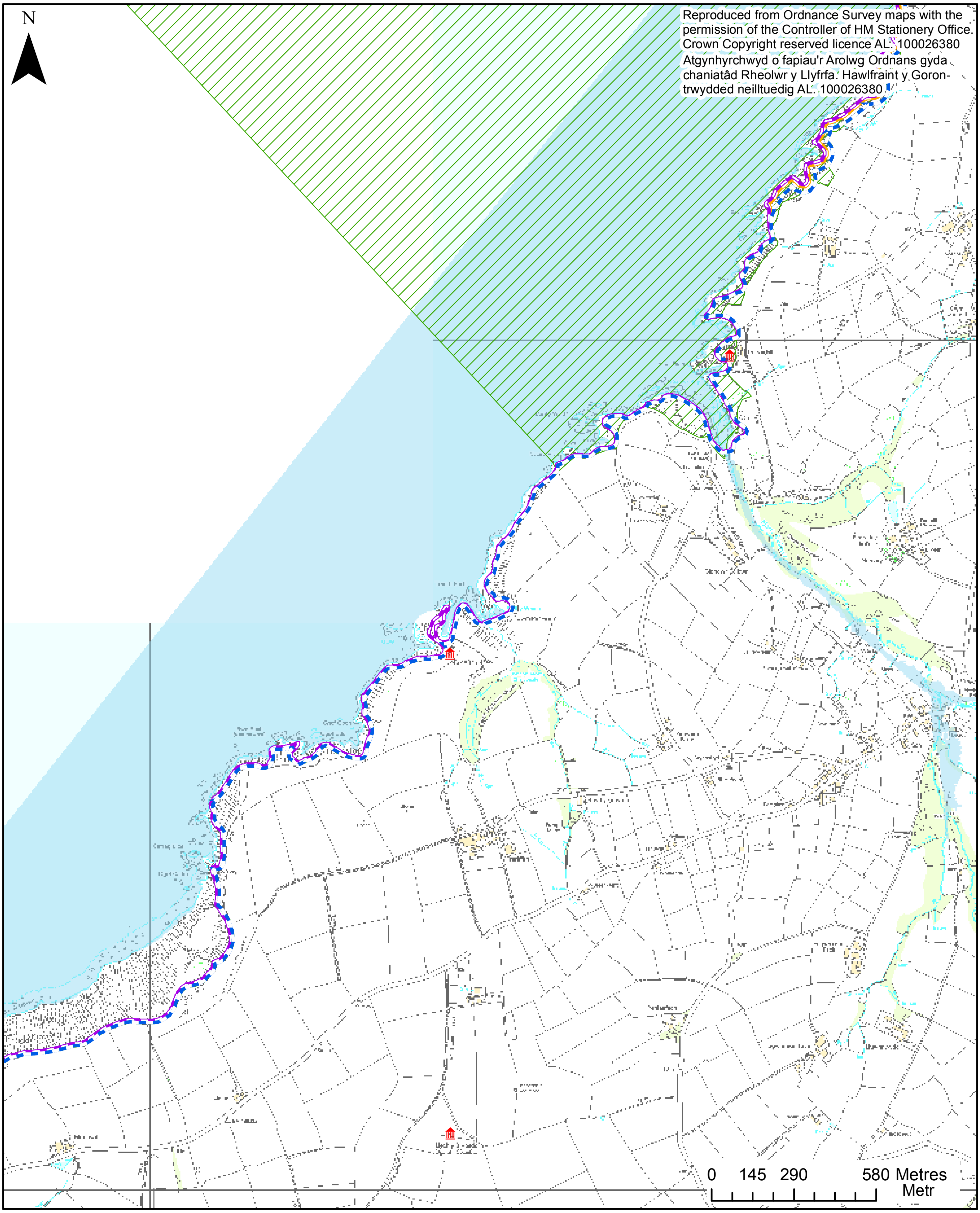
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 25

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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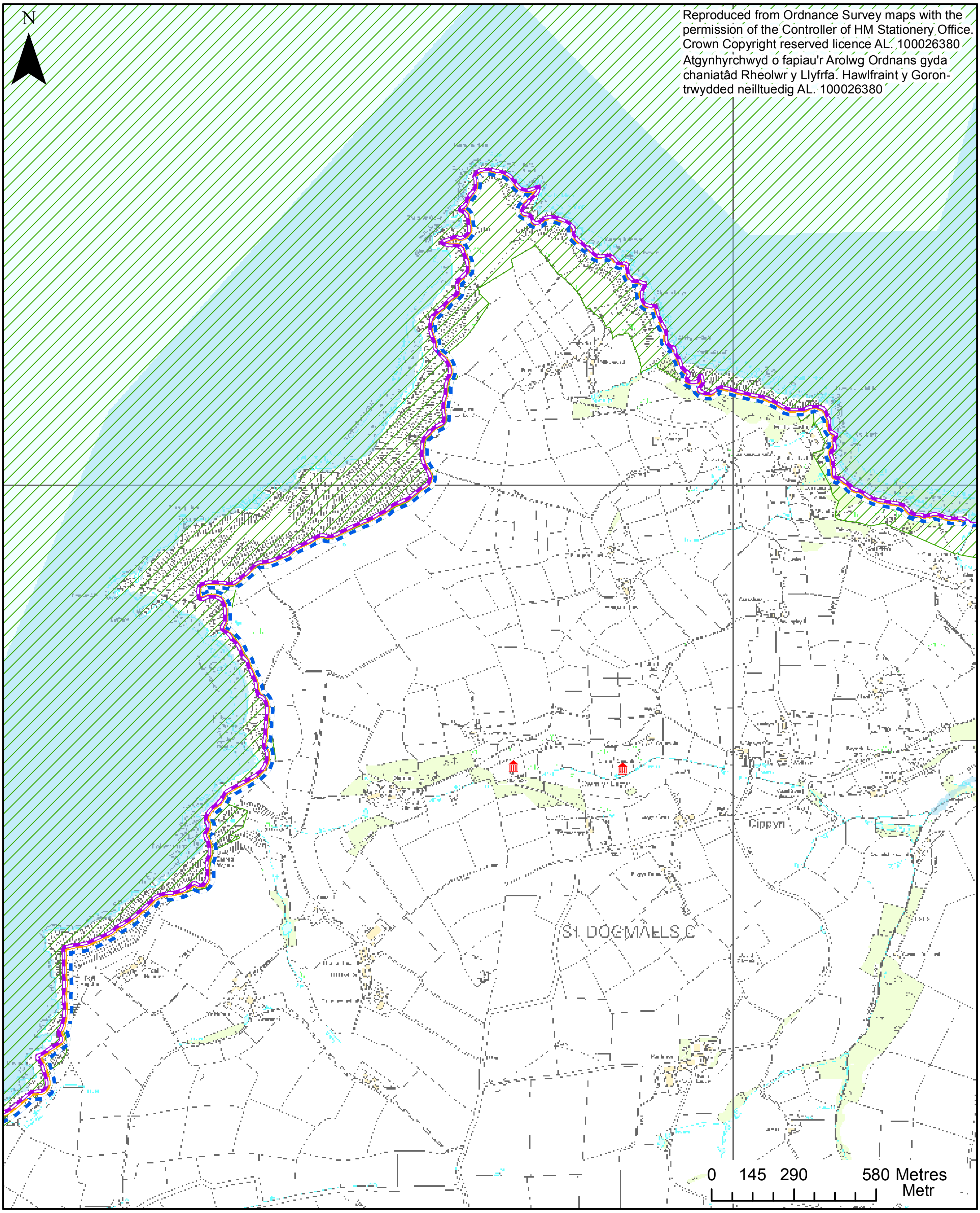
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 26



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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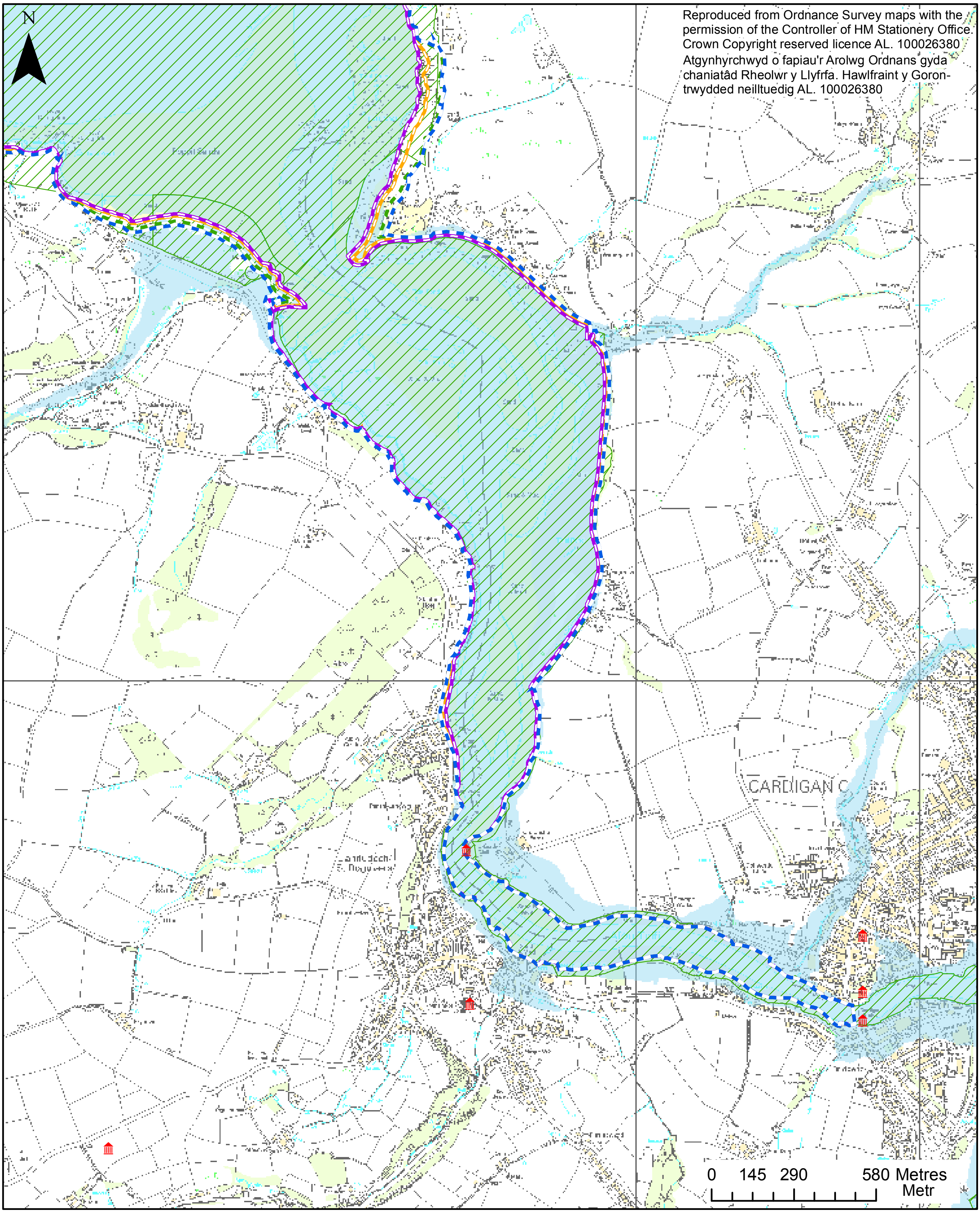
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 27

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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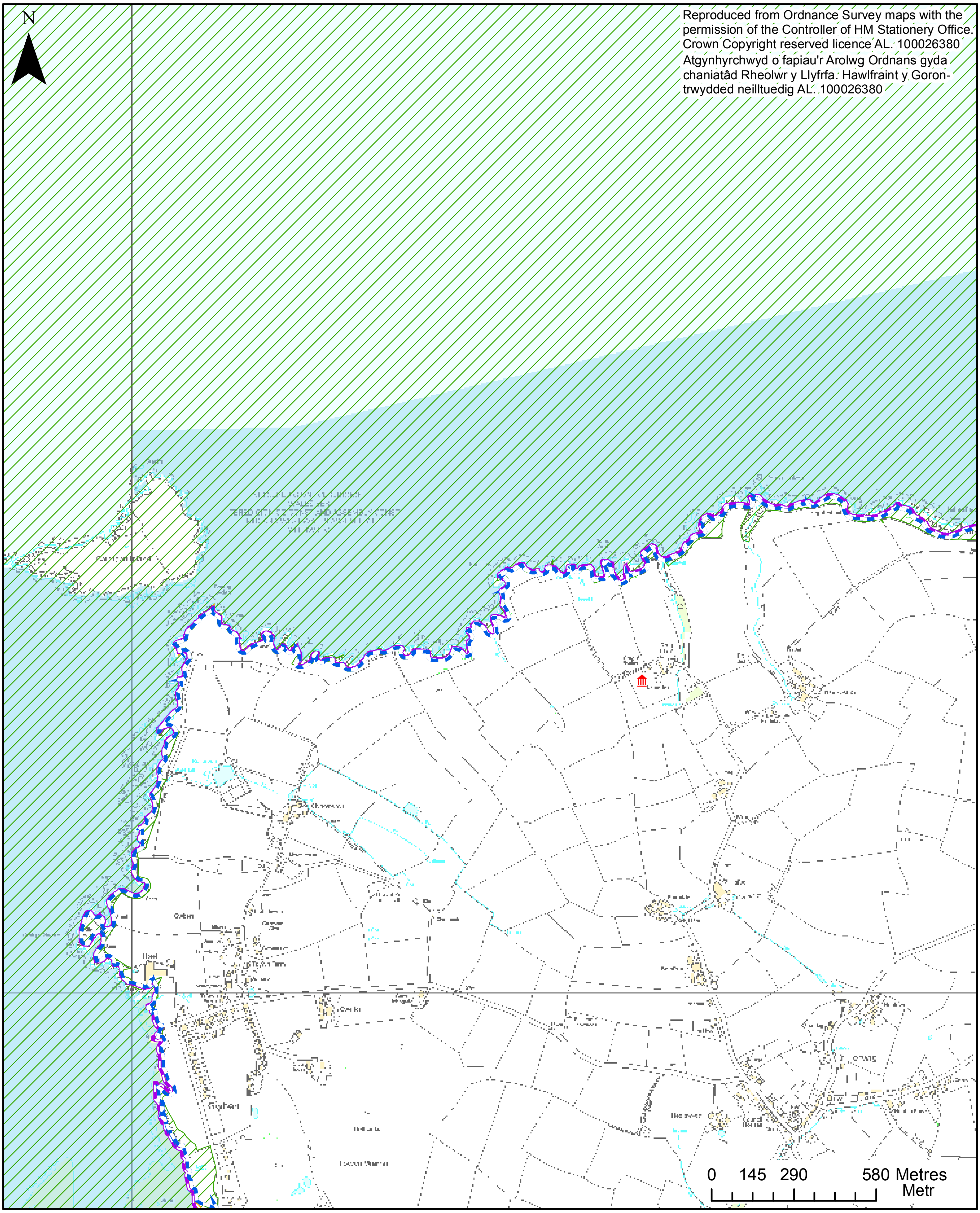
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 28



Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 29

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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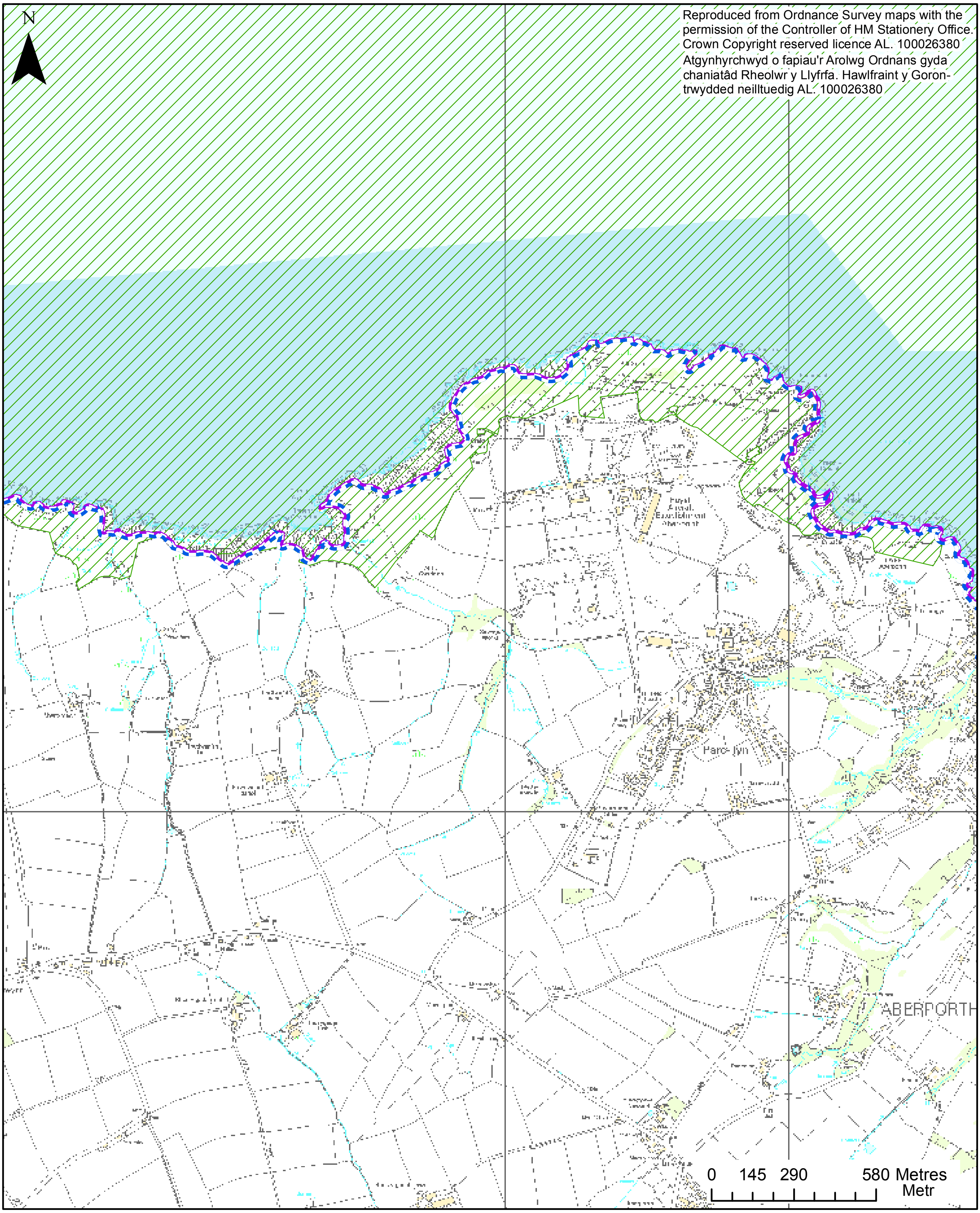
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 30

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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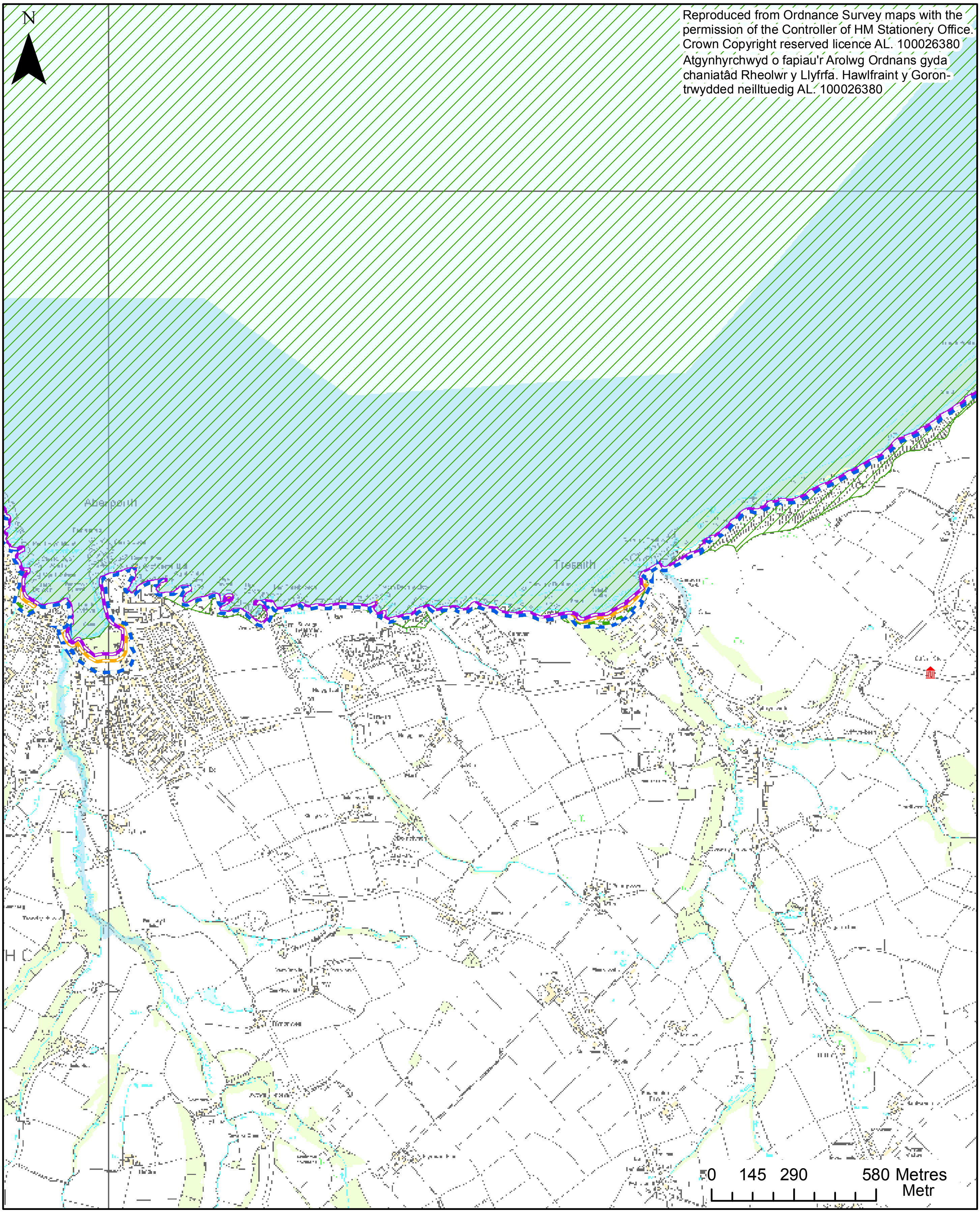
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 31

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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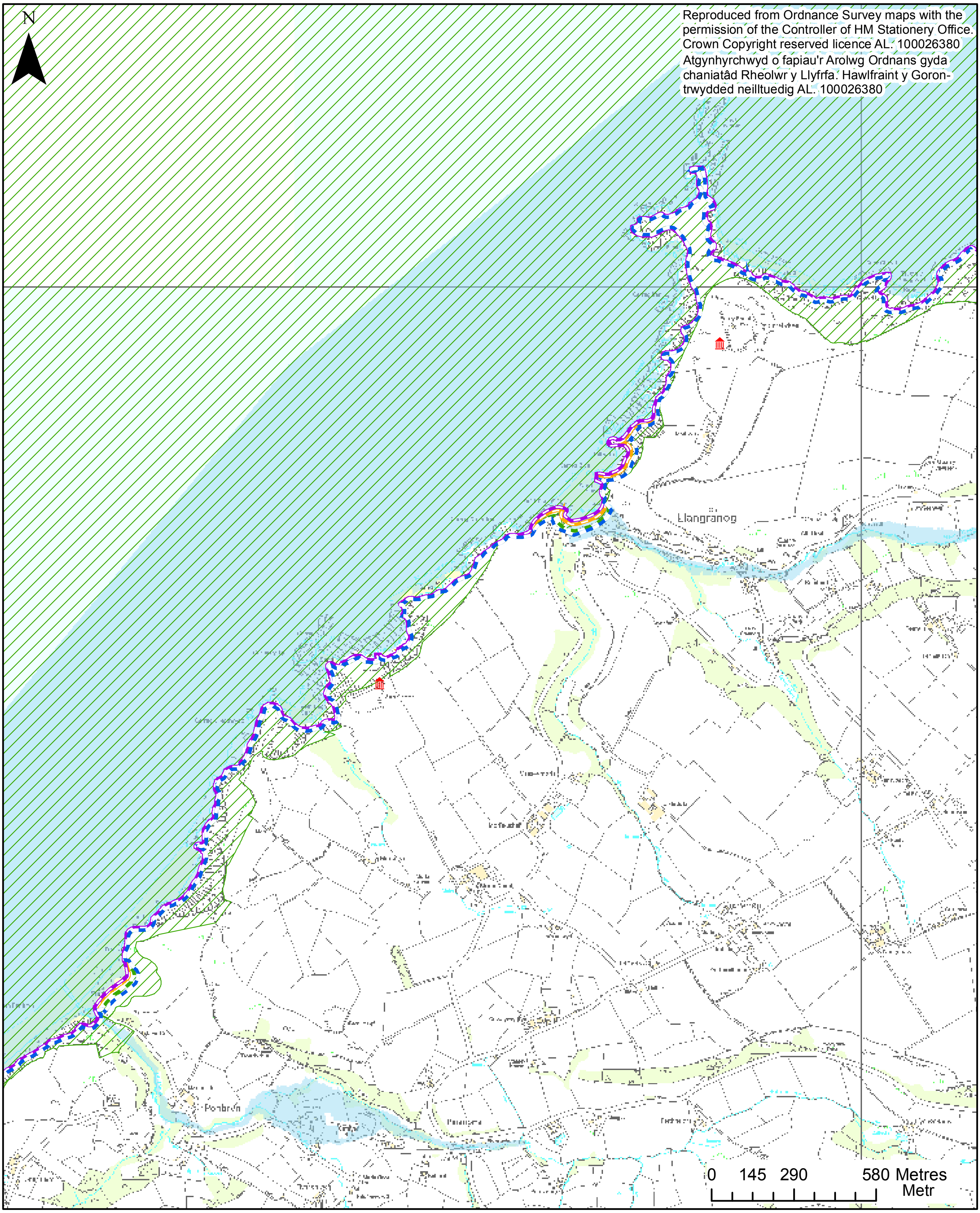
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 32

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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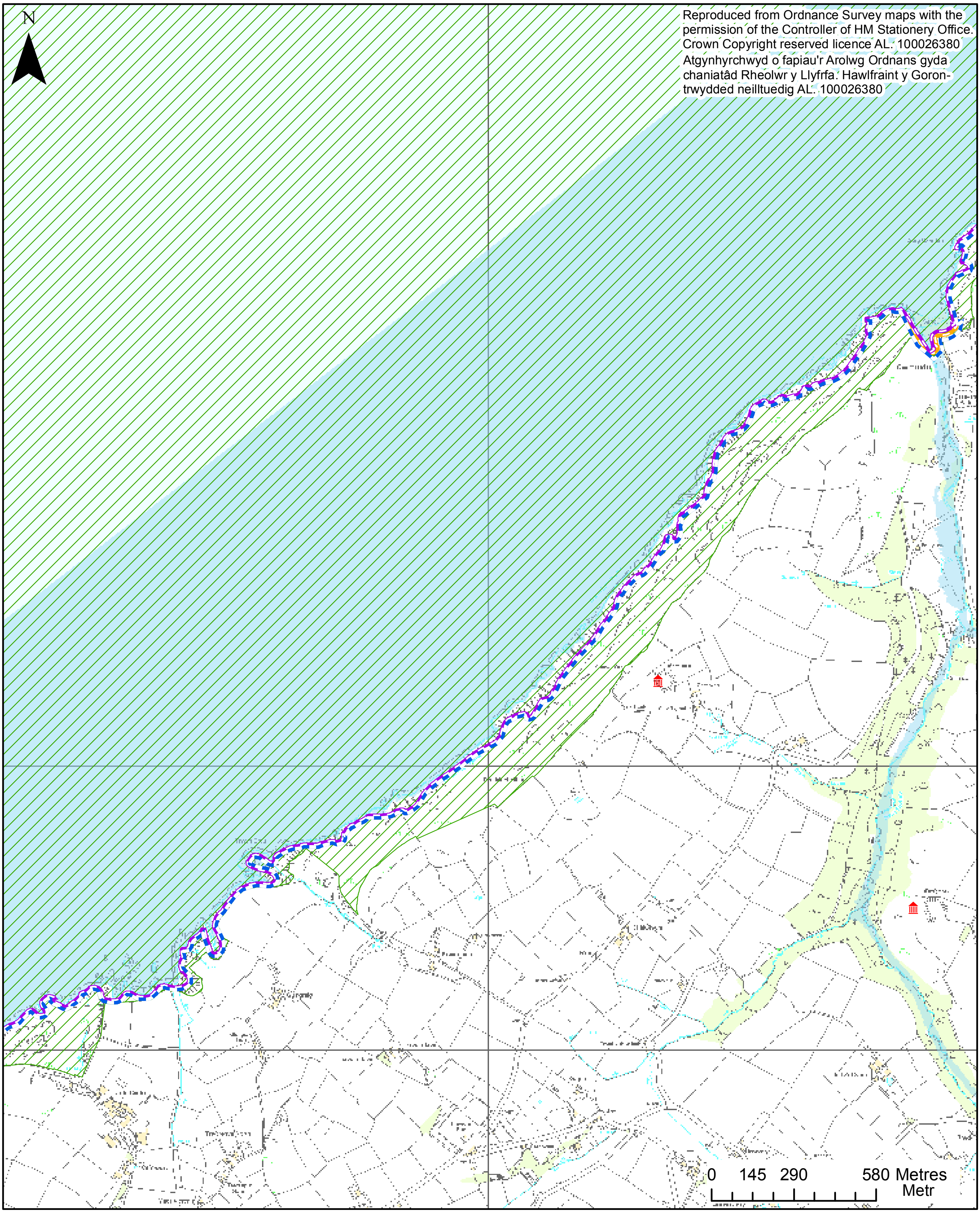
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 33



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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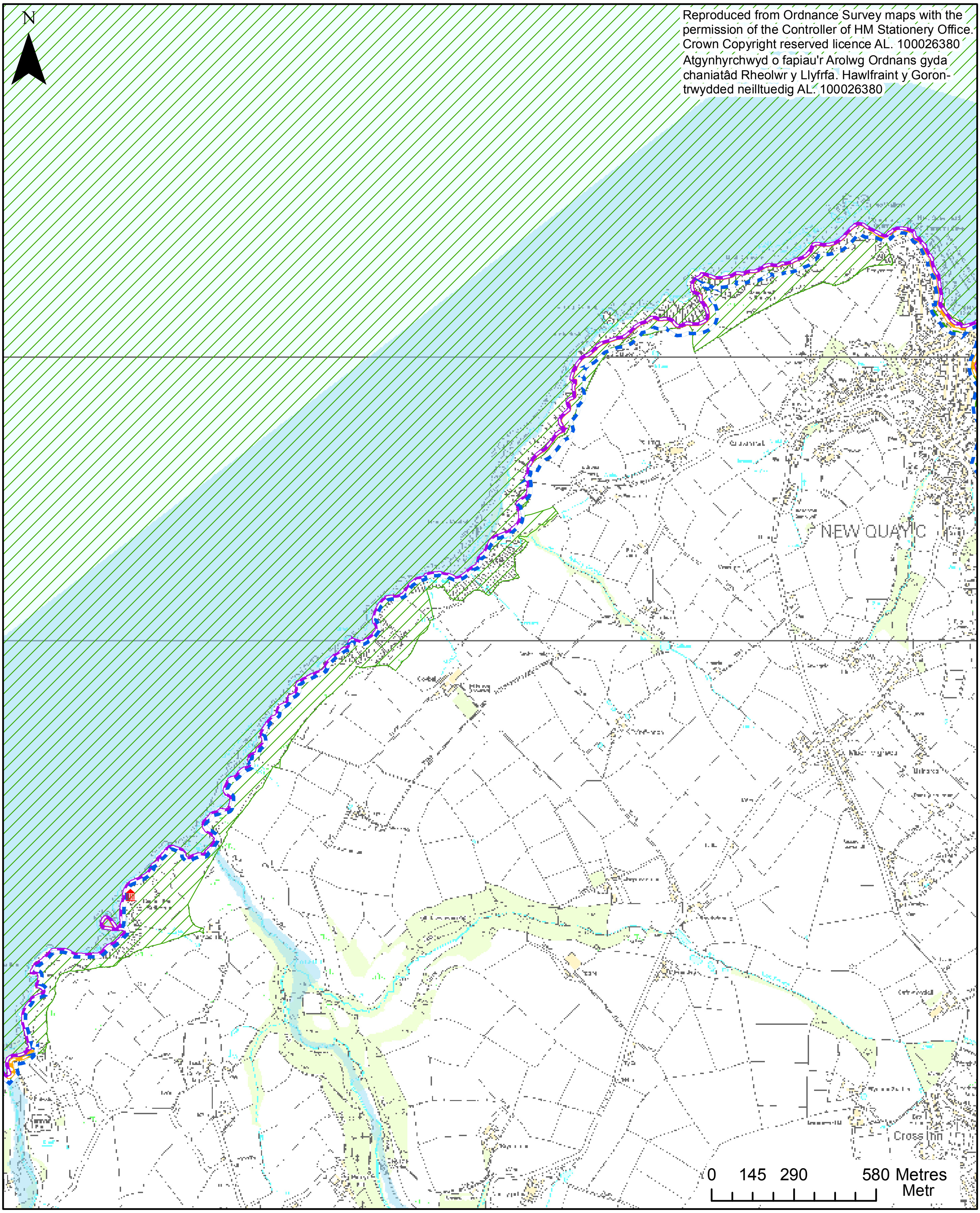
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 34



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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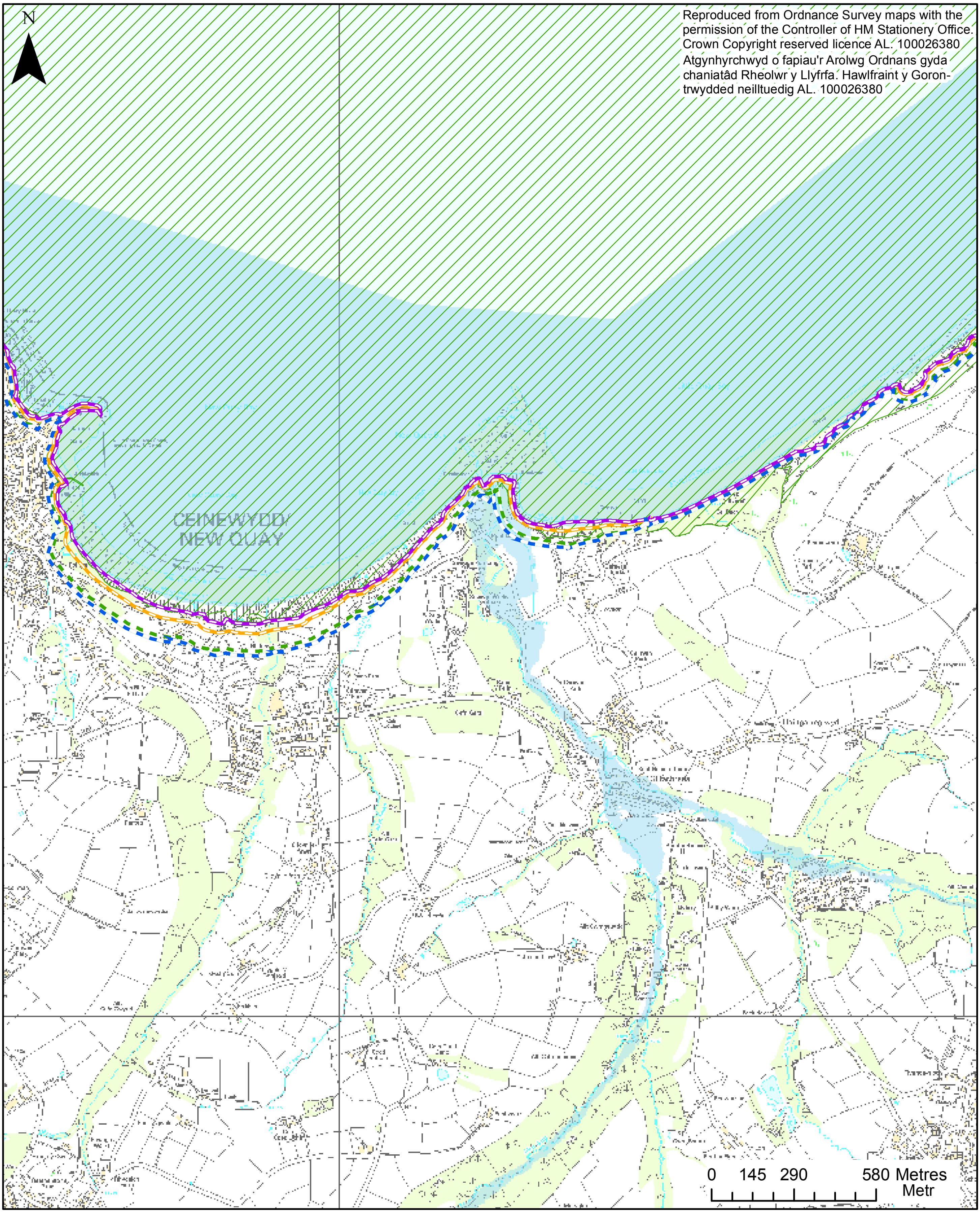
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 35

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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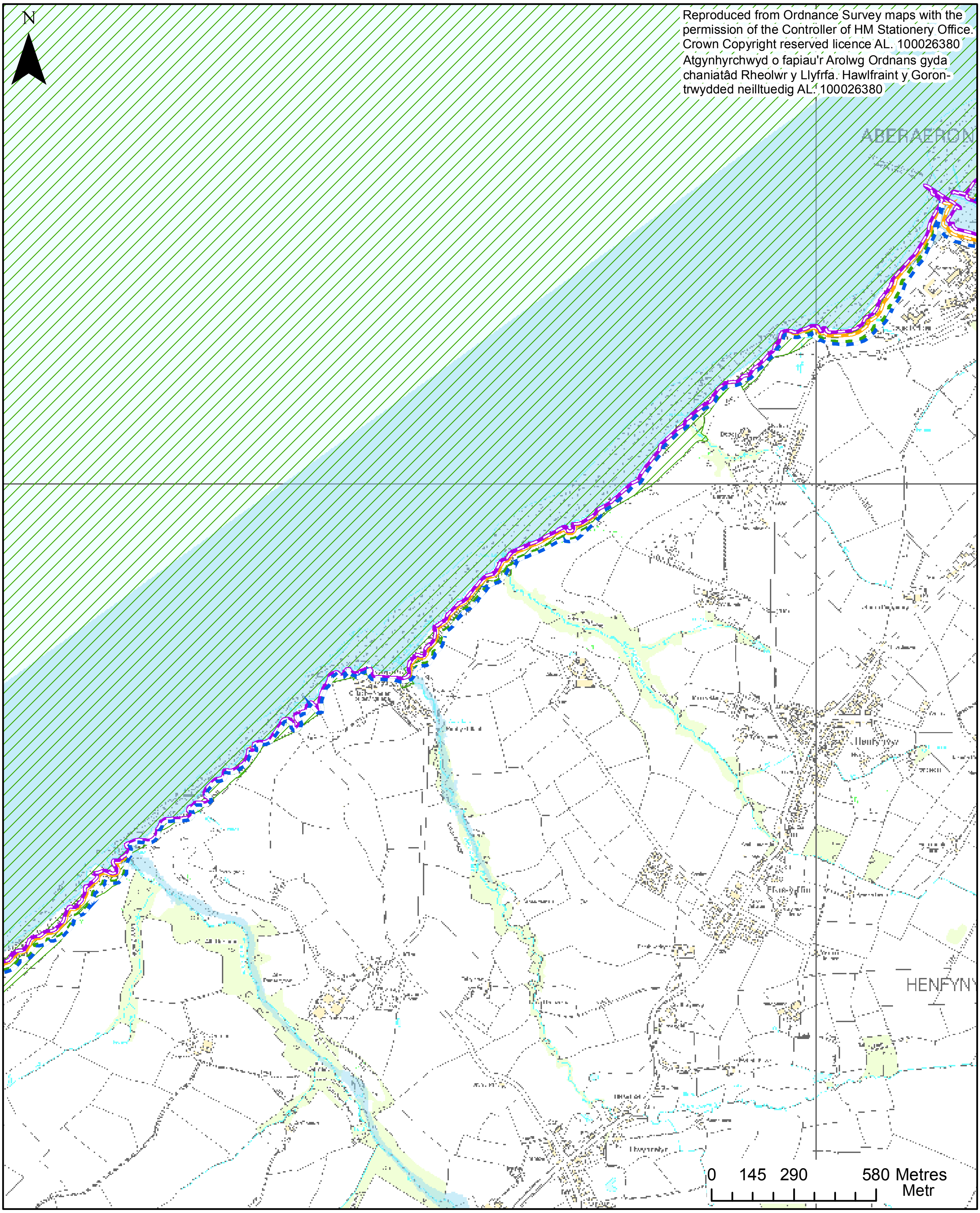
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 36



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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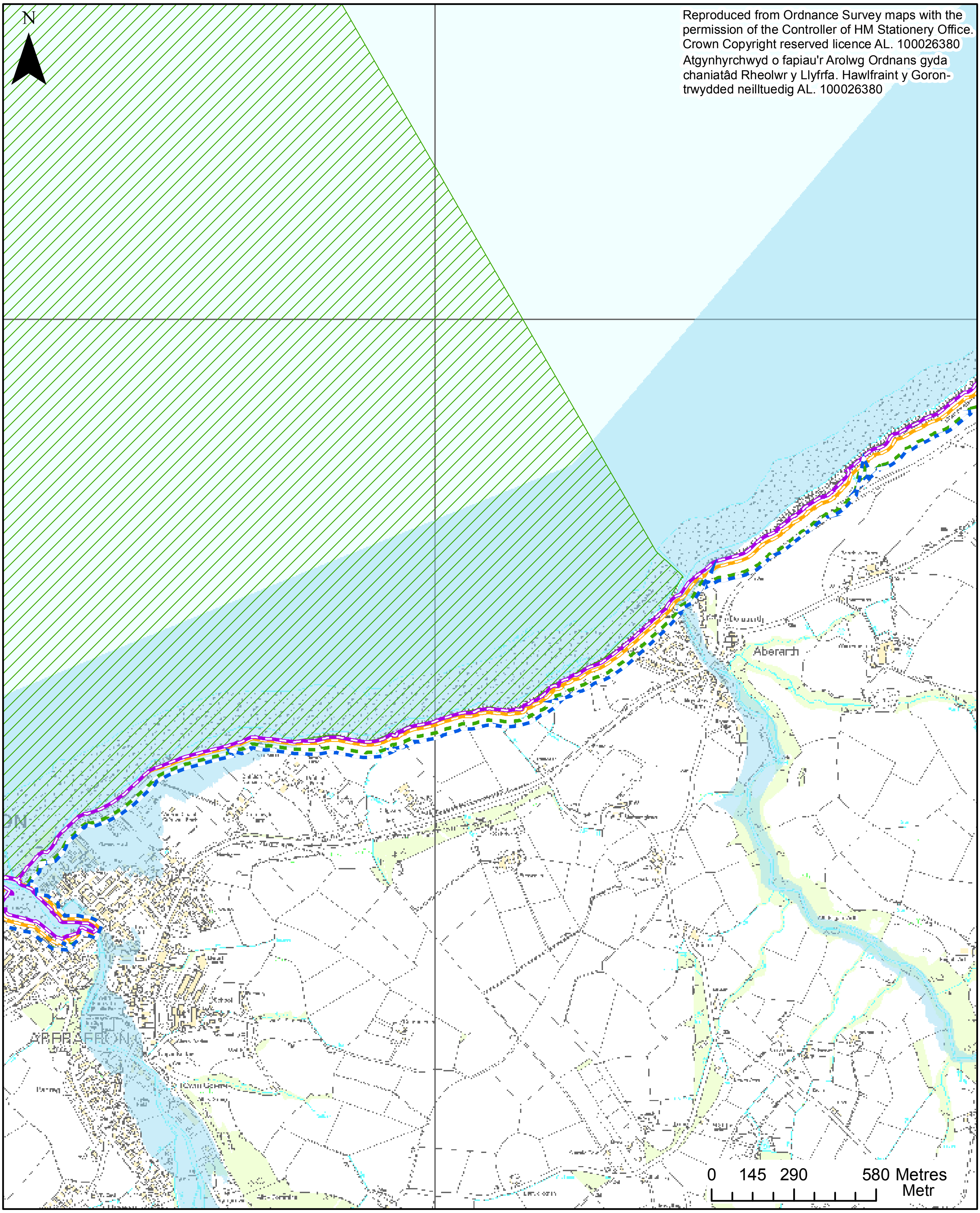
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 37

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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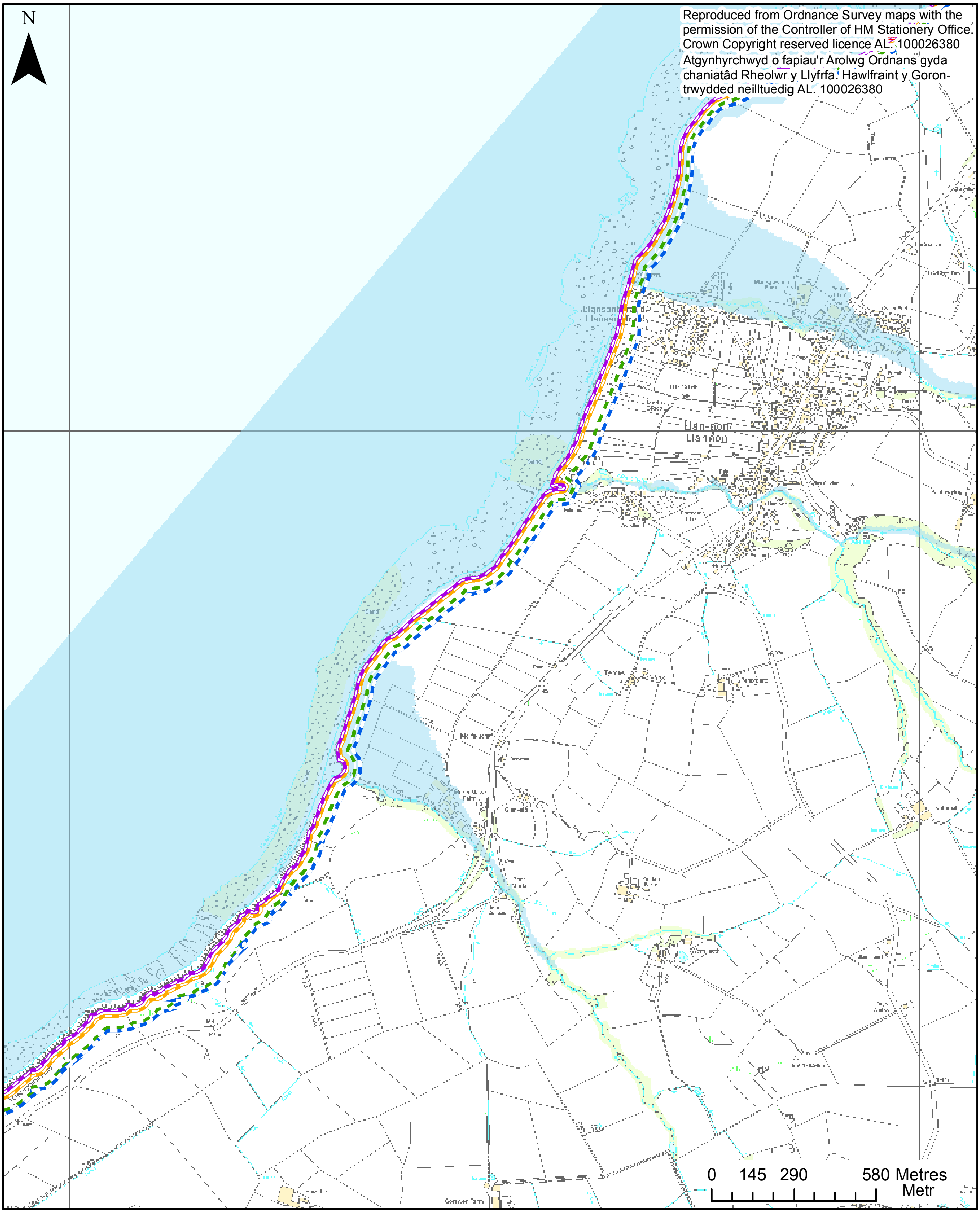
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 38

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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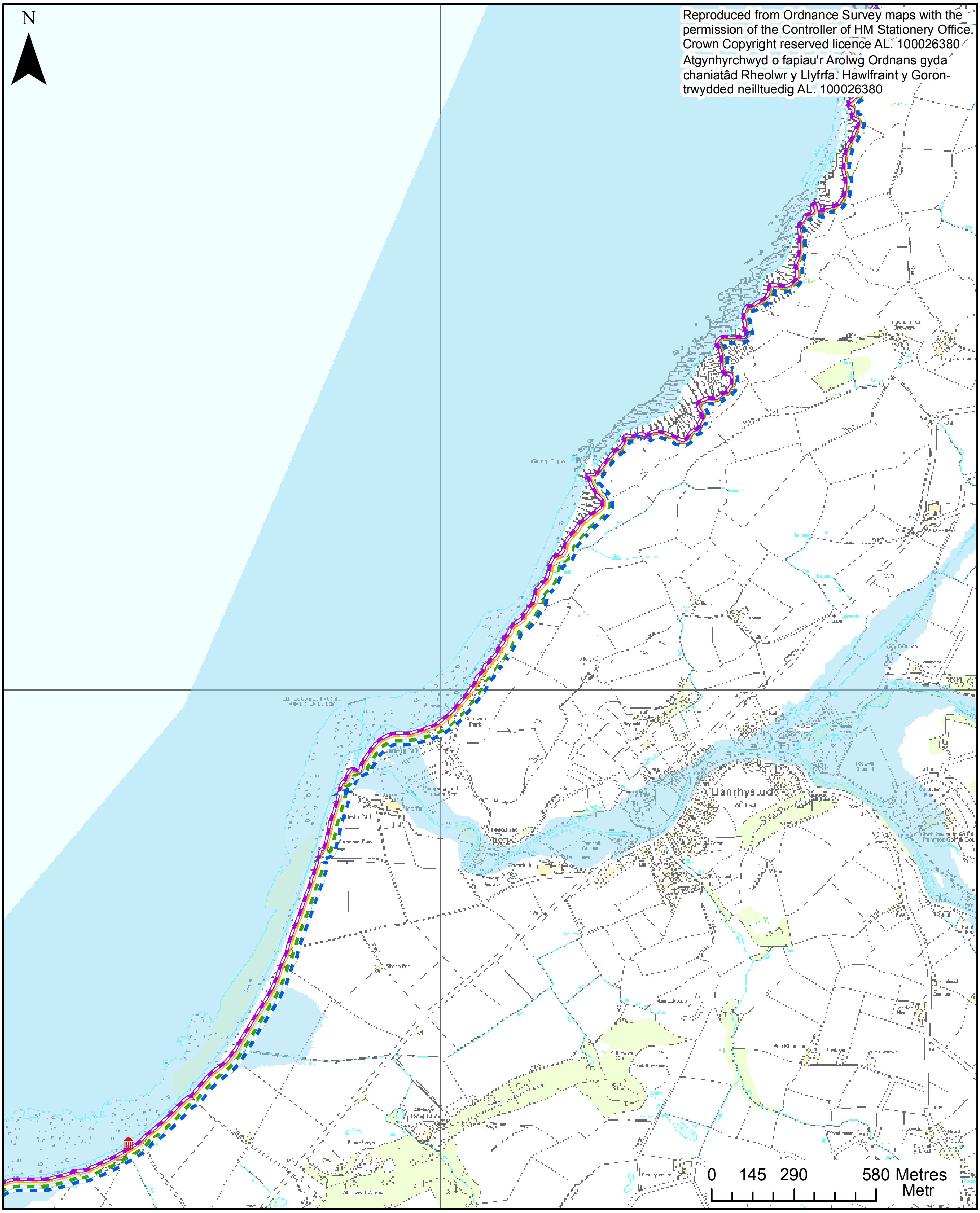
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 39

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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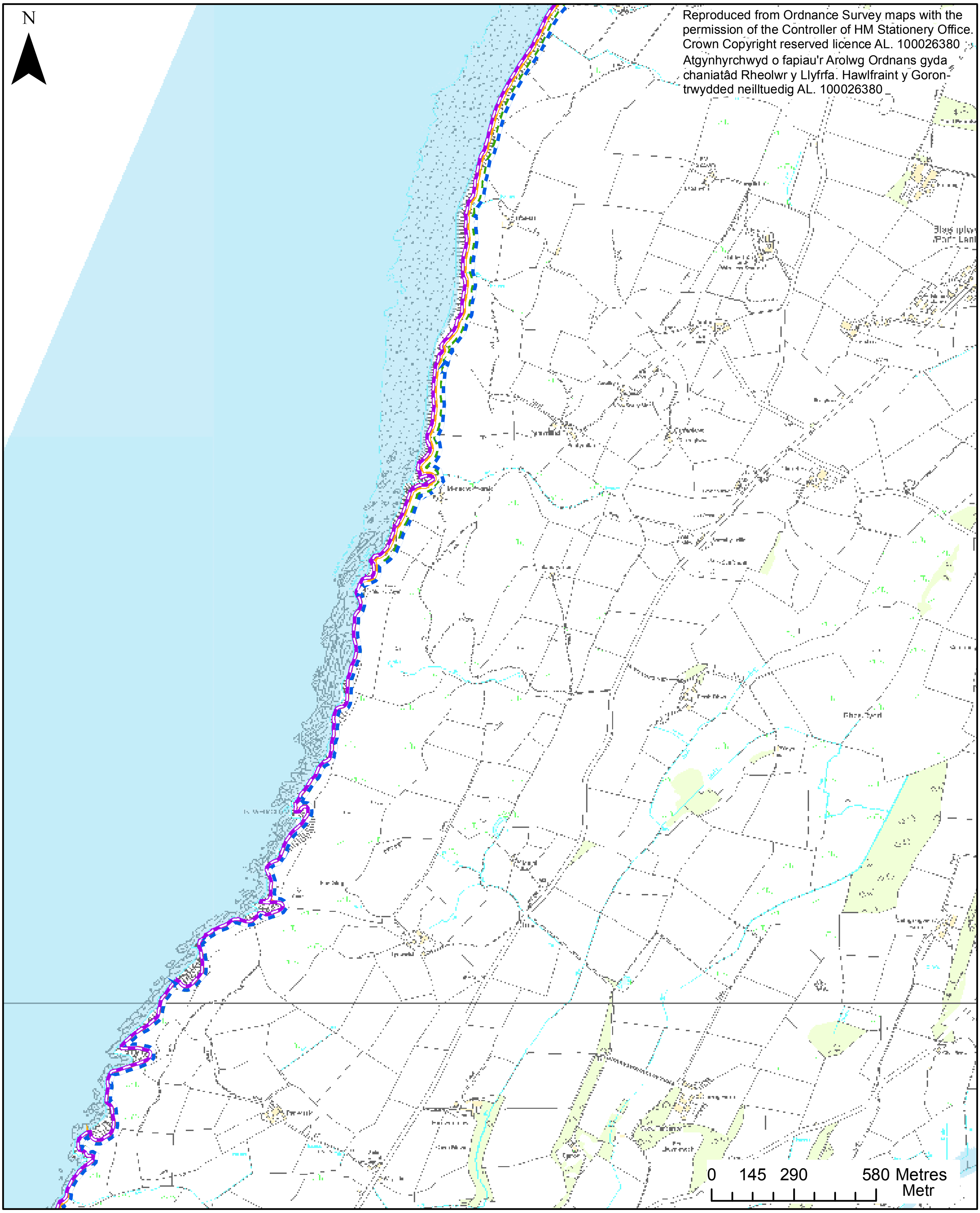
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 40

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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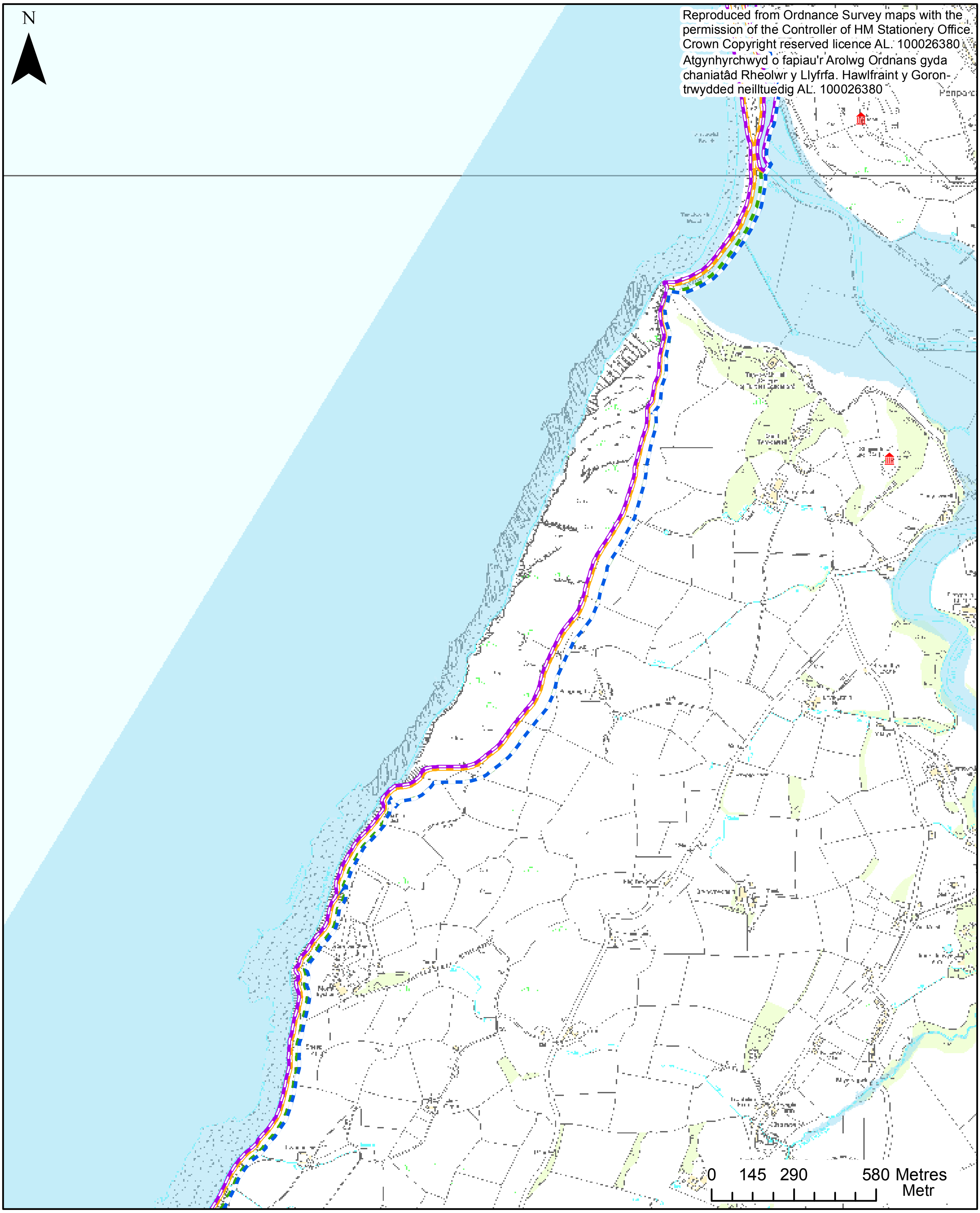
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 41



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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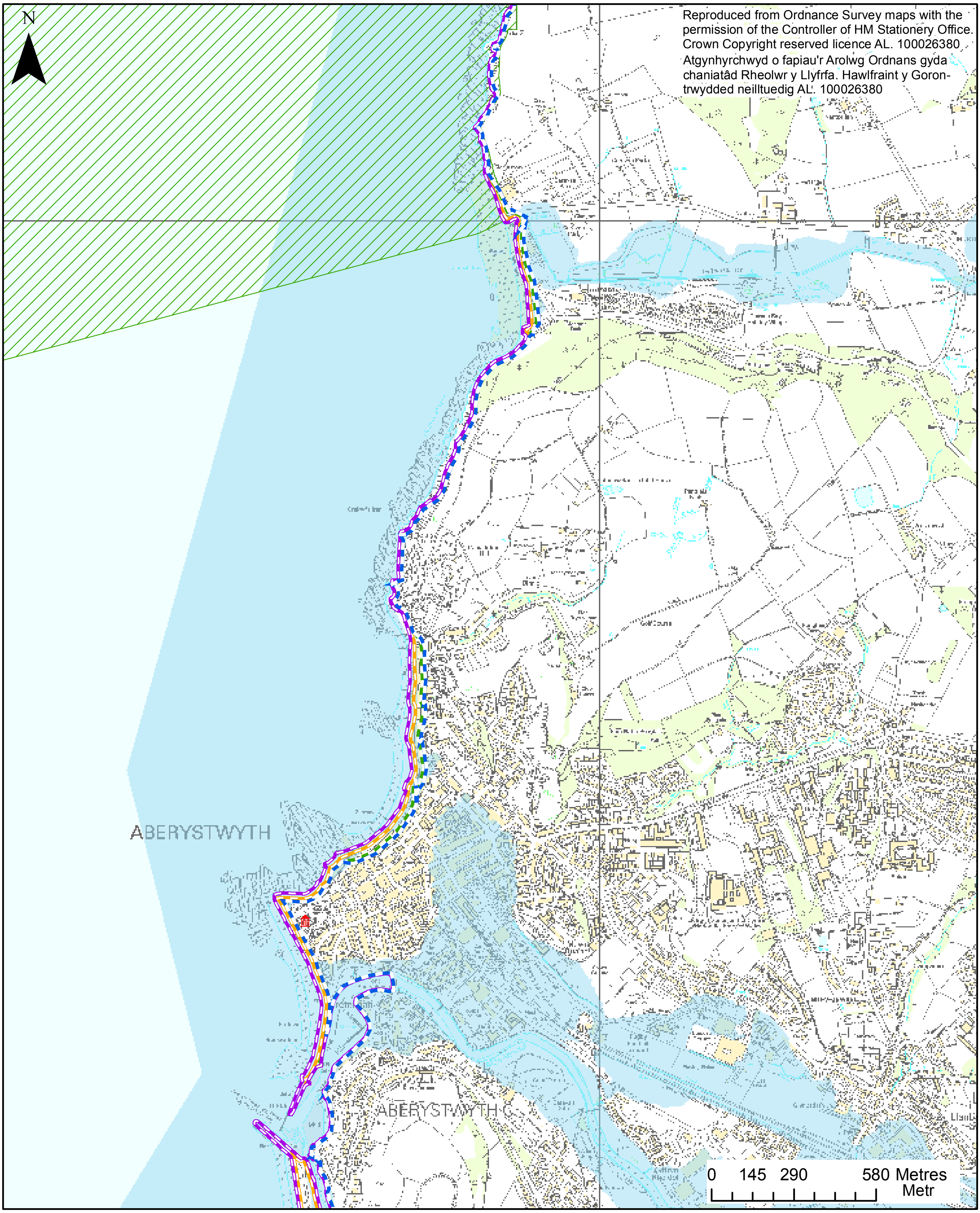
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 42

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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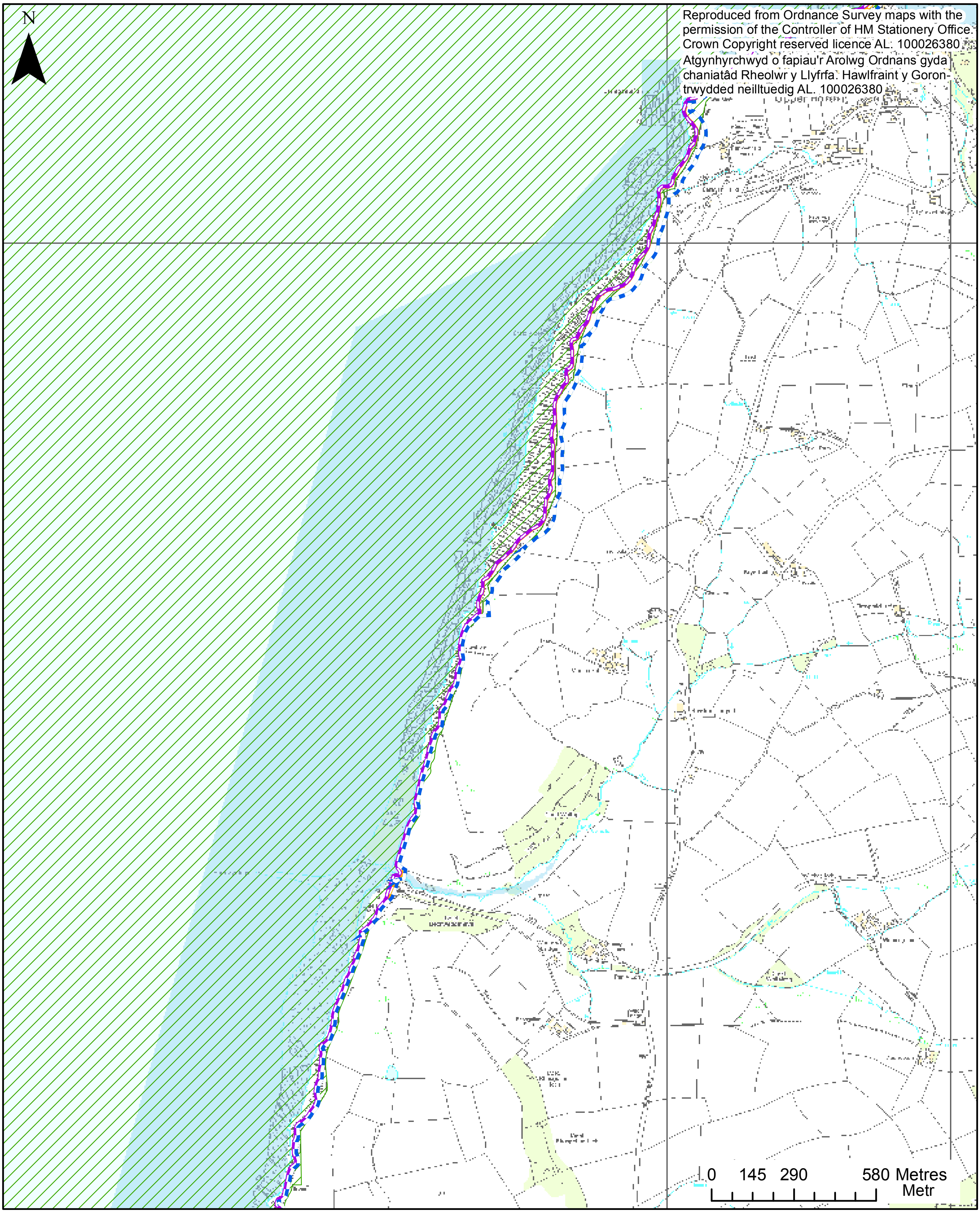
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 43



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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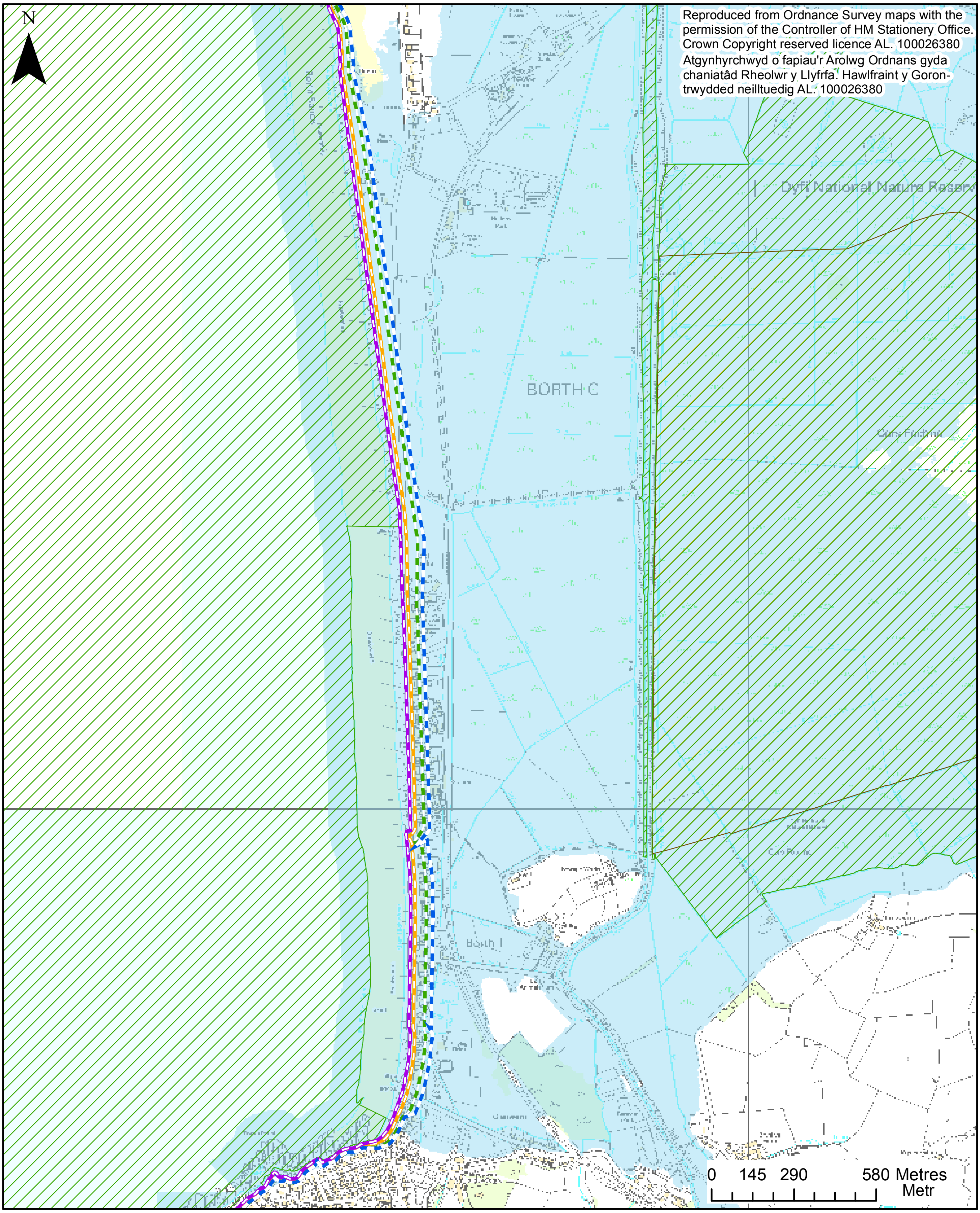
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 44



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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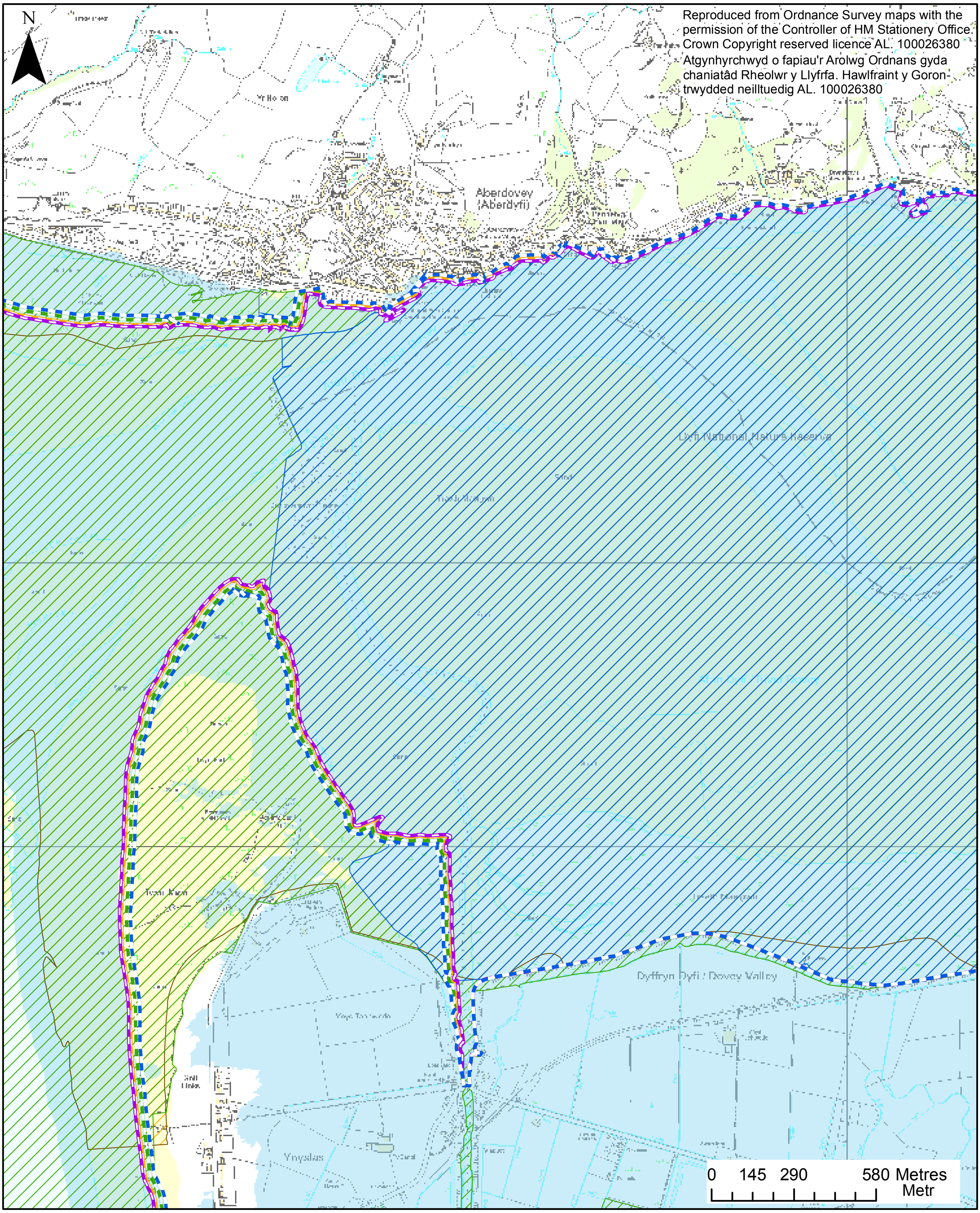
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 45

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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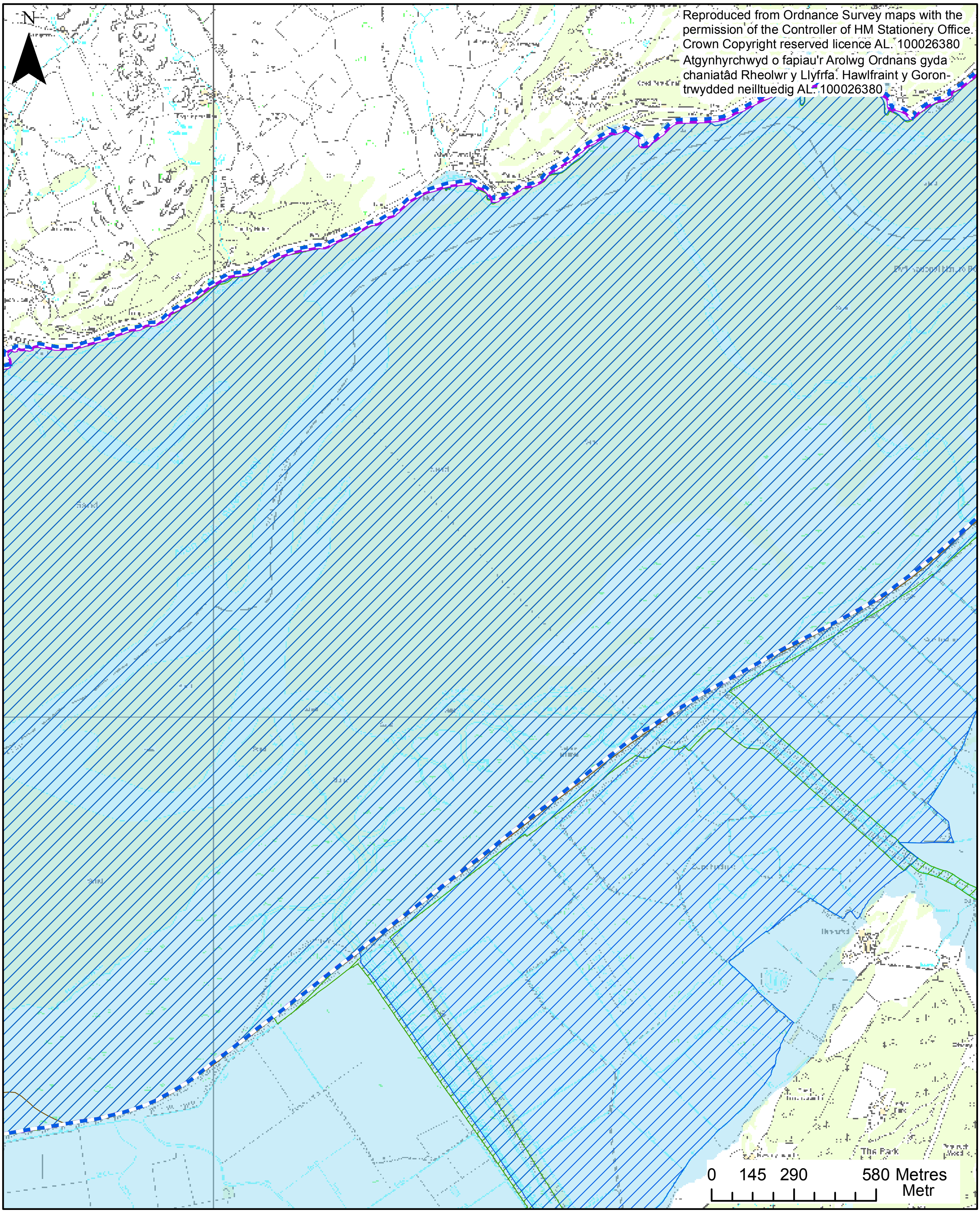
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 46

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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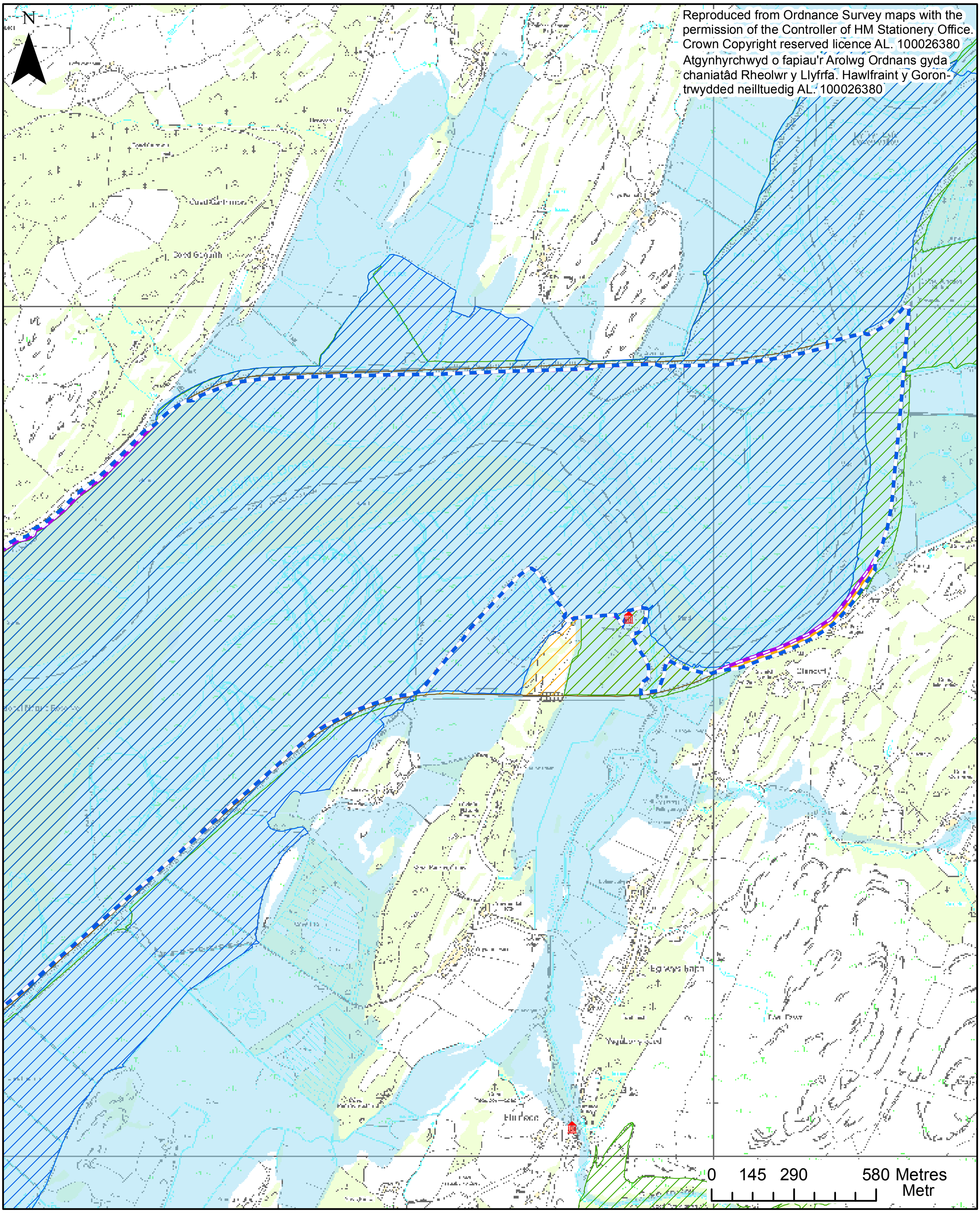
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 47



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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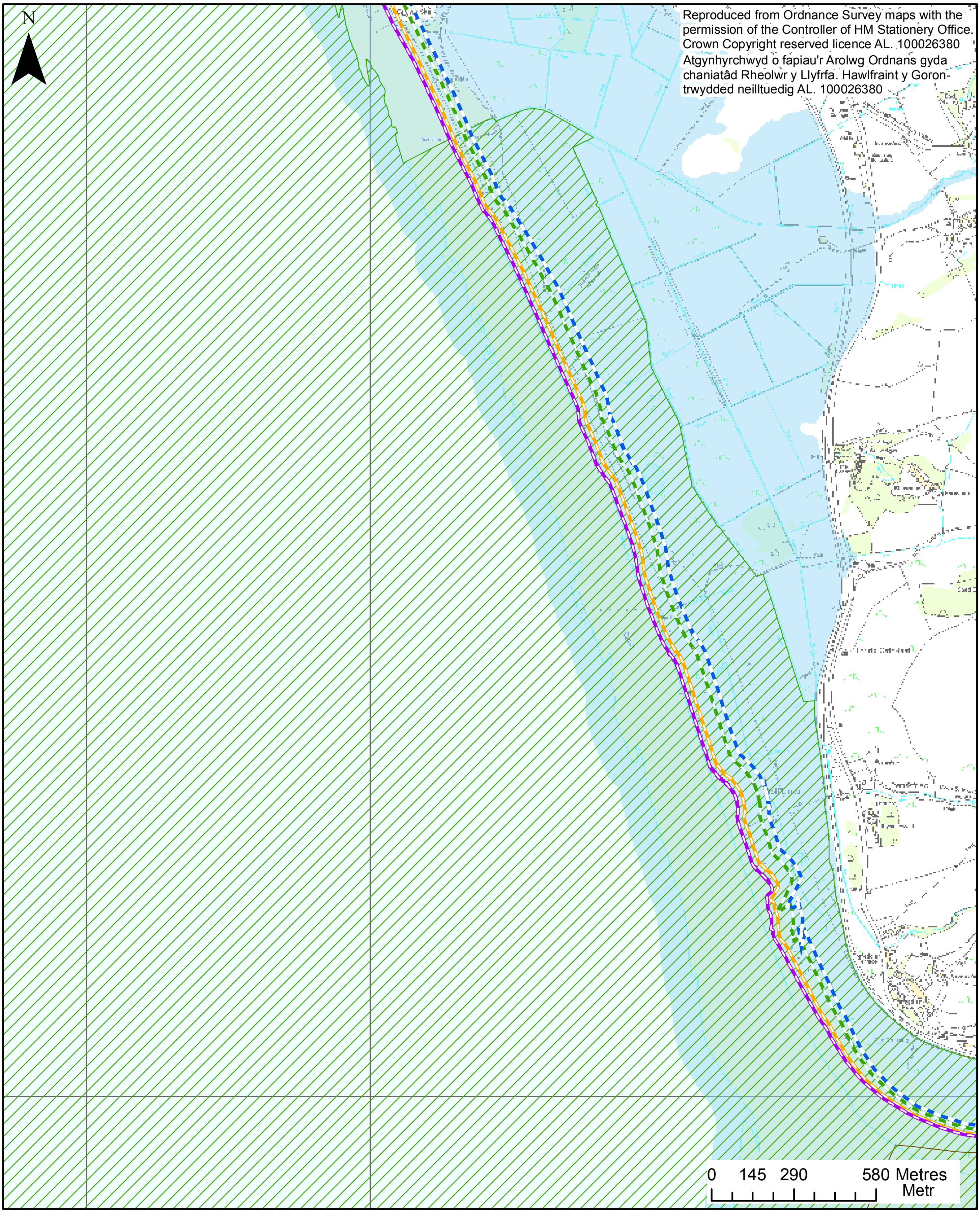
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 48

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR		
	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa	
	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA	
	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA	
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig	

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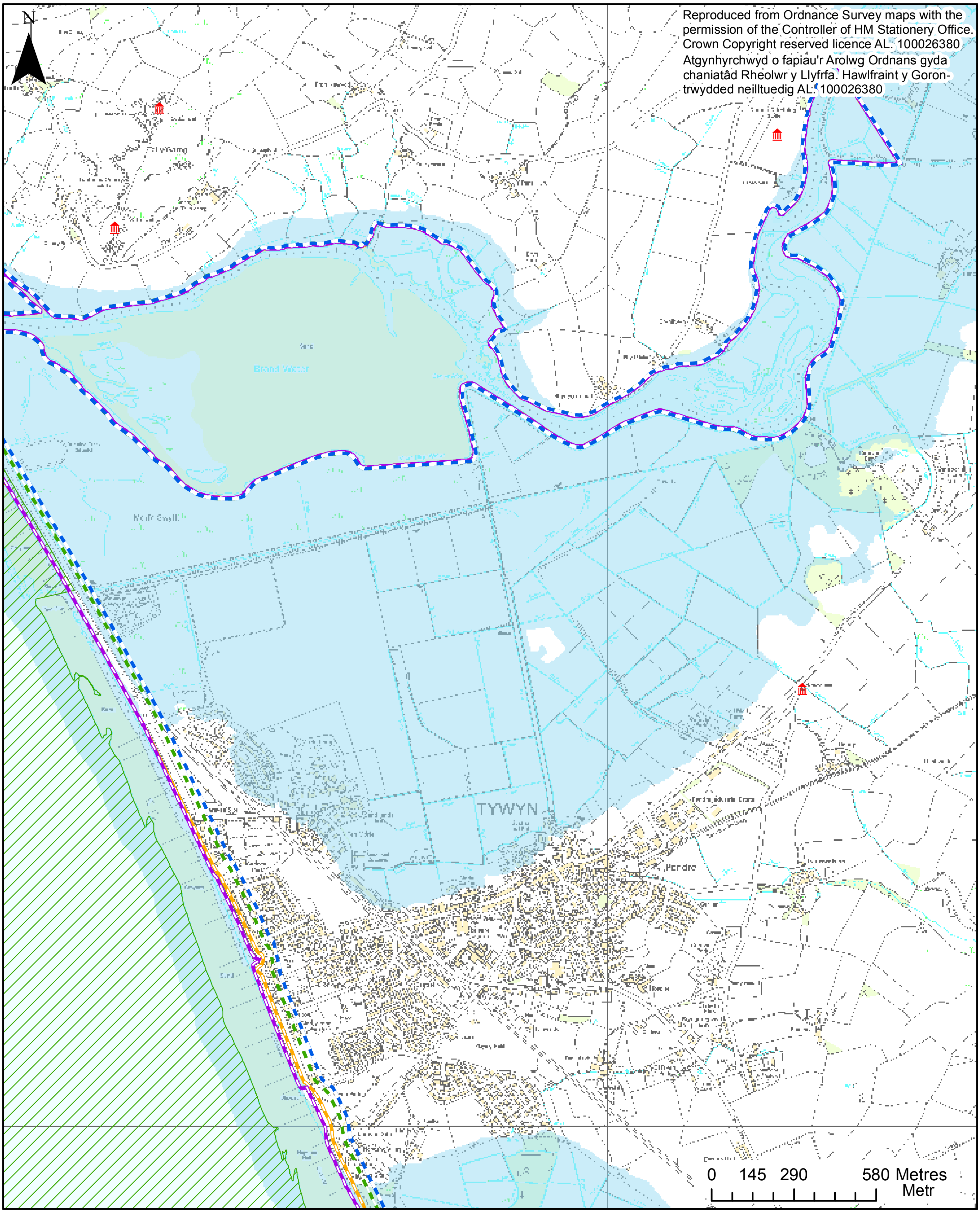
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 49

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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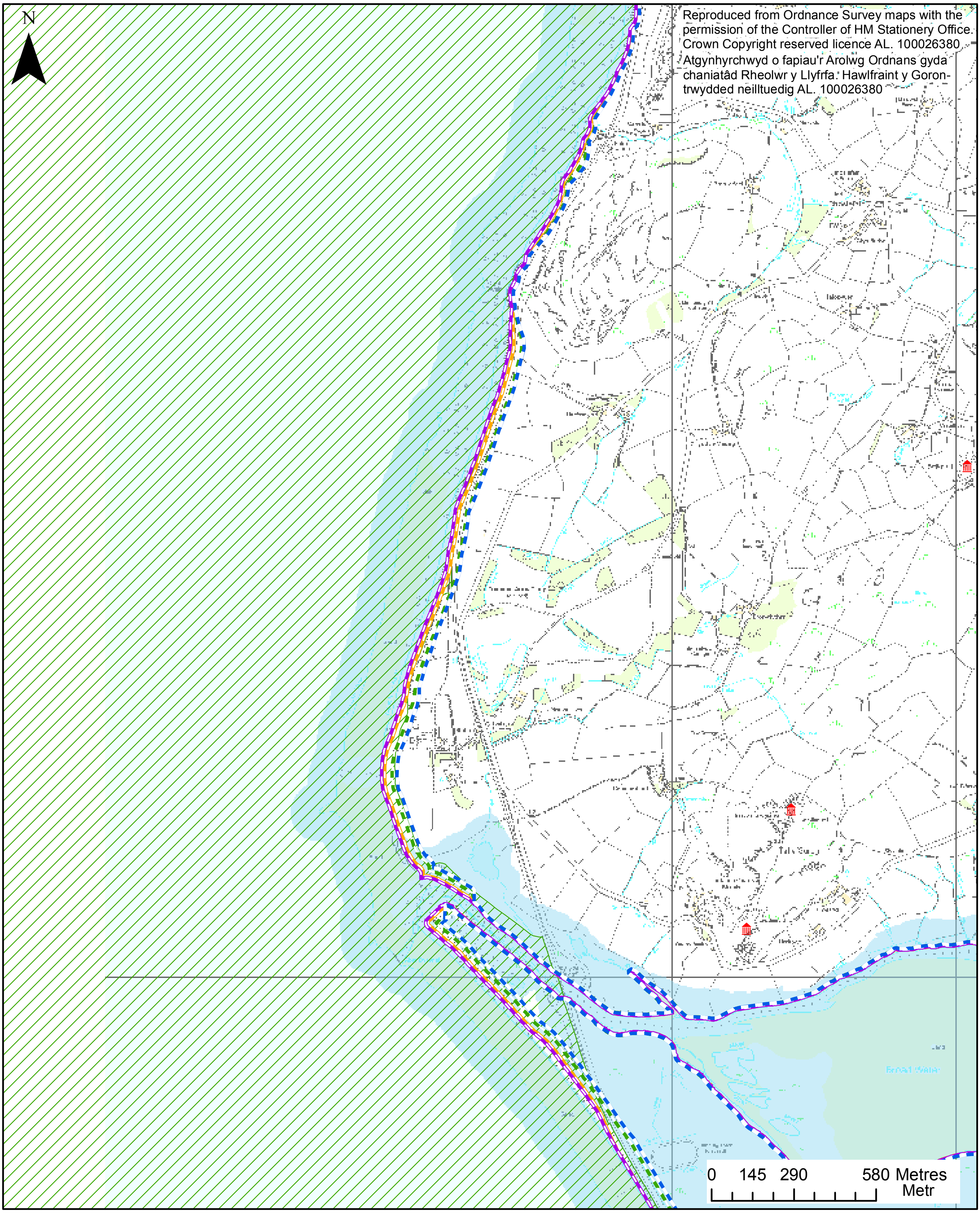
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 50

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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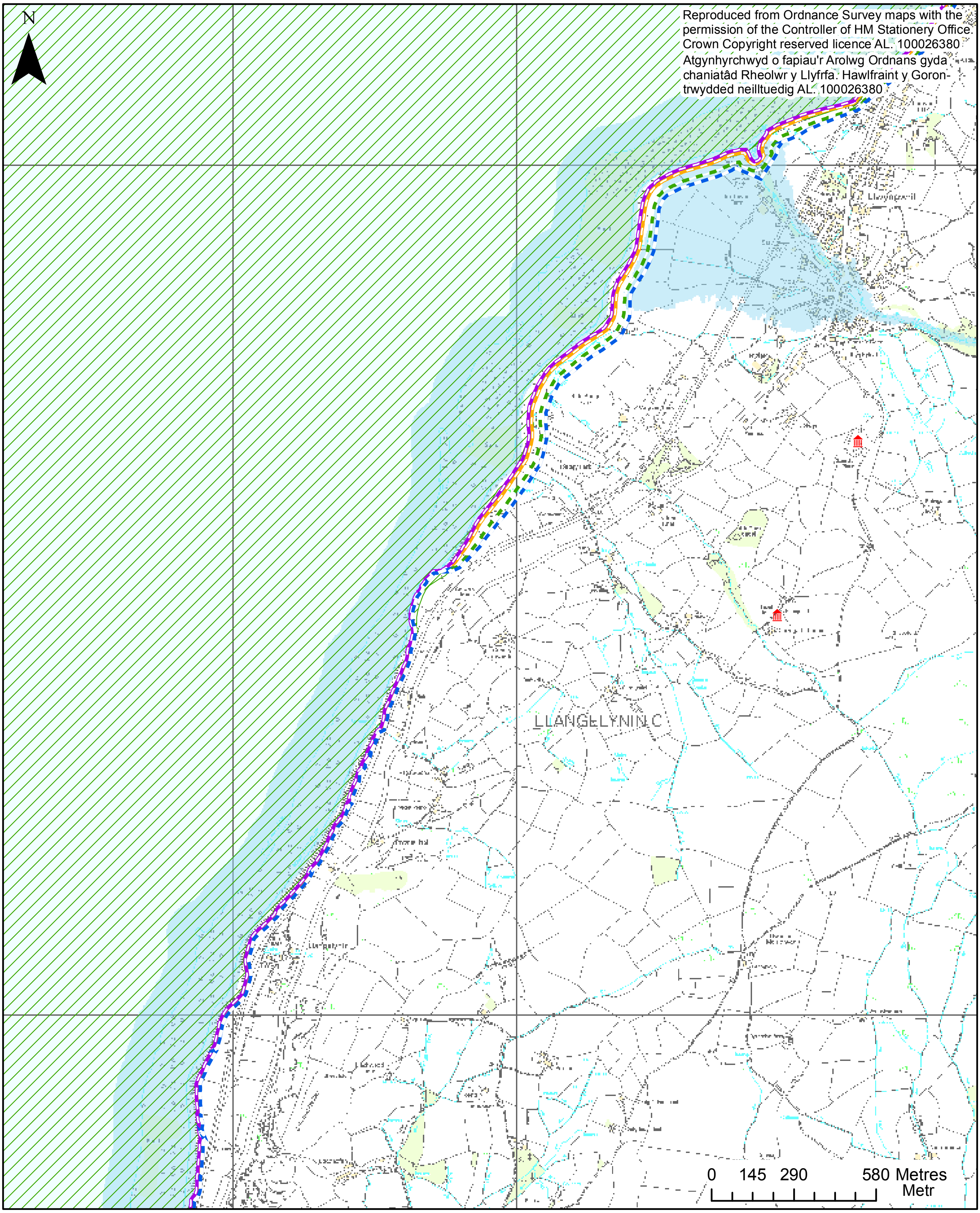
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 51

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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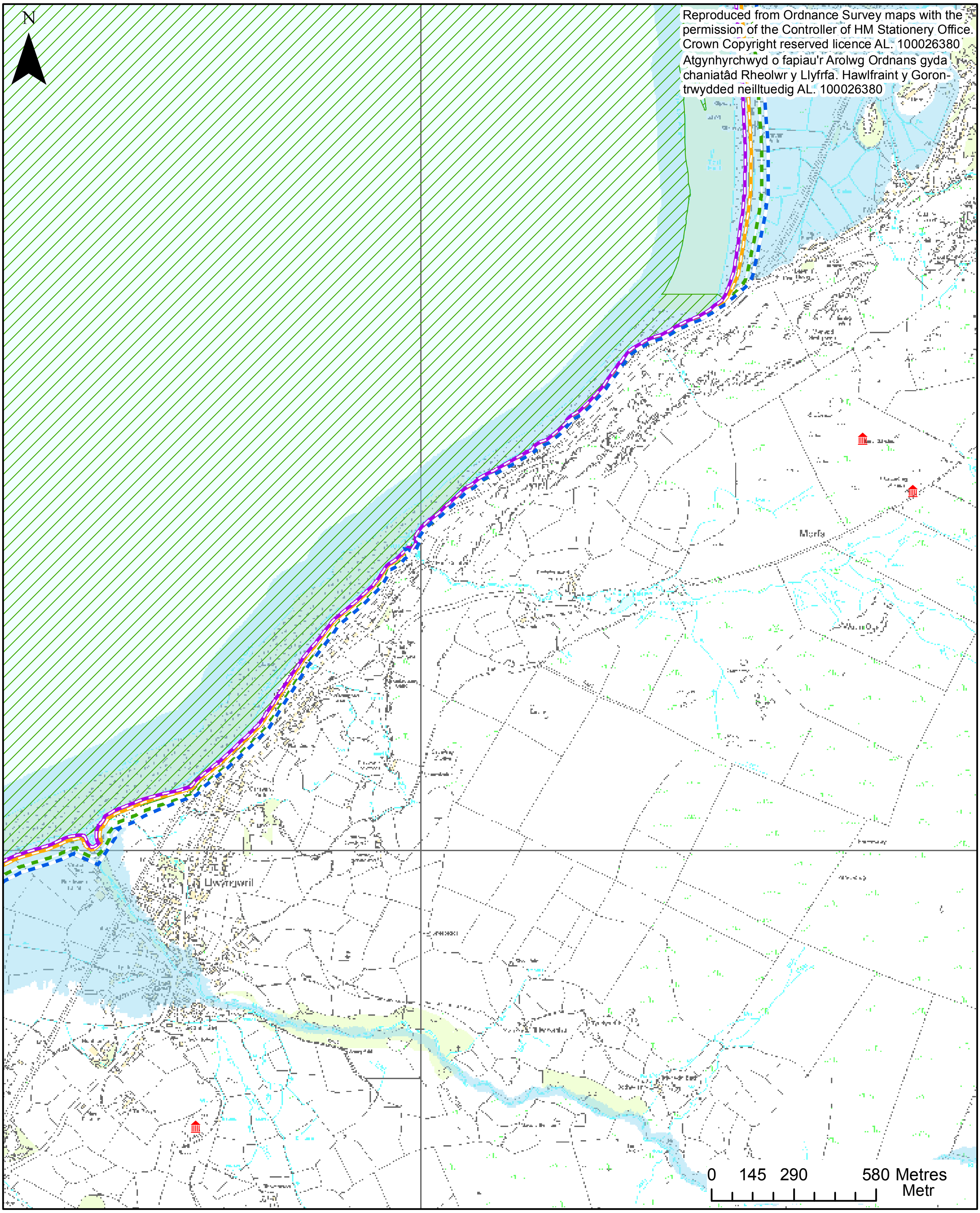
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 52

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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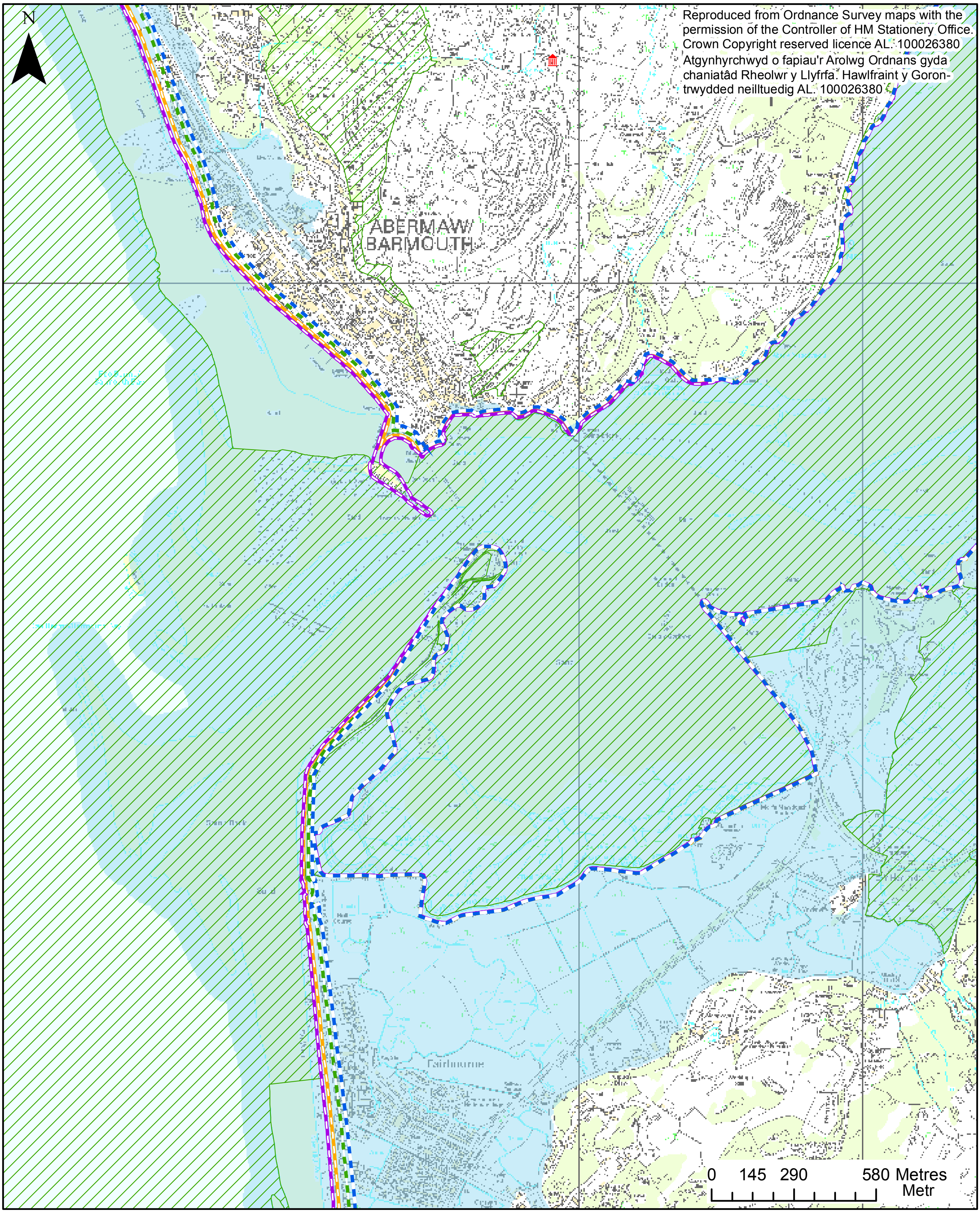
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 53

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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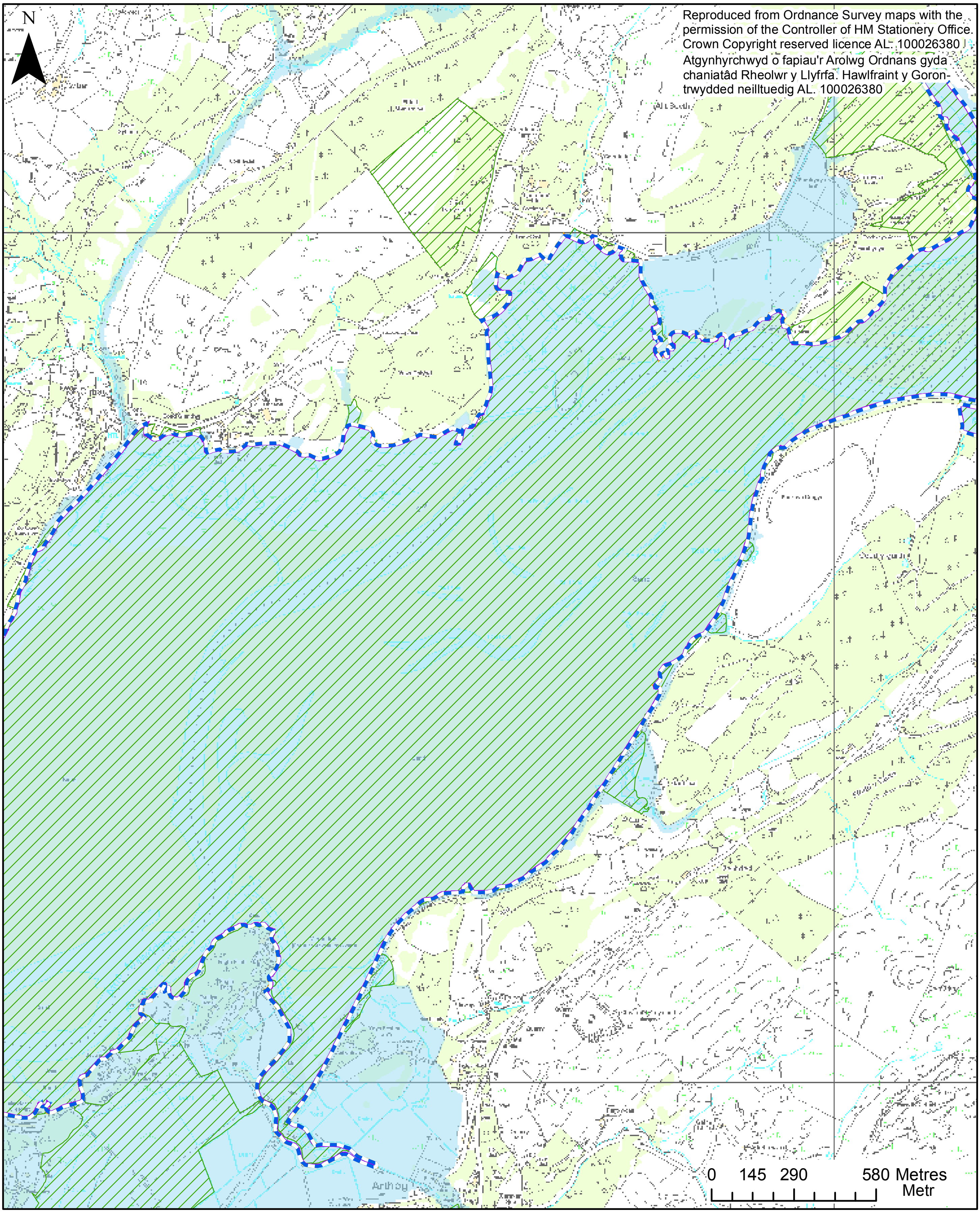
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 54

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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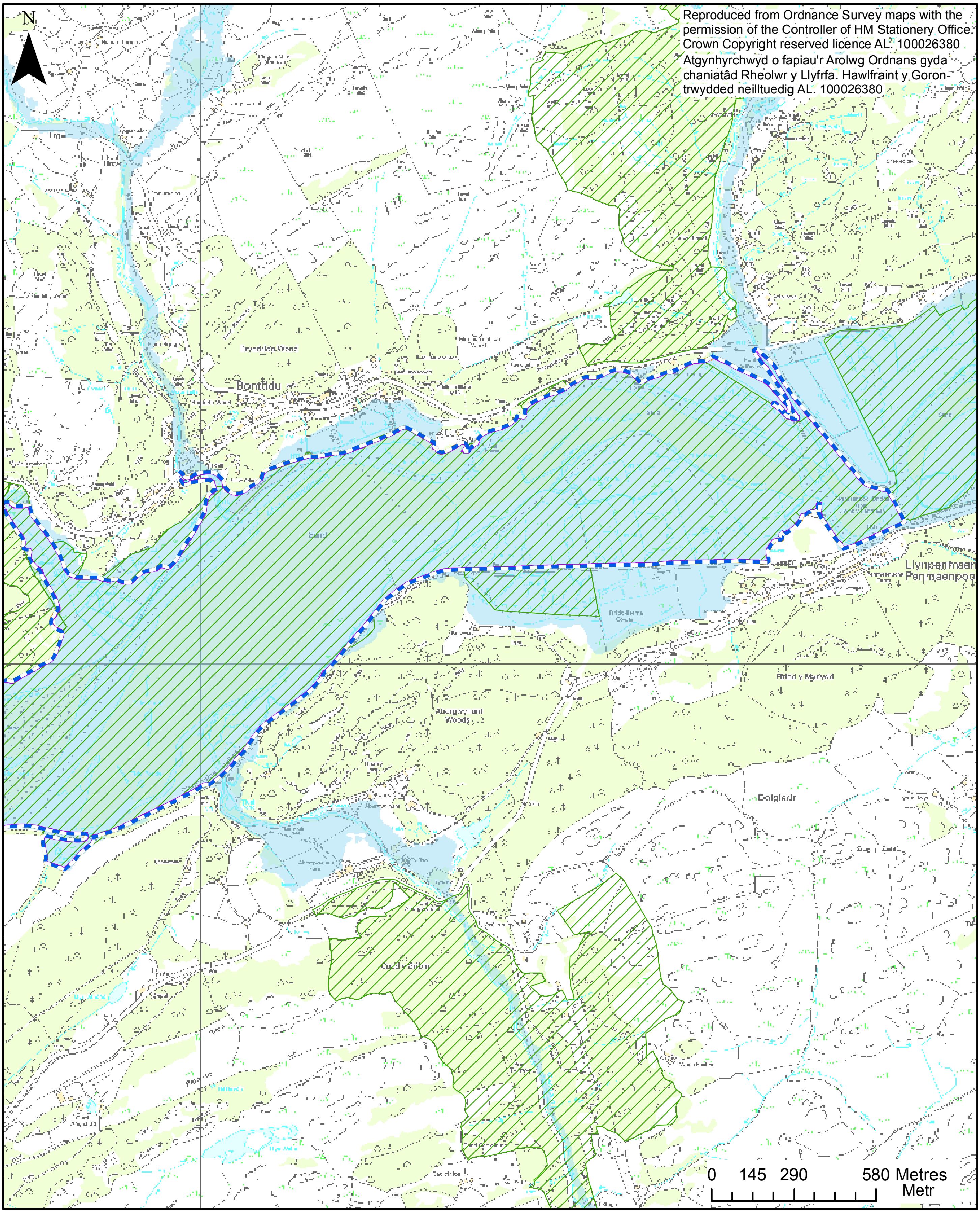
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 55

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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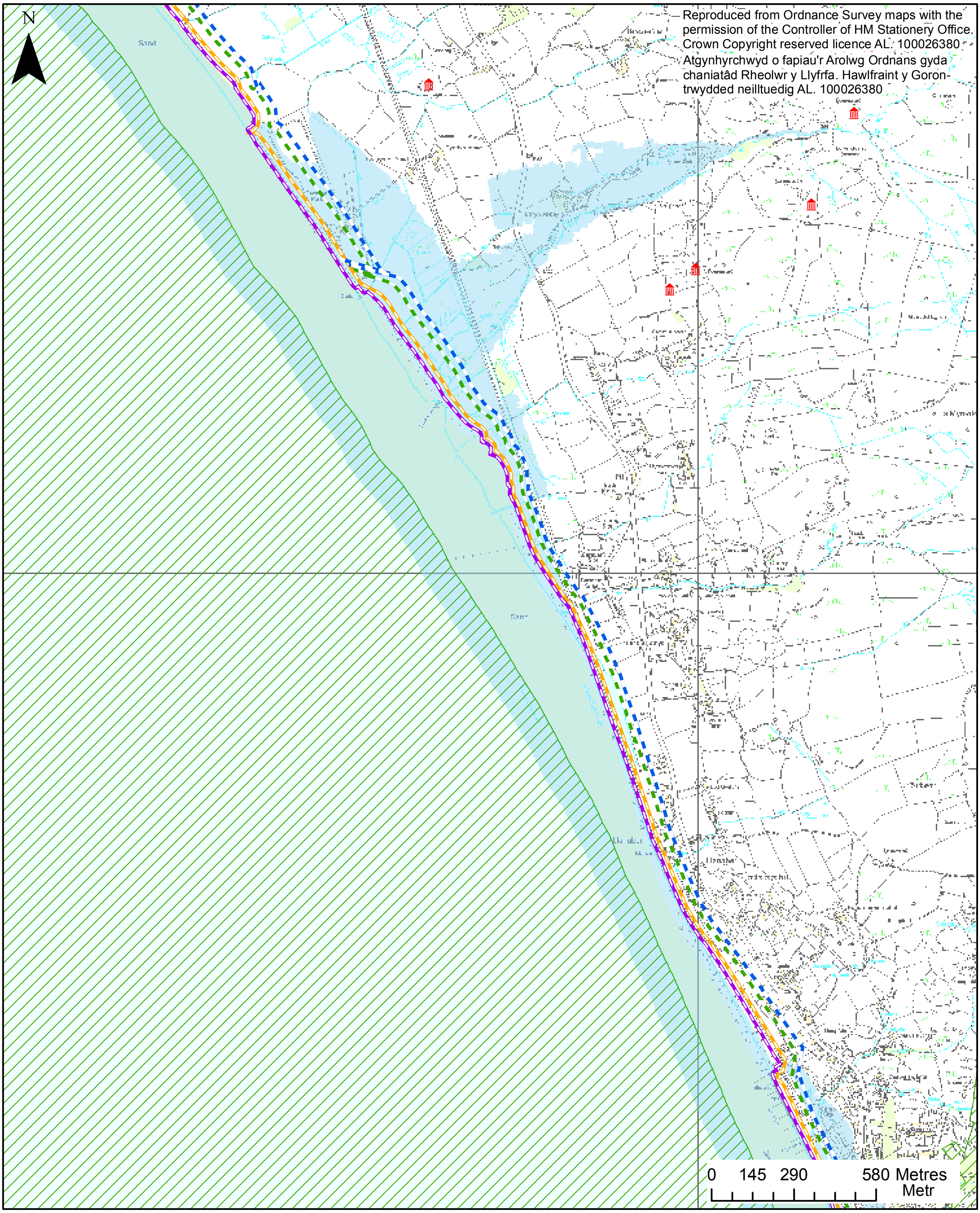
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 56



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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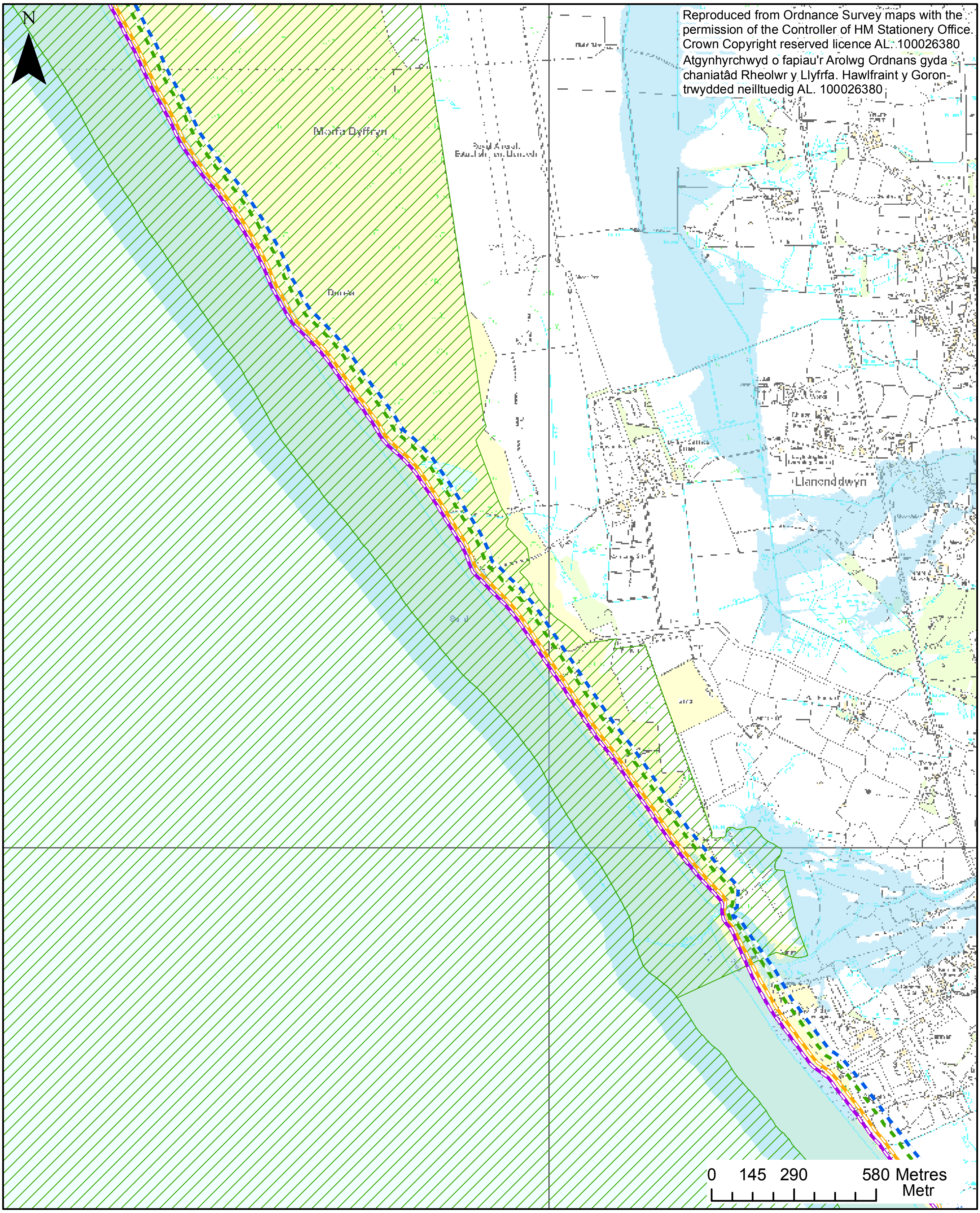
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 57

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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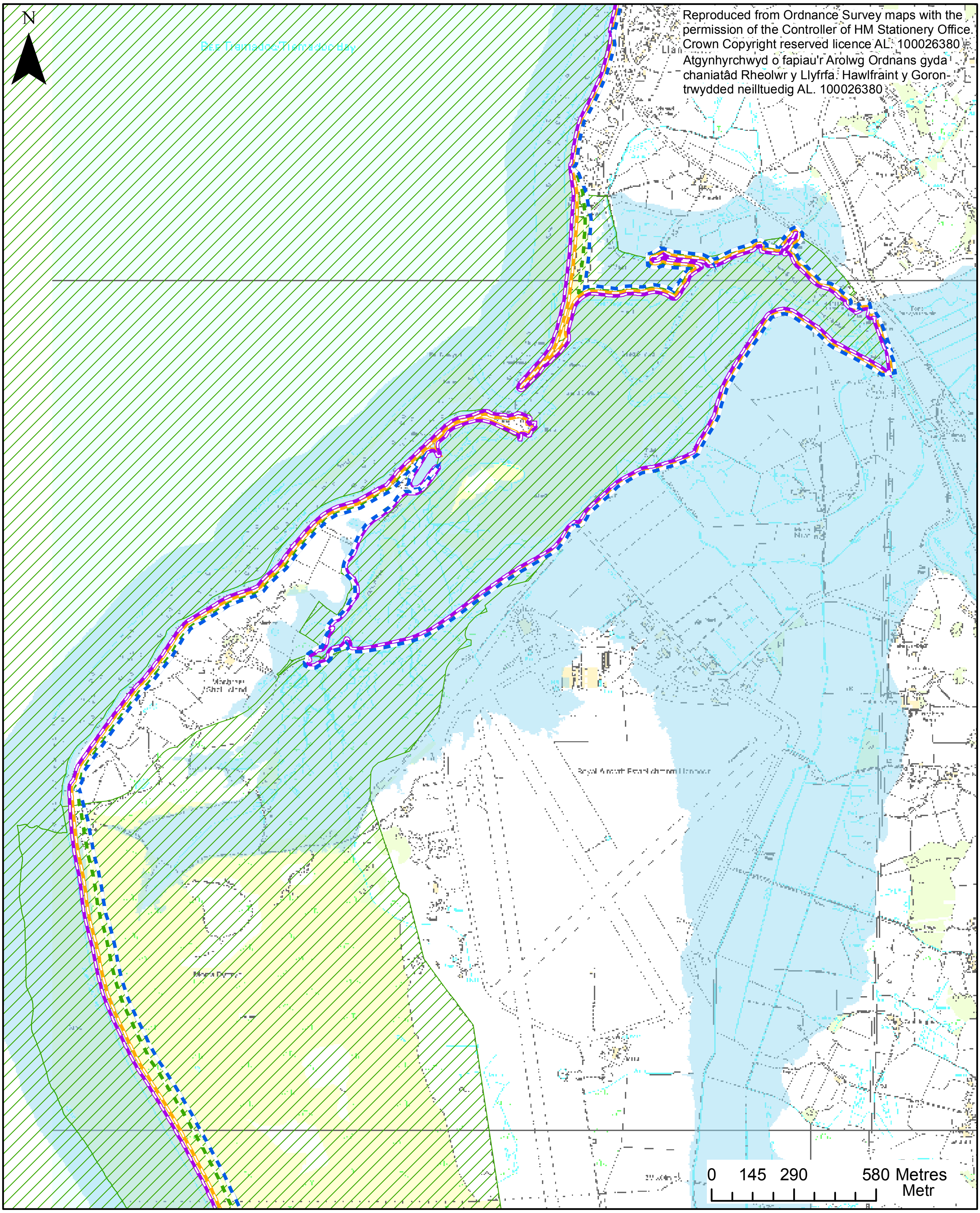
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 58

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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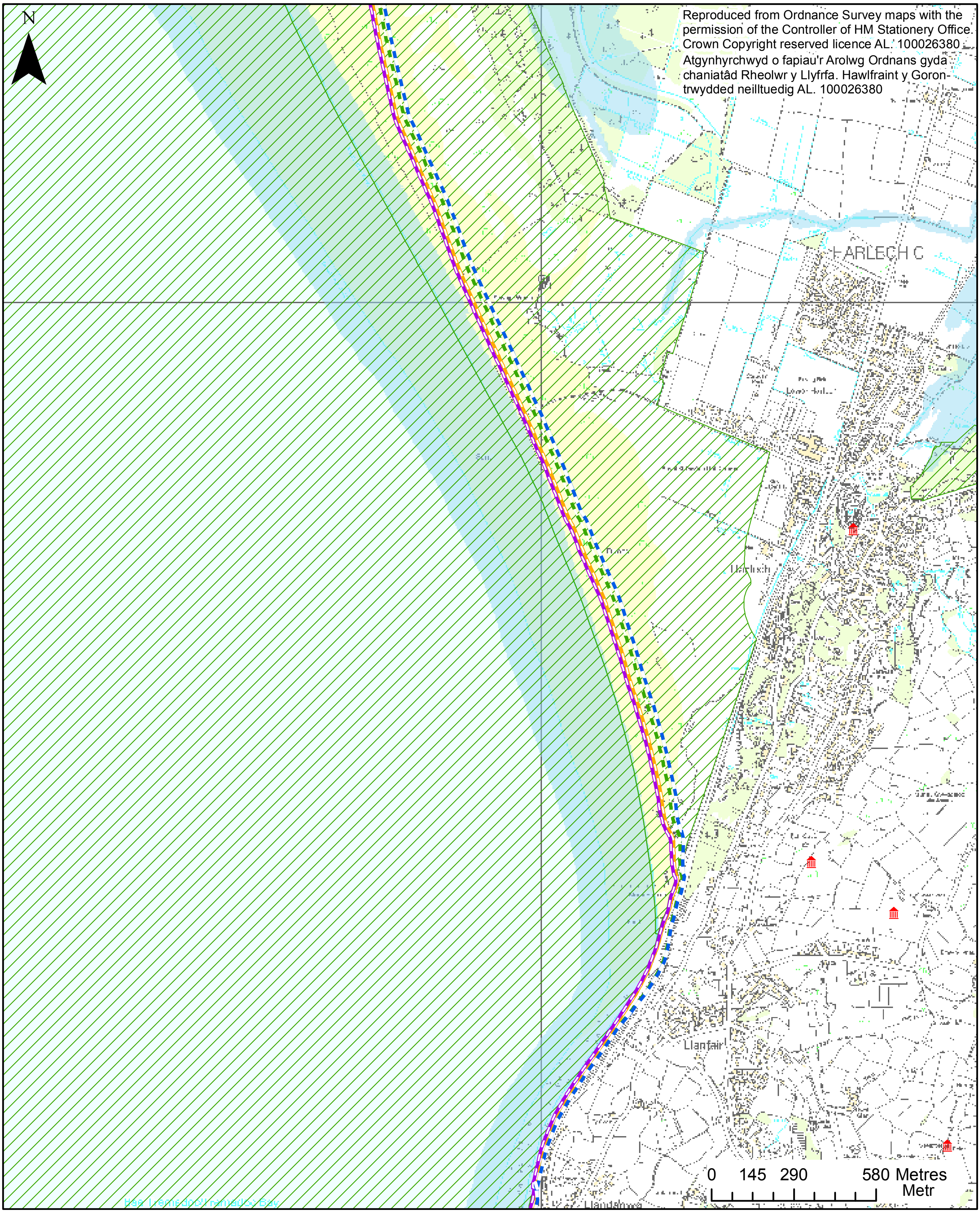
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 59



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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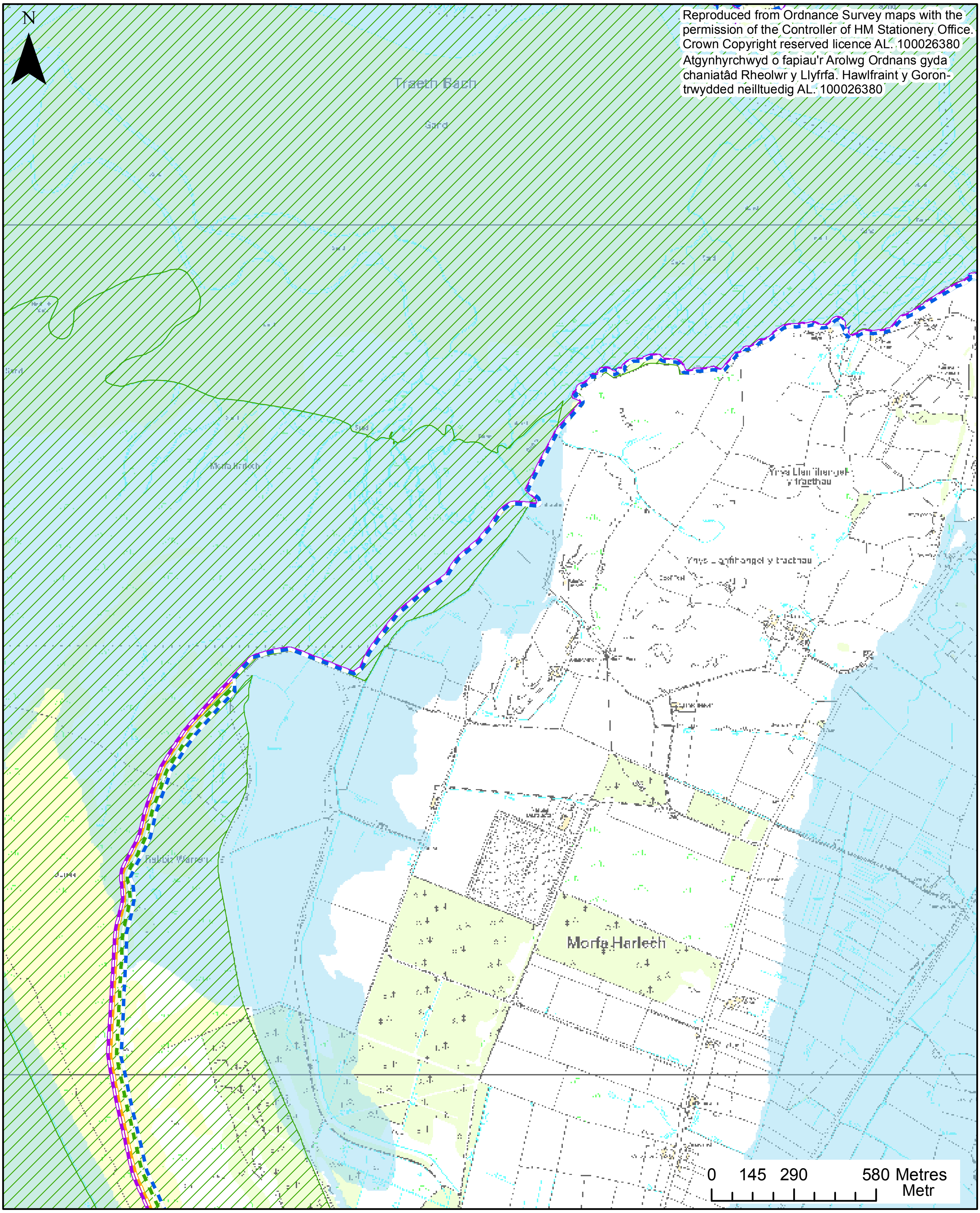
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 60

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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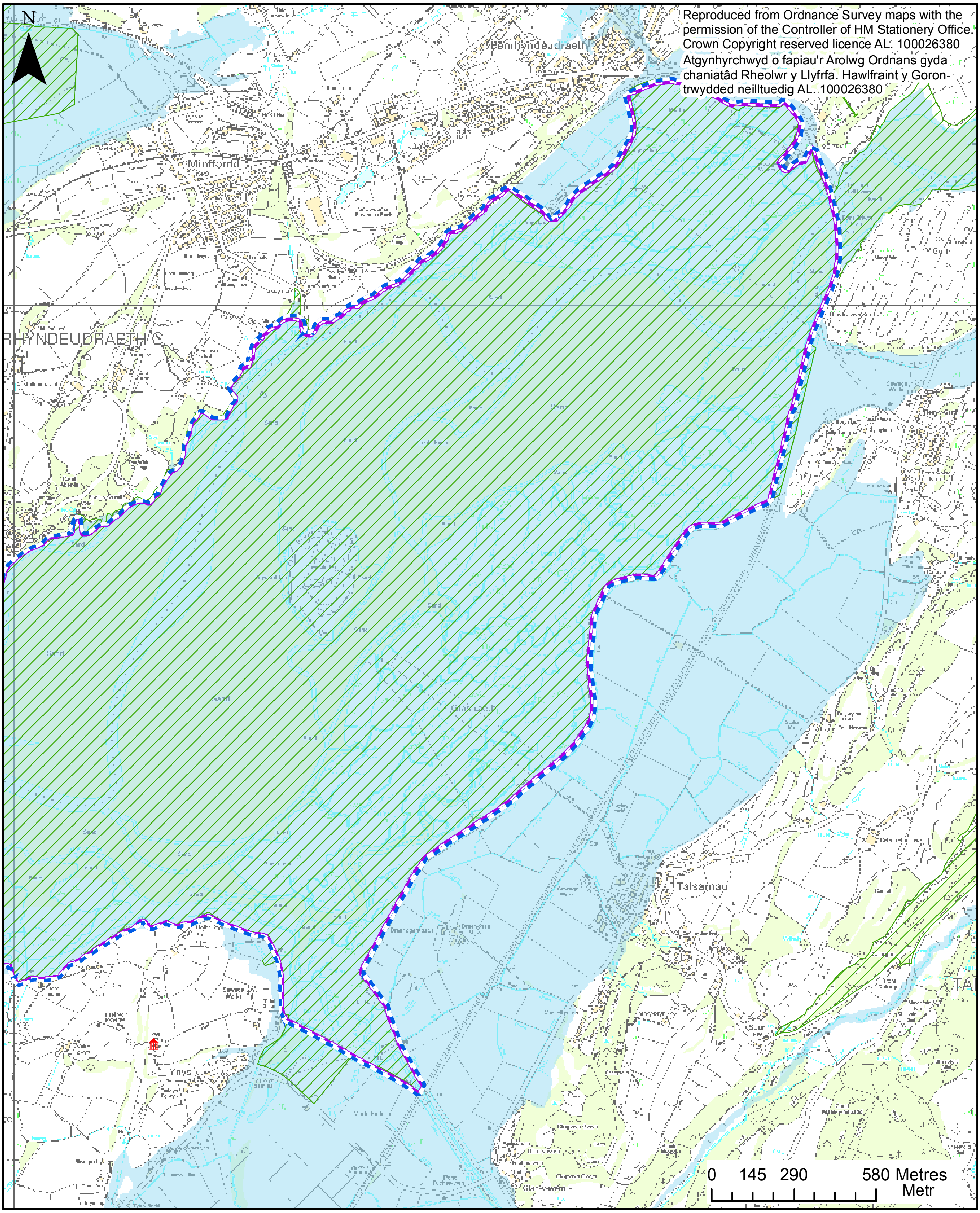
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 61

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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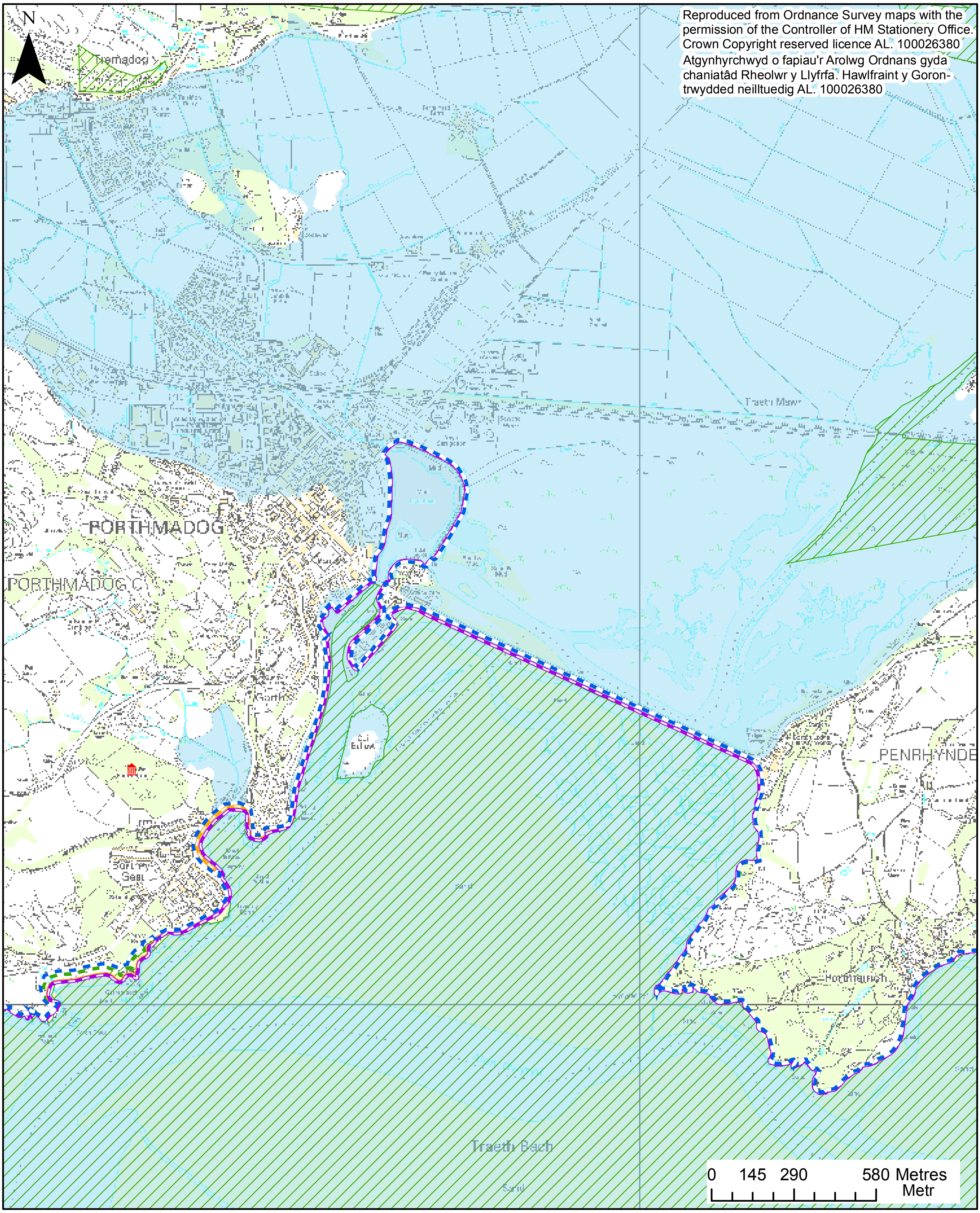
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 62

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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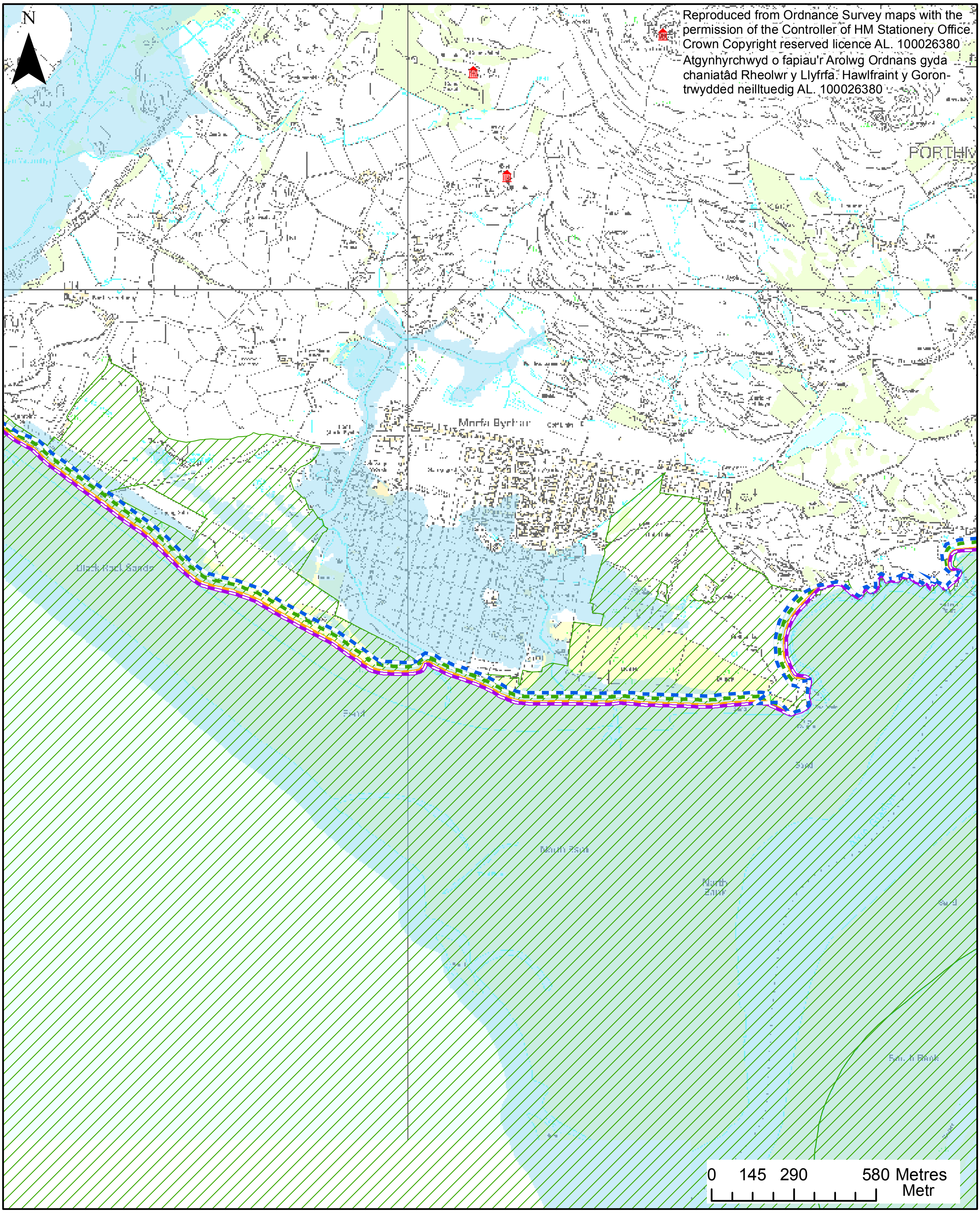
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 63



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 64

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 65

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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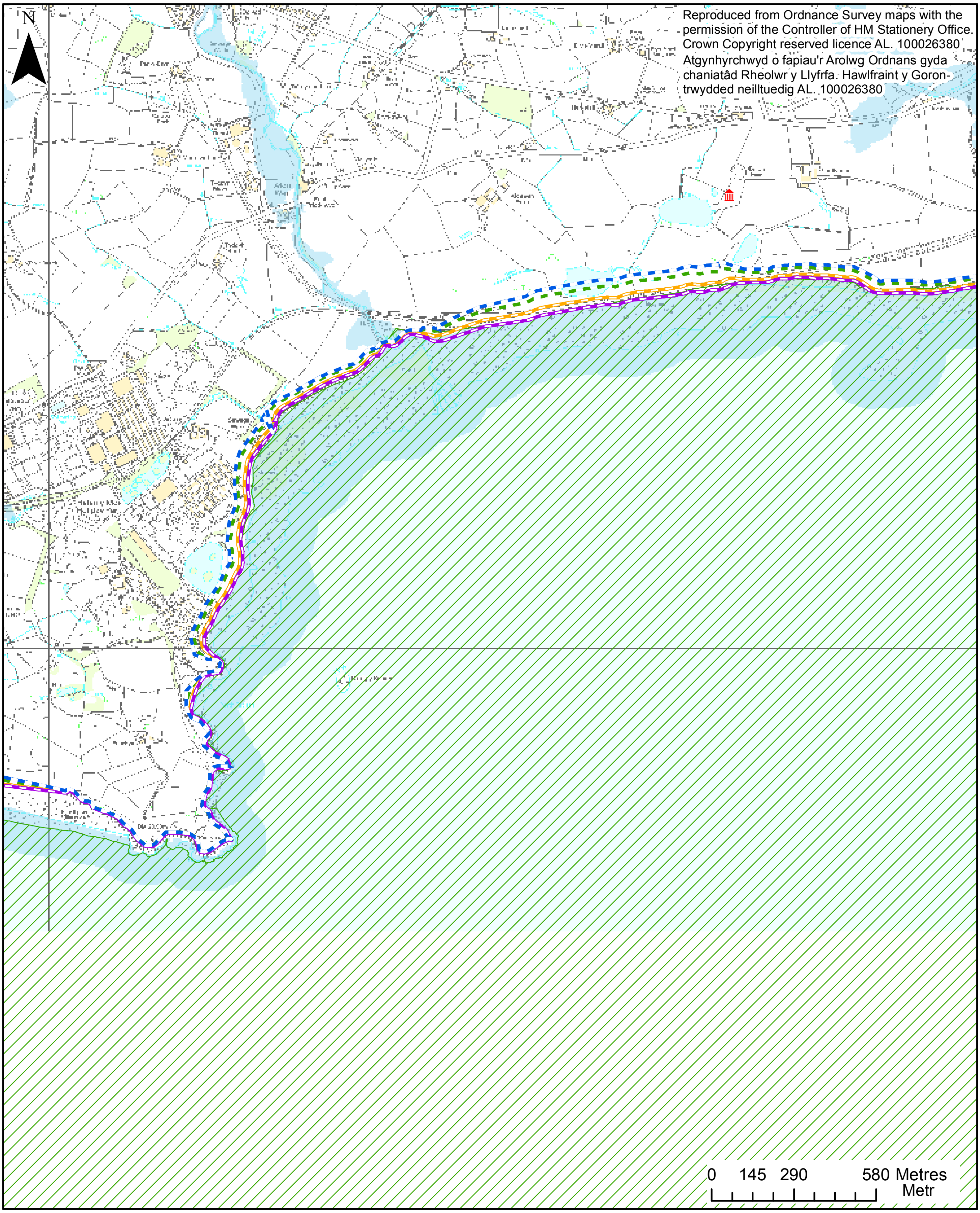
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 66



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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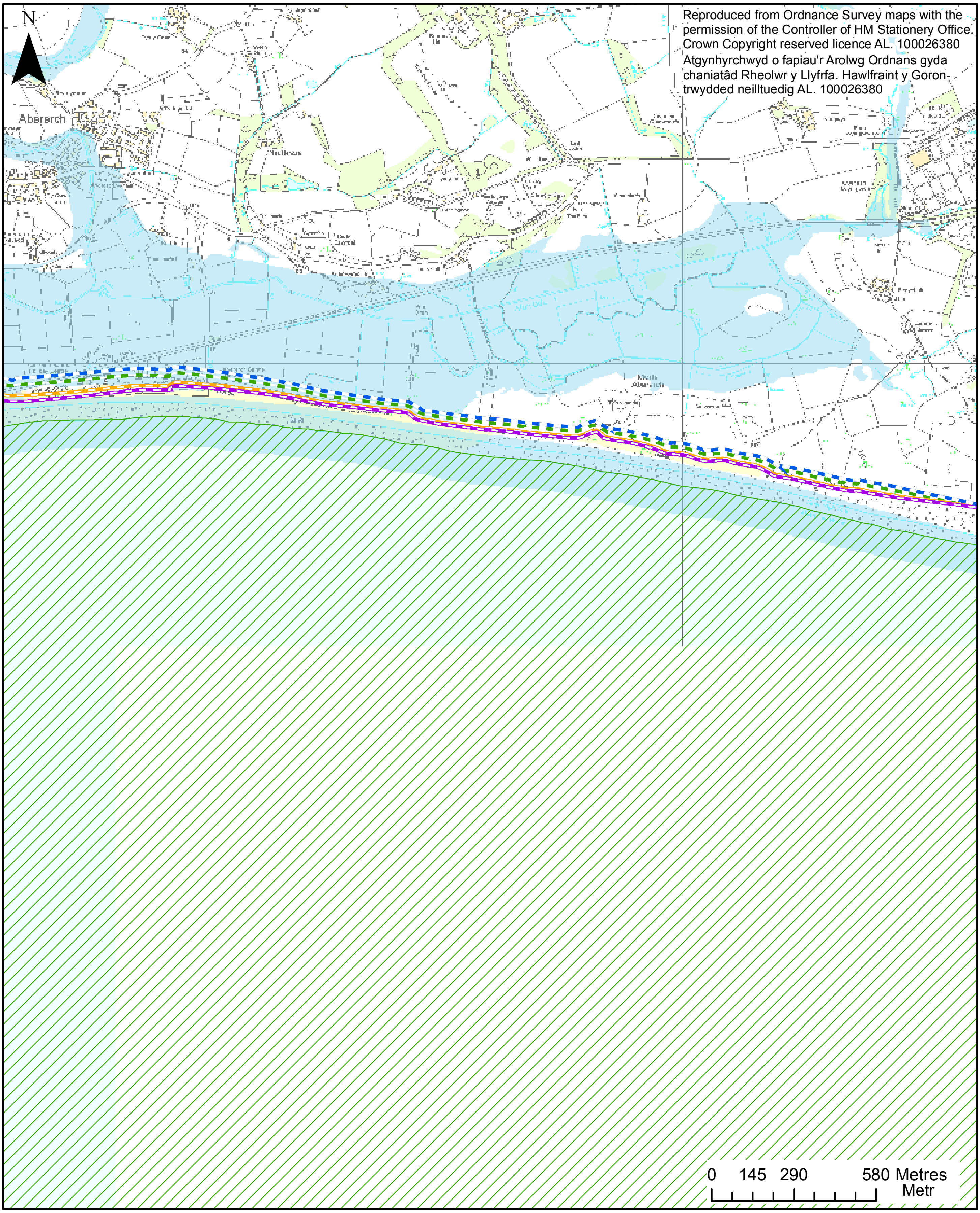
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 67

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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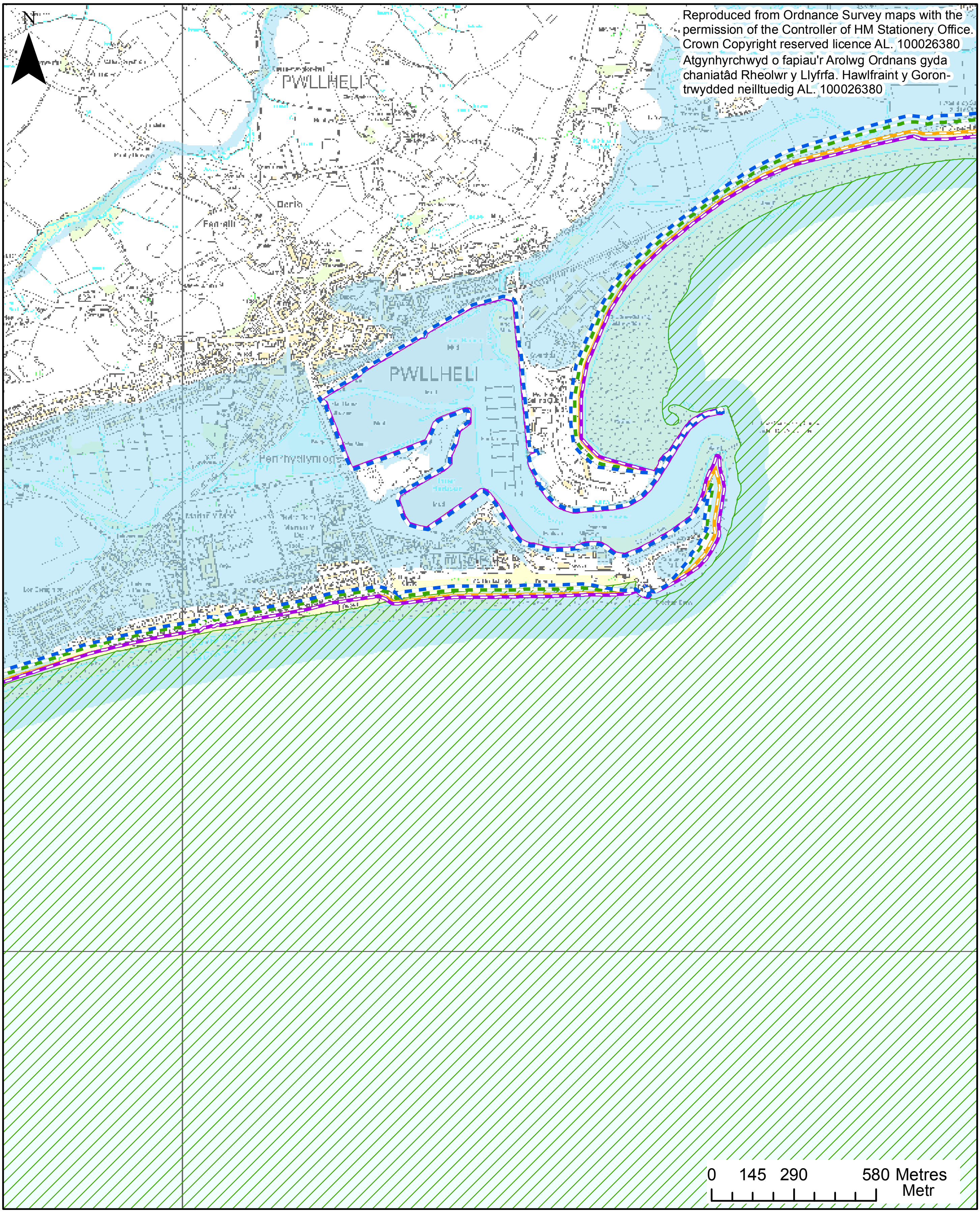
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 68



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 69

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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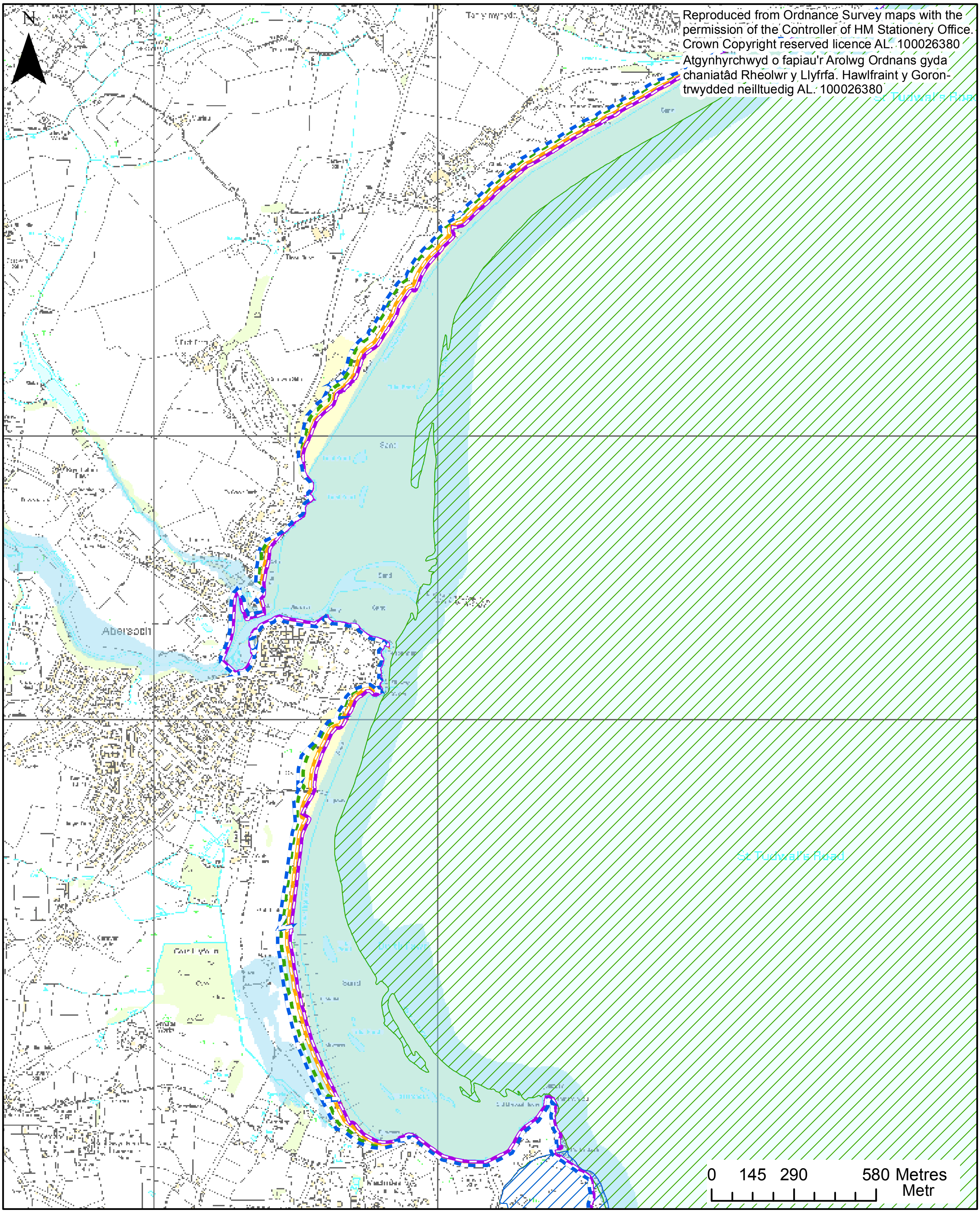
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 70

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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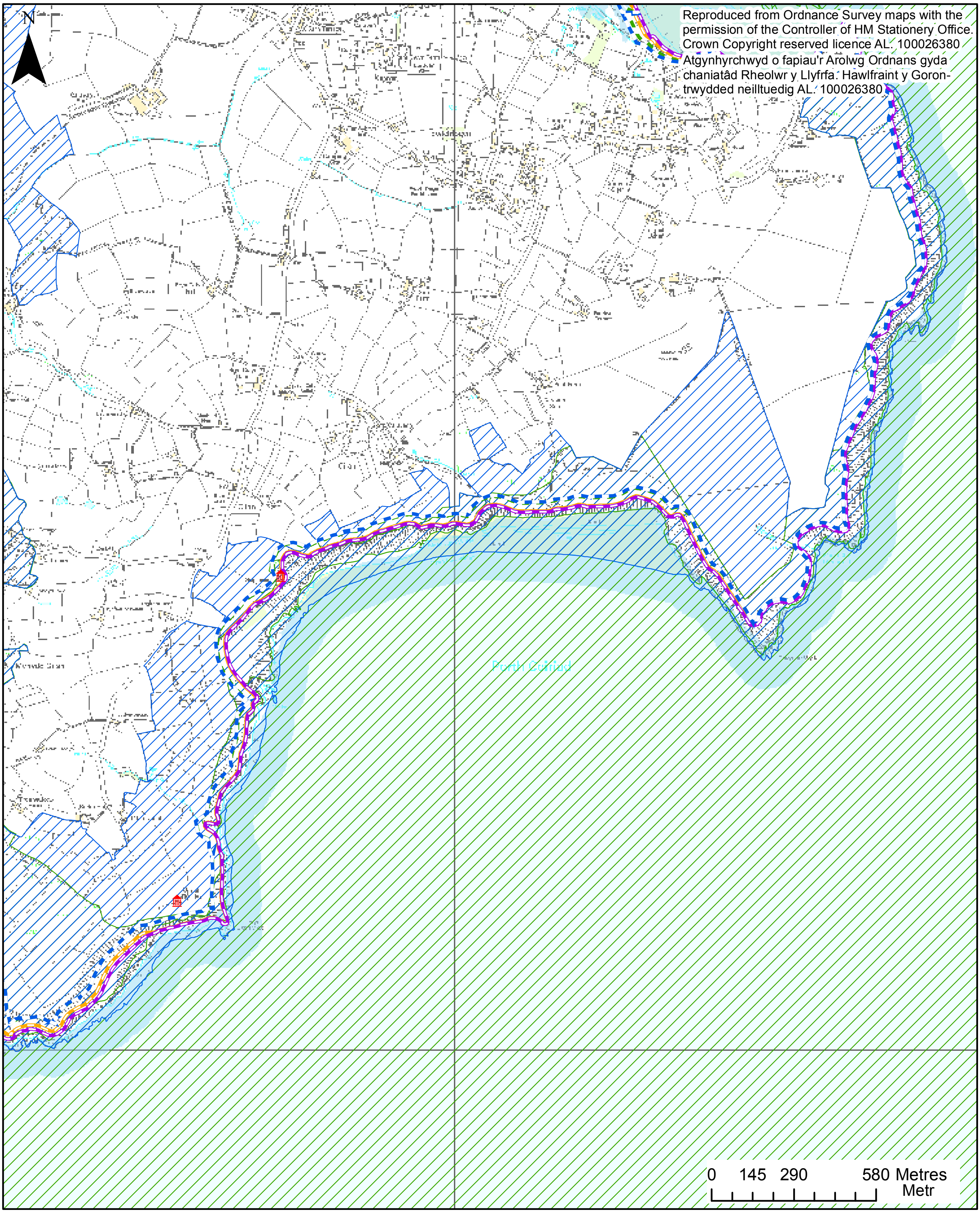
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 71

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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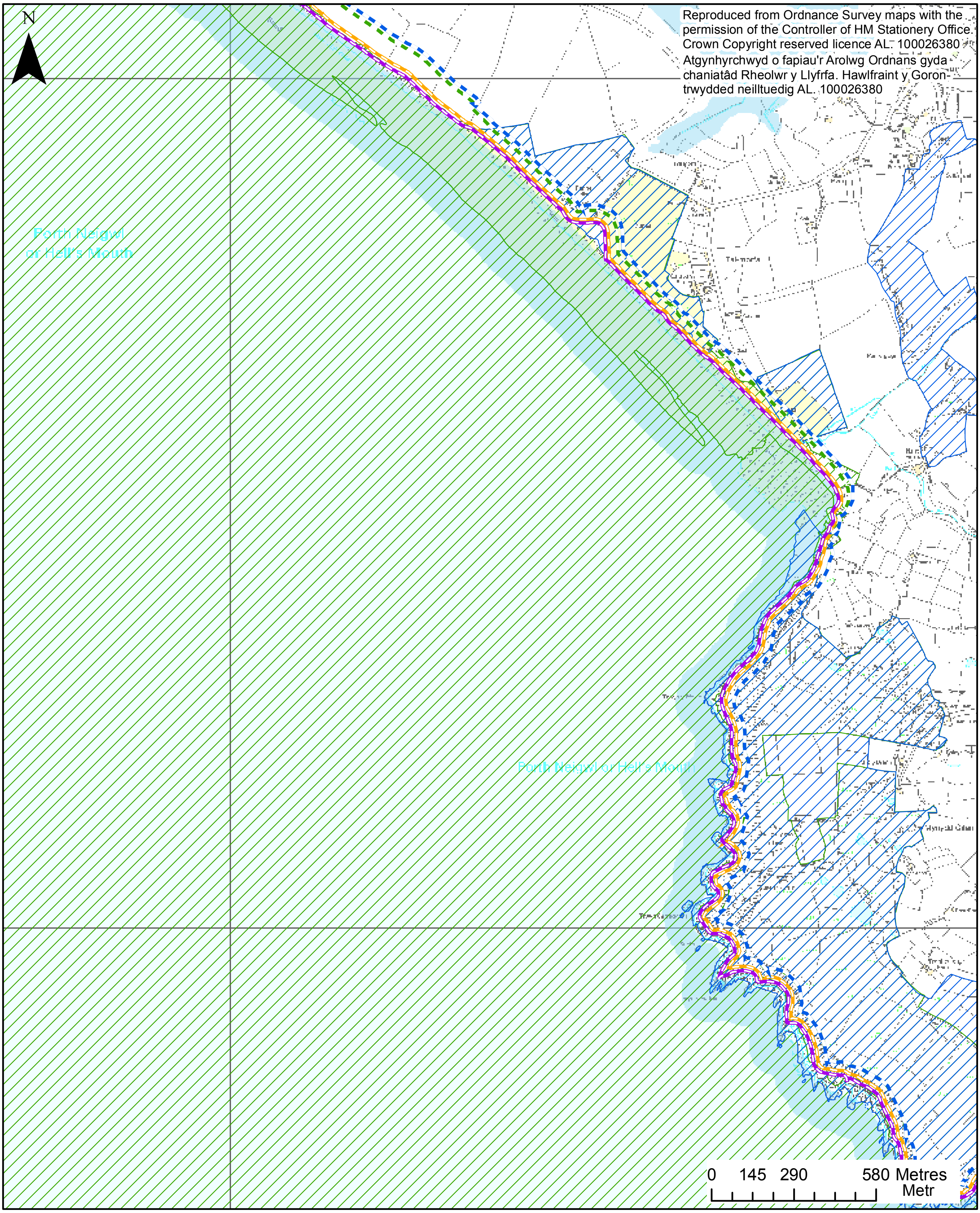
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 72

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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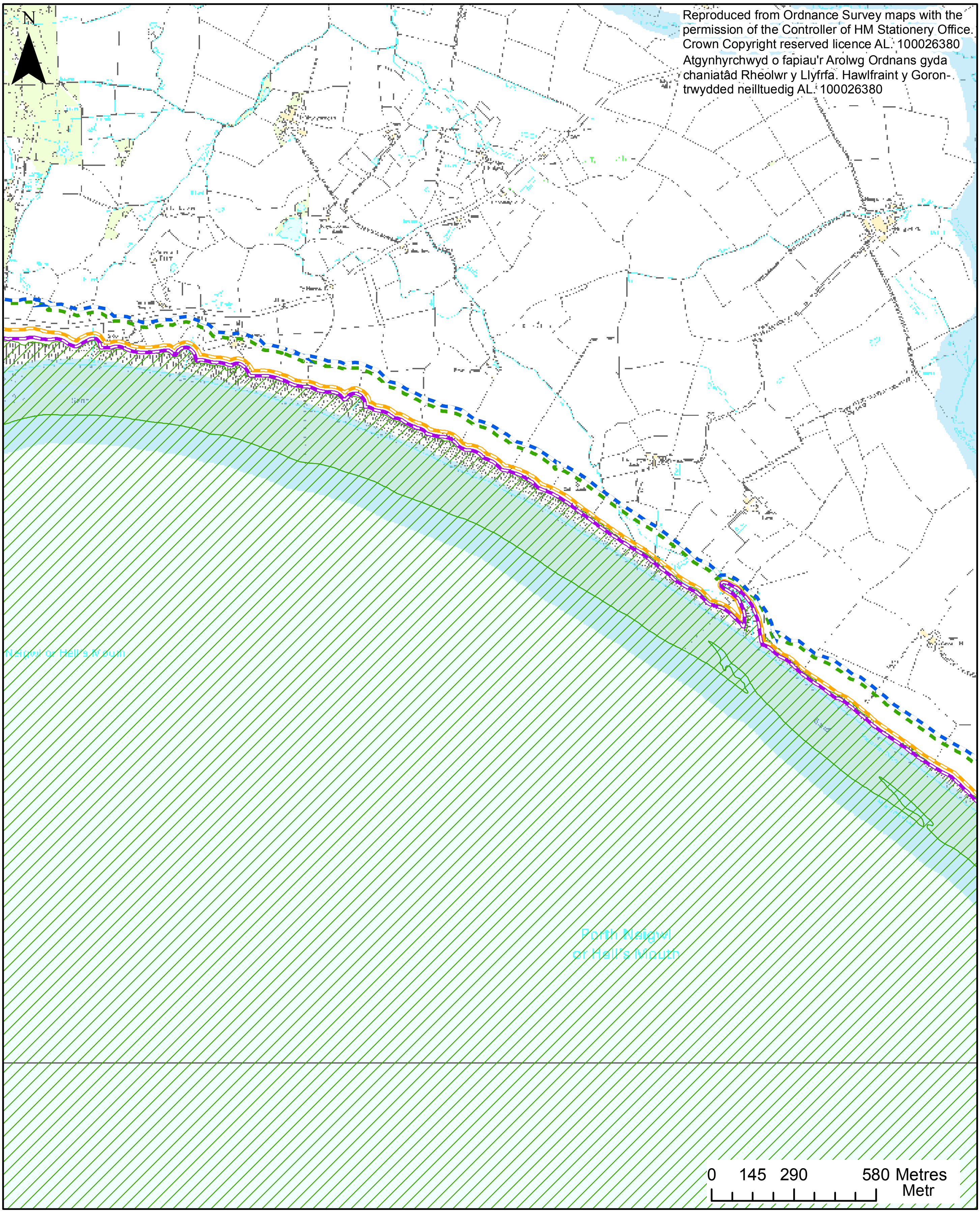
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 73



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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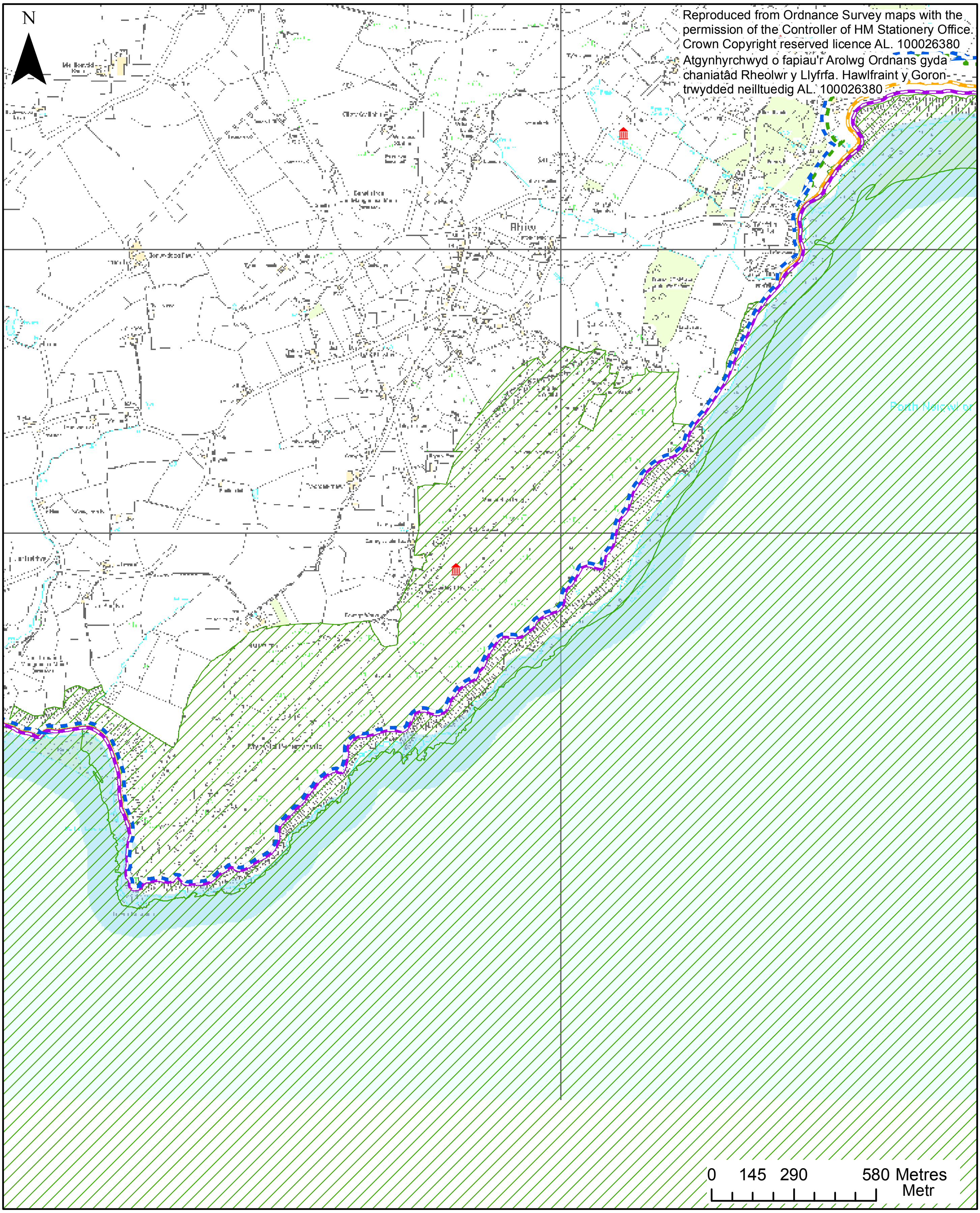
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 74

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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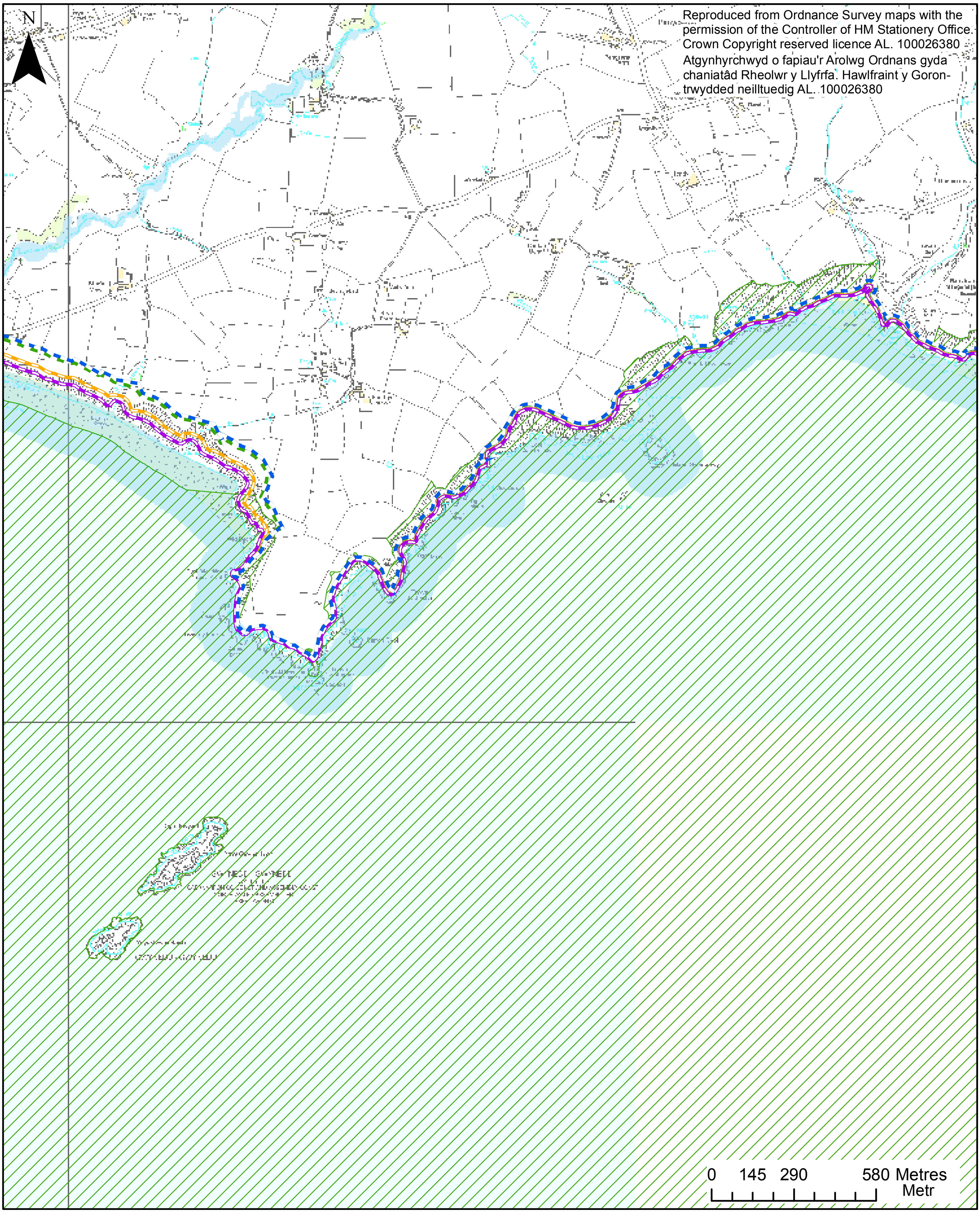
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 75

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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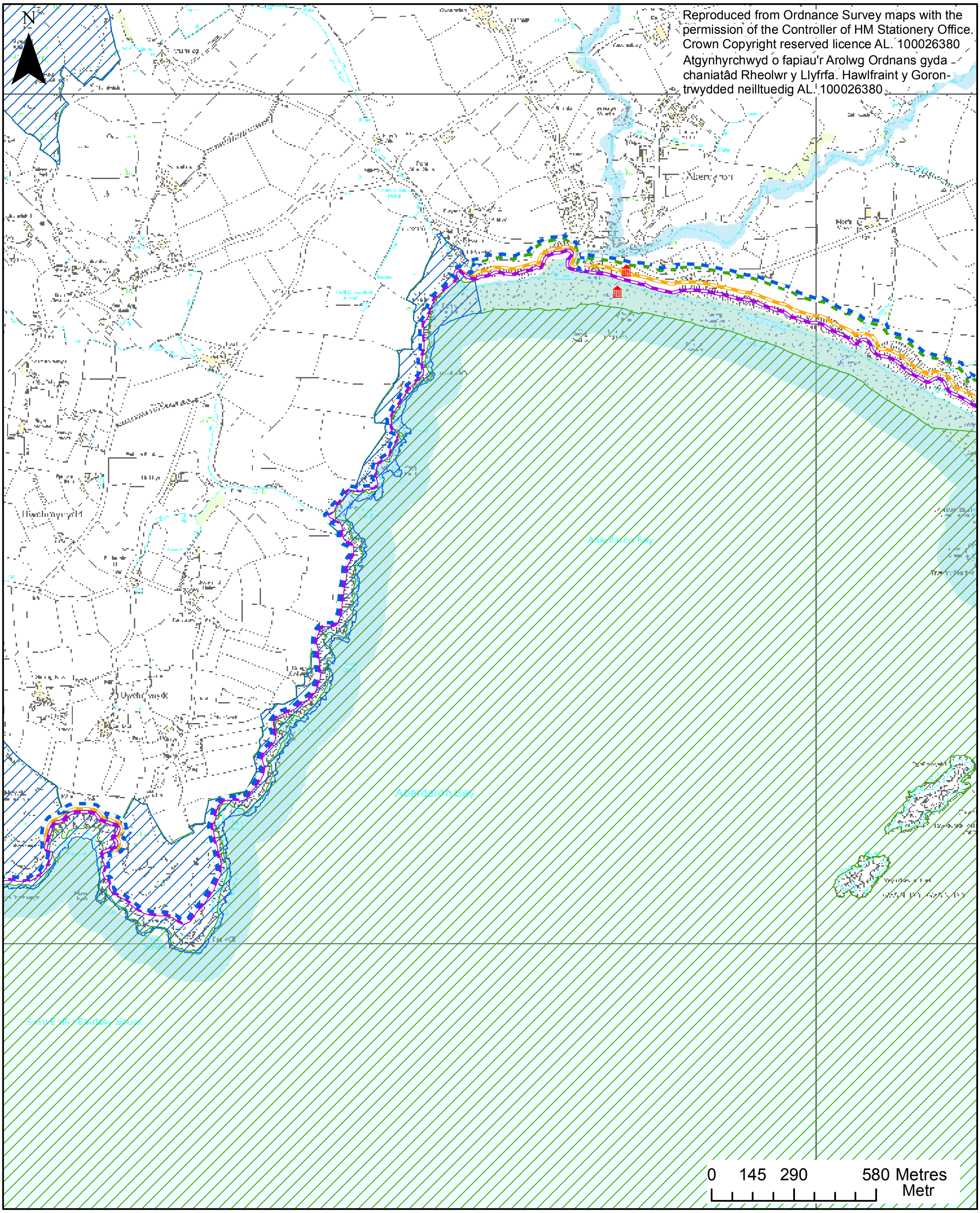
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 76

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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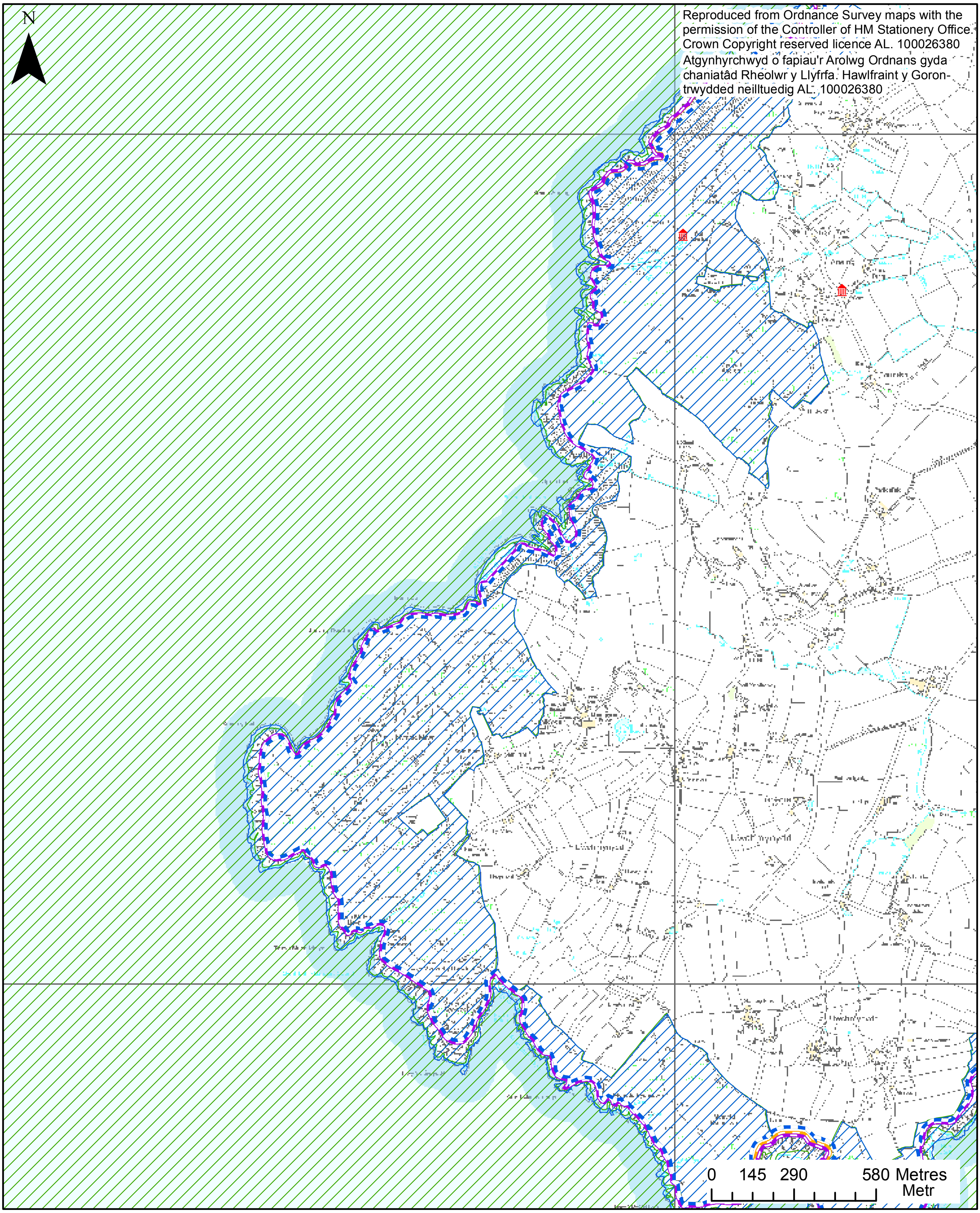
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 77



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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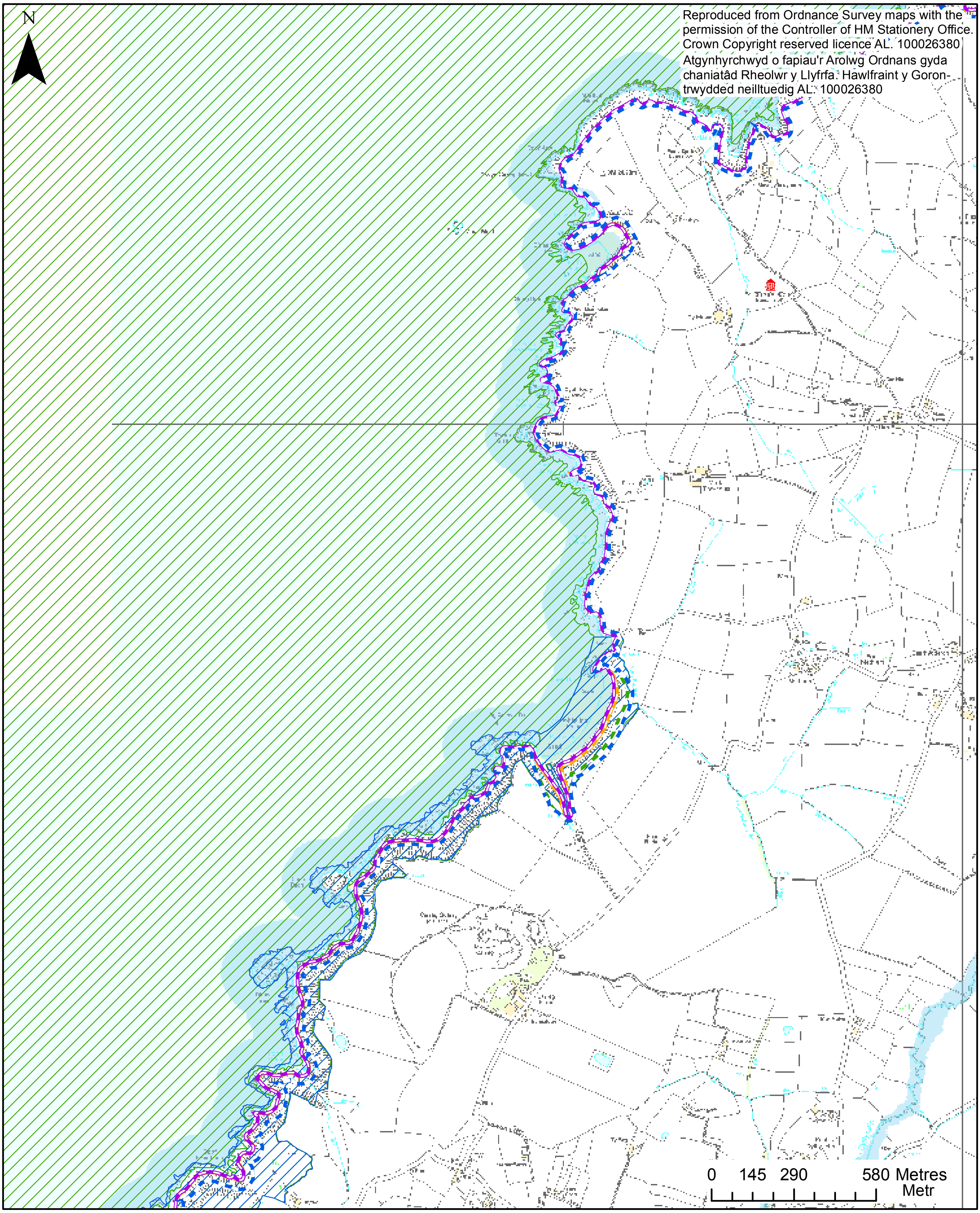
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 78



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

ROYAL HASKONING

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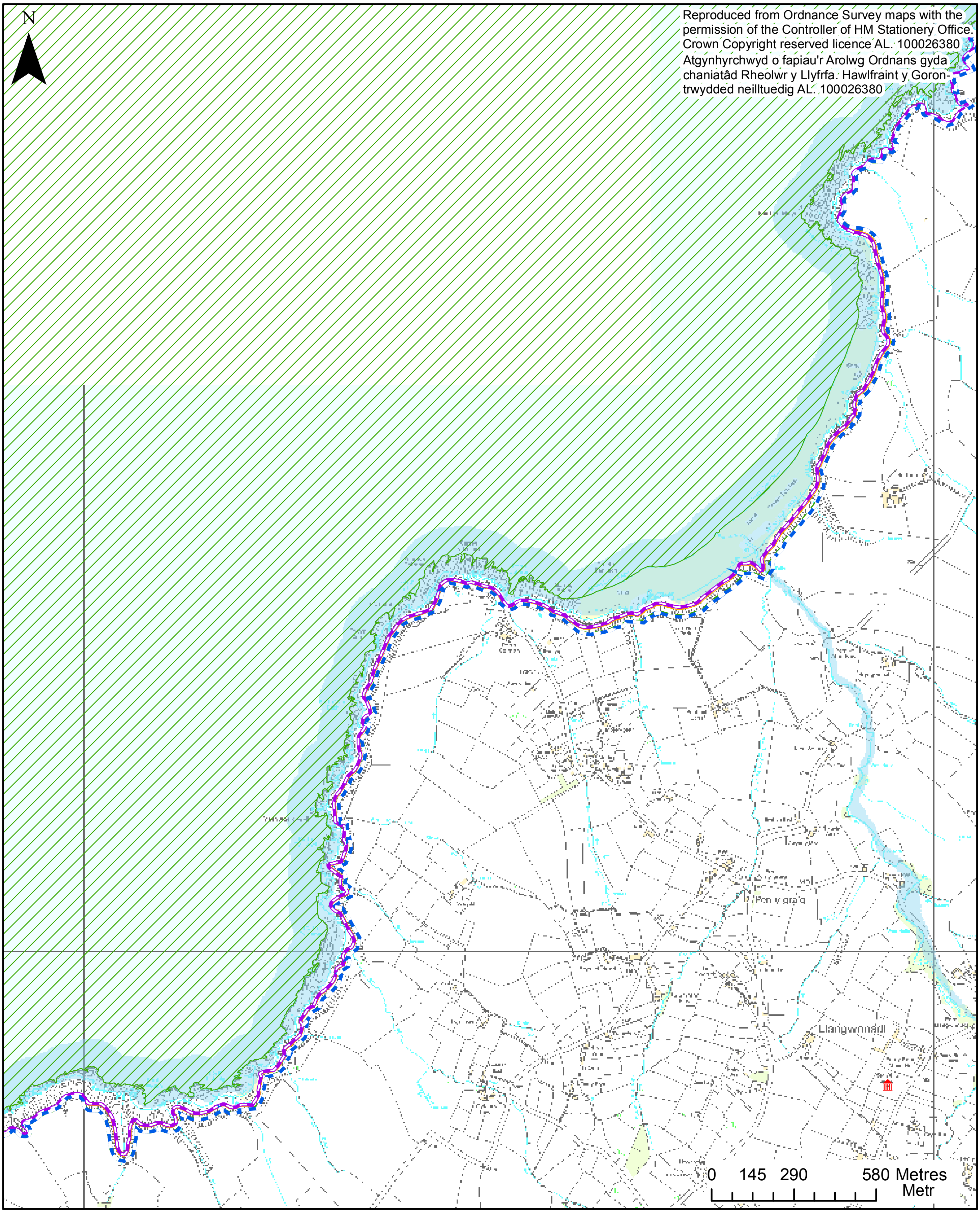
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 79

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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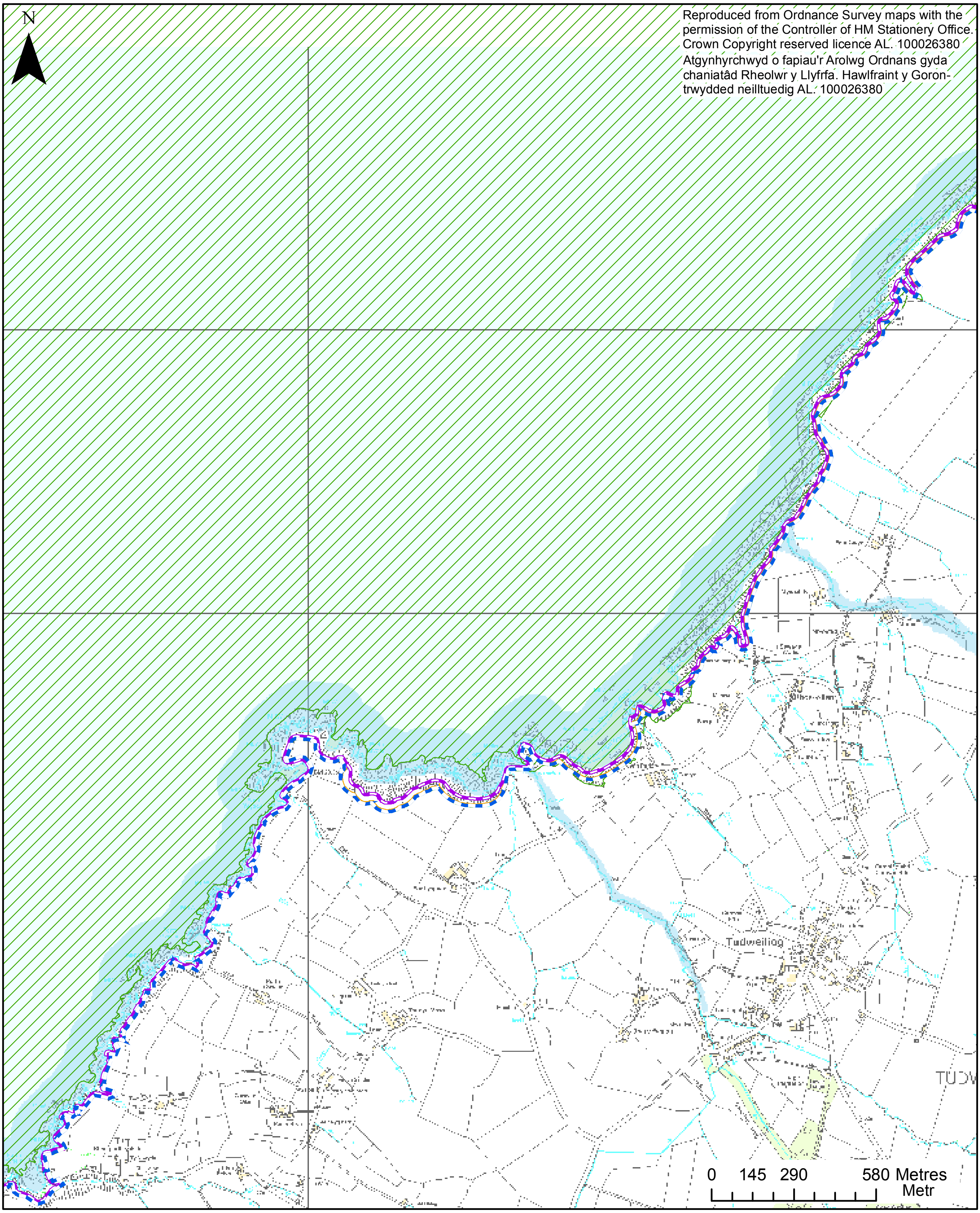
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 80



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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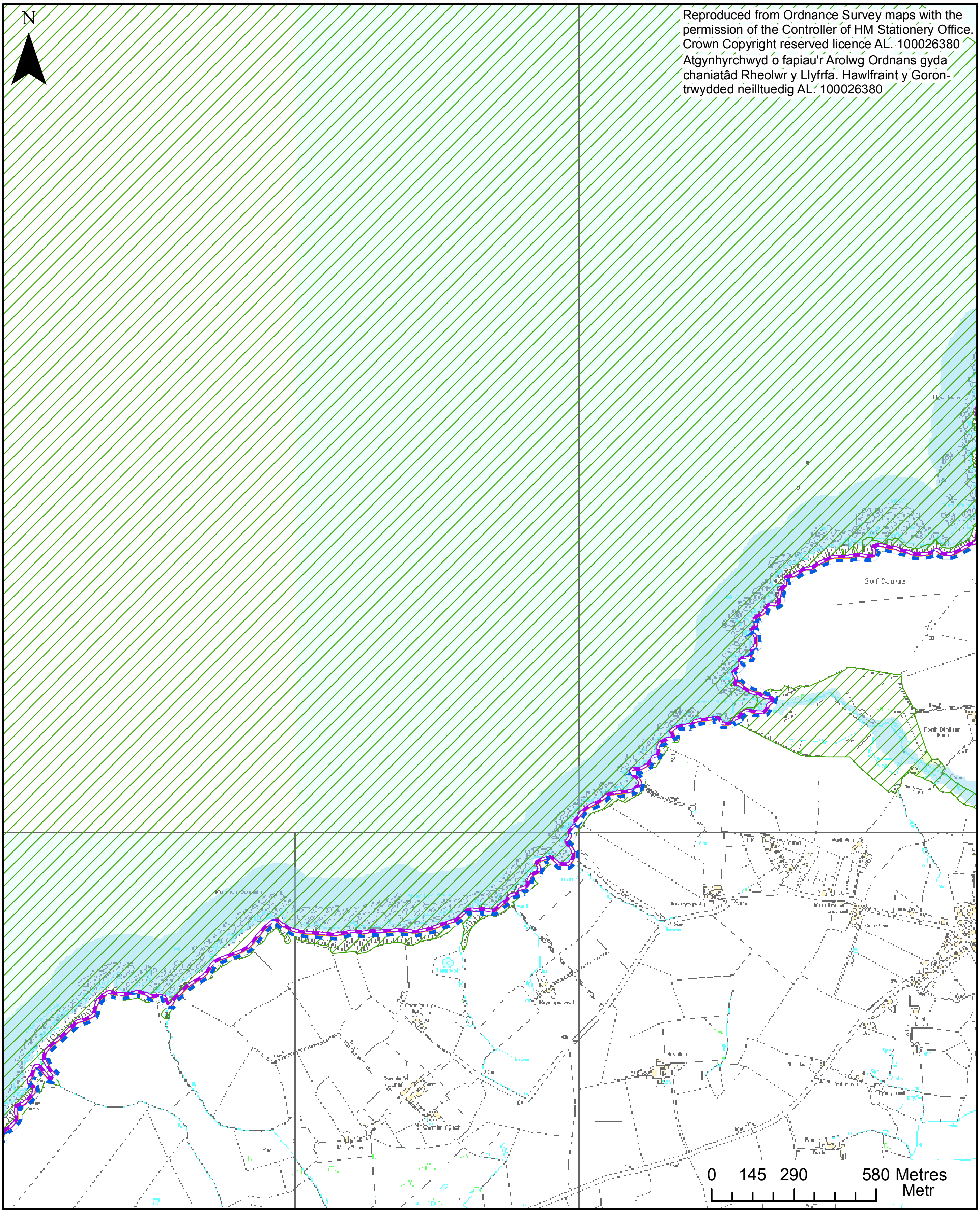
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 81

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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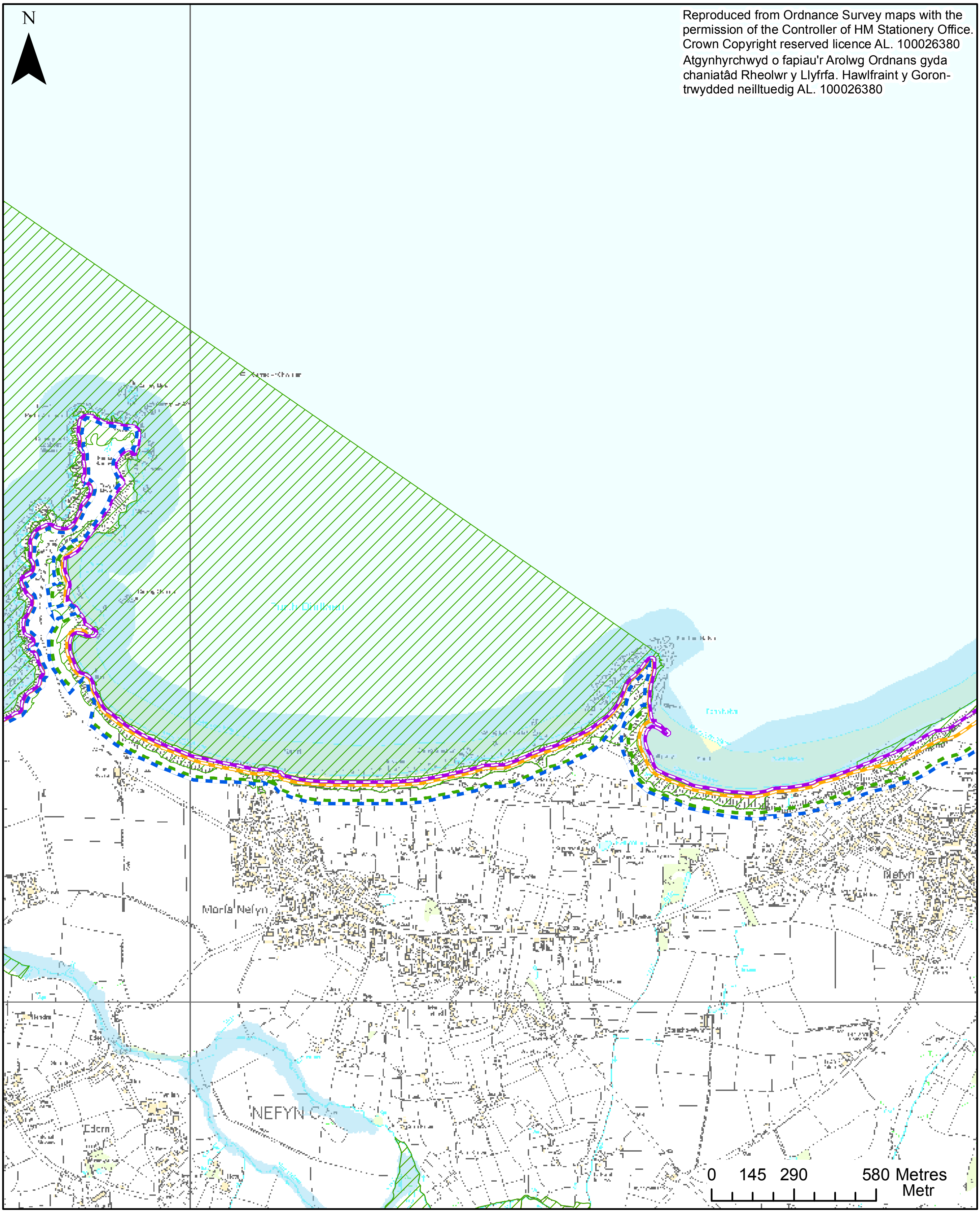
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 82

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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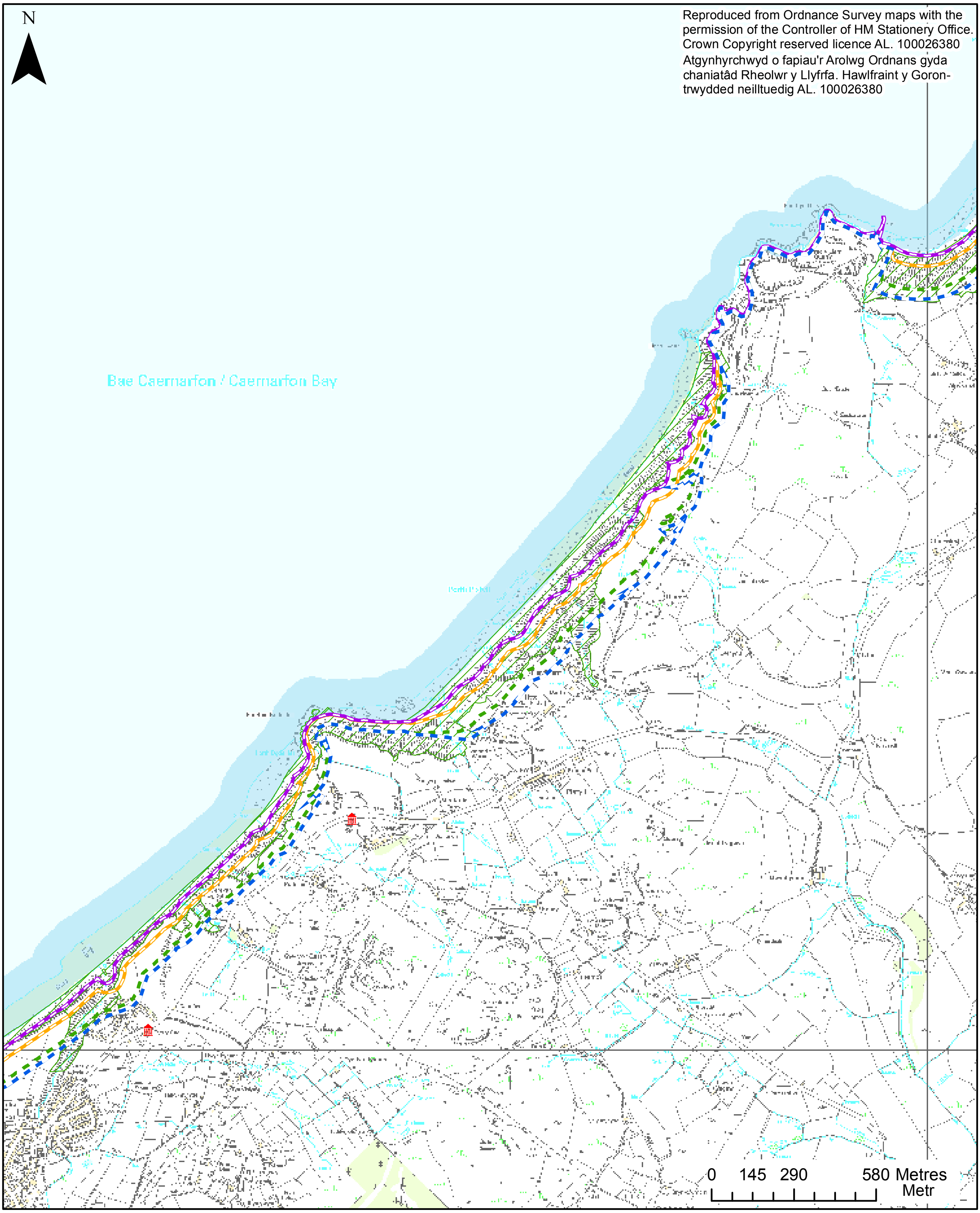
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 83

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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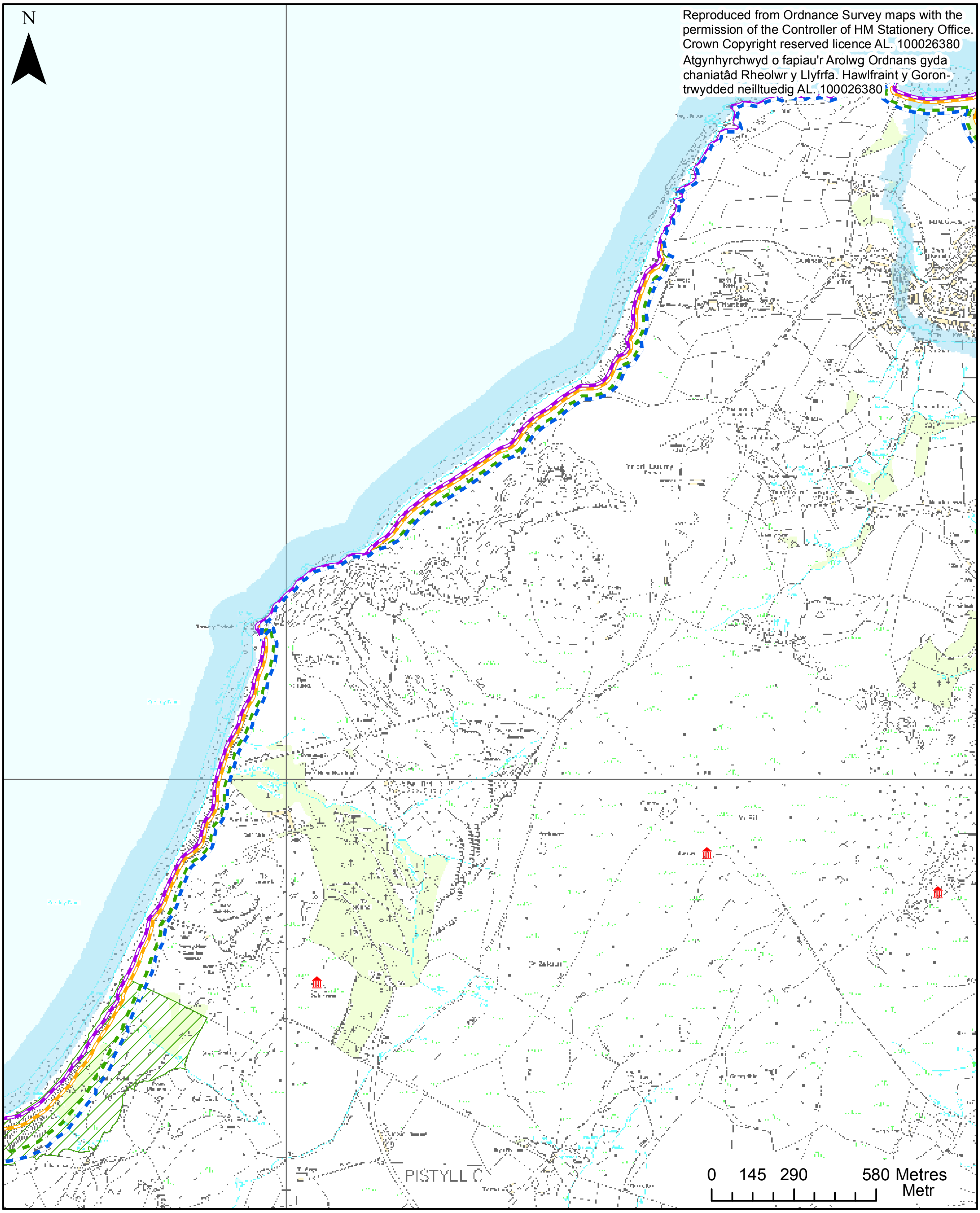
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 84



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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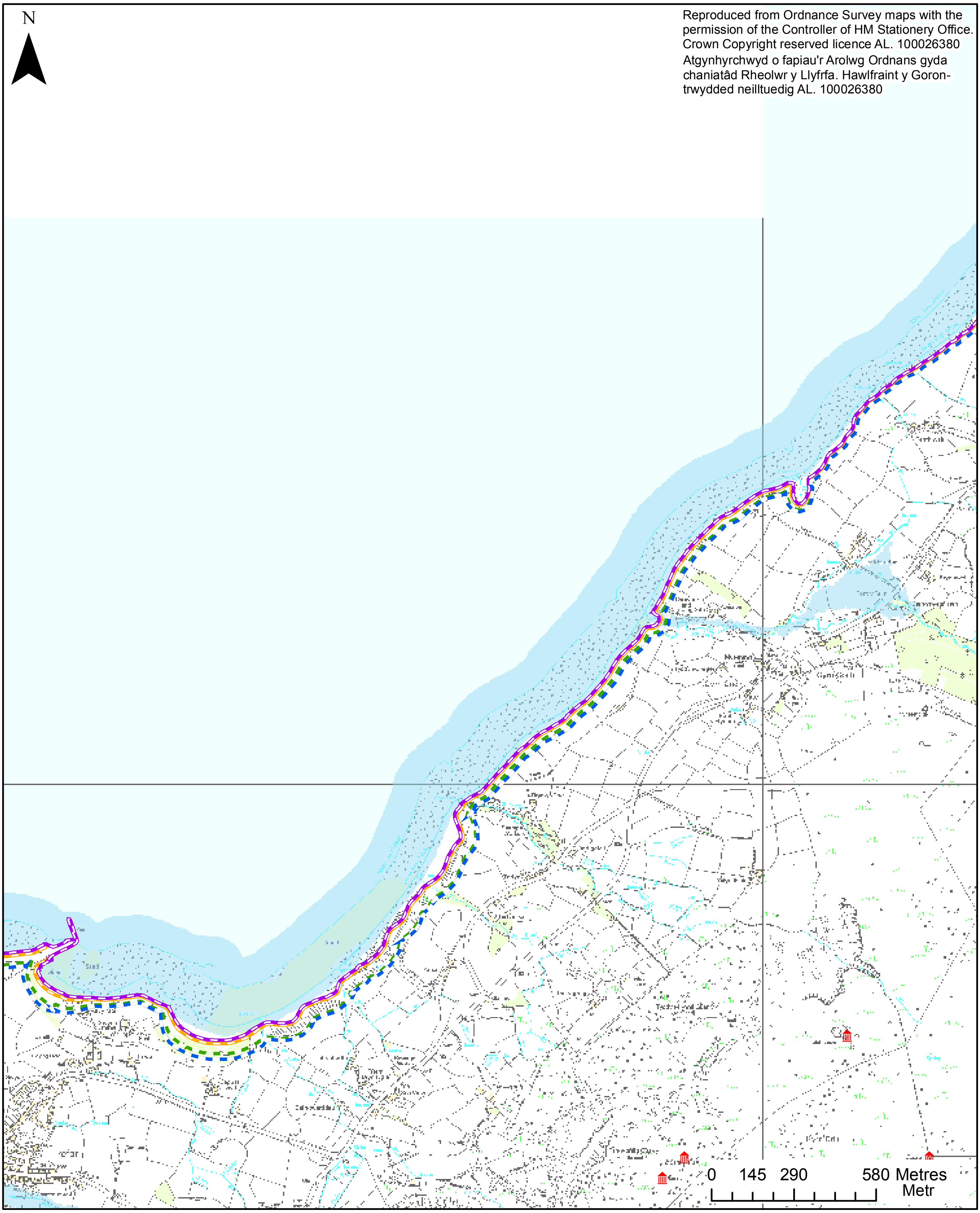
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 85

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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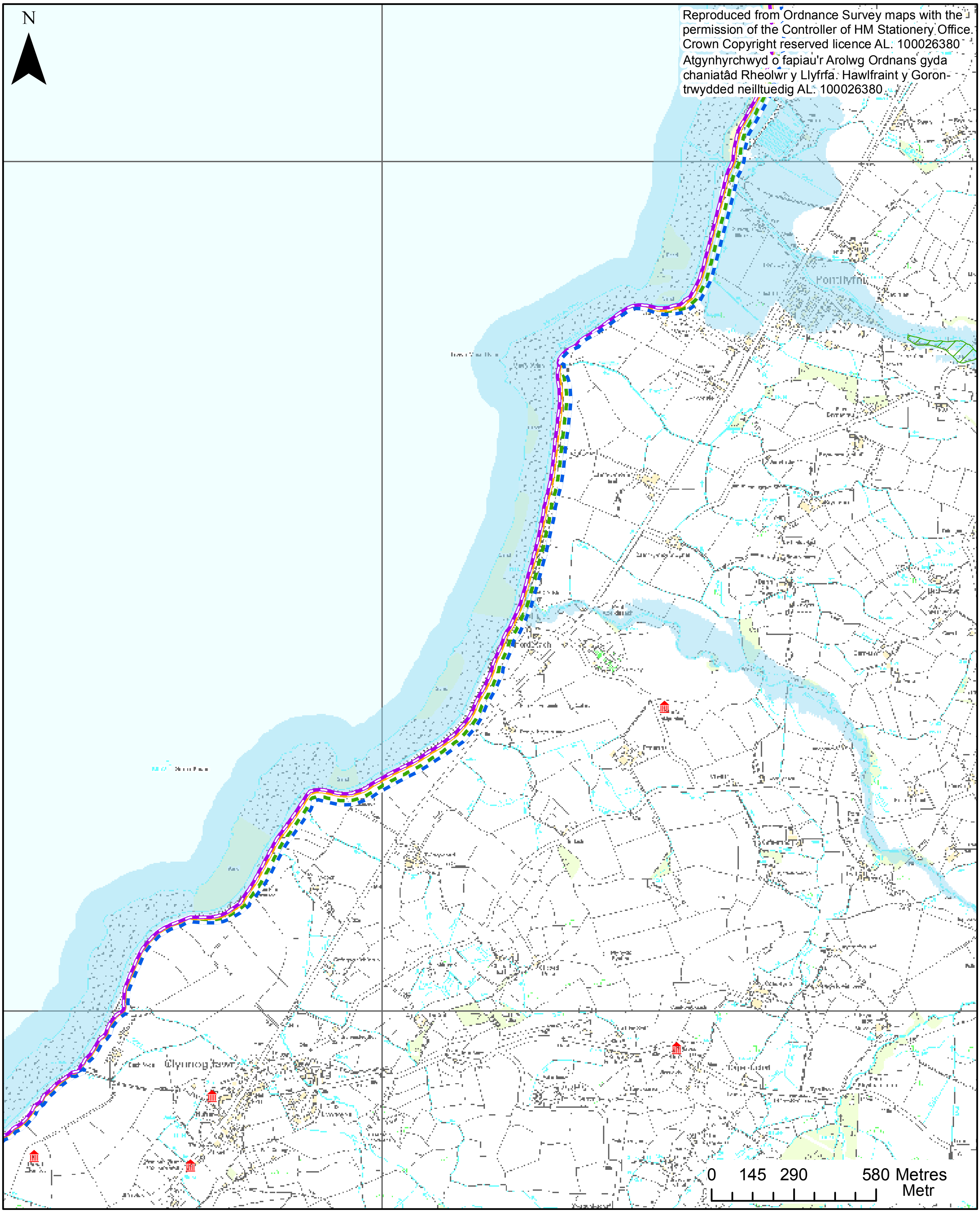
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 86



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 87

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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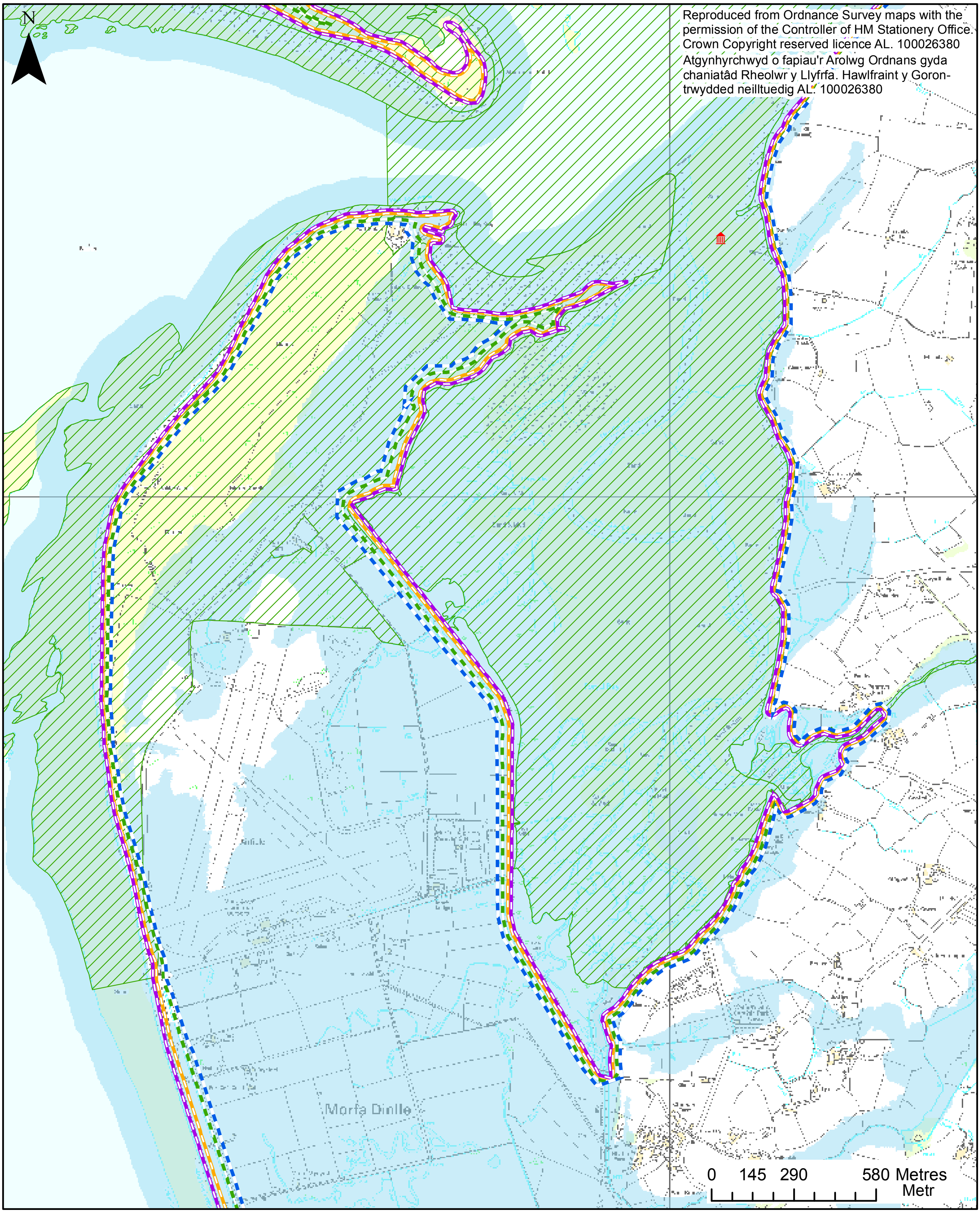
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 88



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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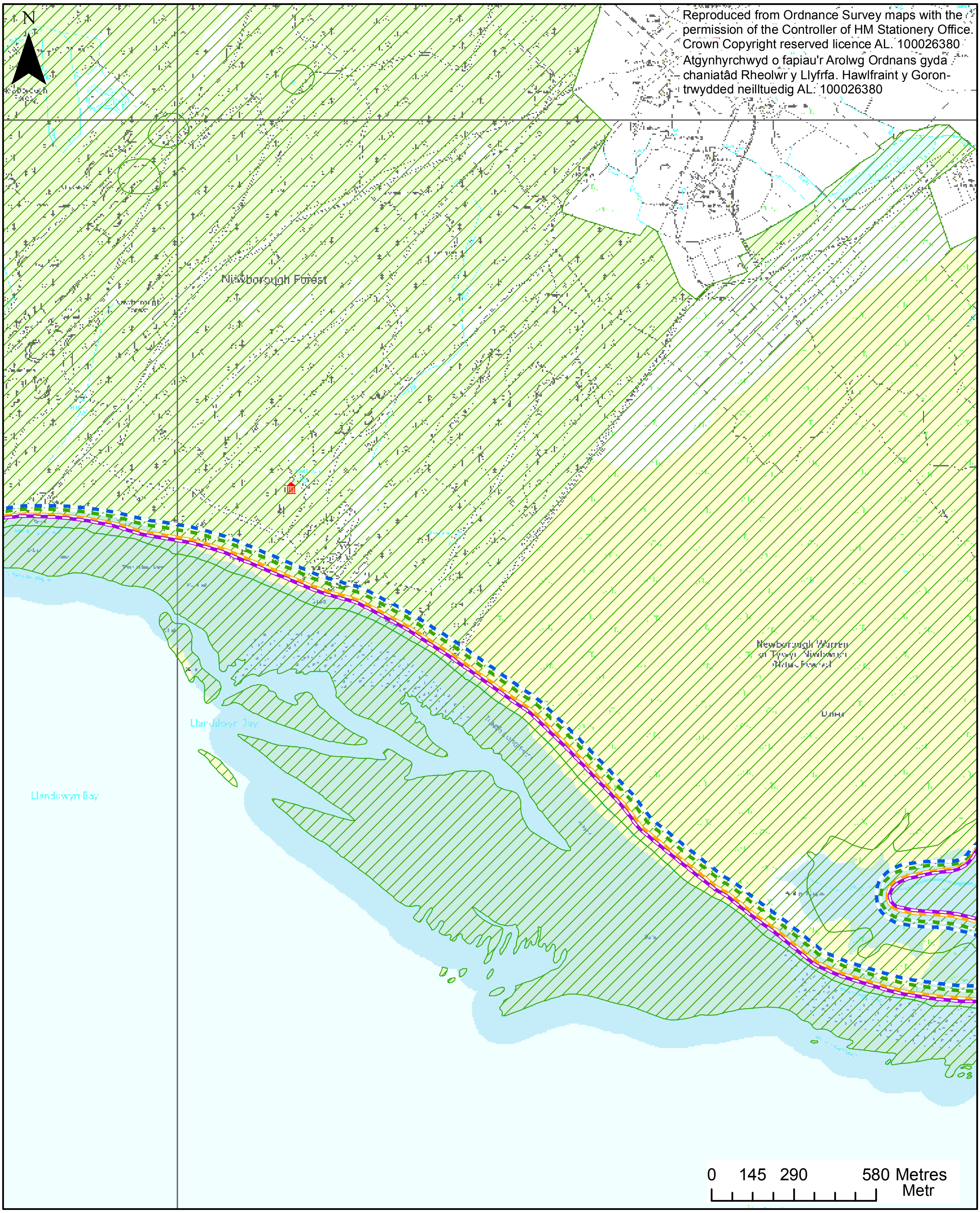
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 89

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

ROYAL HASKONING

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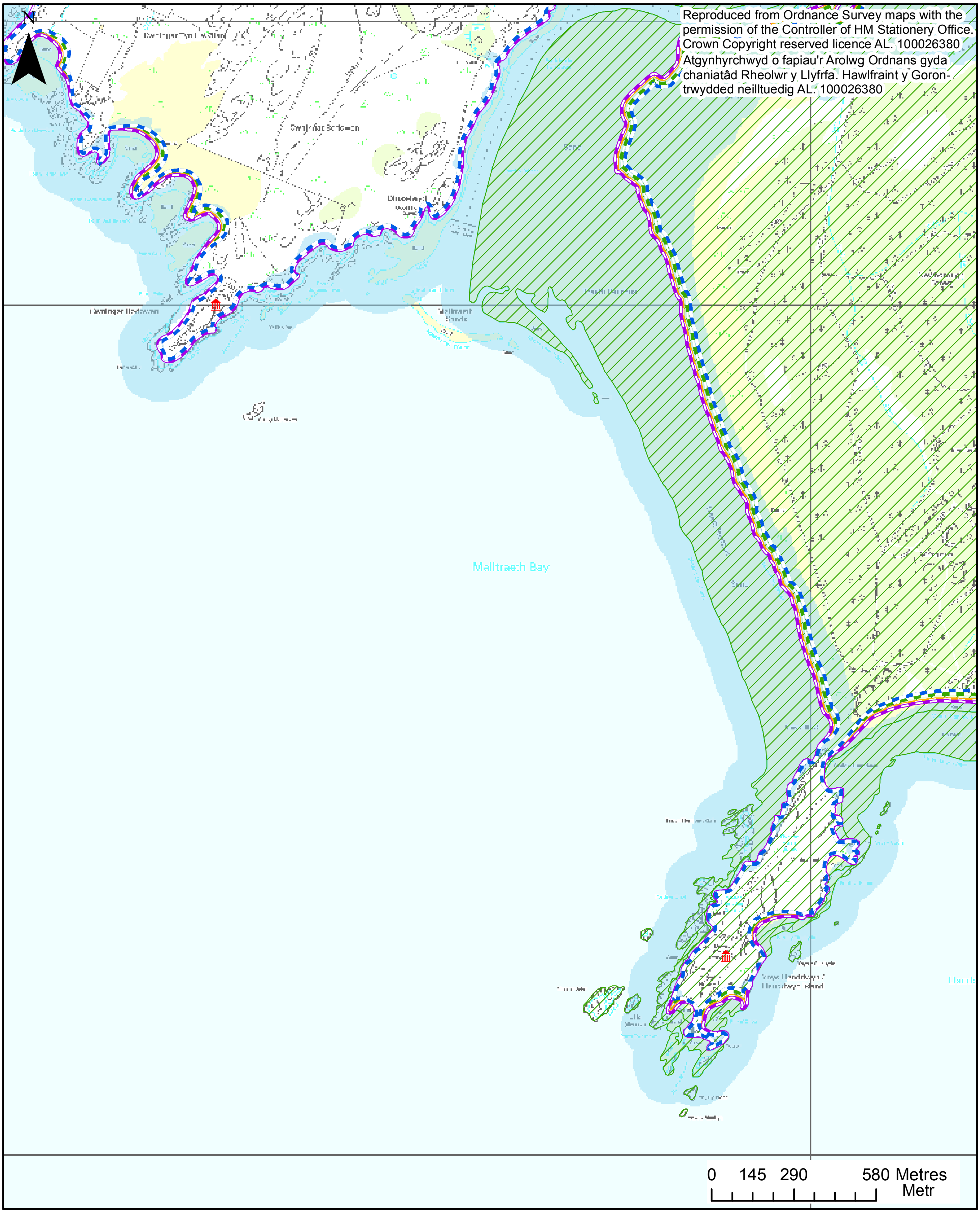
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 90

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

ROYAL HASKONING

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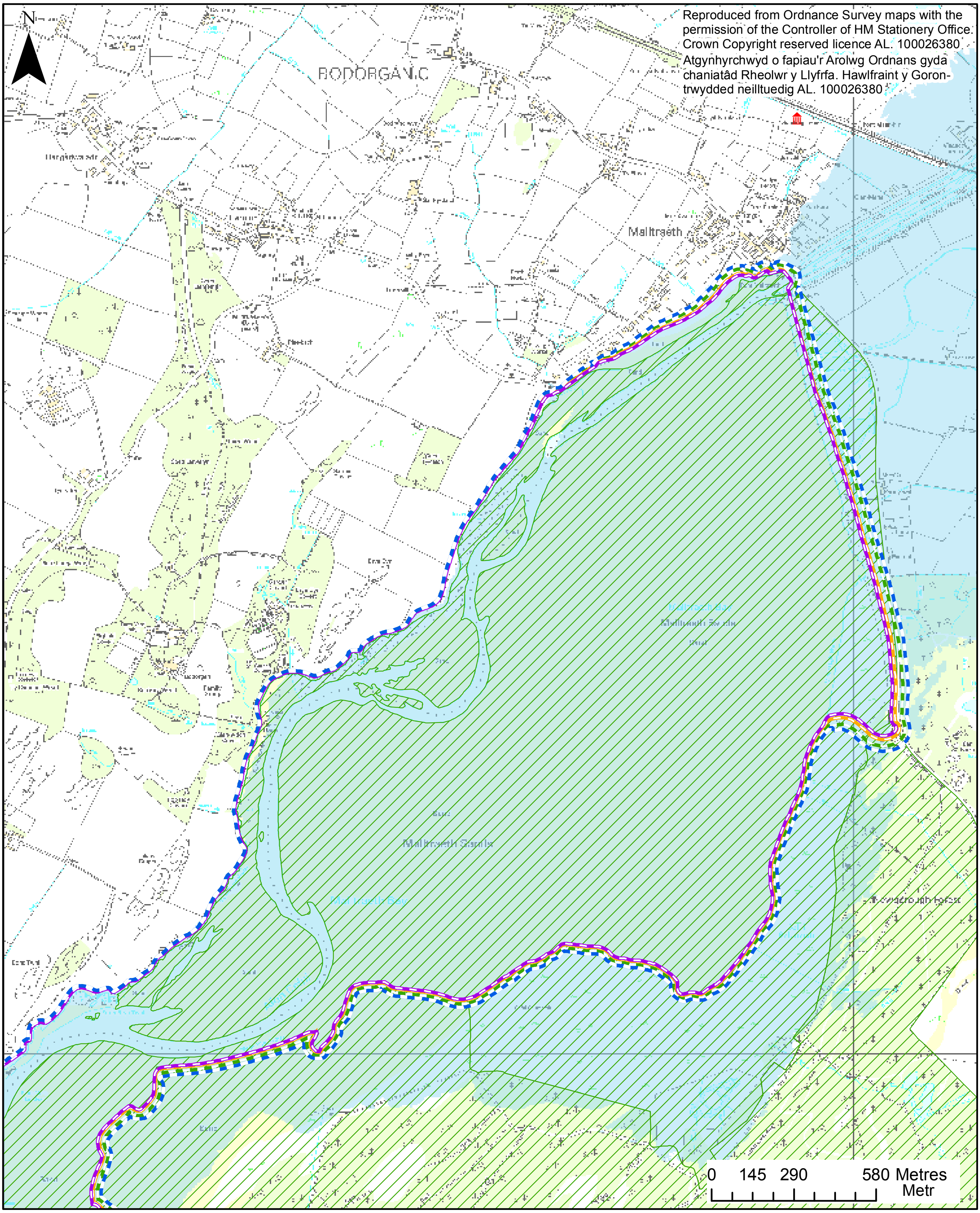
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 91

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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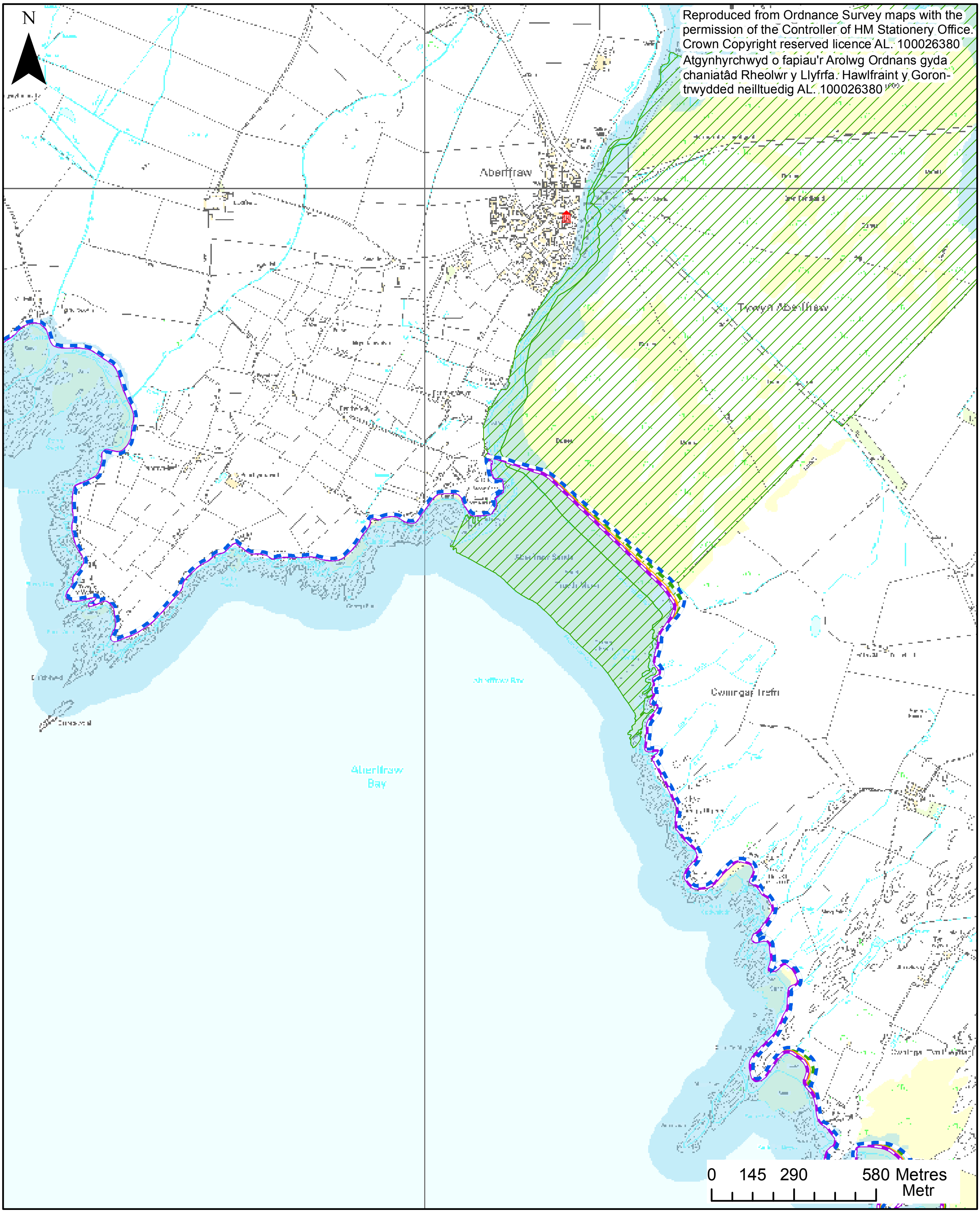
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 92

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 93

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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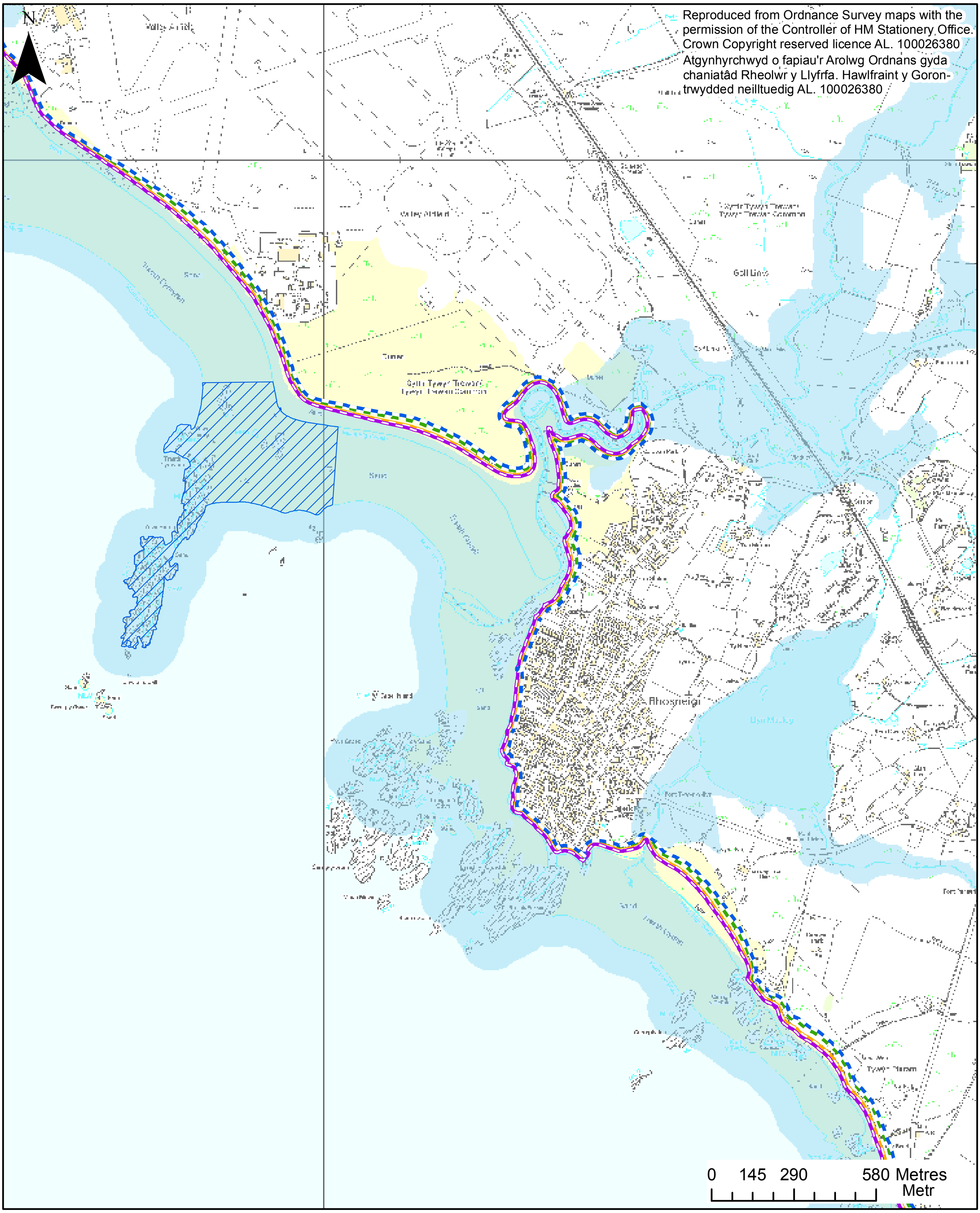
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 94

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

ROYAL HASKONING

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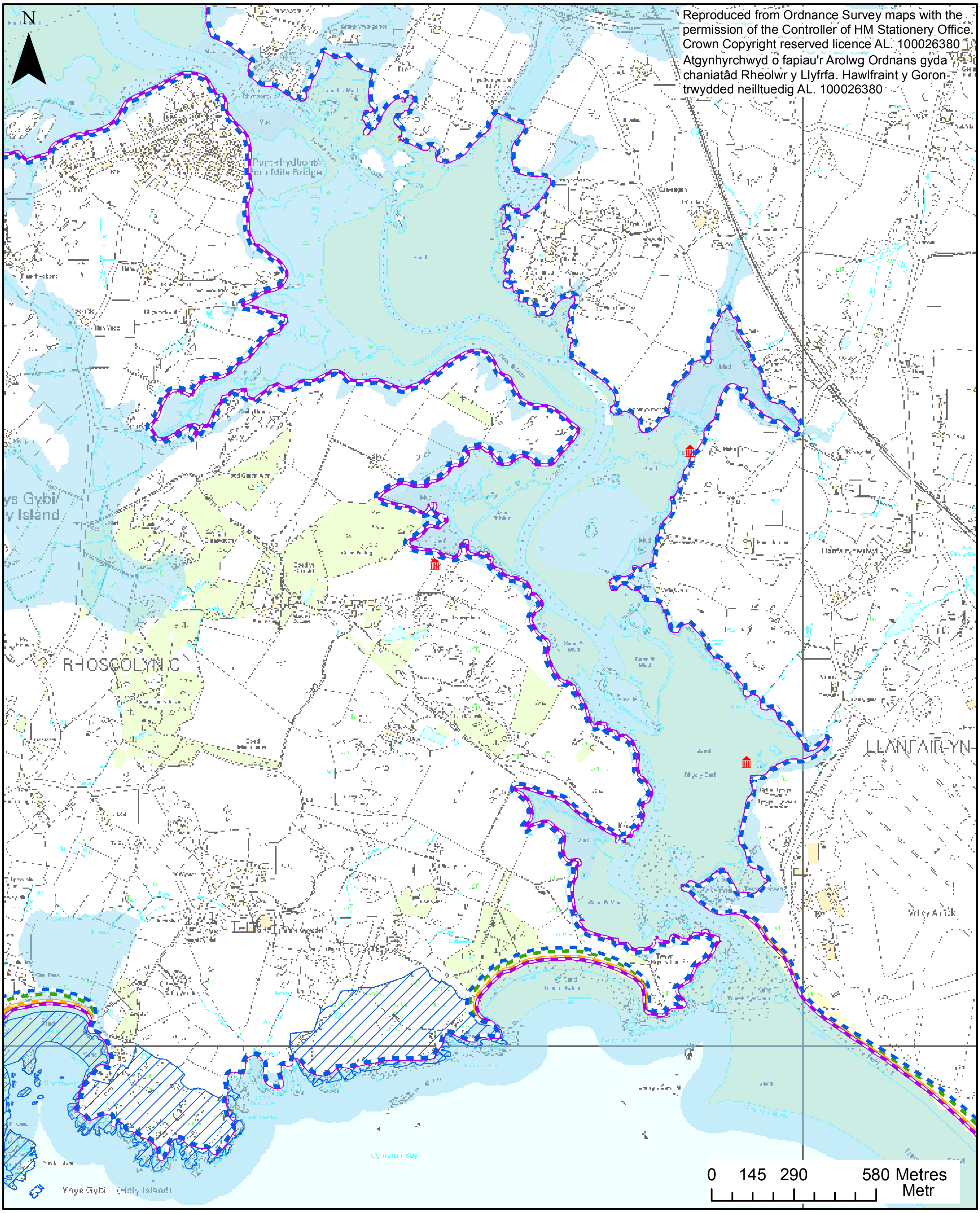
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 95

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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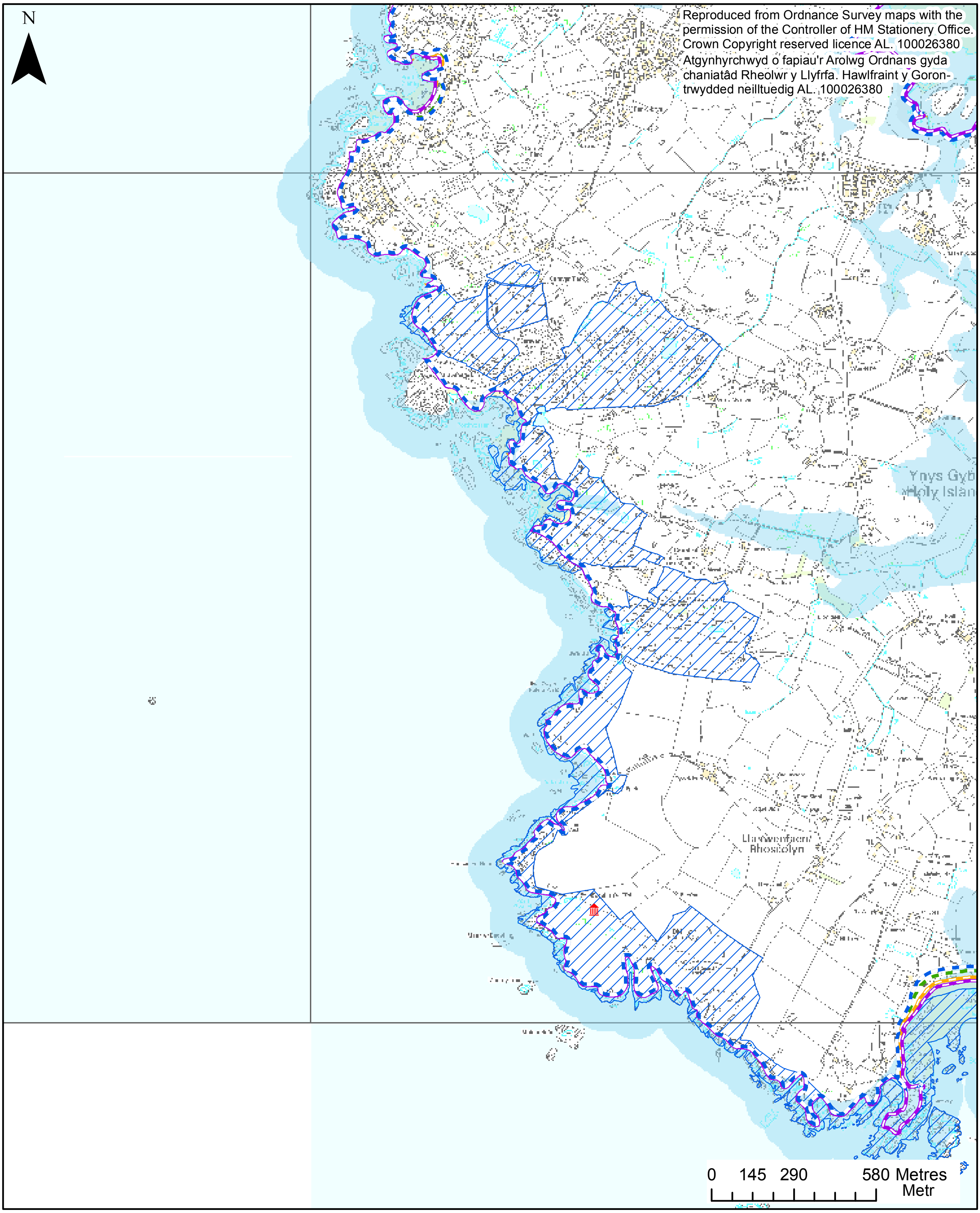
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 96

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▇	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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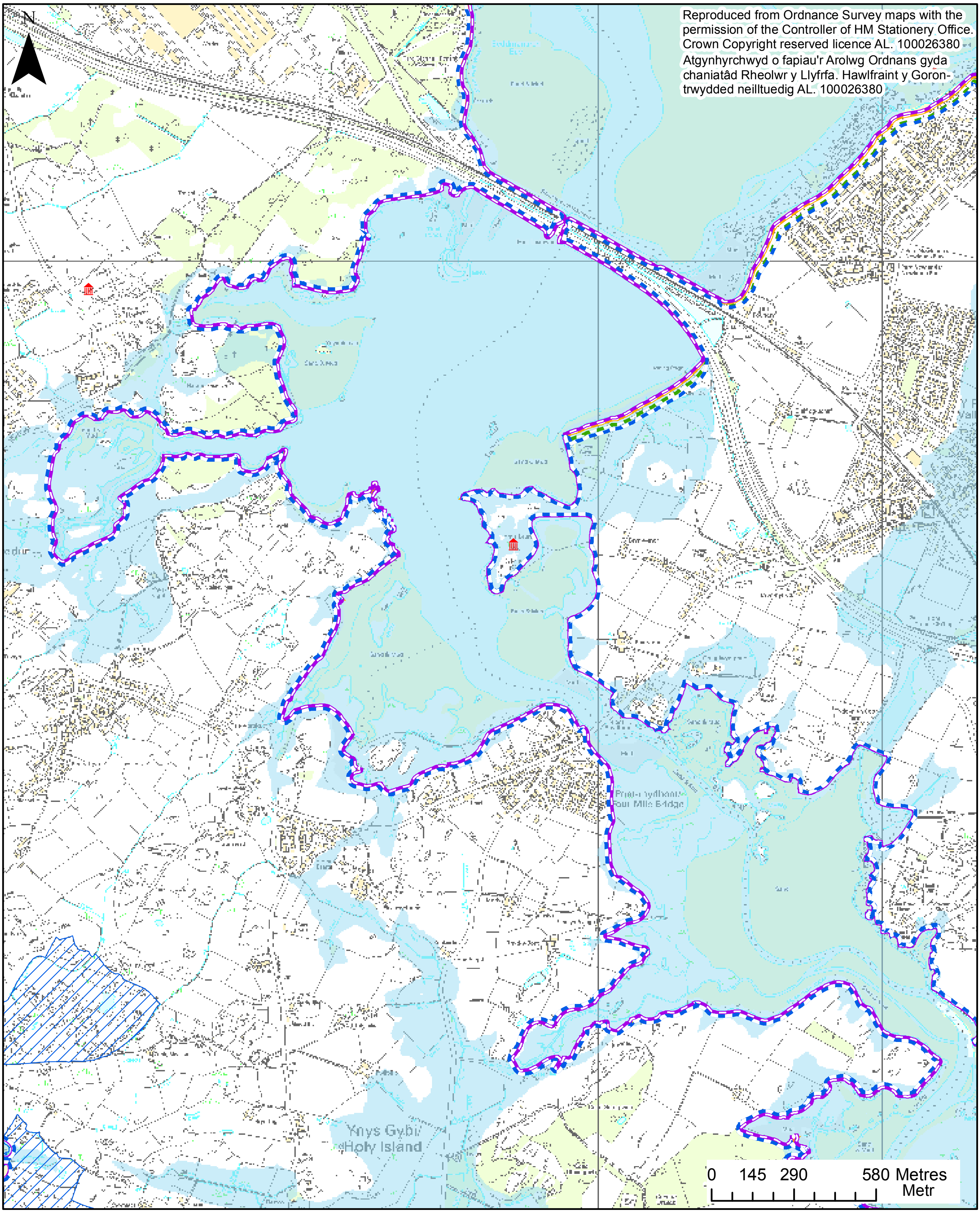
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 97

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 98

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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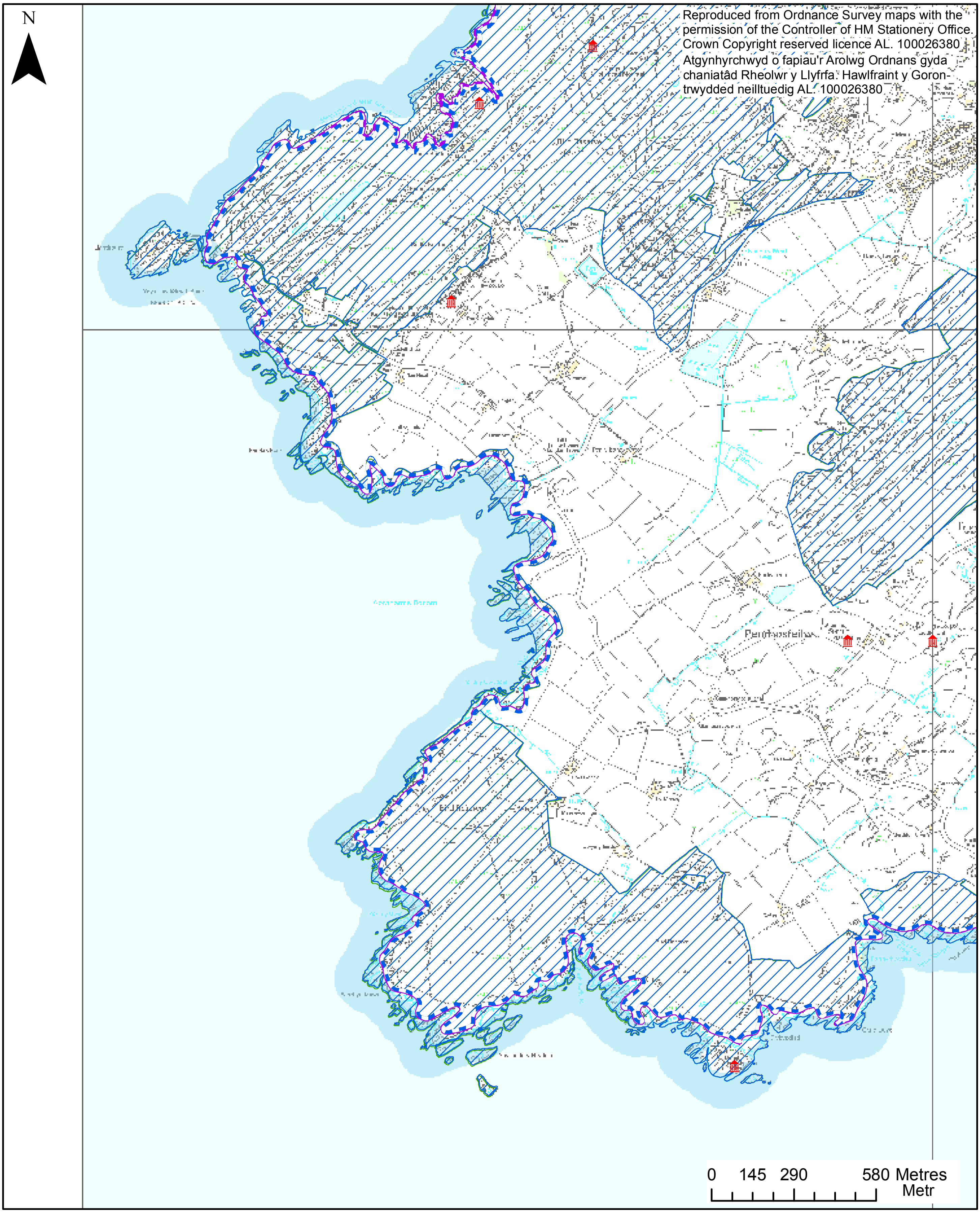
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 99

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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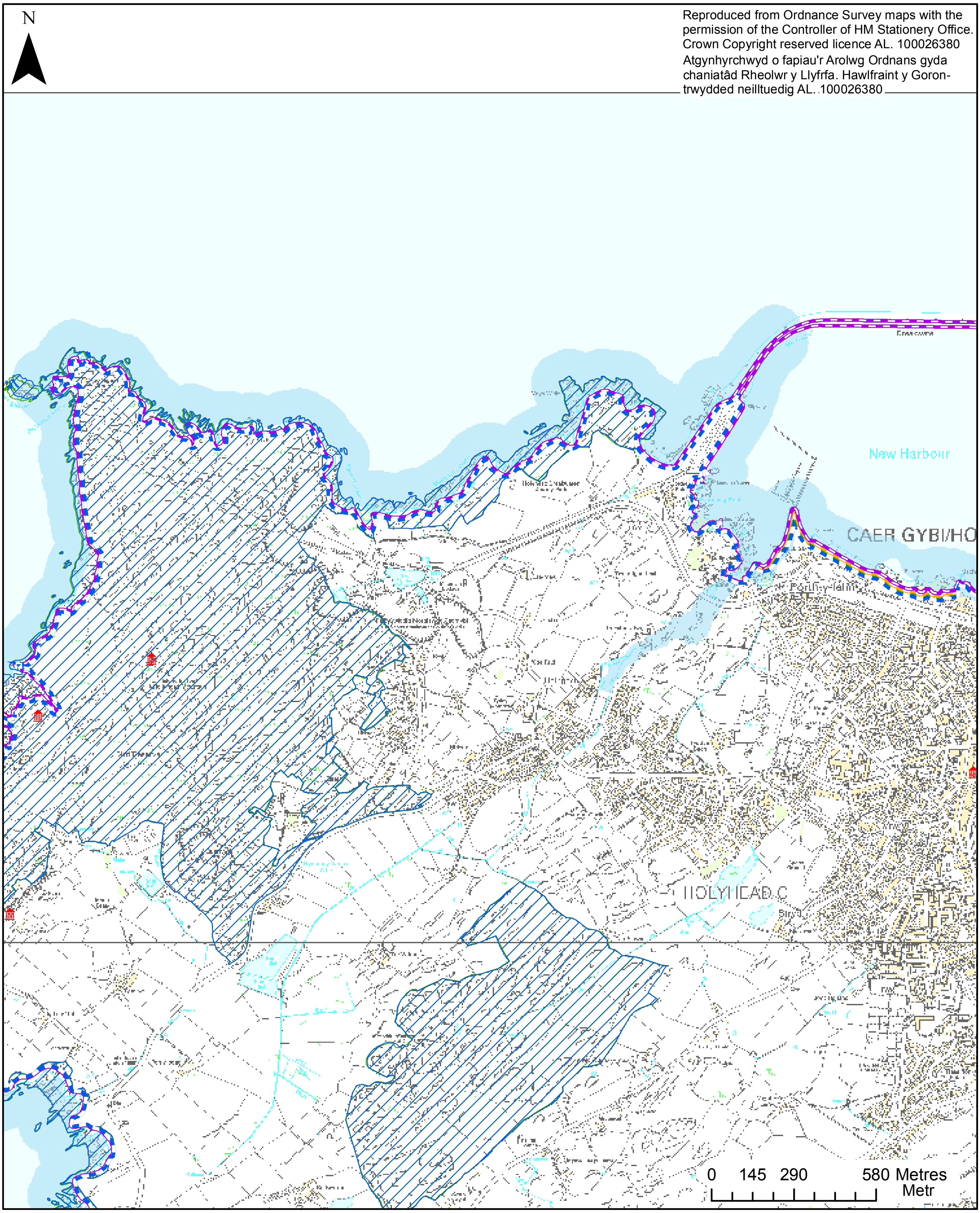
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 100

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 101

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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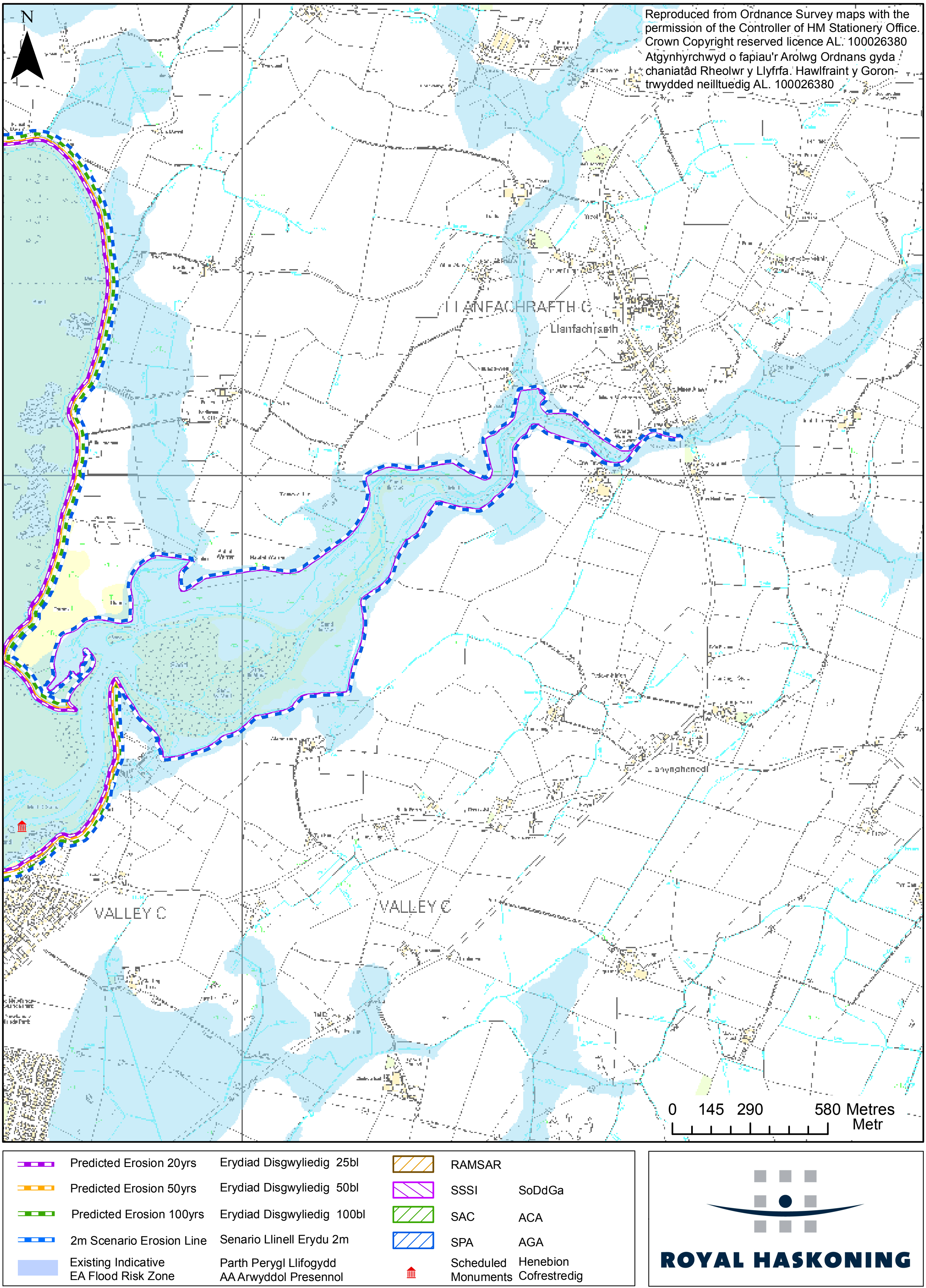
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 102

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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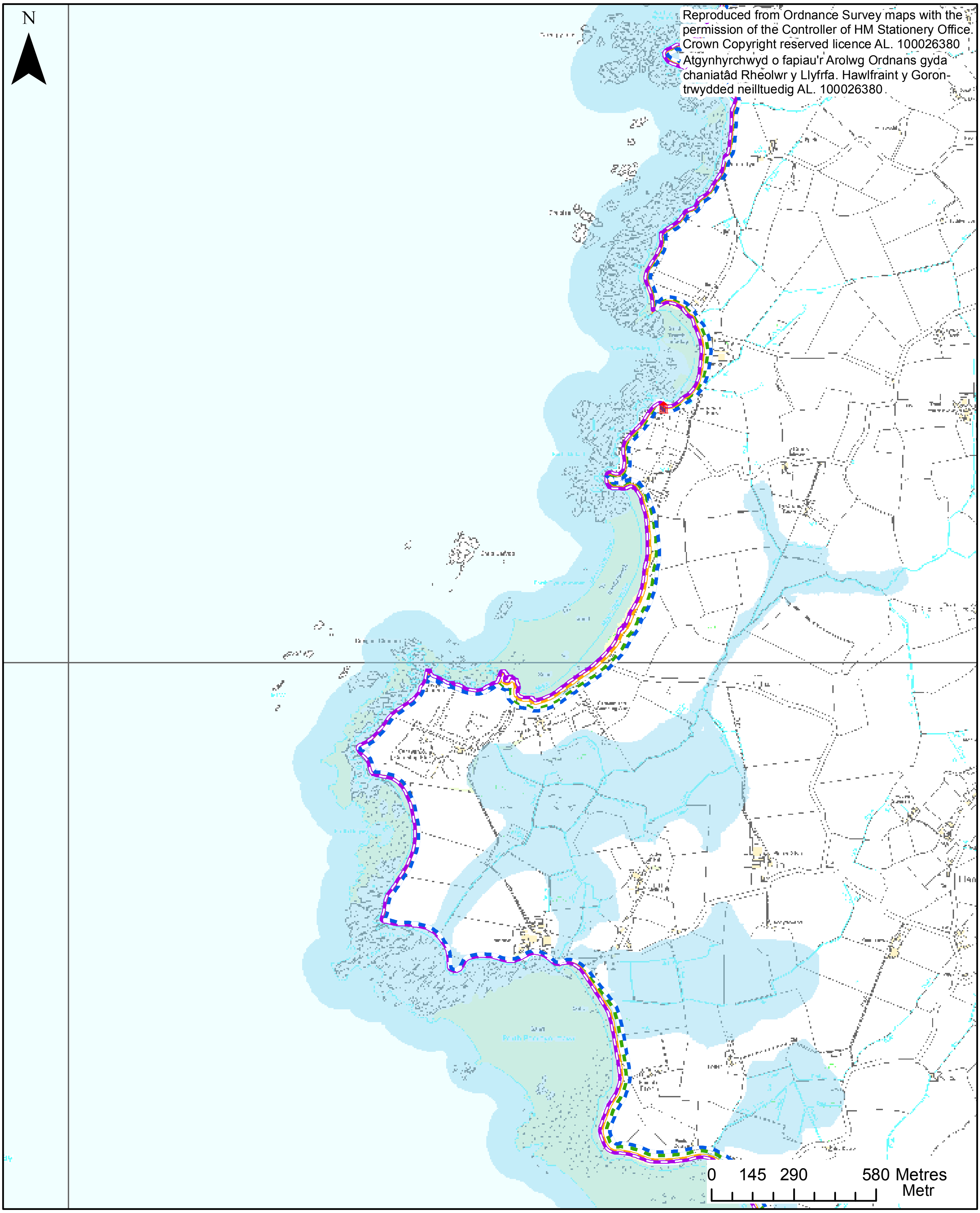
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 103



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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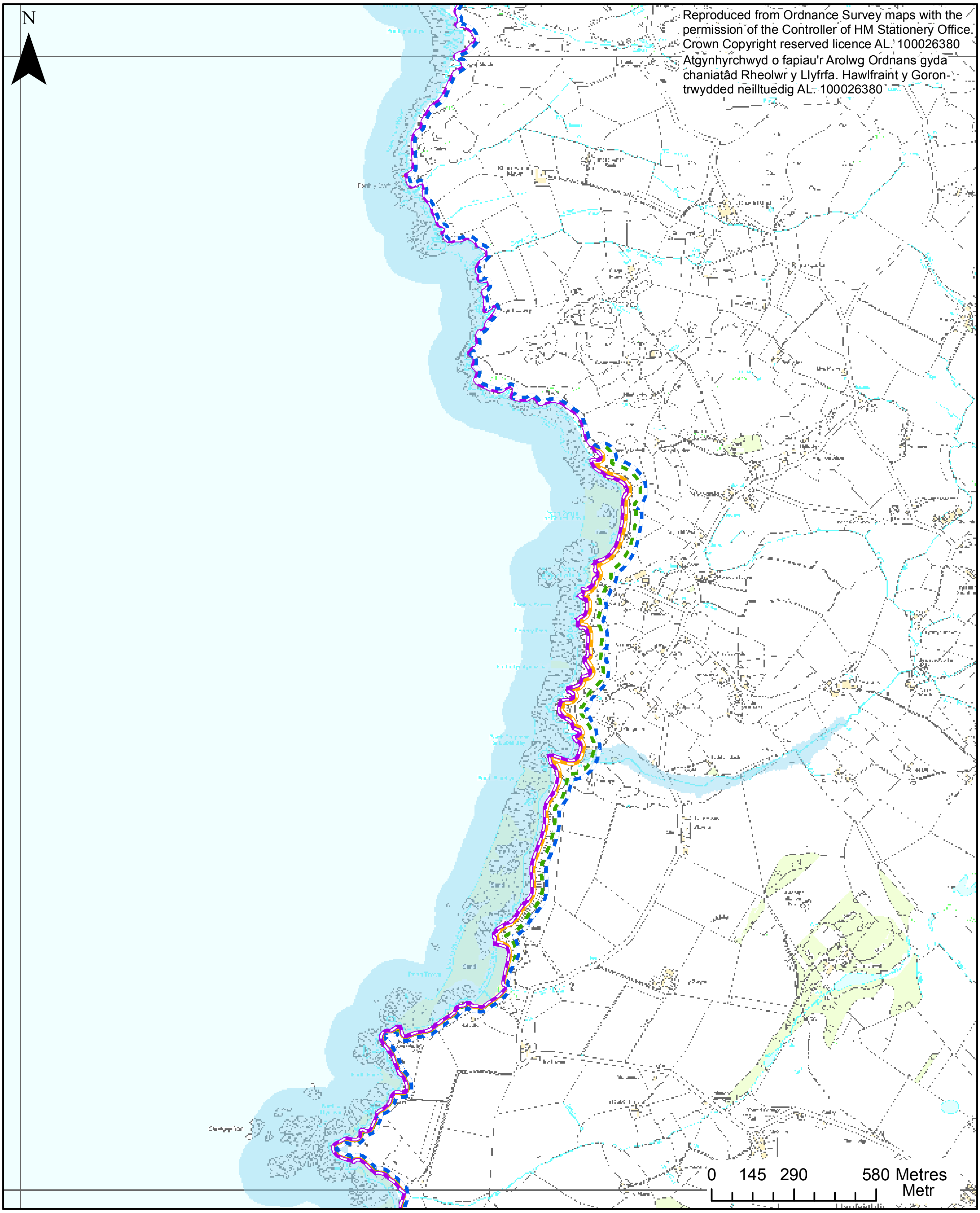
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 104

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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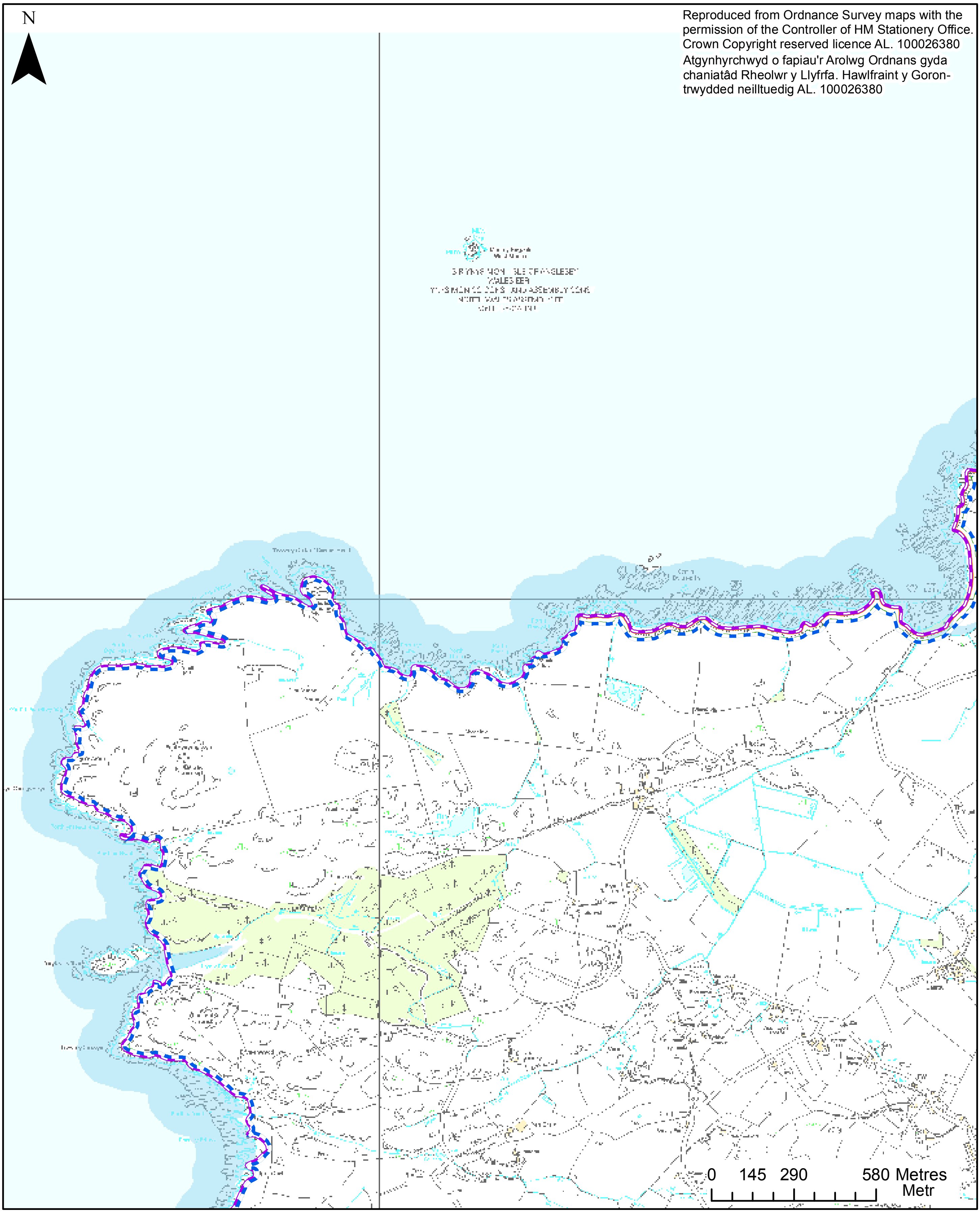
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 105



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 106

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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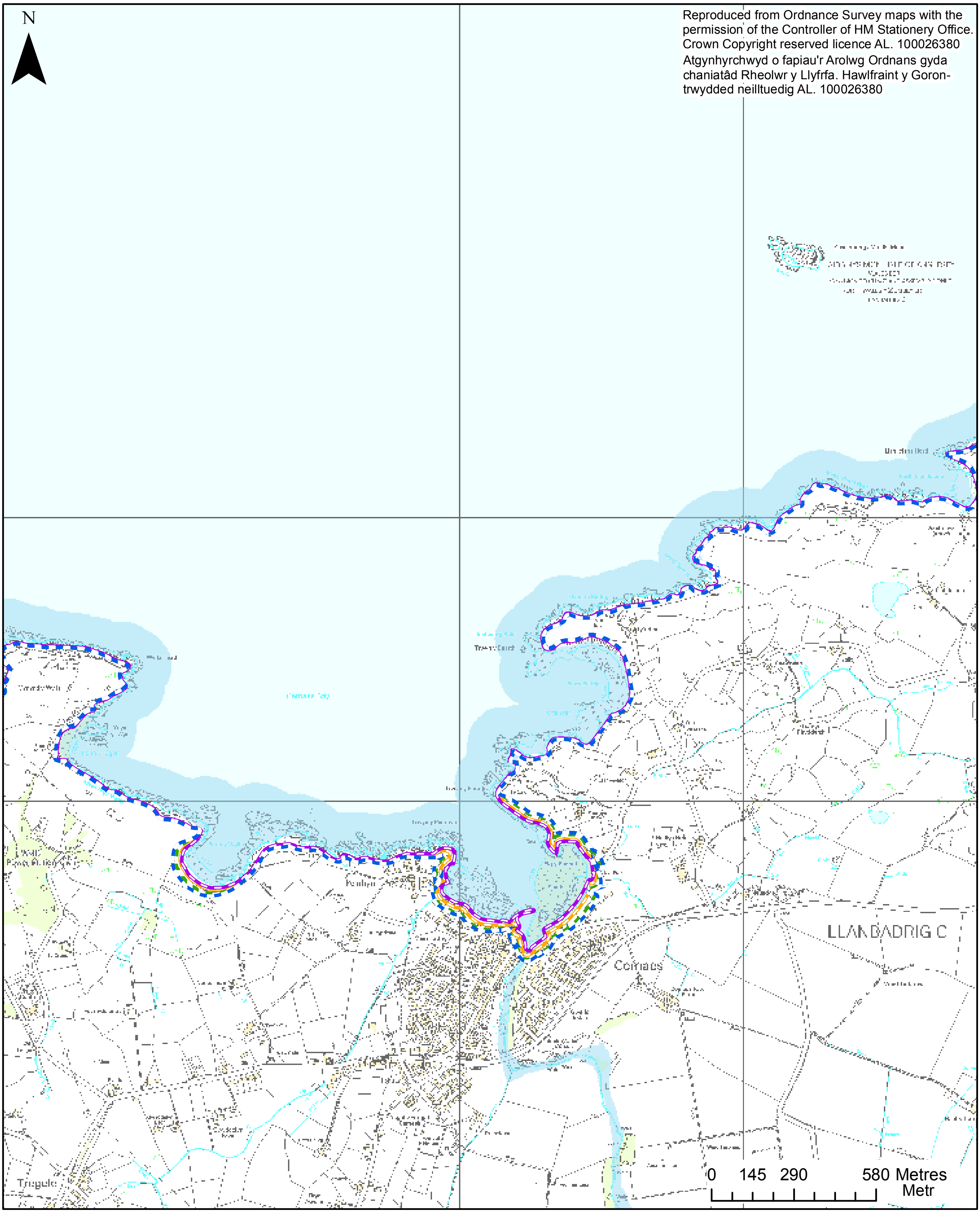
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 107

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 108

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 109

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention
Map 110

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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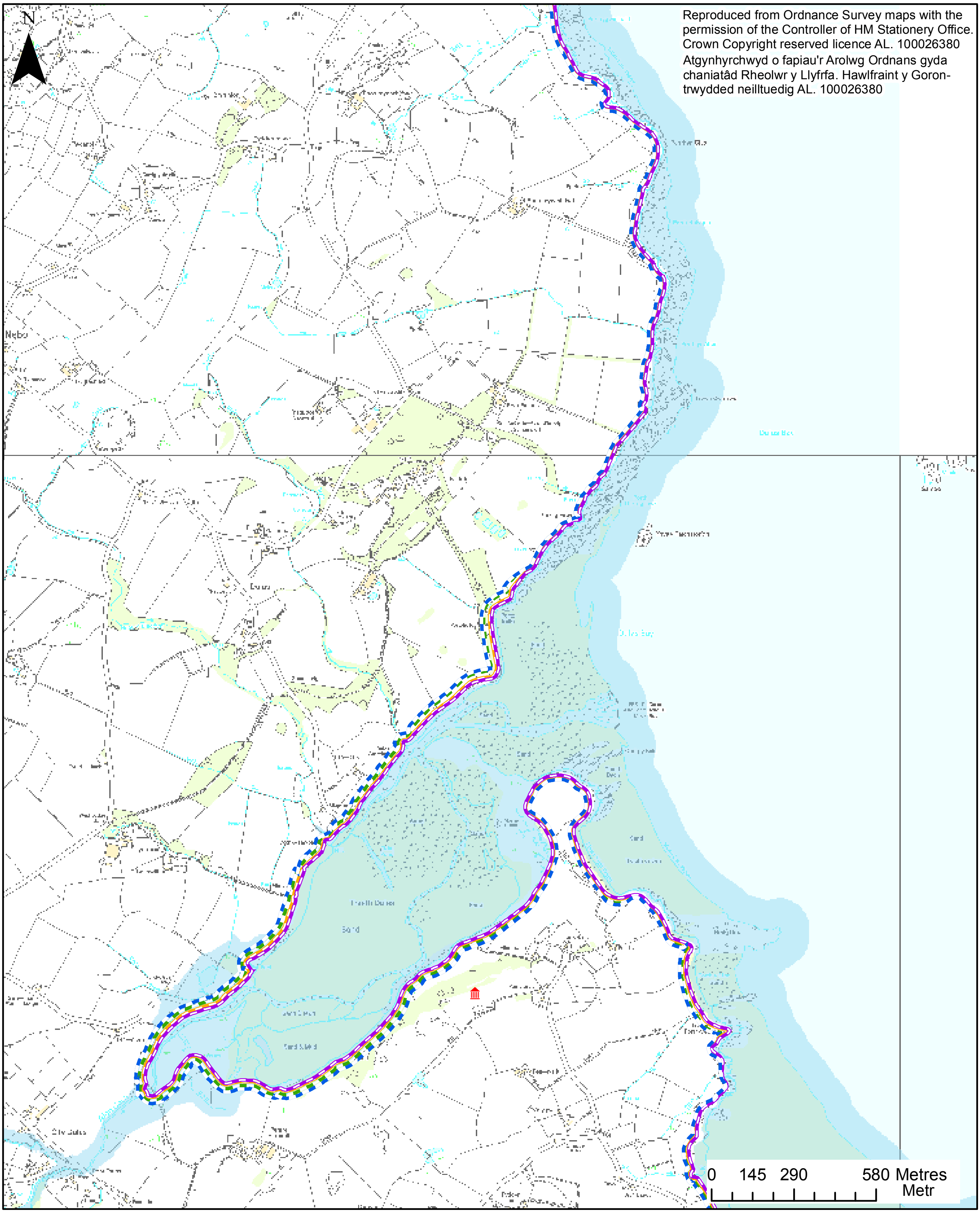
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 111



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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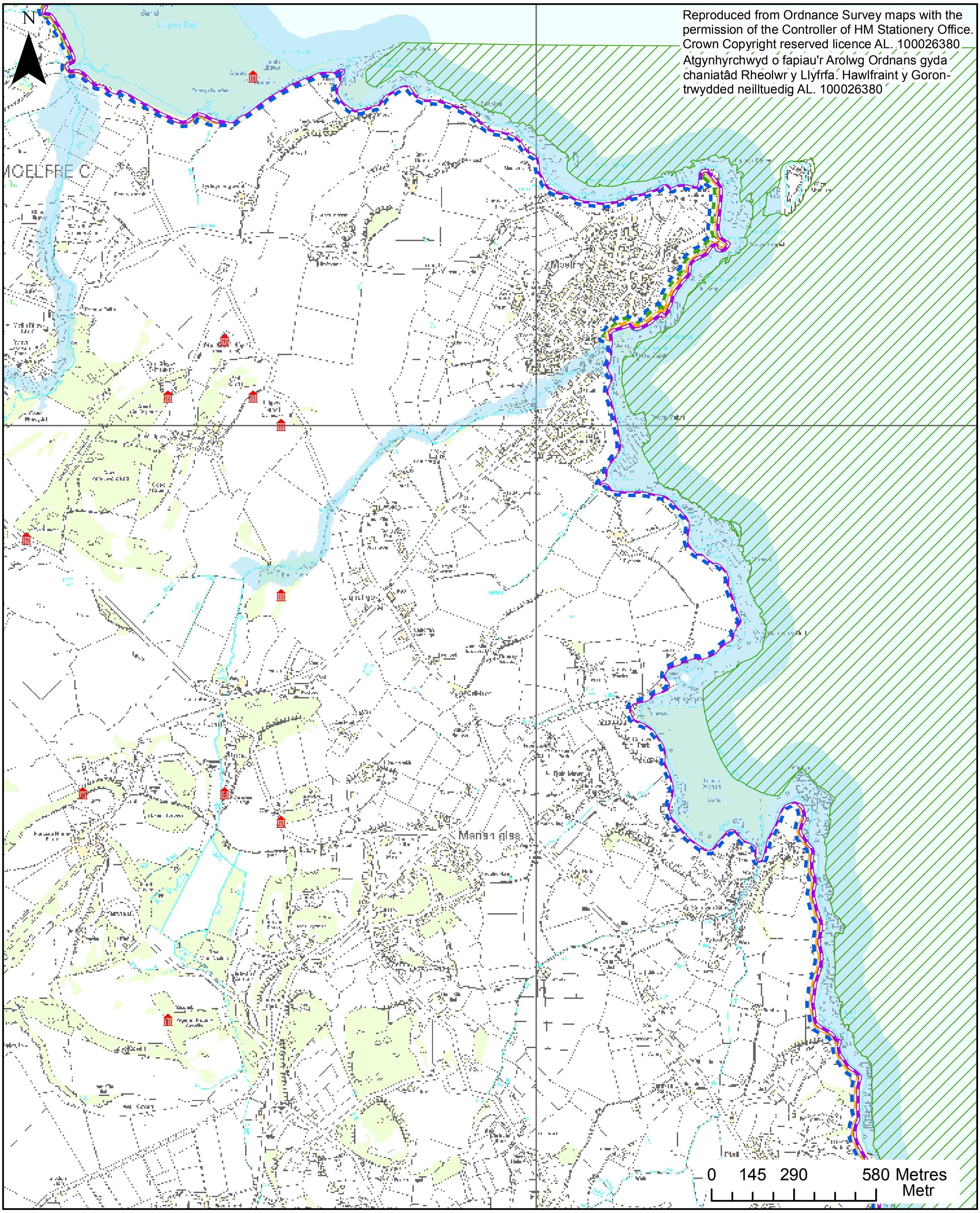
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 112

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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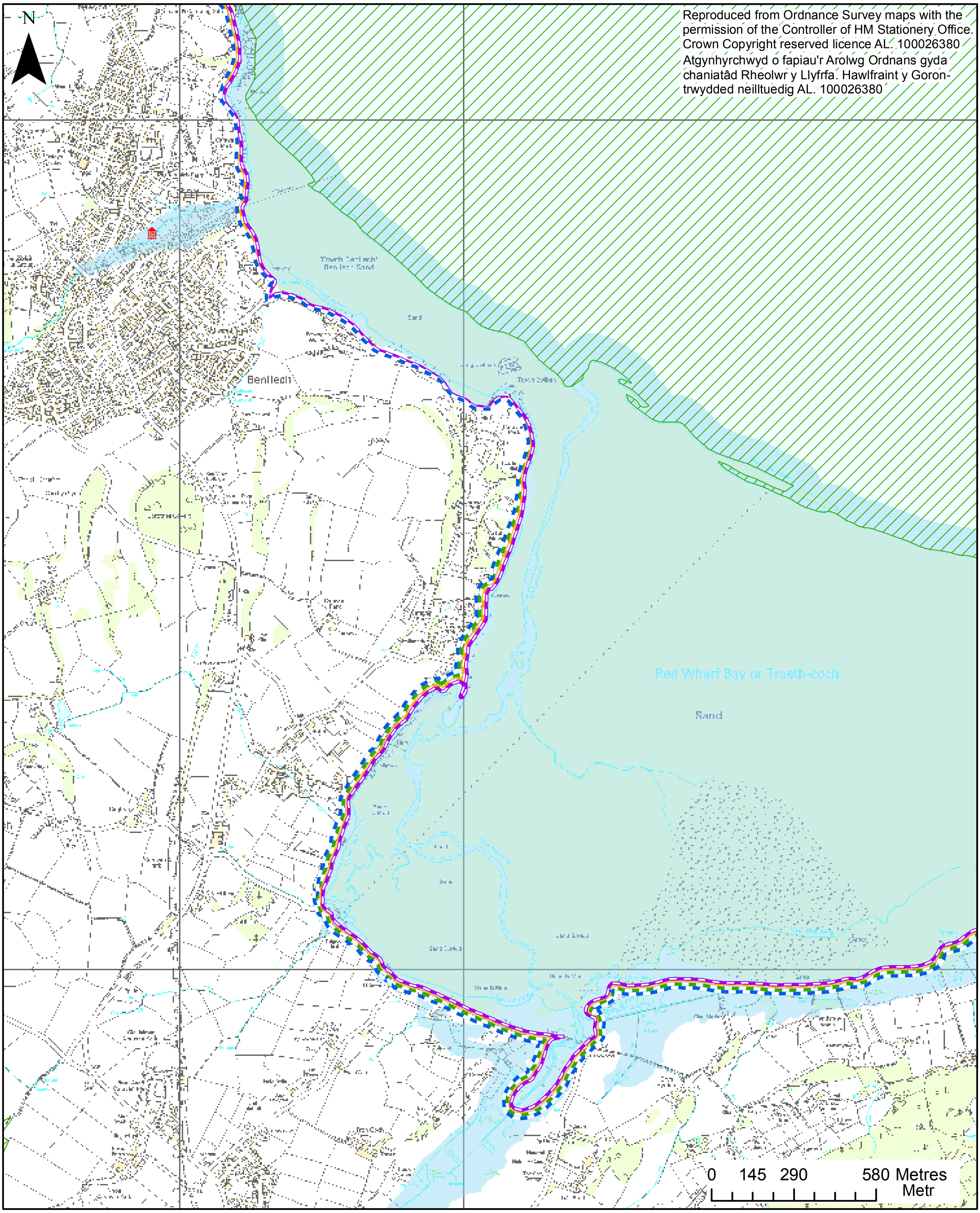
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 113

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 114

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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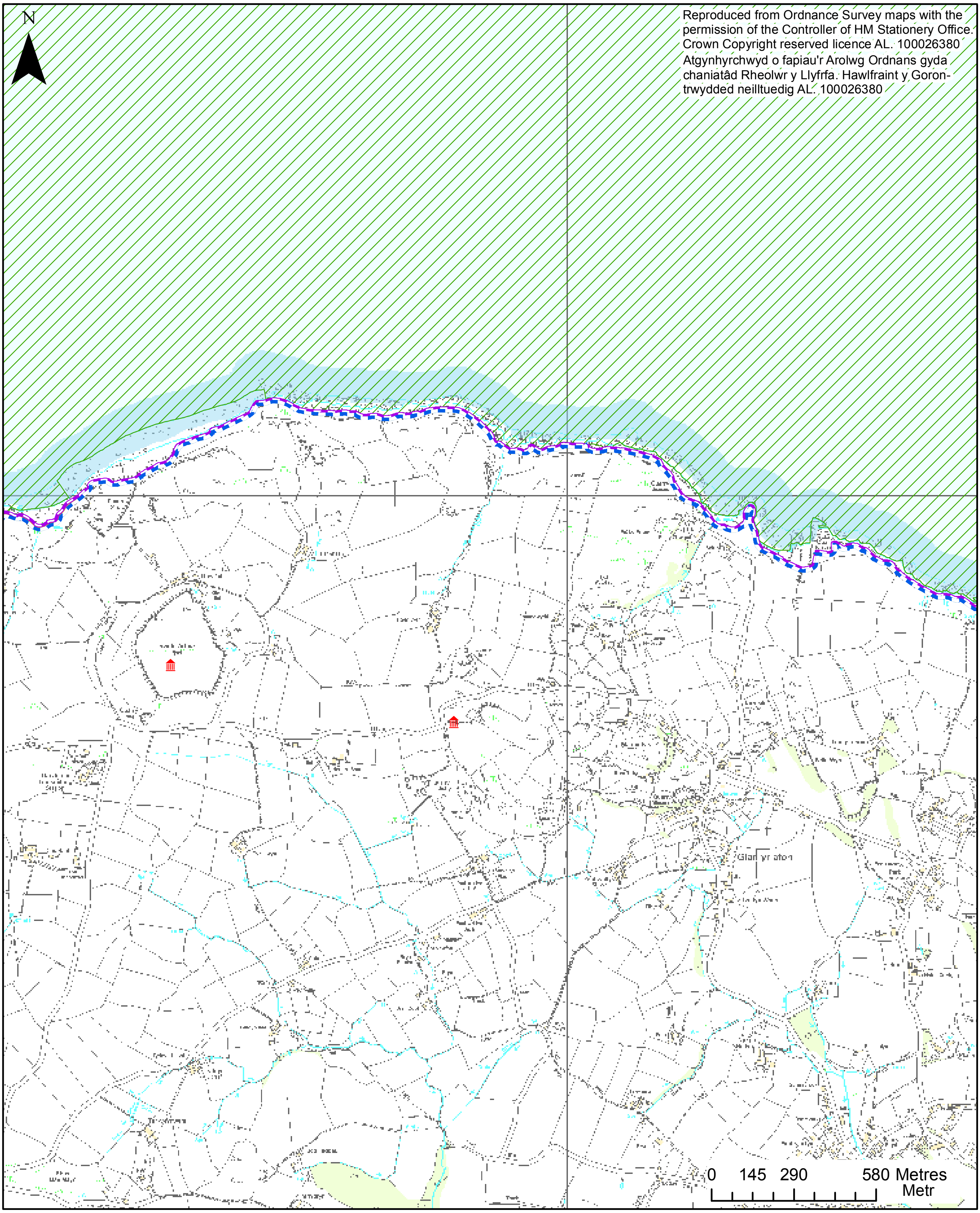
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 115



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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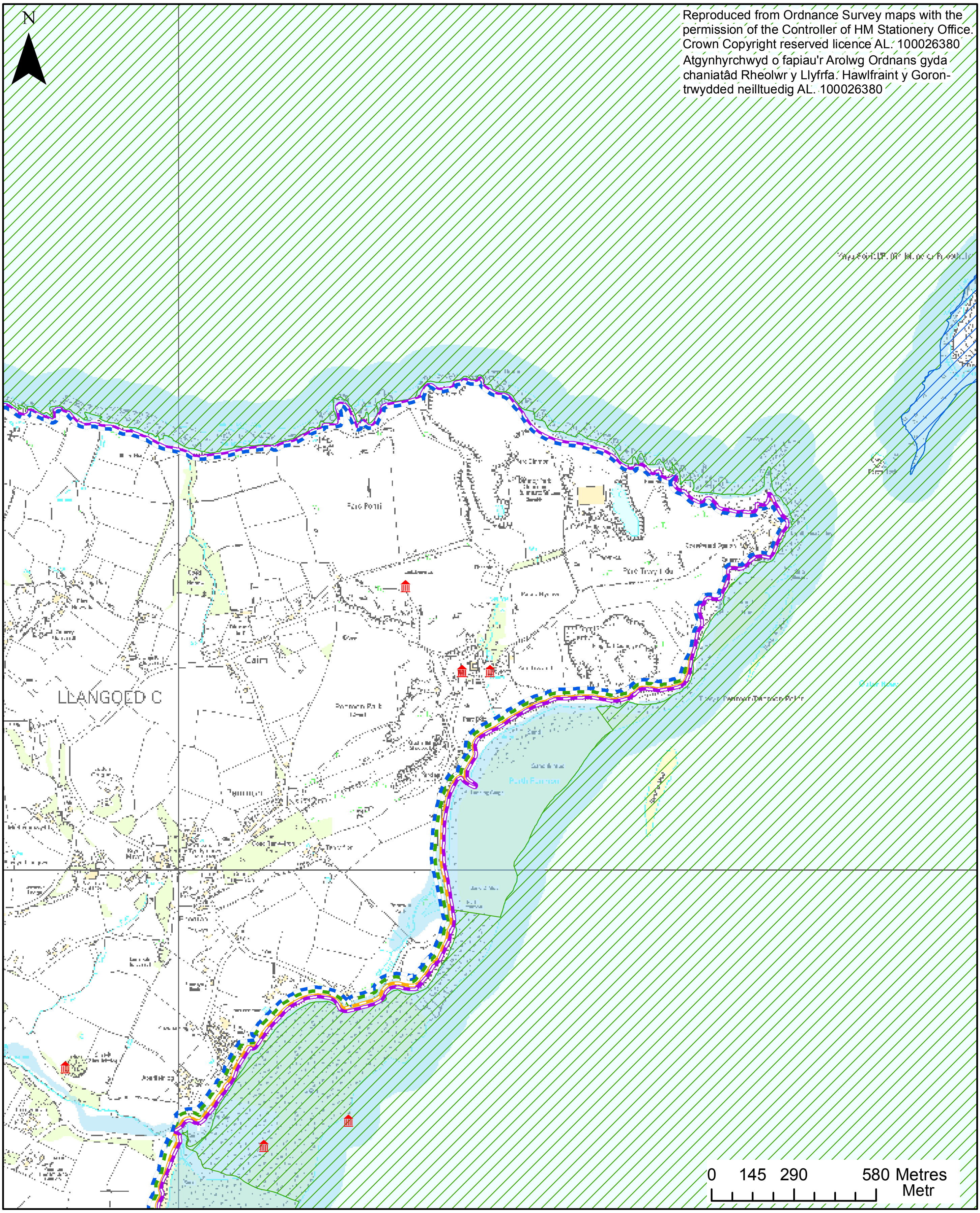
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 116



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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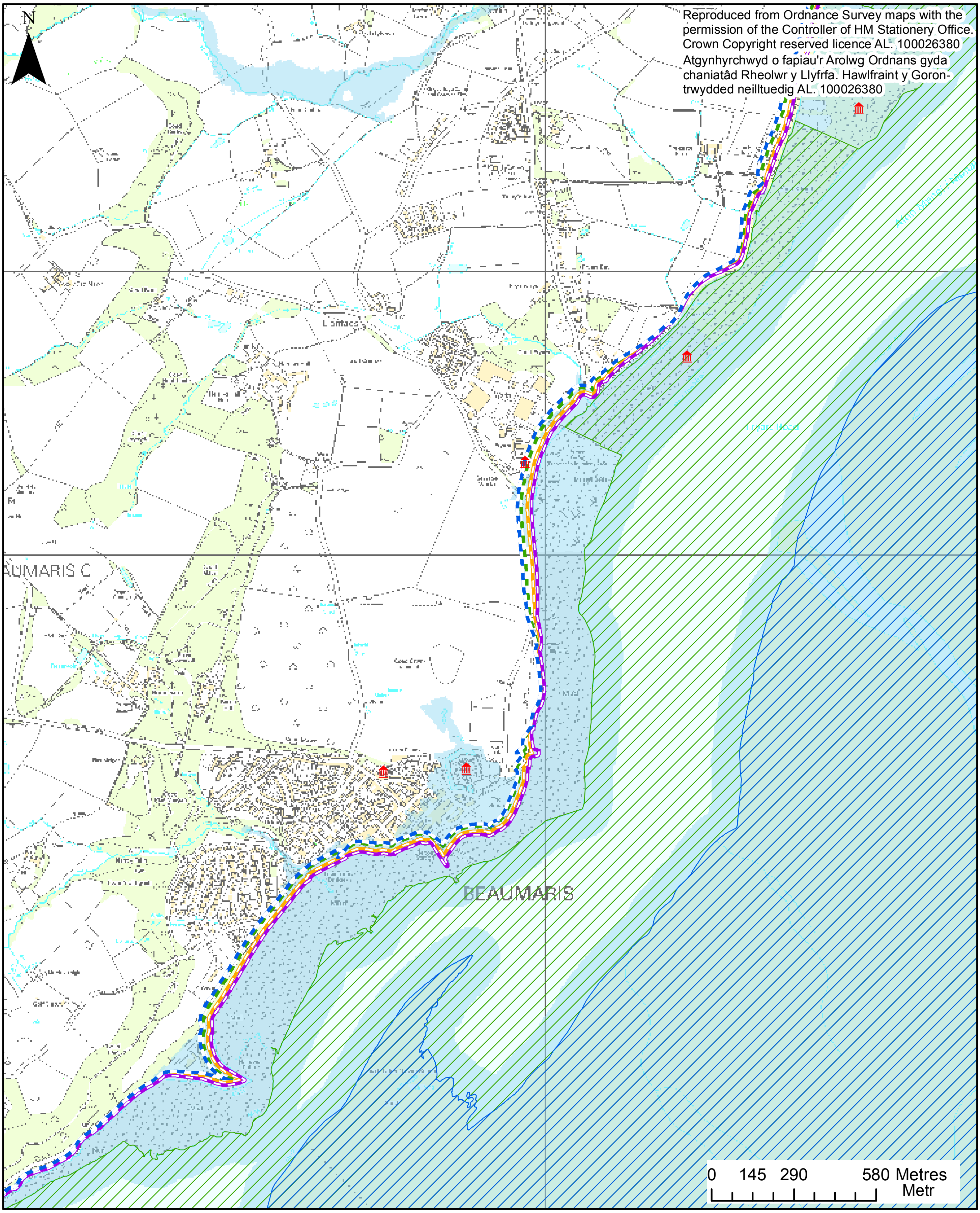
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 117

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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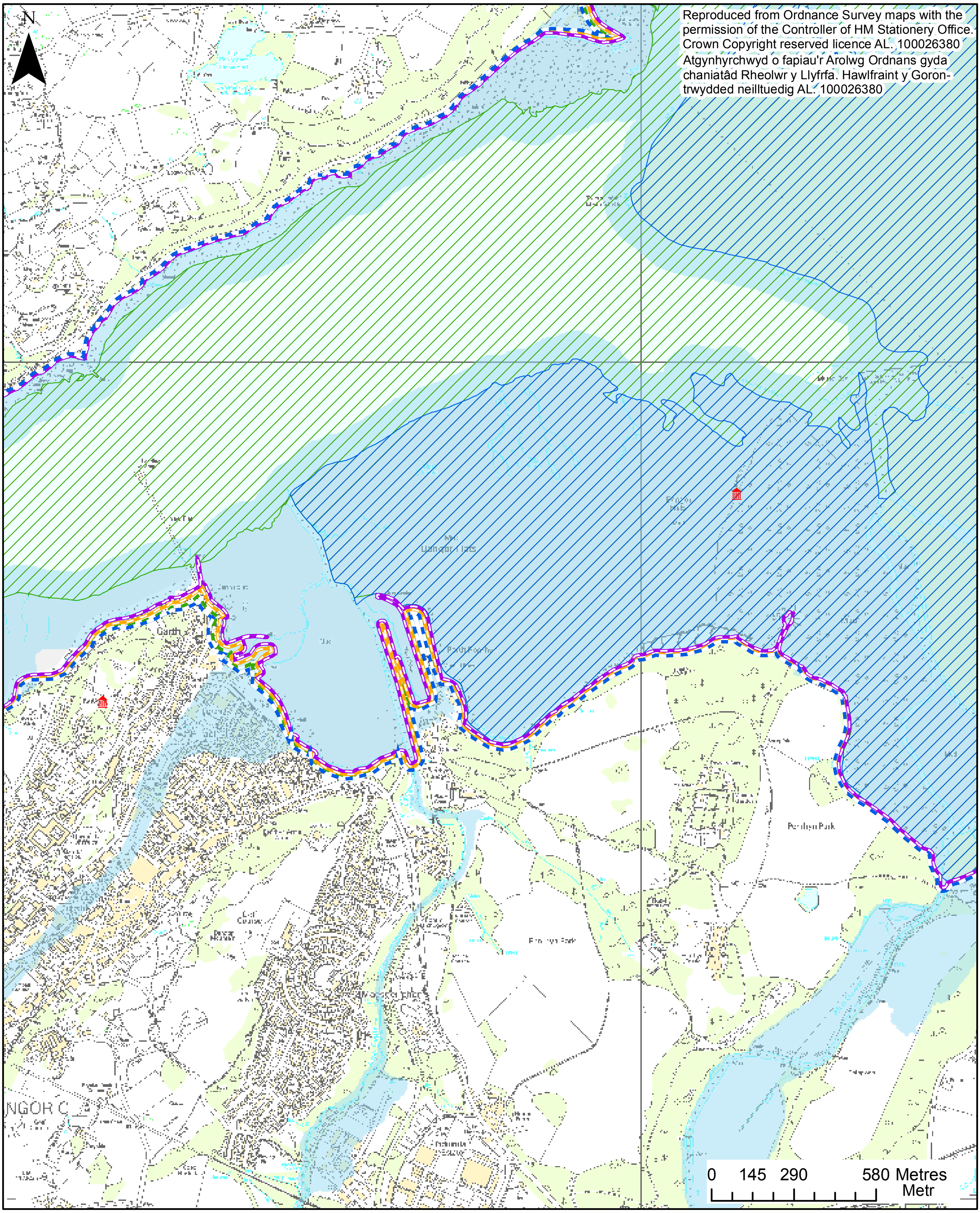
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 118

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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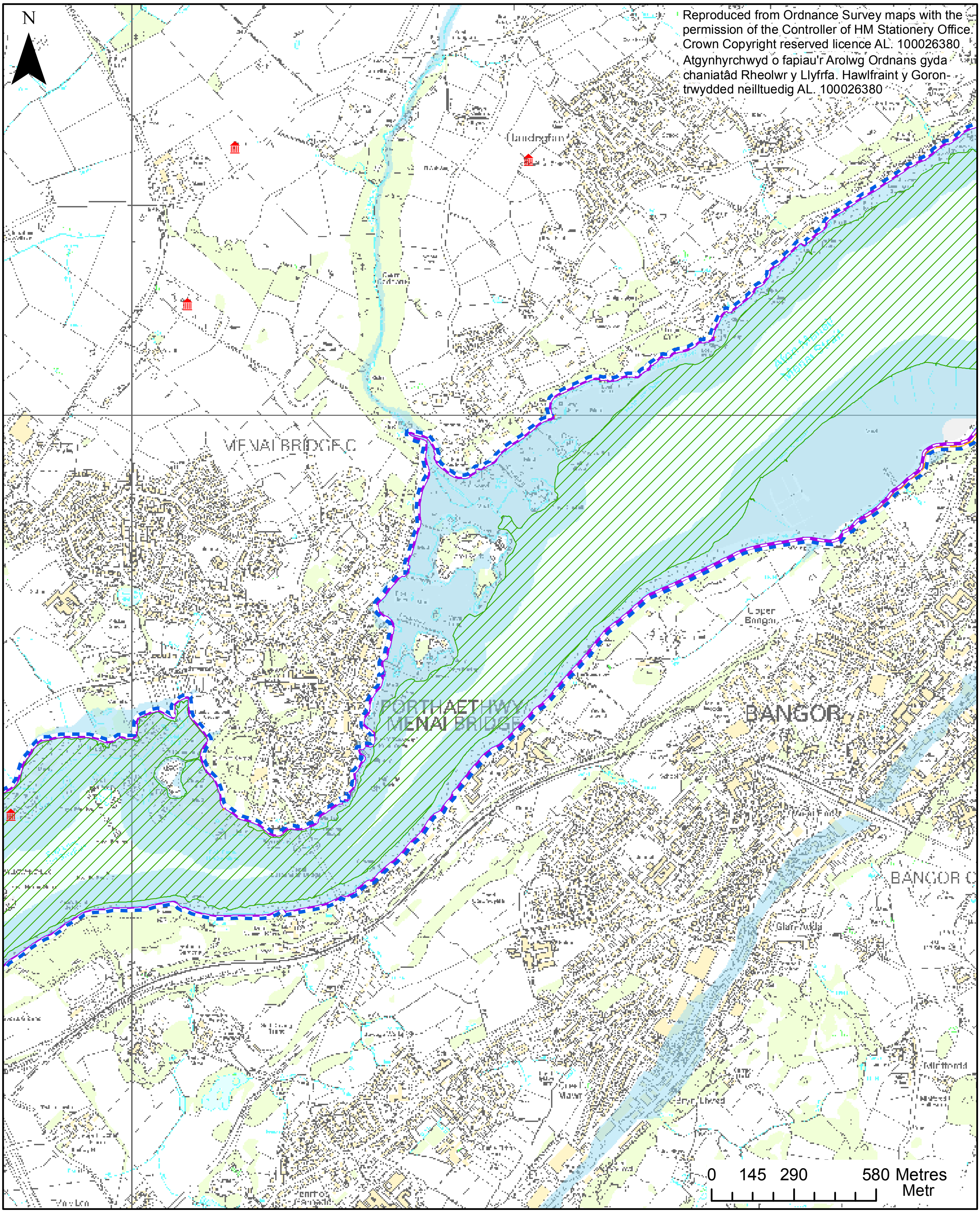
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 119



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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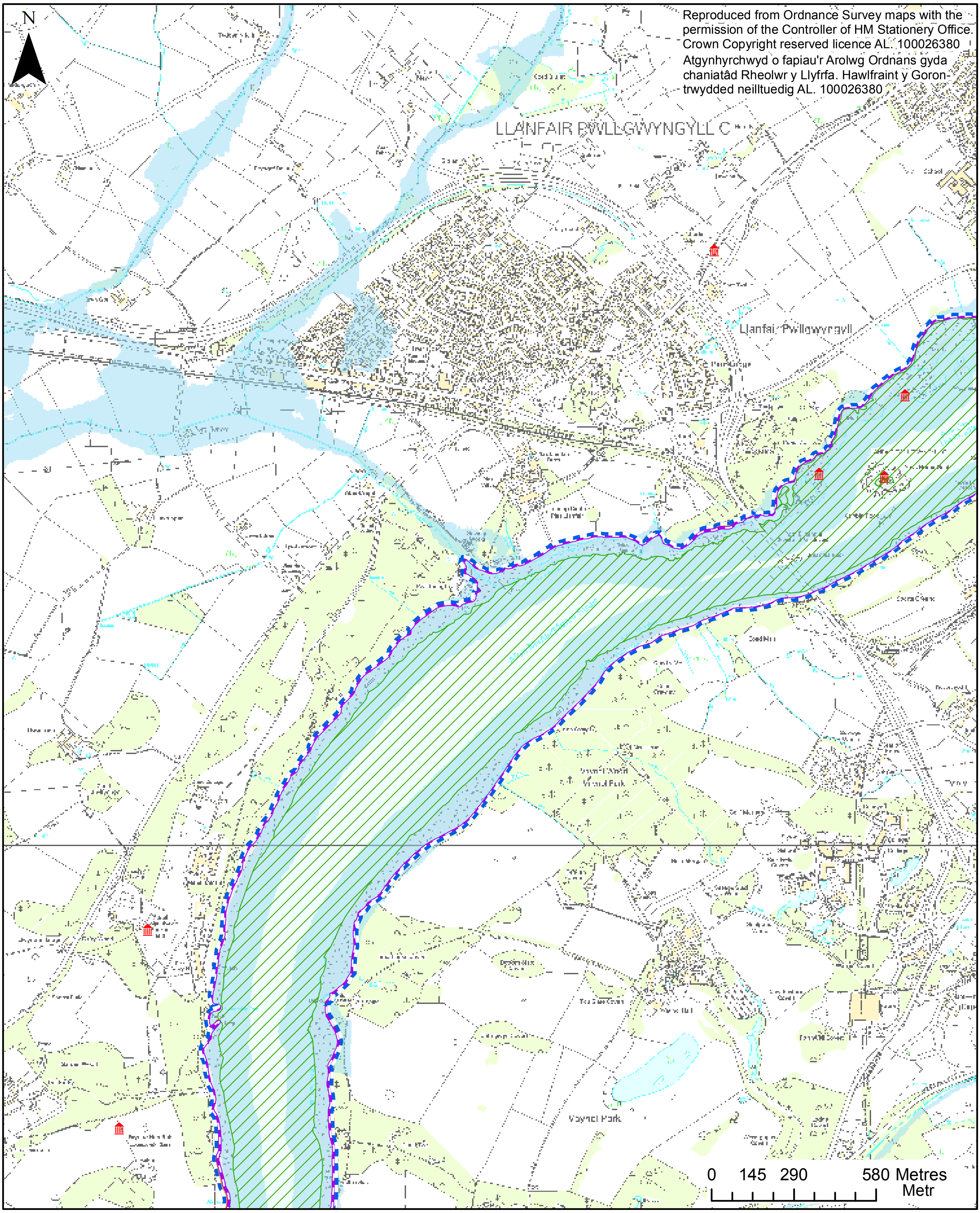
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 120

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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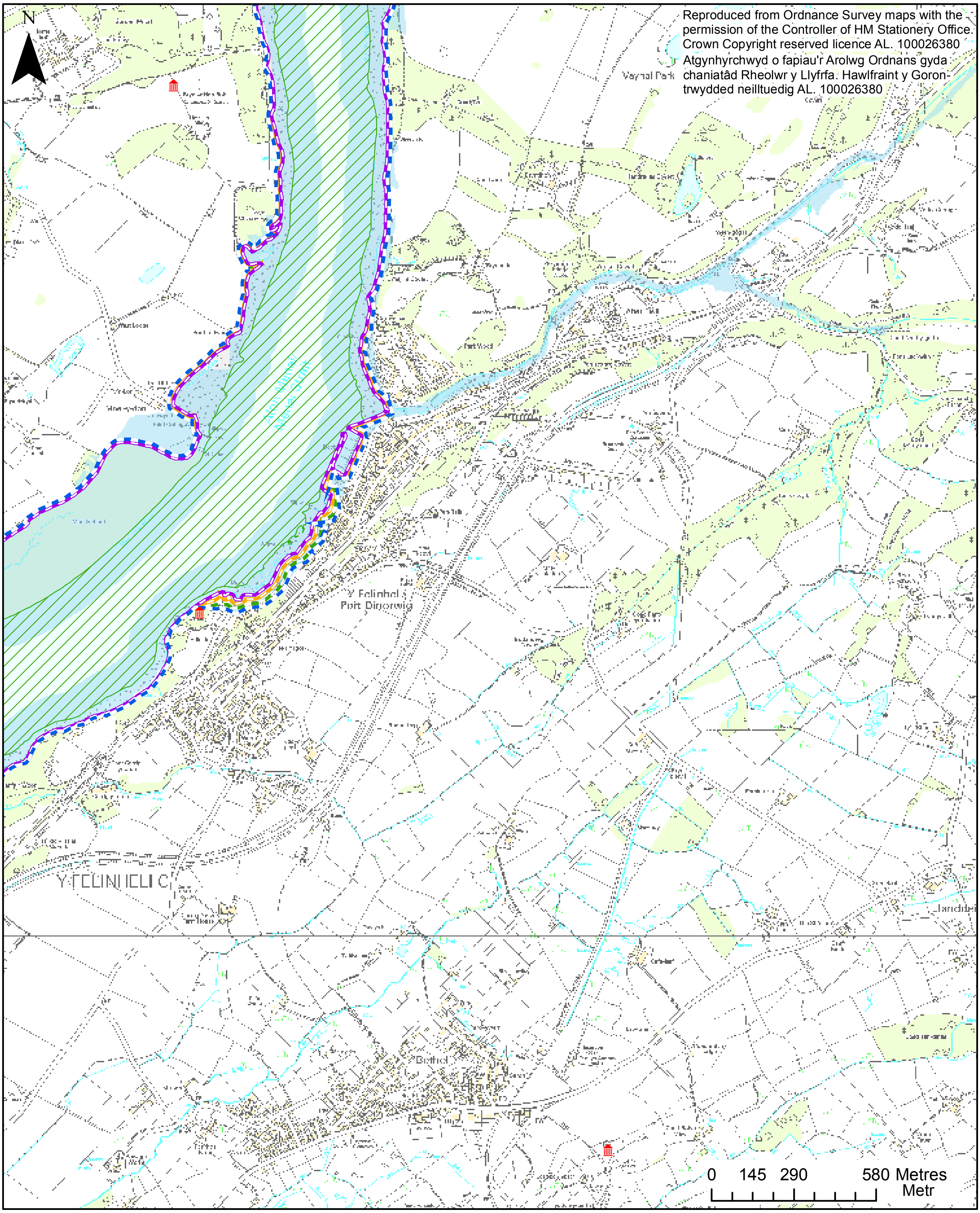
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 121



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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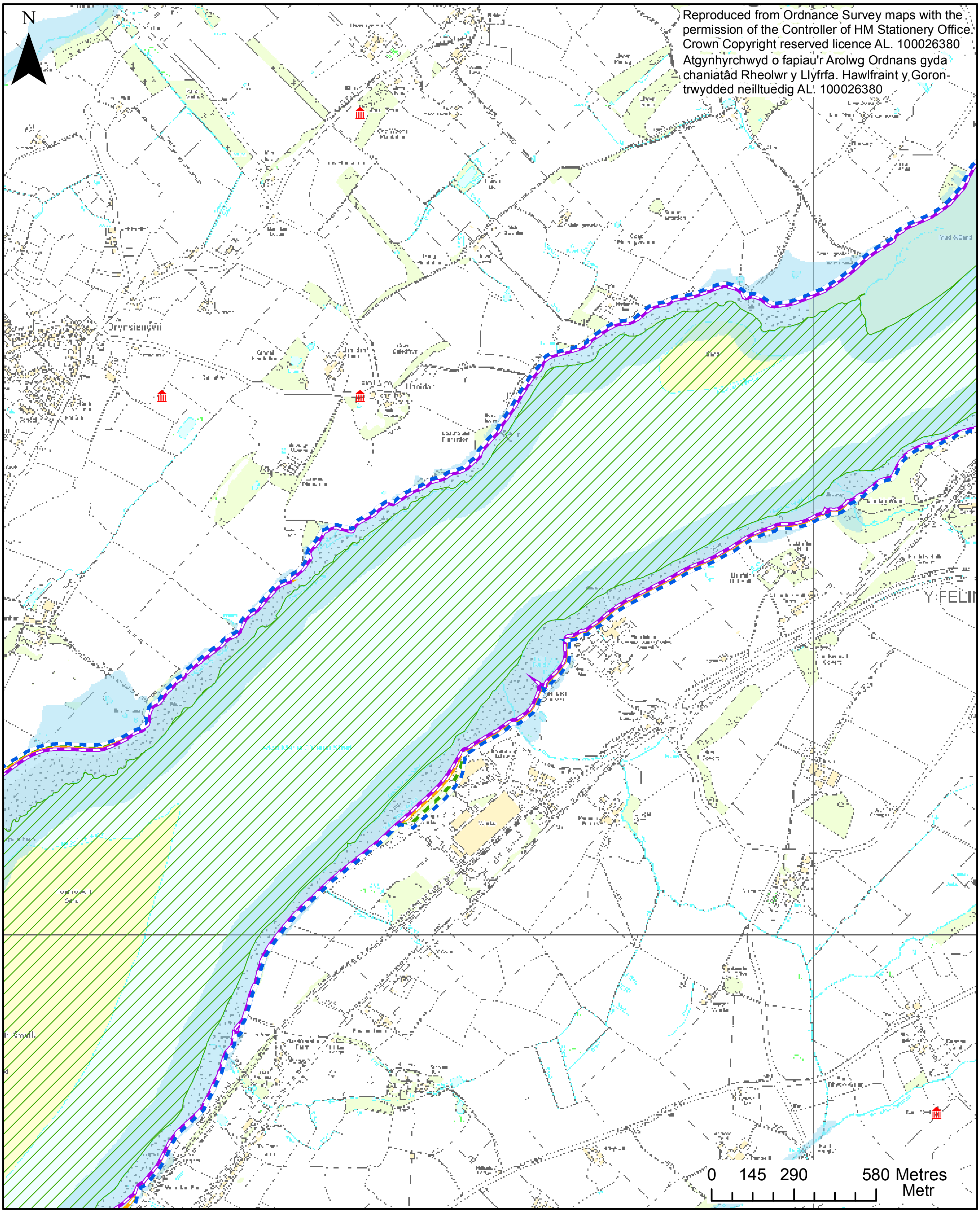
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 122



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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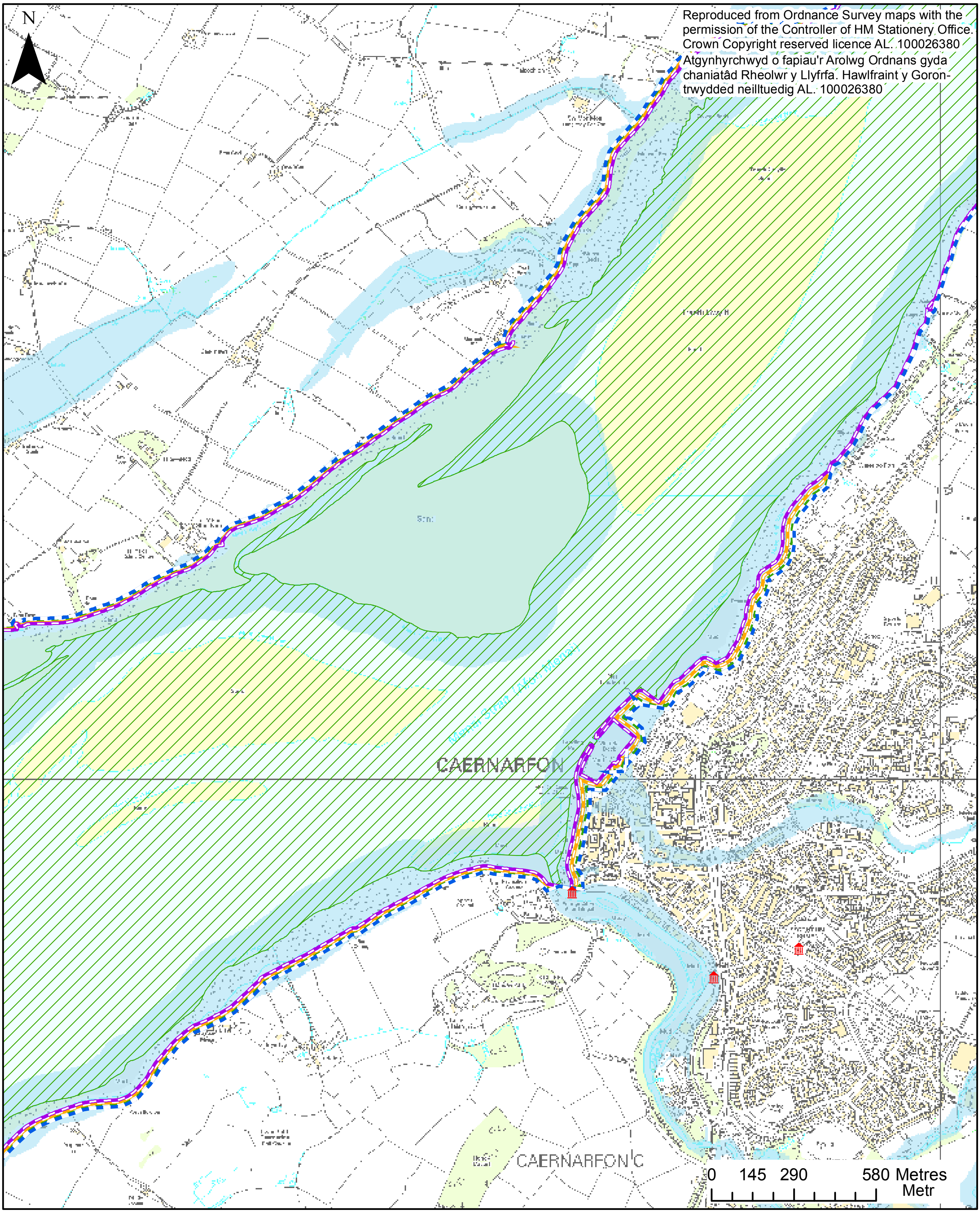
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 123



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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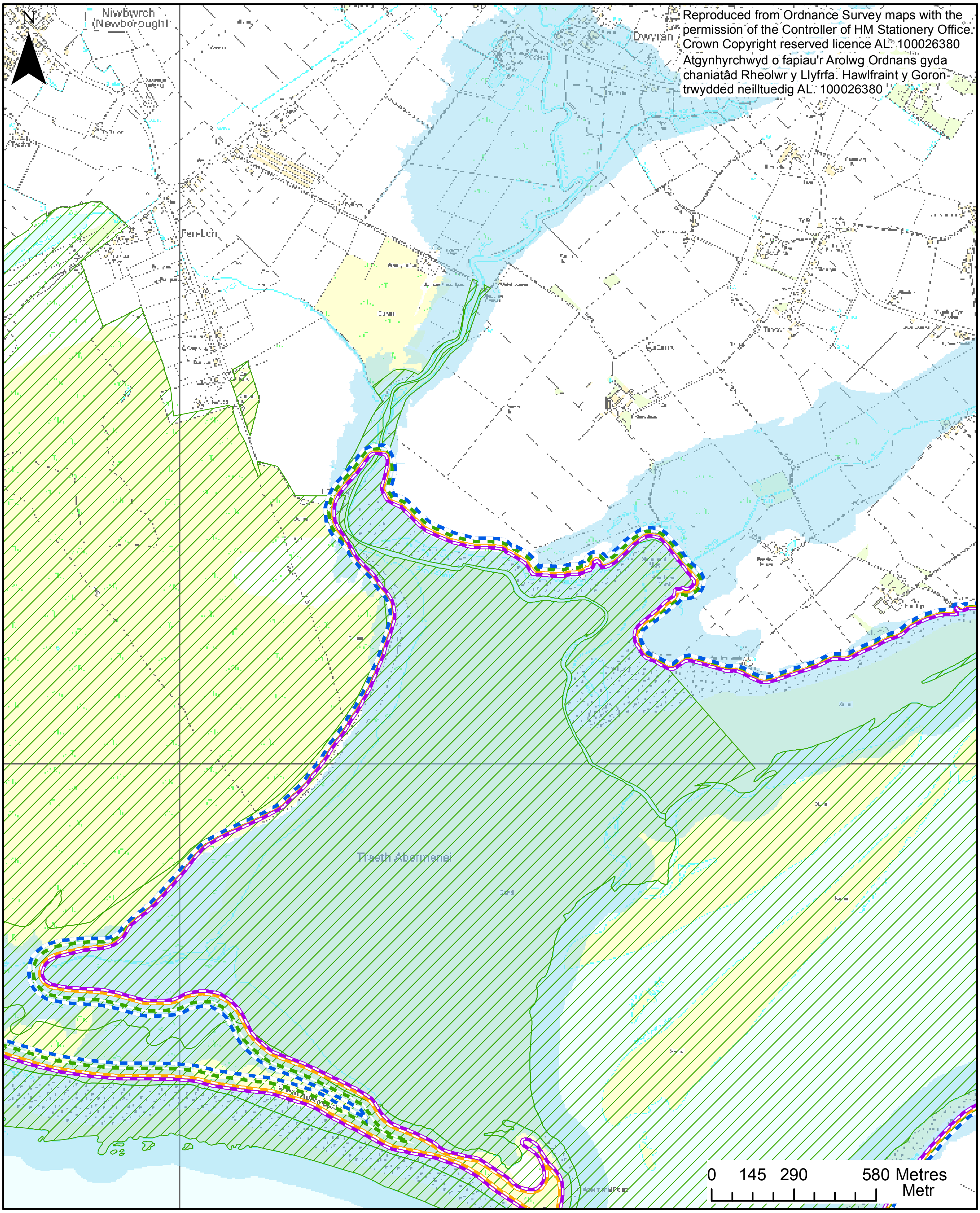
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 124



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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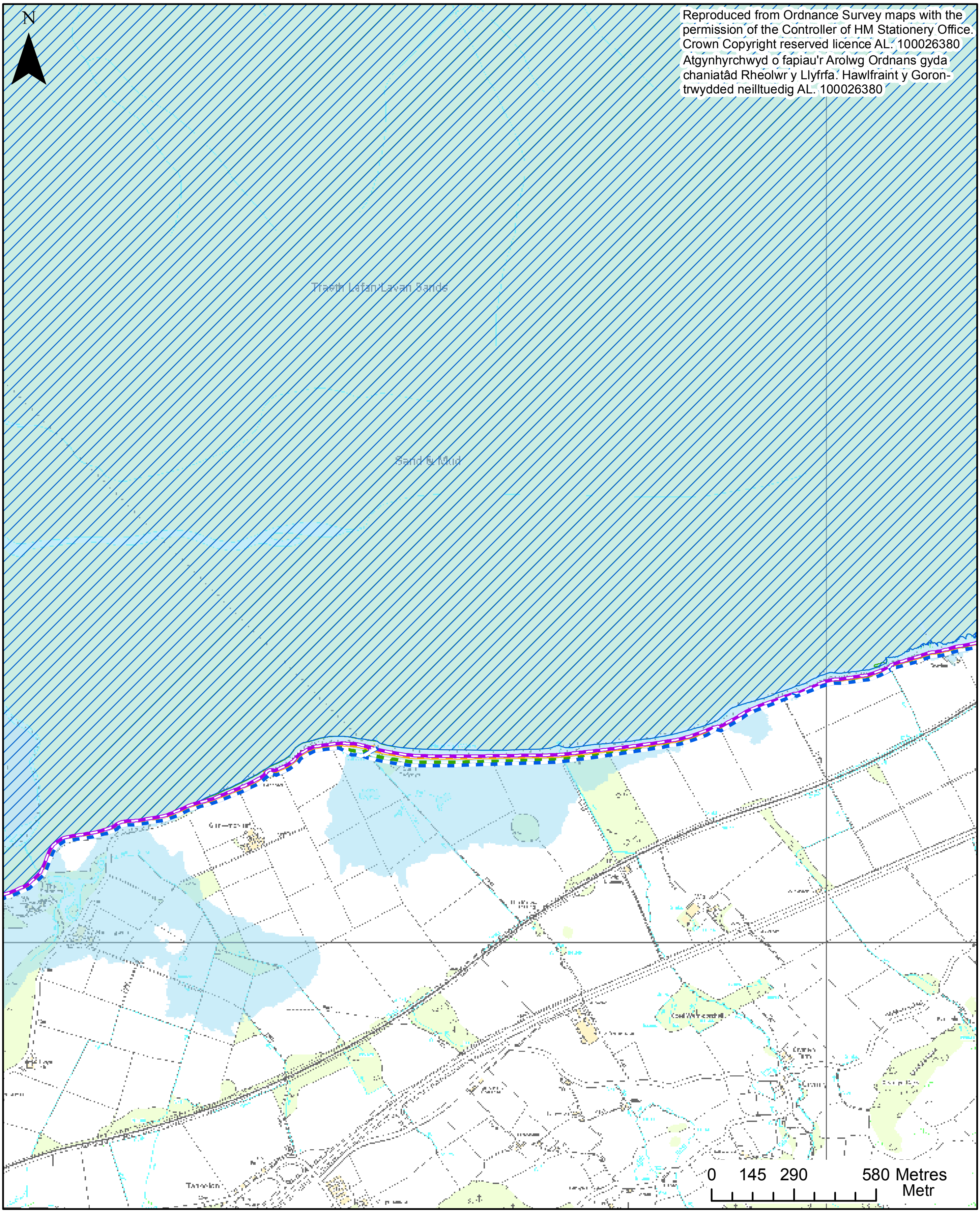
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 125

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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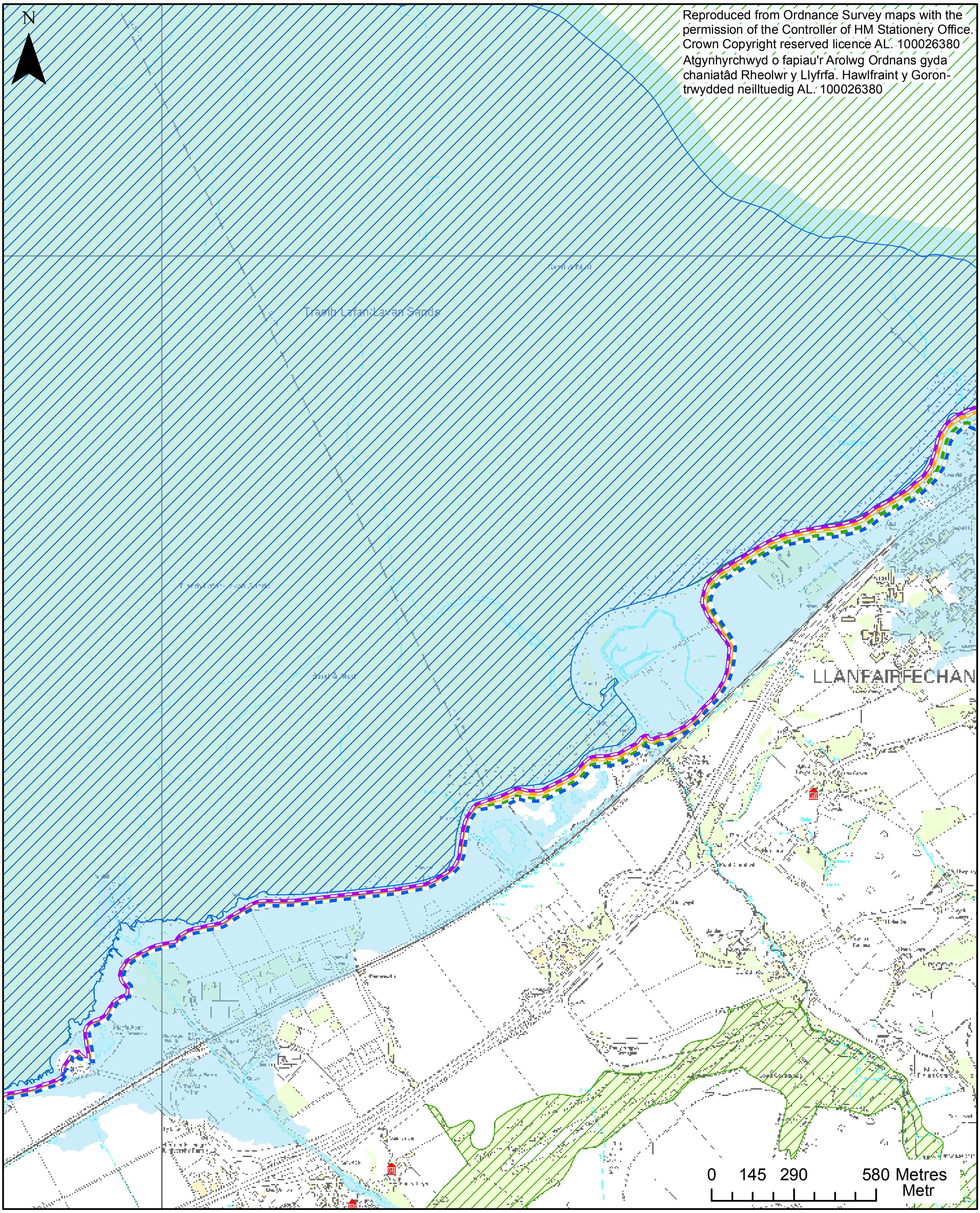
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 126

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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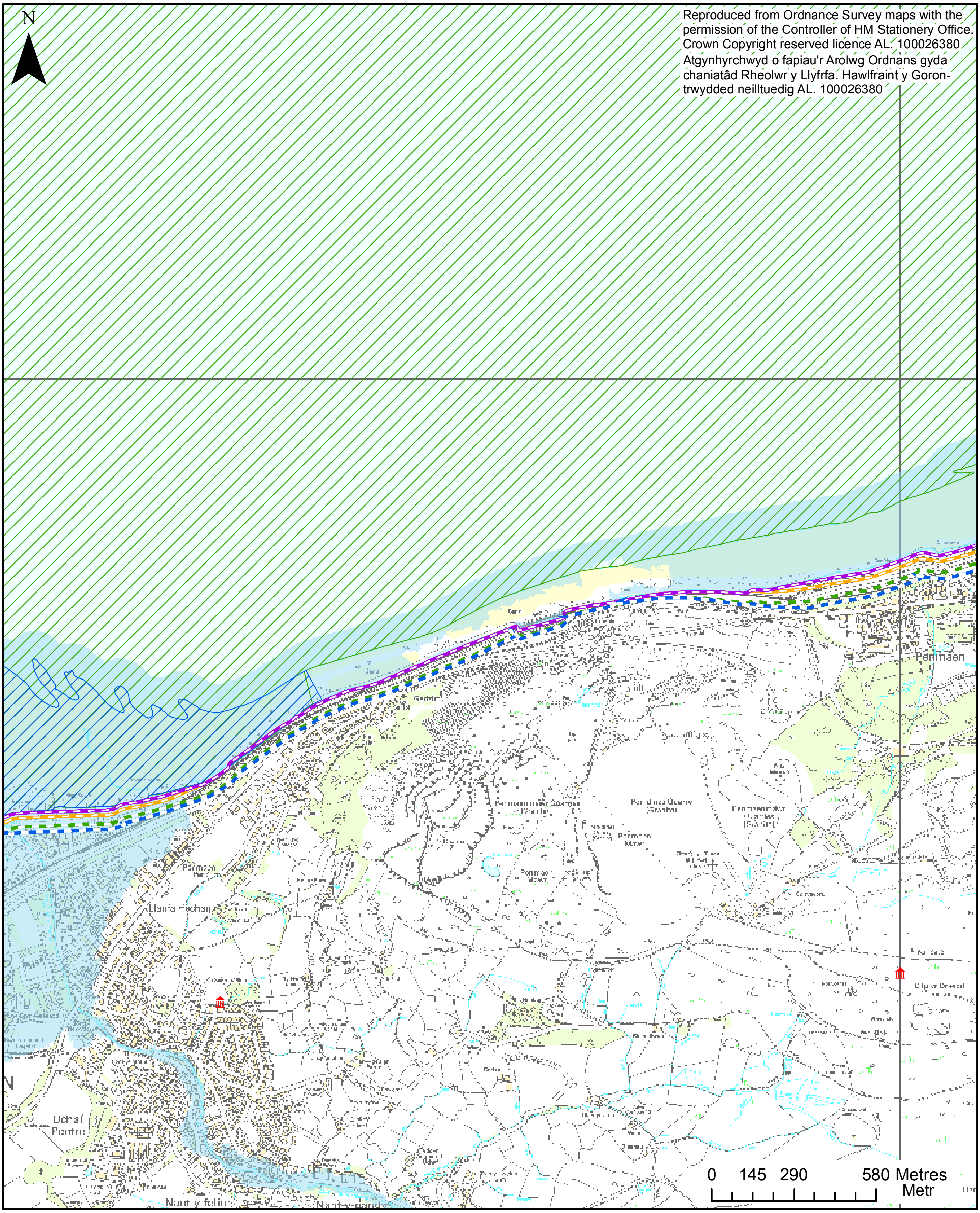
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 127

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
	Scheduled Monuments	Henebion Cofrestredig

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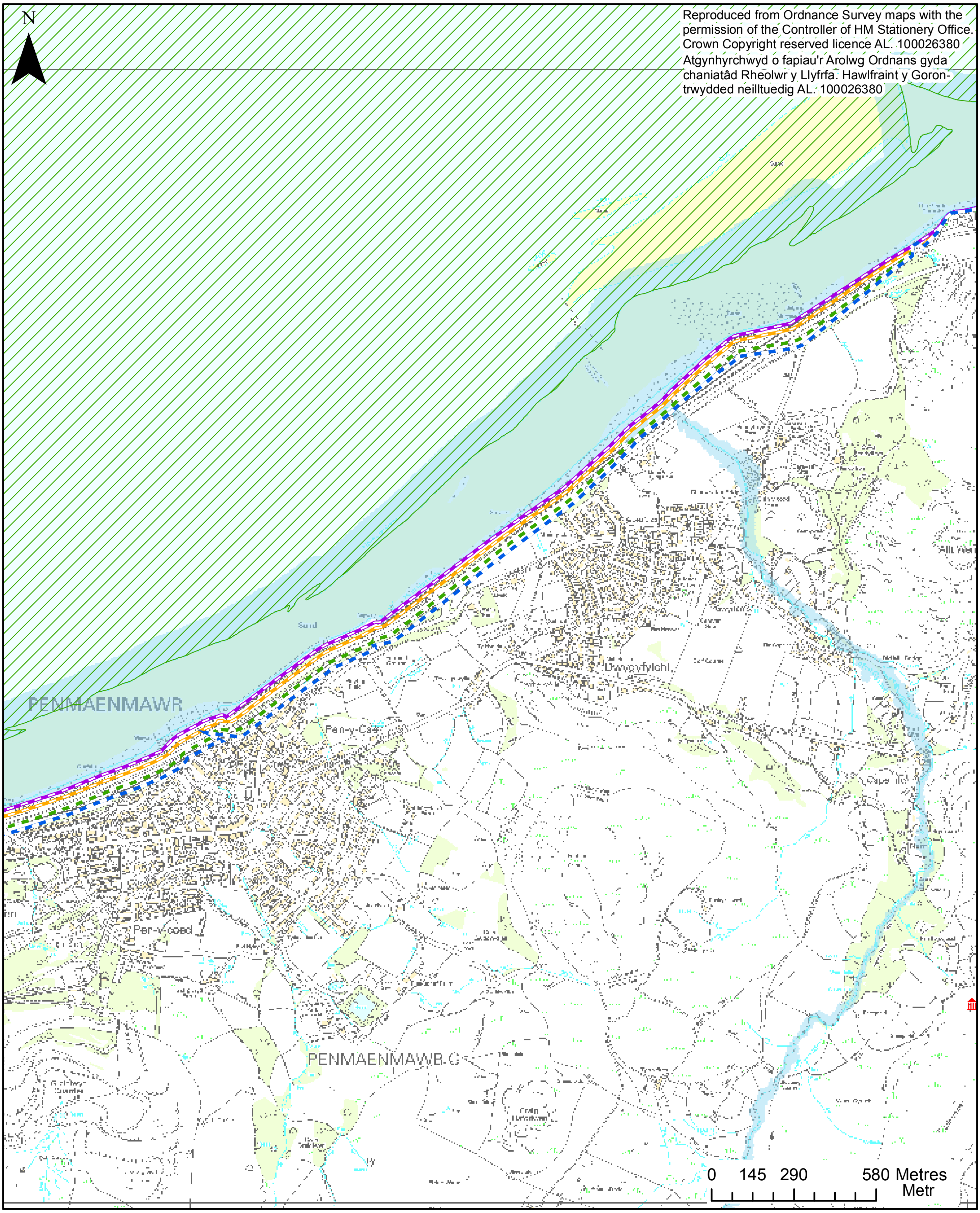
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 128

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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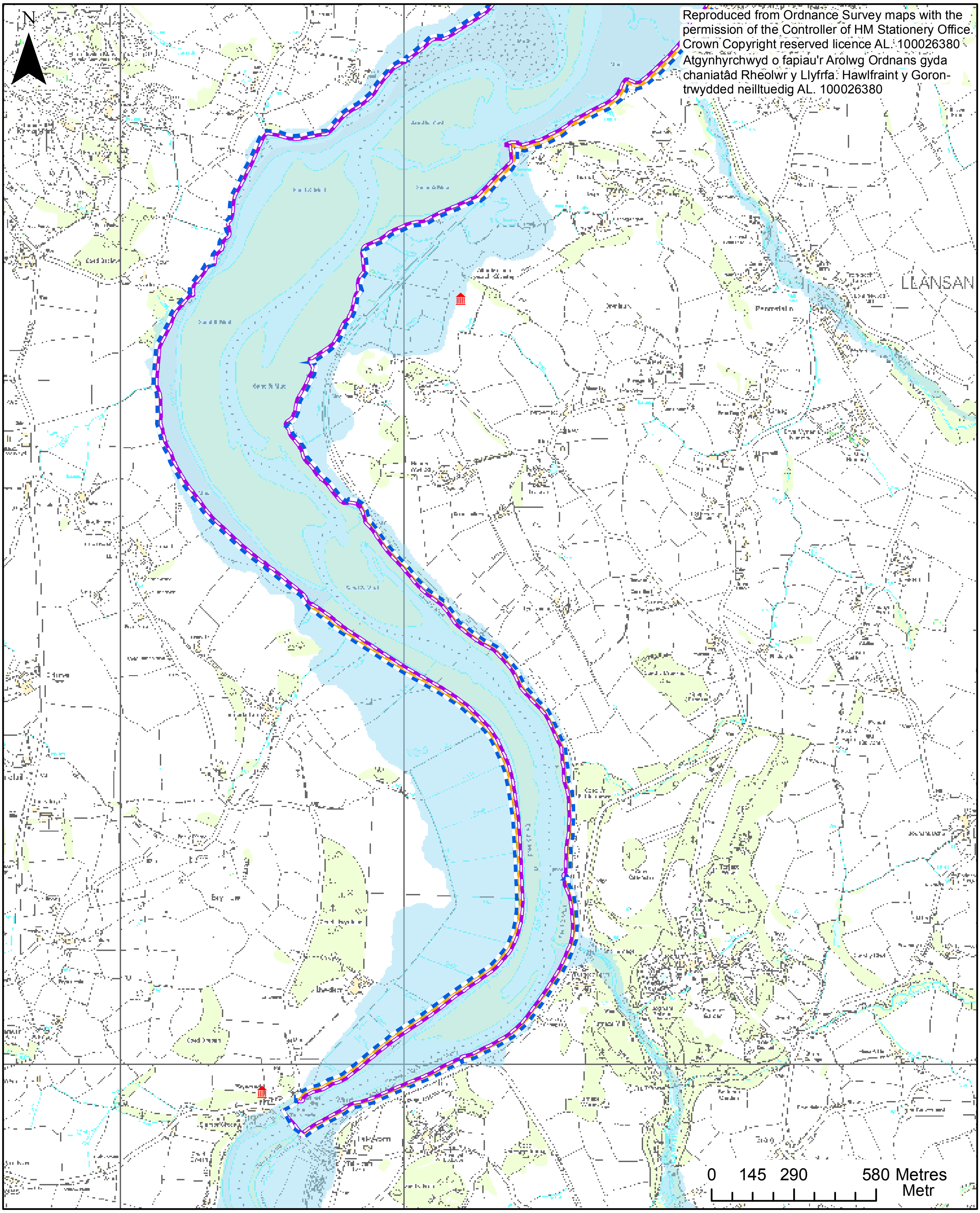
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 129

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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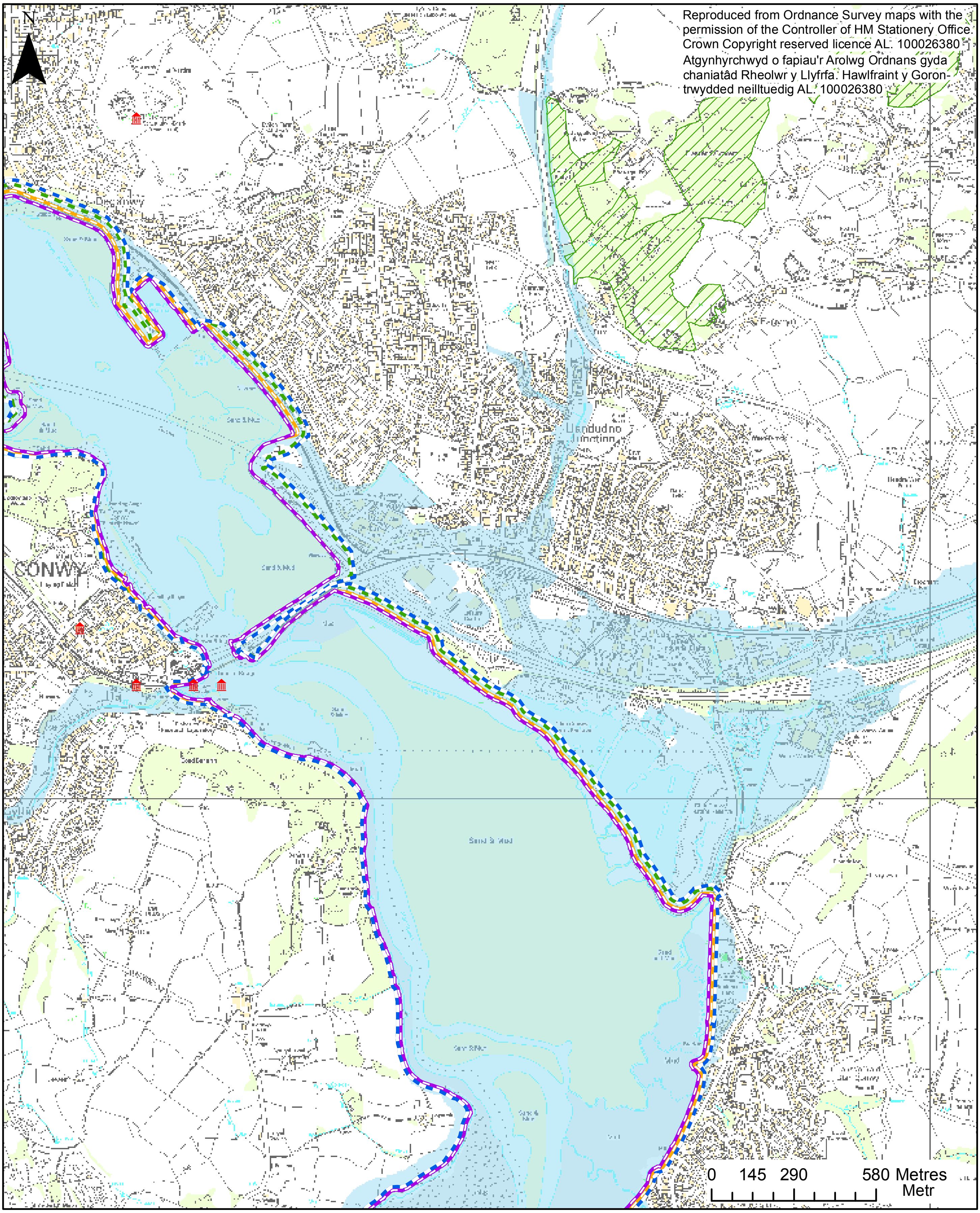
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Map 130

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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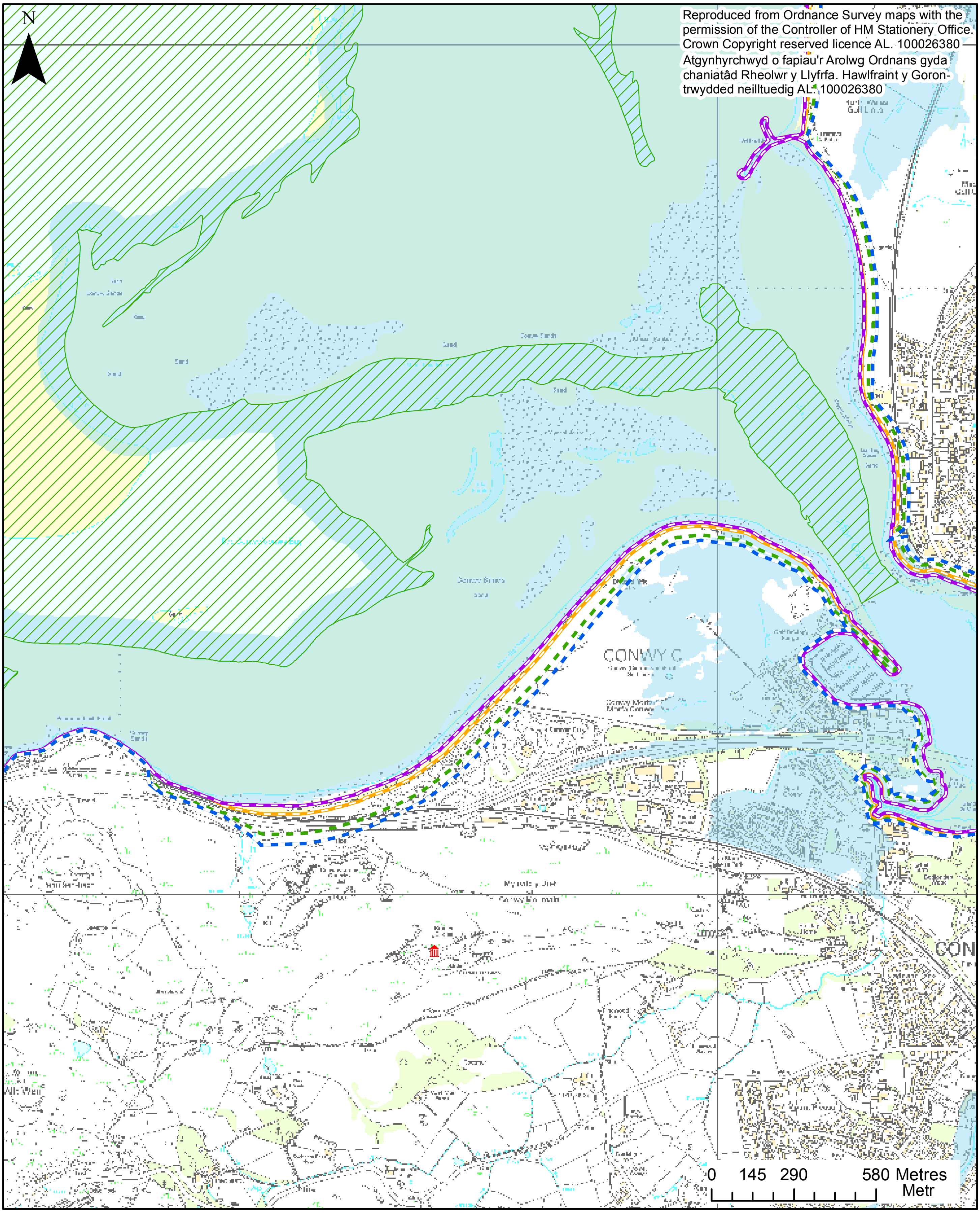
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 131



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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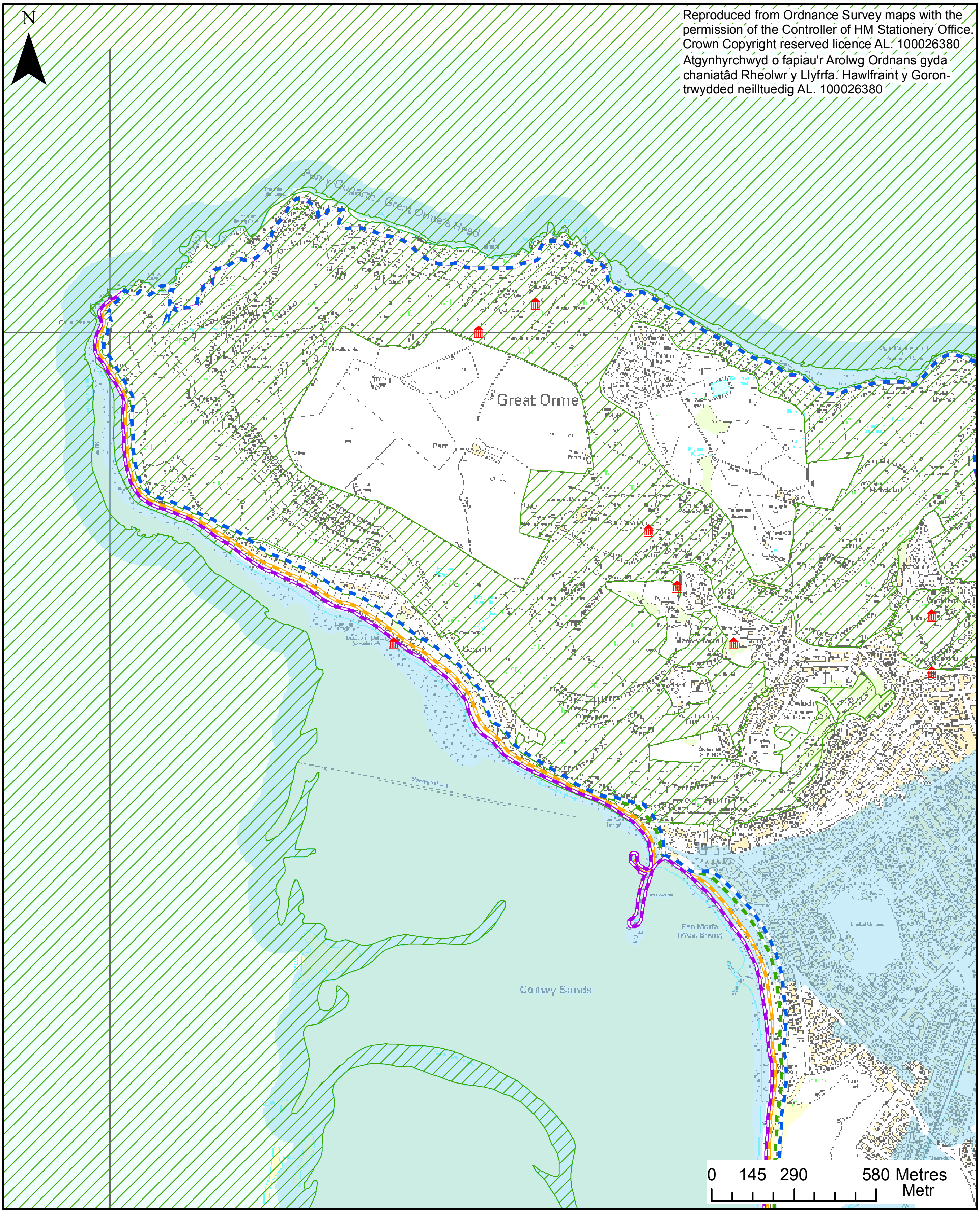
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - No Active Intervention

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Dim Ymyriad Gweithredol

Map 132



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 1

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0 150 300 600 Metres
Metr

🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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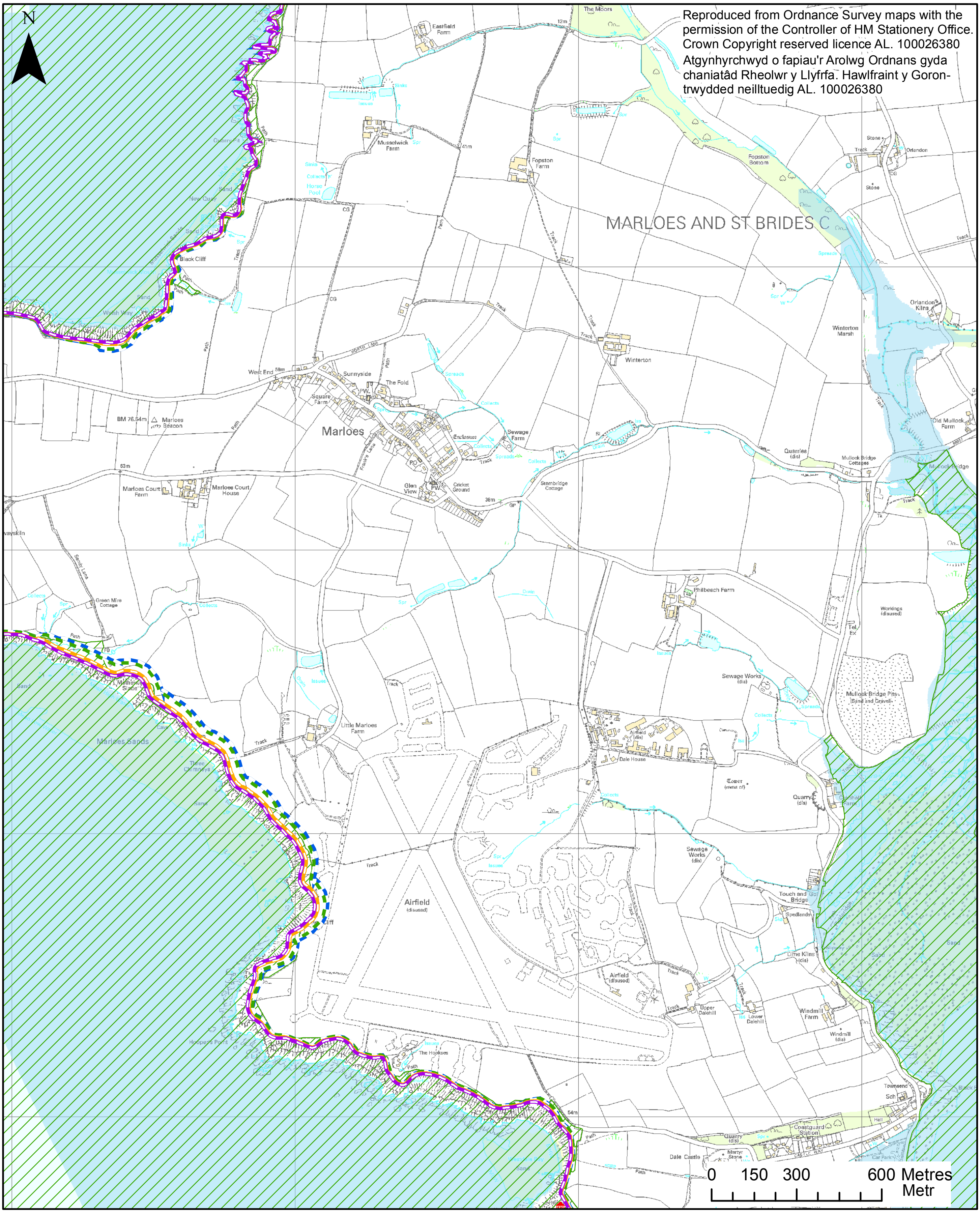
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 2



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 3

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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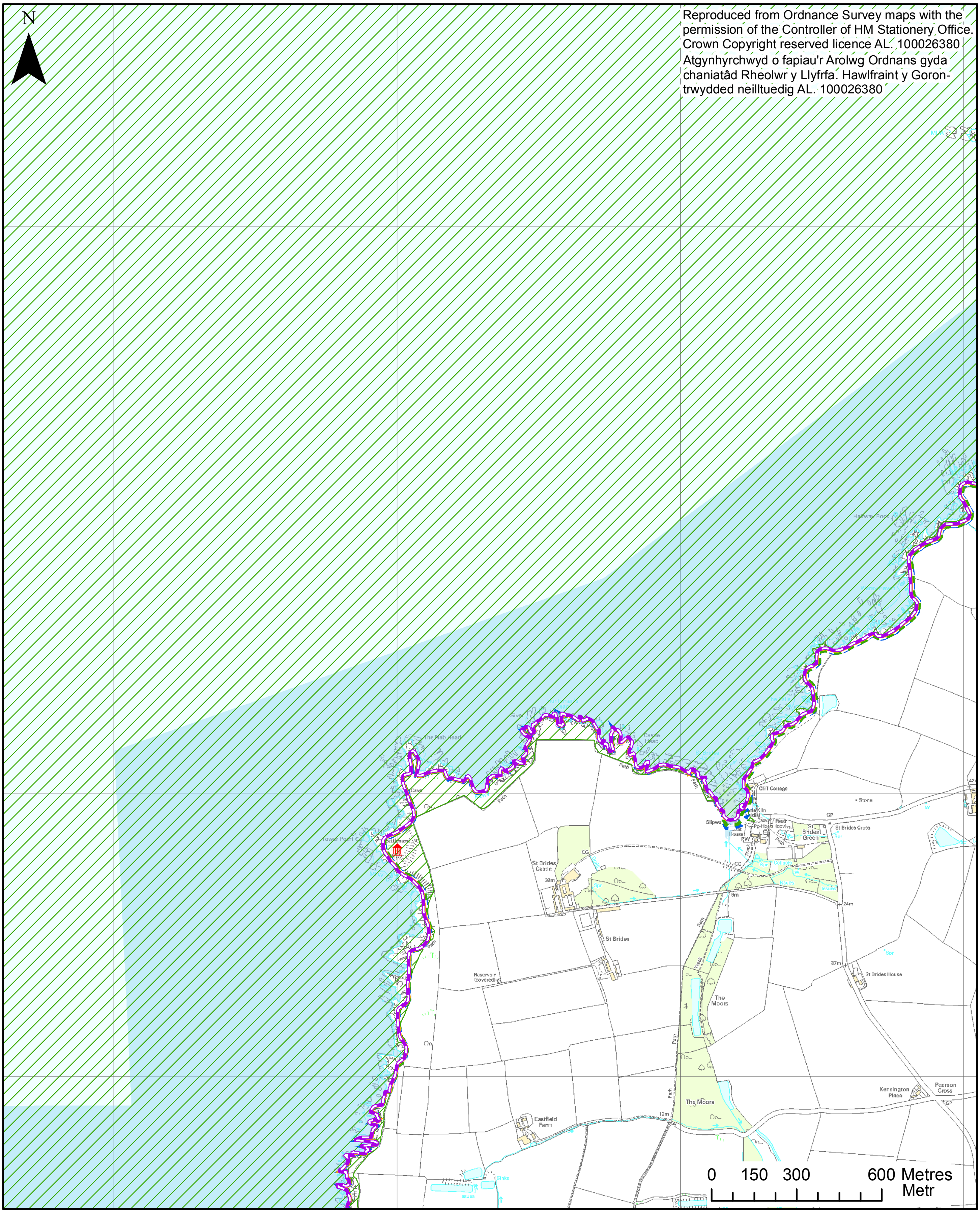
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 4



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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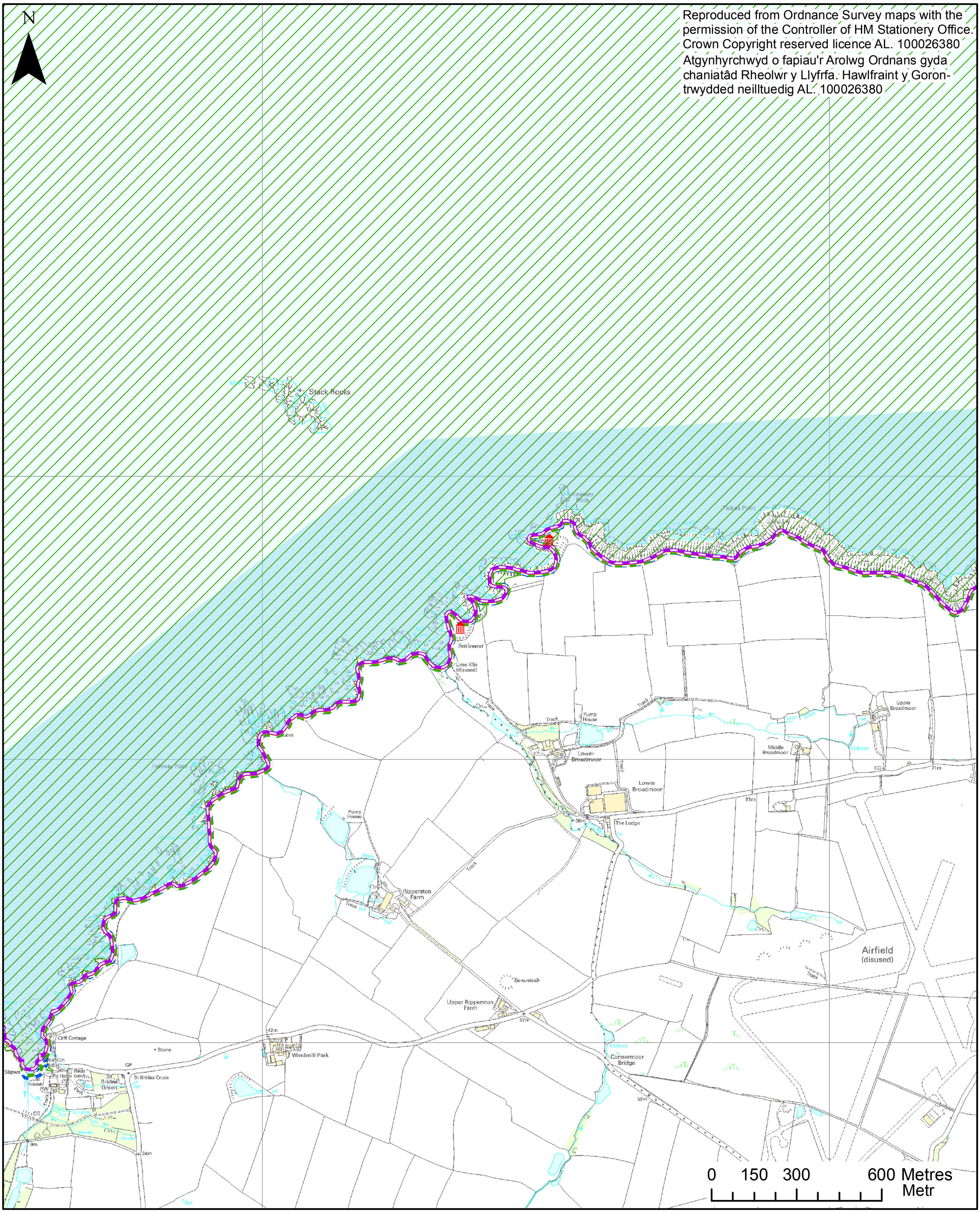
Shoreline Management Plan - West of Wales | Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management | Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 5



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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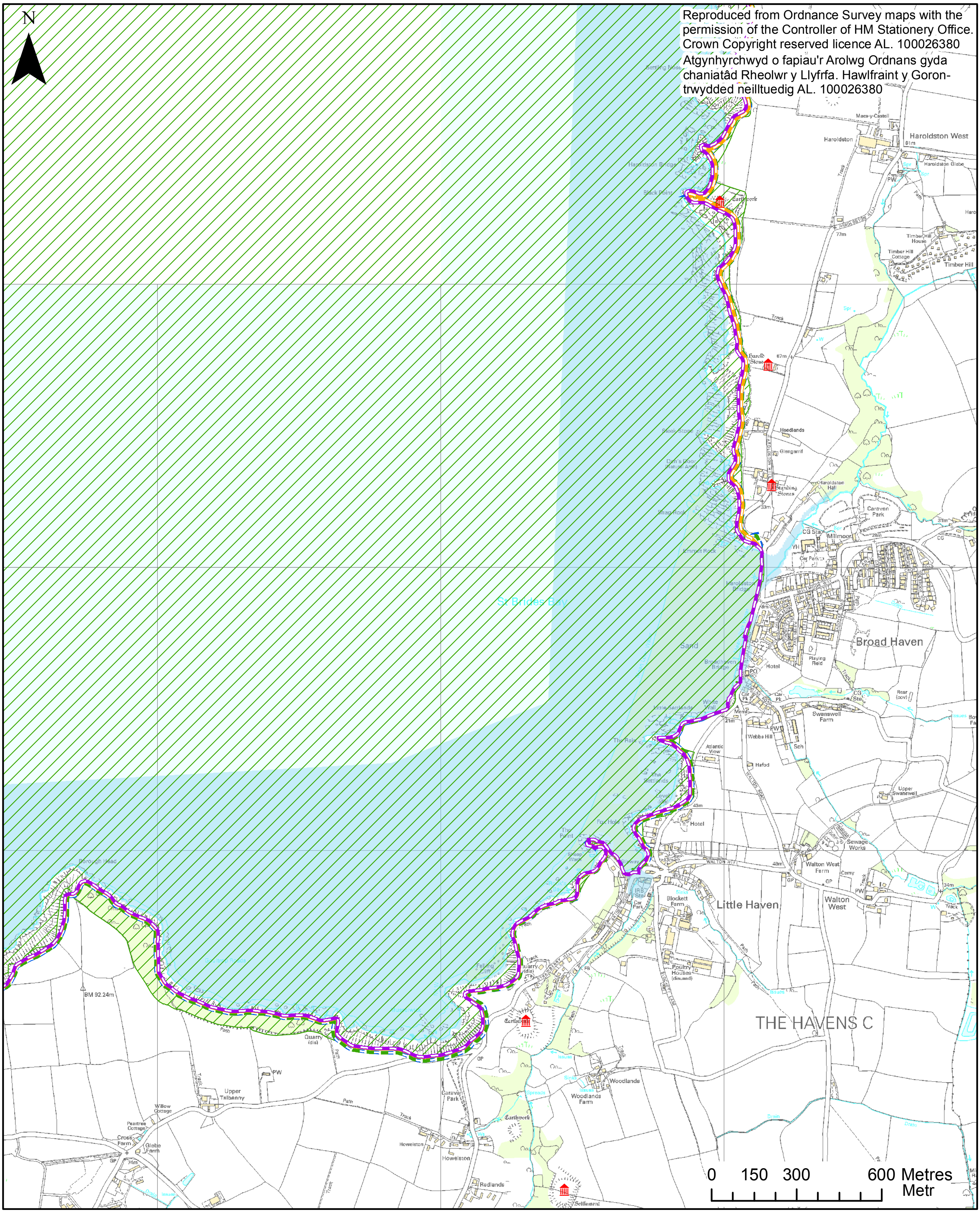
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 6



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol
▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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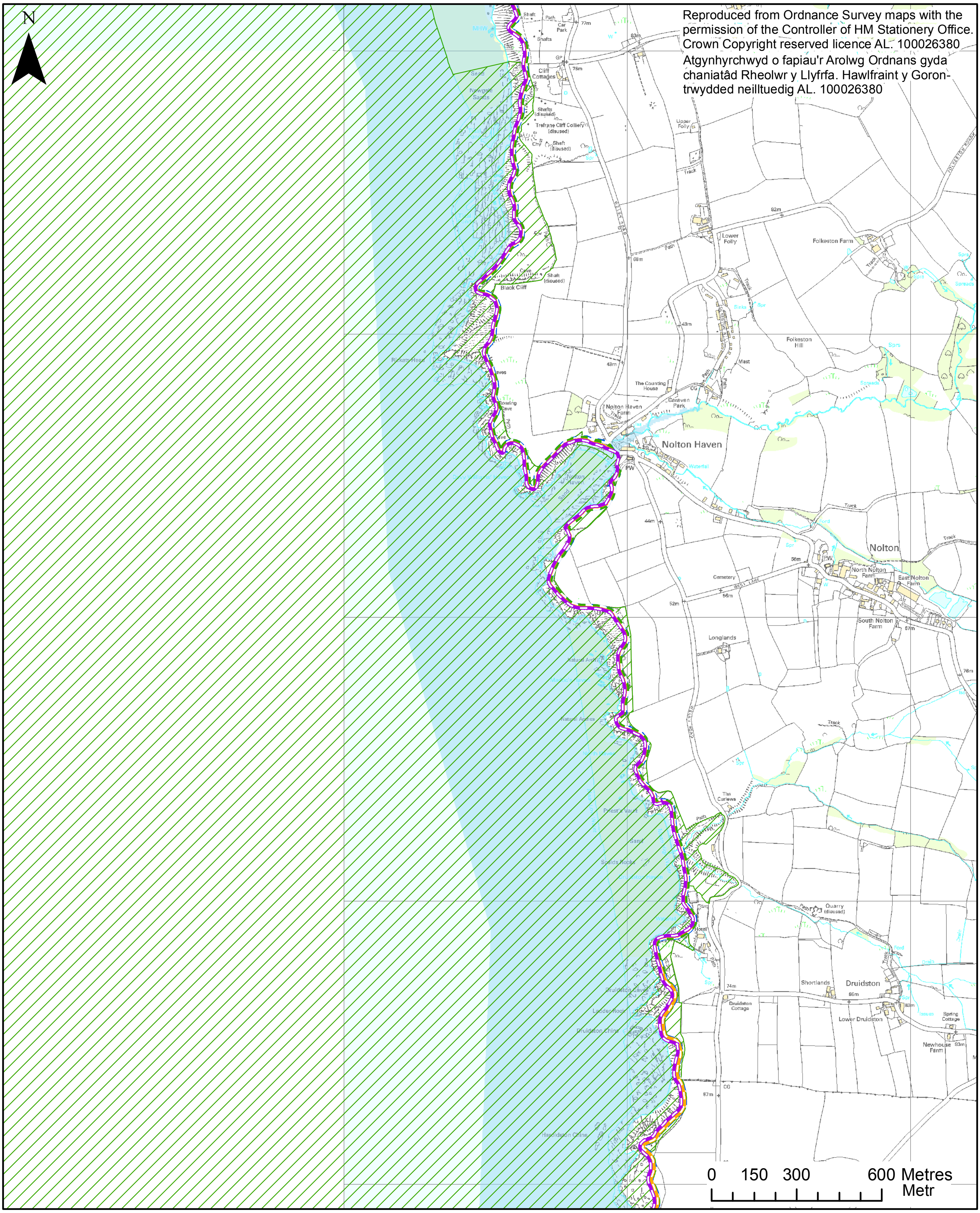
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 7



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 8

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 9

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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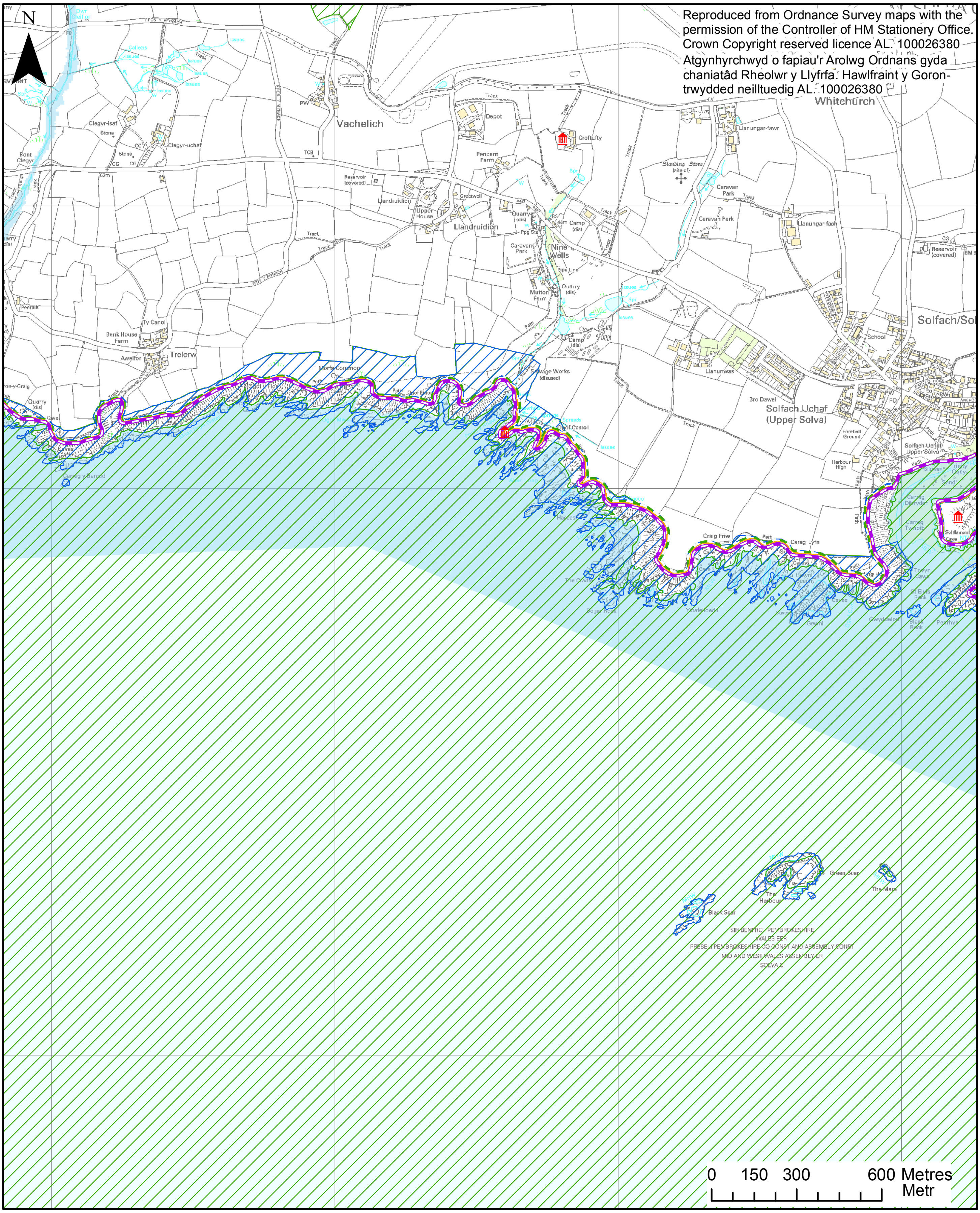
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 10



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 11

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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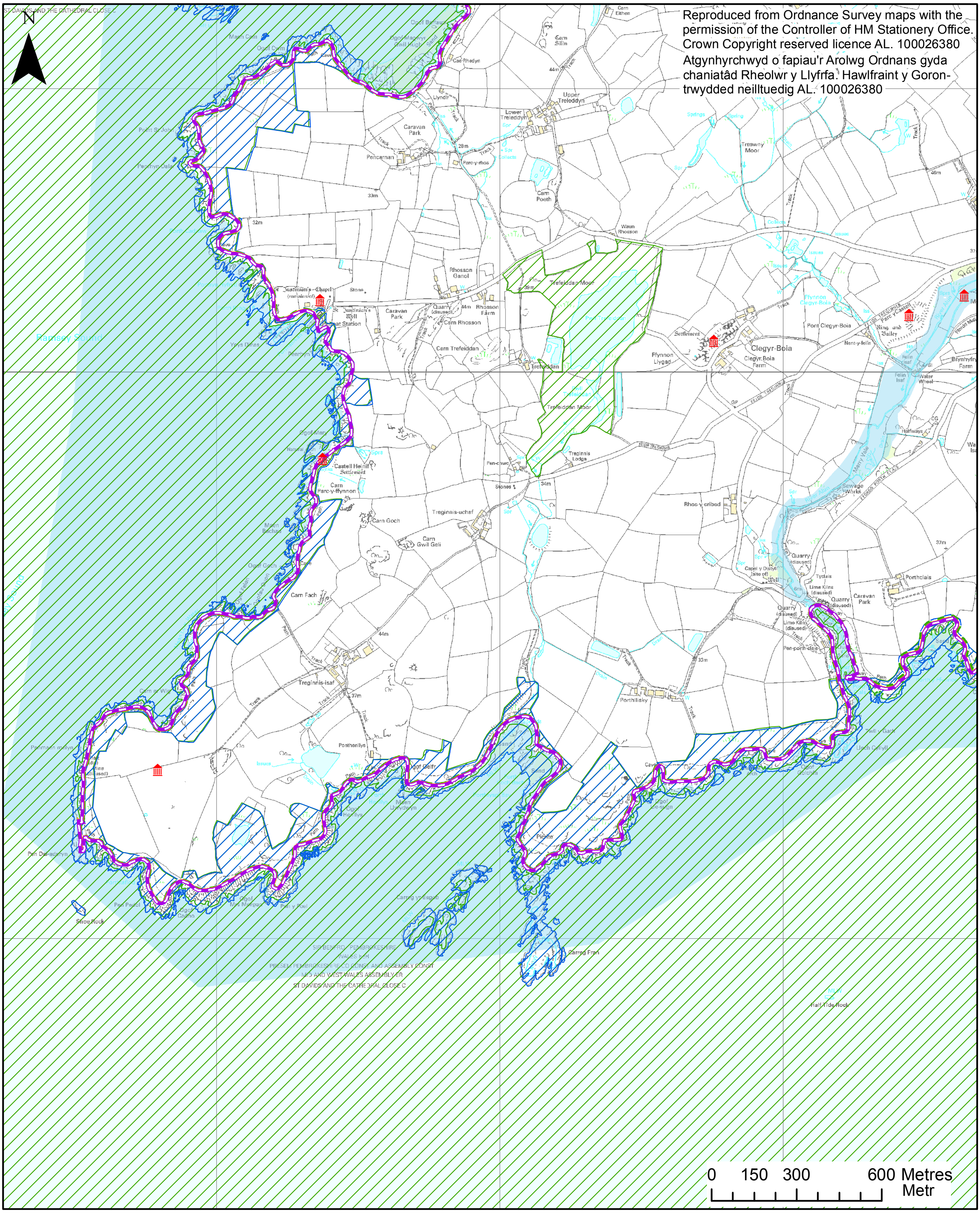
# Shoreline Management Plan - West of Wales		Cynllun Rheoli Traethlin - Gorllewin Cymru
# Erosion and Flood Risk - With Present Management	Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 12



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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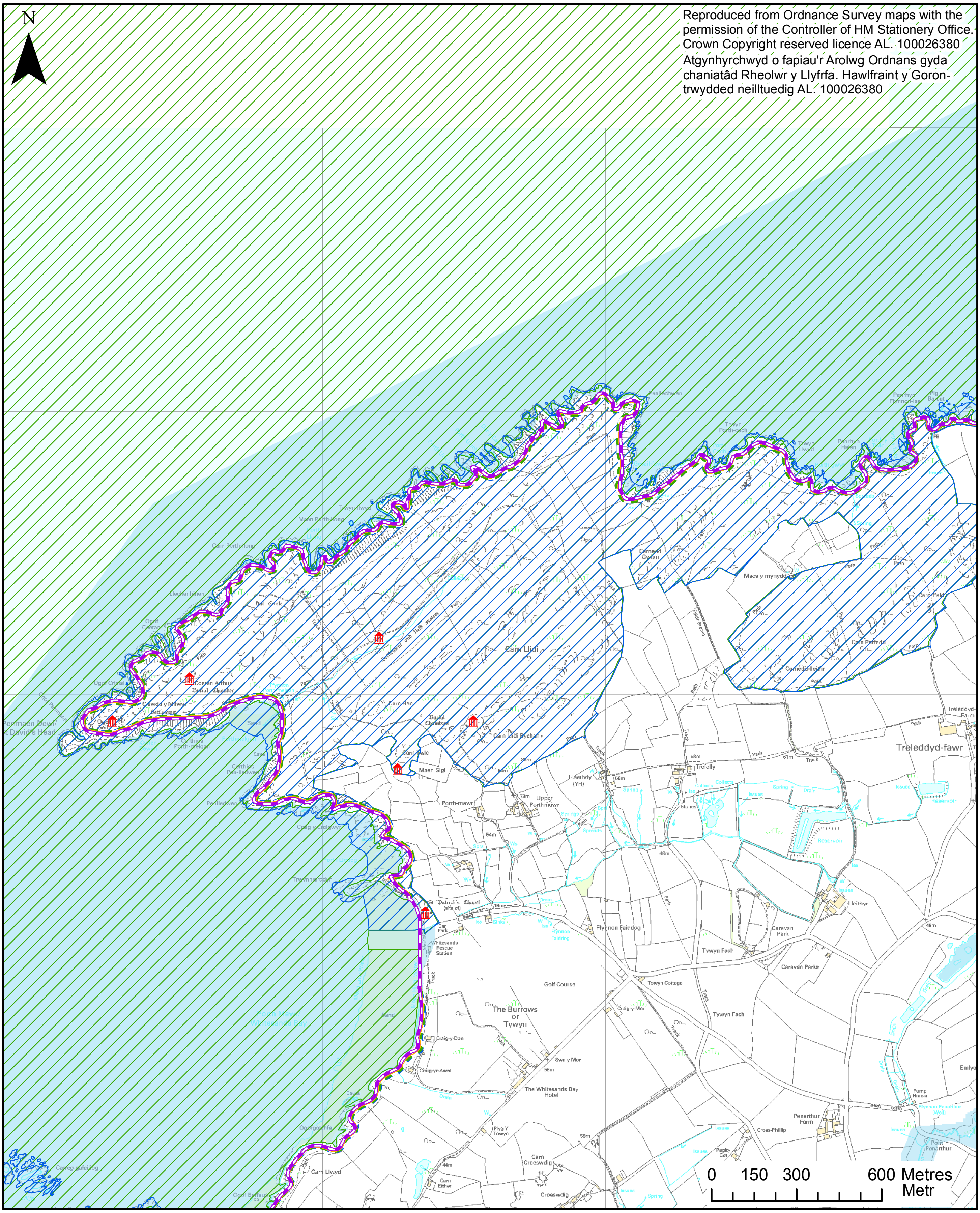
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 13



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬ Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨ RAMSAR	
▬ Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨ SSSI	SoDdGa
▬ Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨ SAC	ACA
▬ 2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨ SPA	AGA
▬ Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂ Scheduled Monuments	Henebion Cofrestredig

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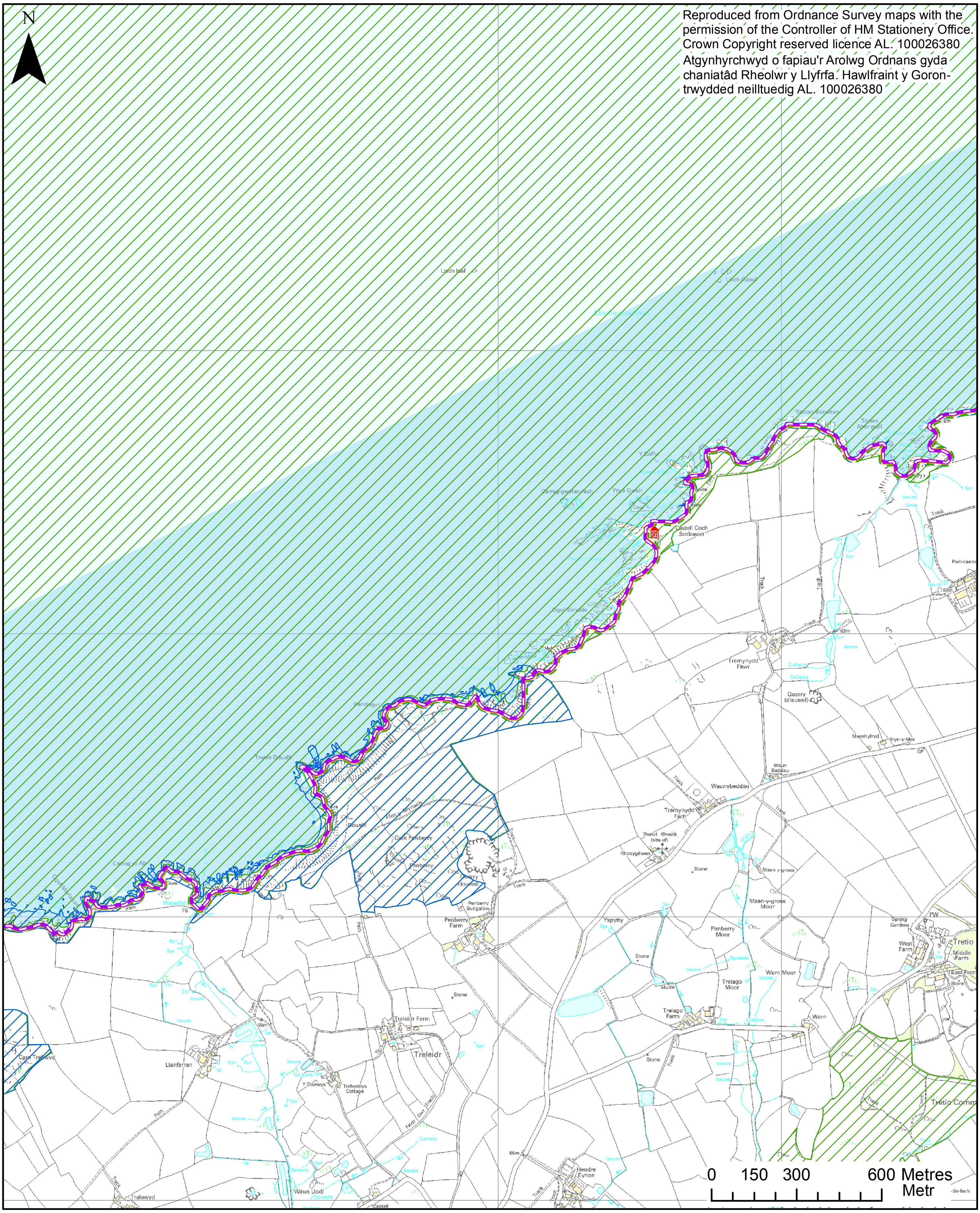
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 14



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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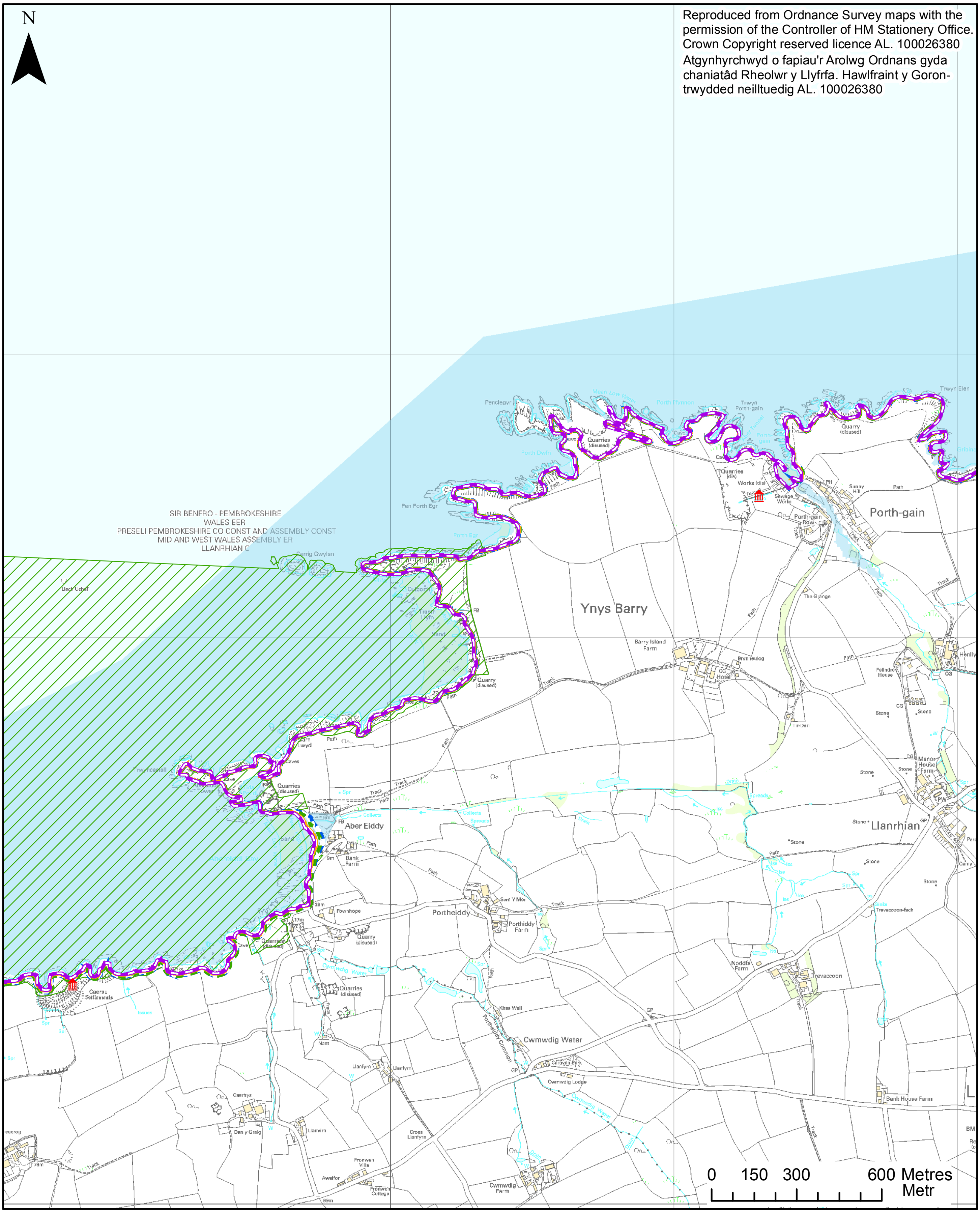
Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 15



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Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR		
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig	

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Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management   Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 16

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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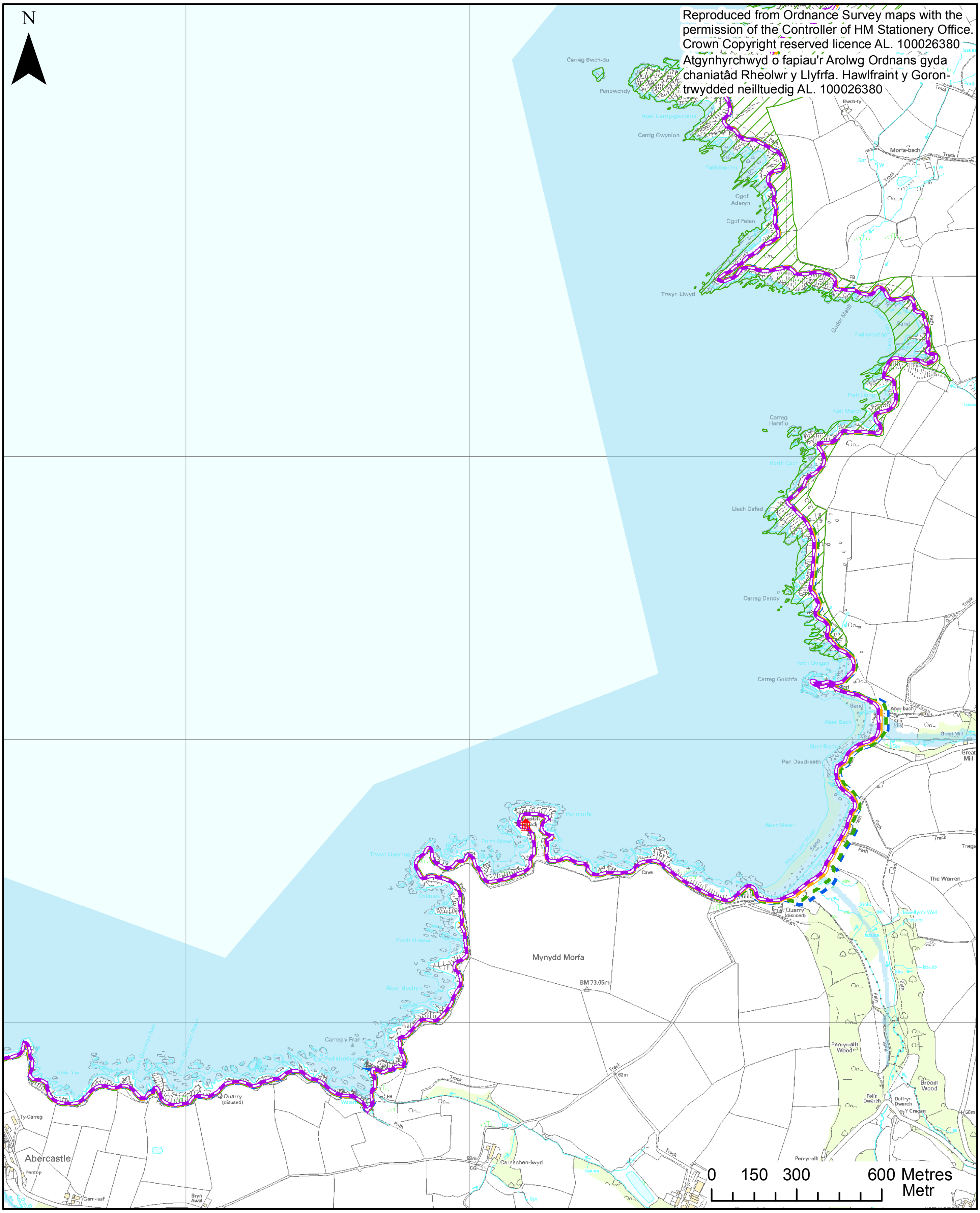
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 17



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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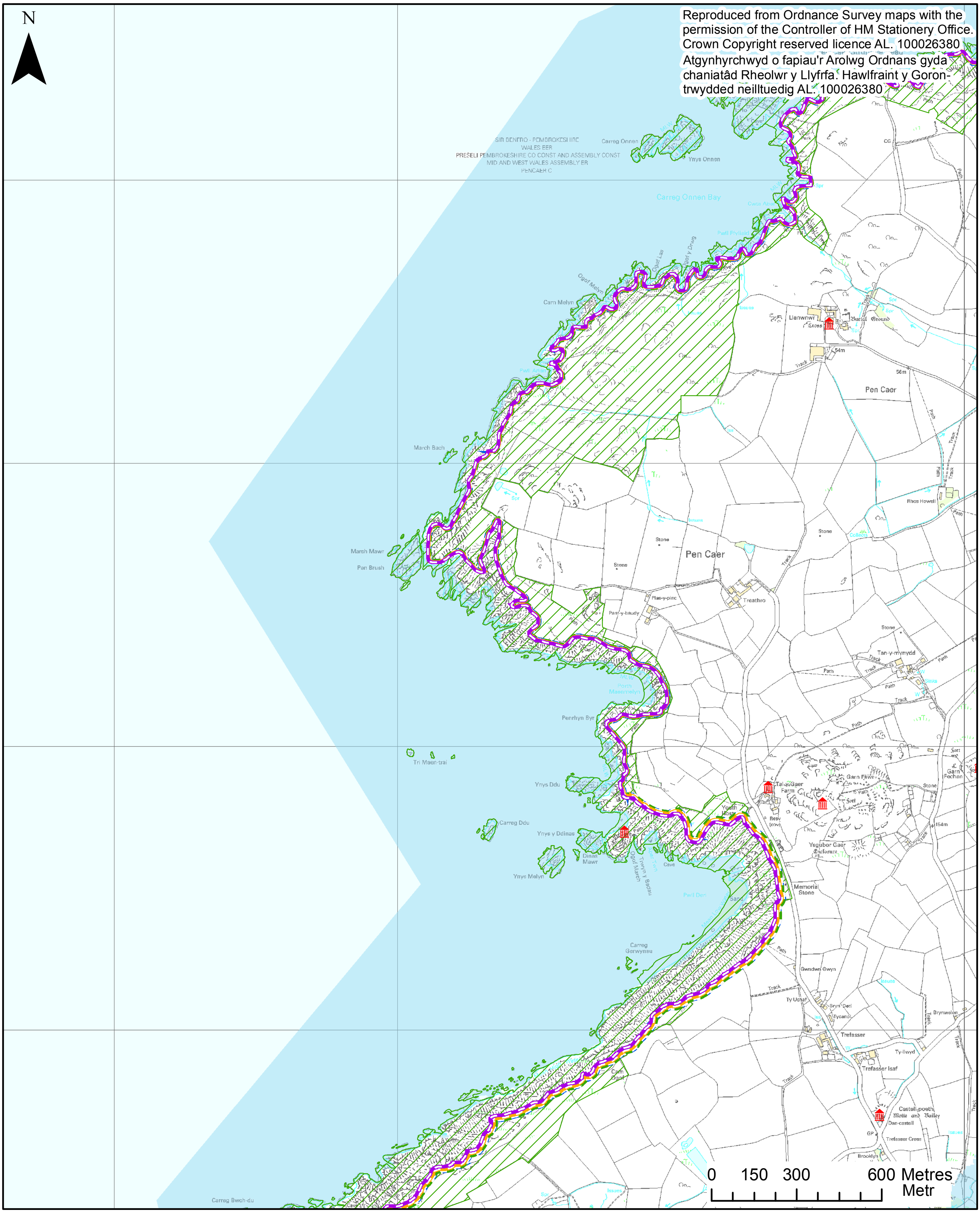
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 18



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol
Map 19

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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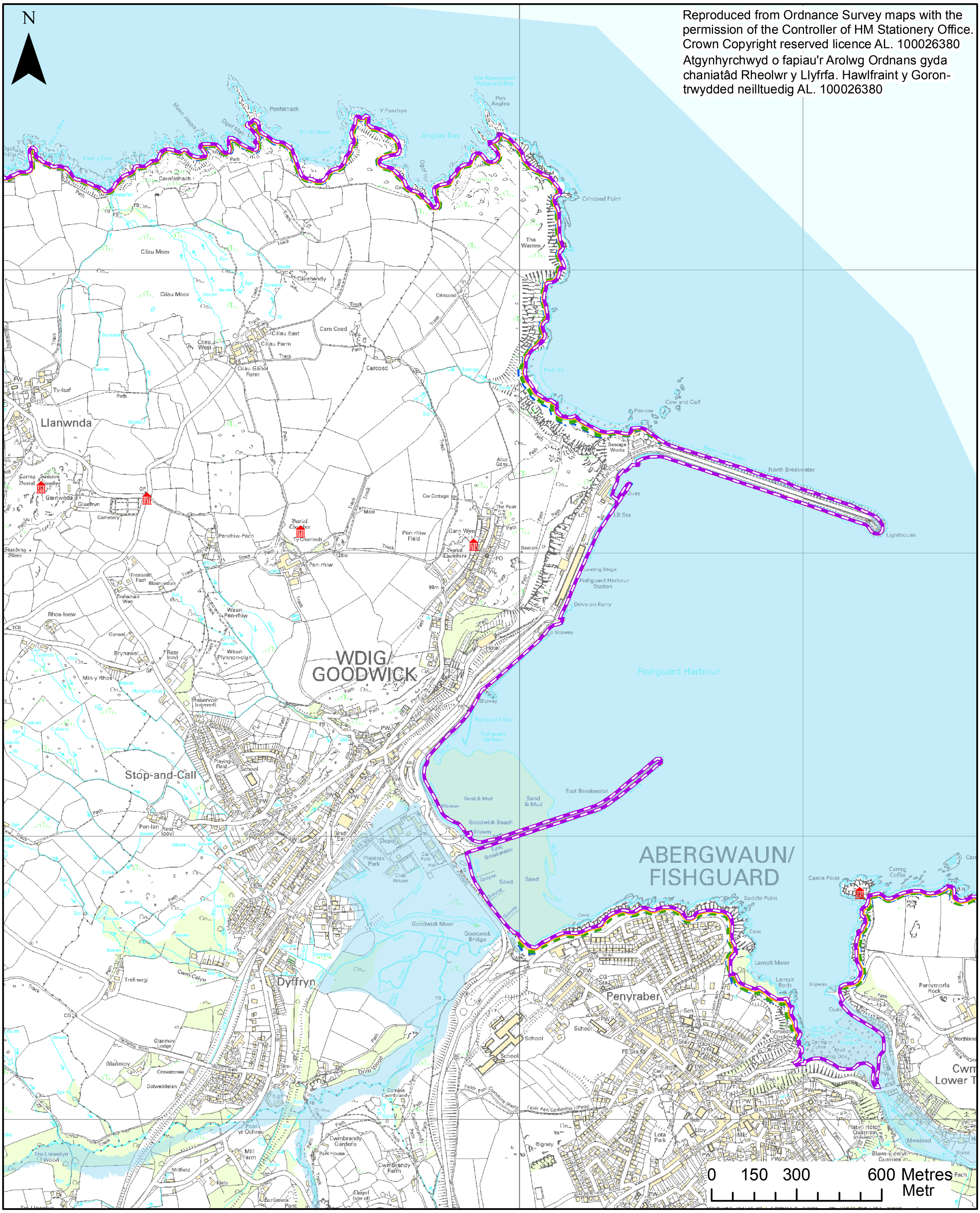
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 20



Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR		
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig	

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 21

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 22

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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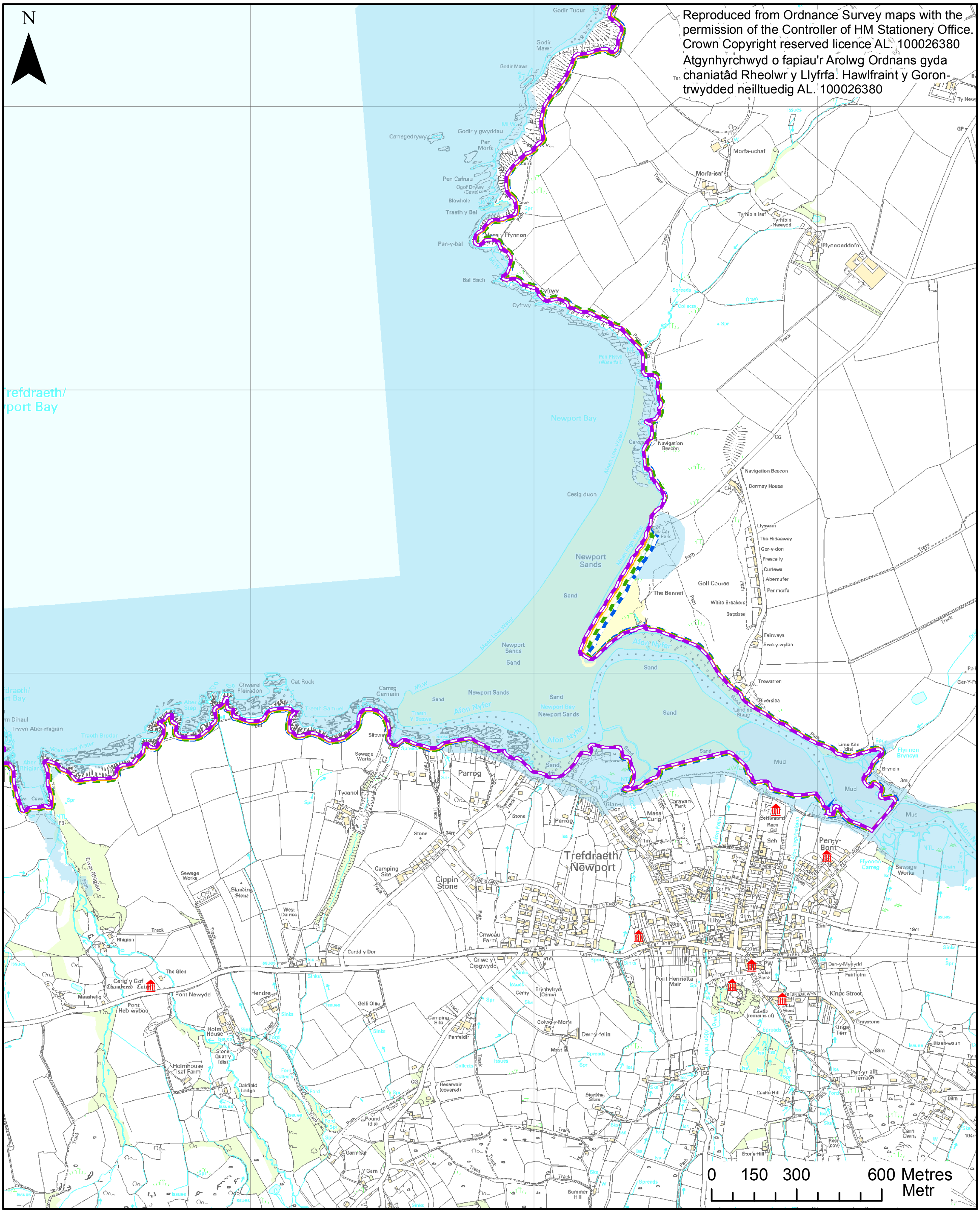
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 23



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 24

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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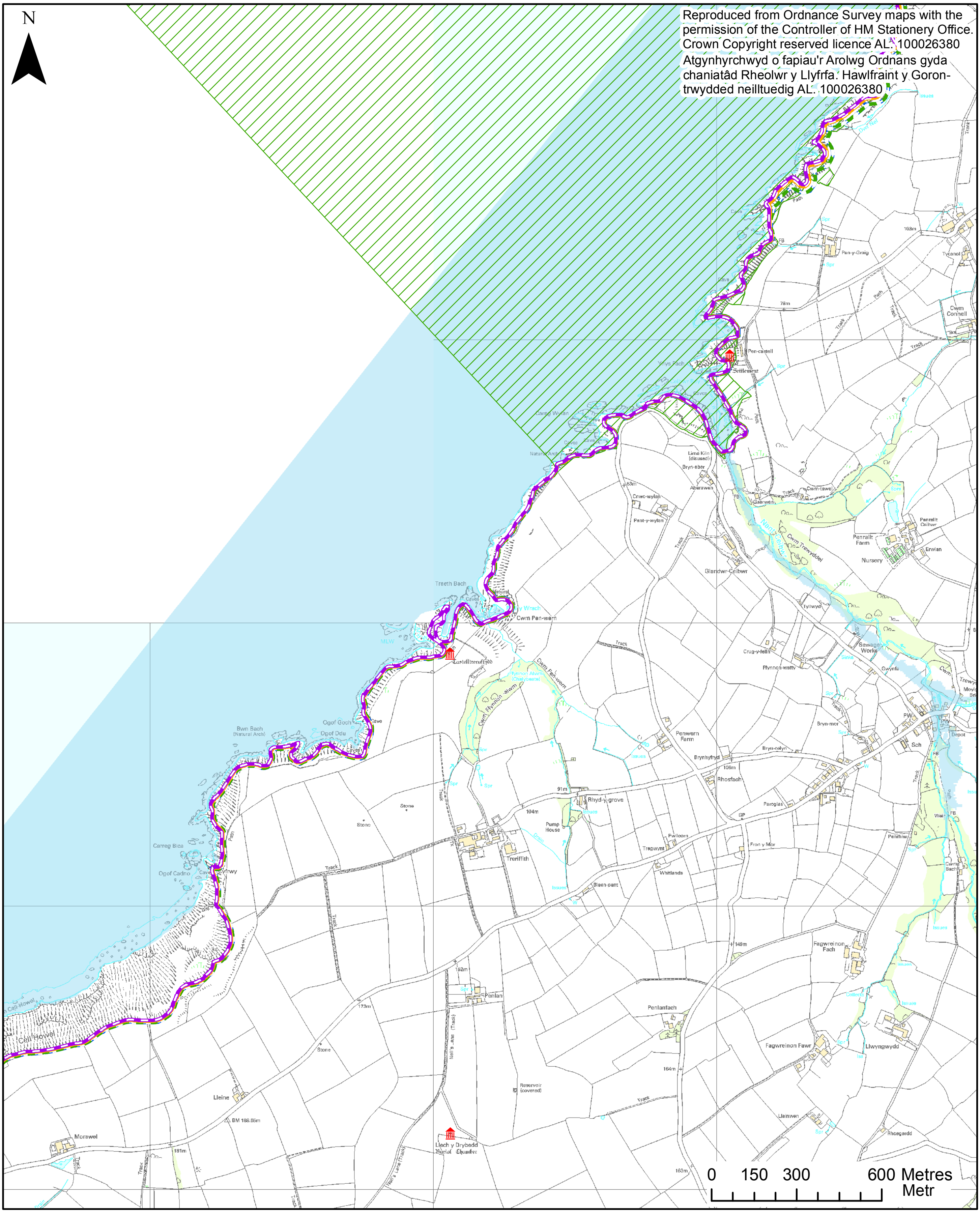
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 25



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨ RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨ SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨ SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨ SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	Scheduled Monuments	Henebion Cofrestredig

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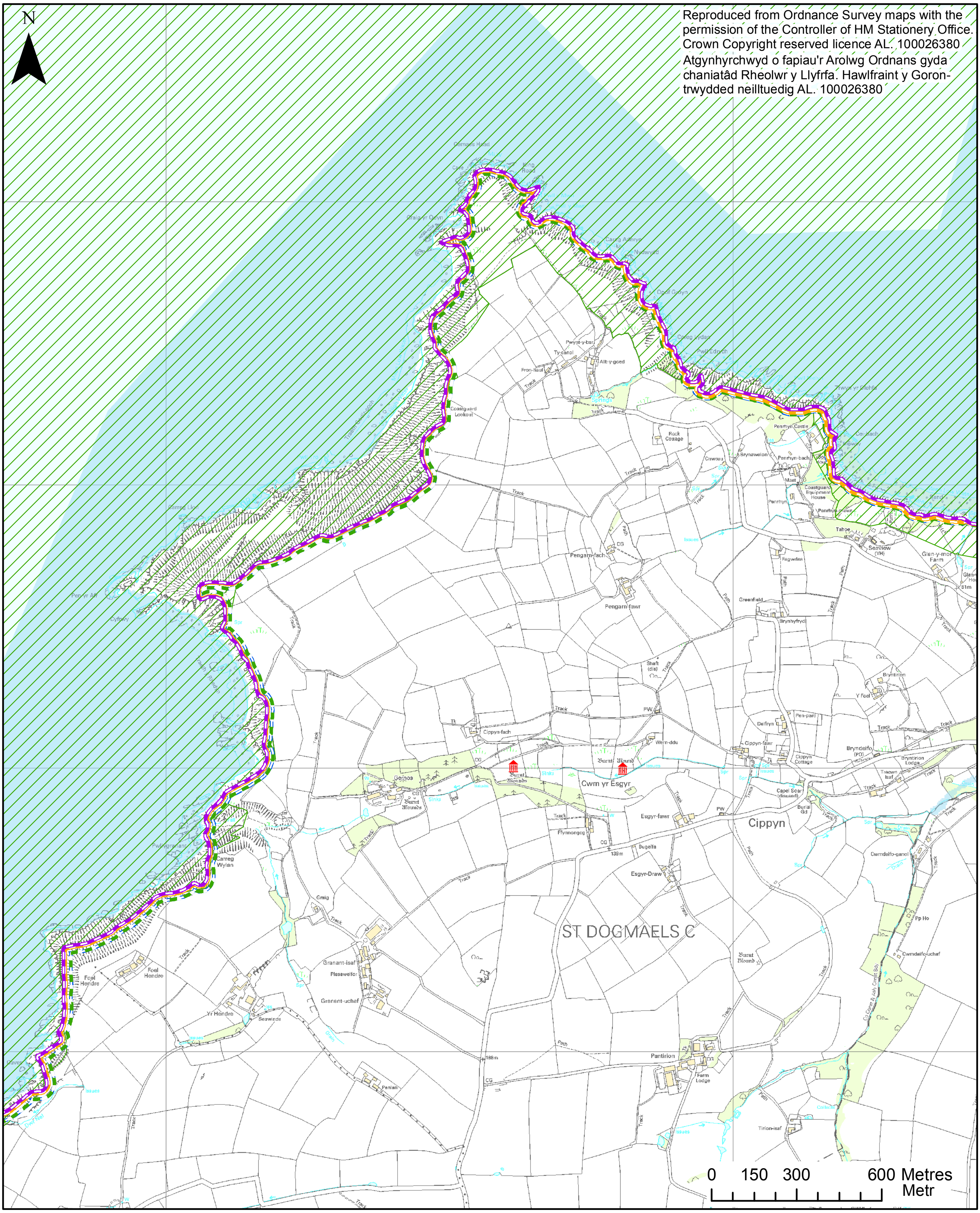
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 26



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 29

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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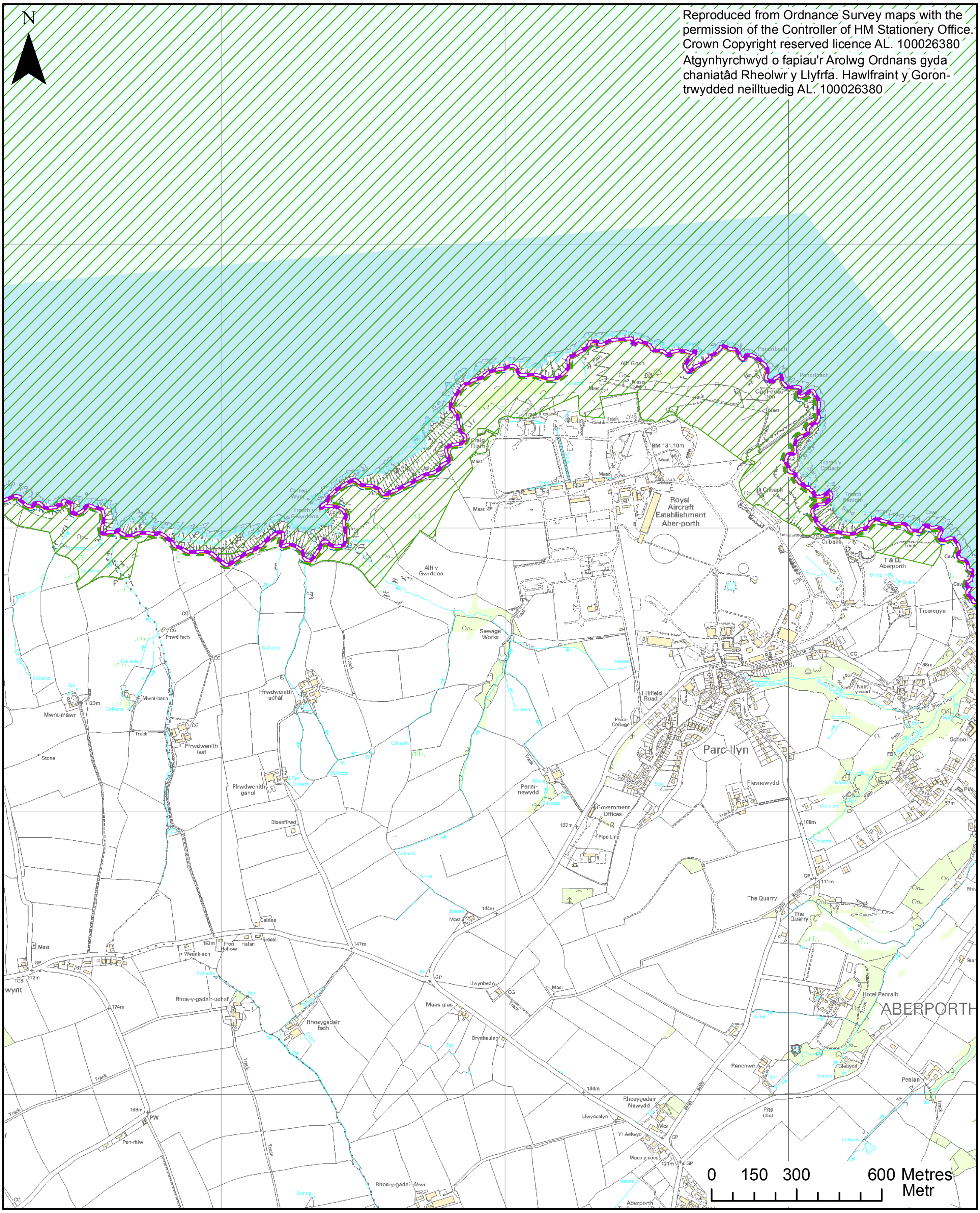
Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management   Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 30



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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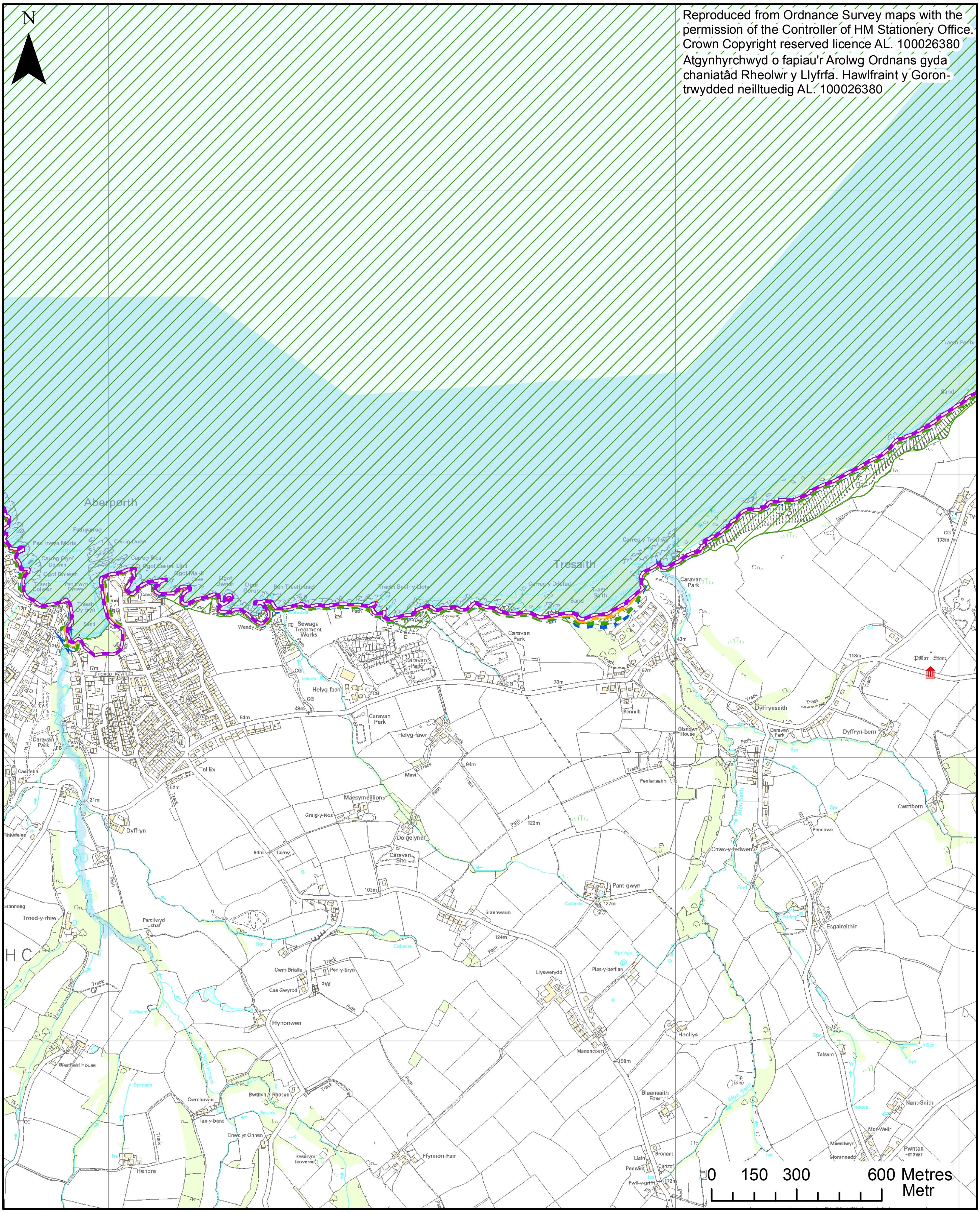
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 31



🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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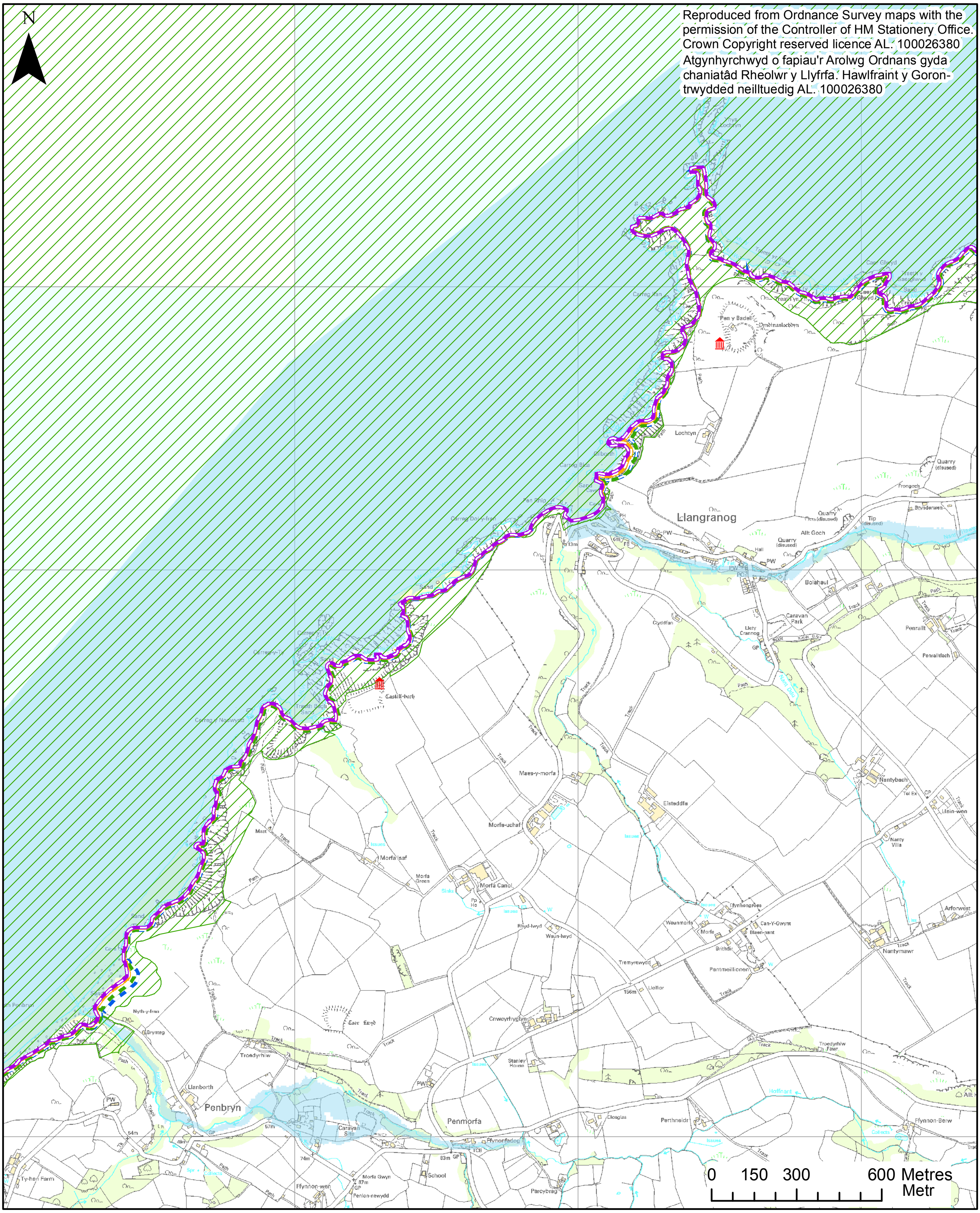
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 32



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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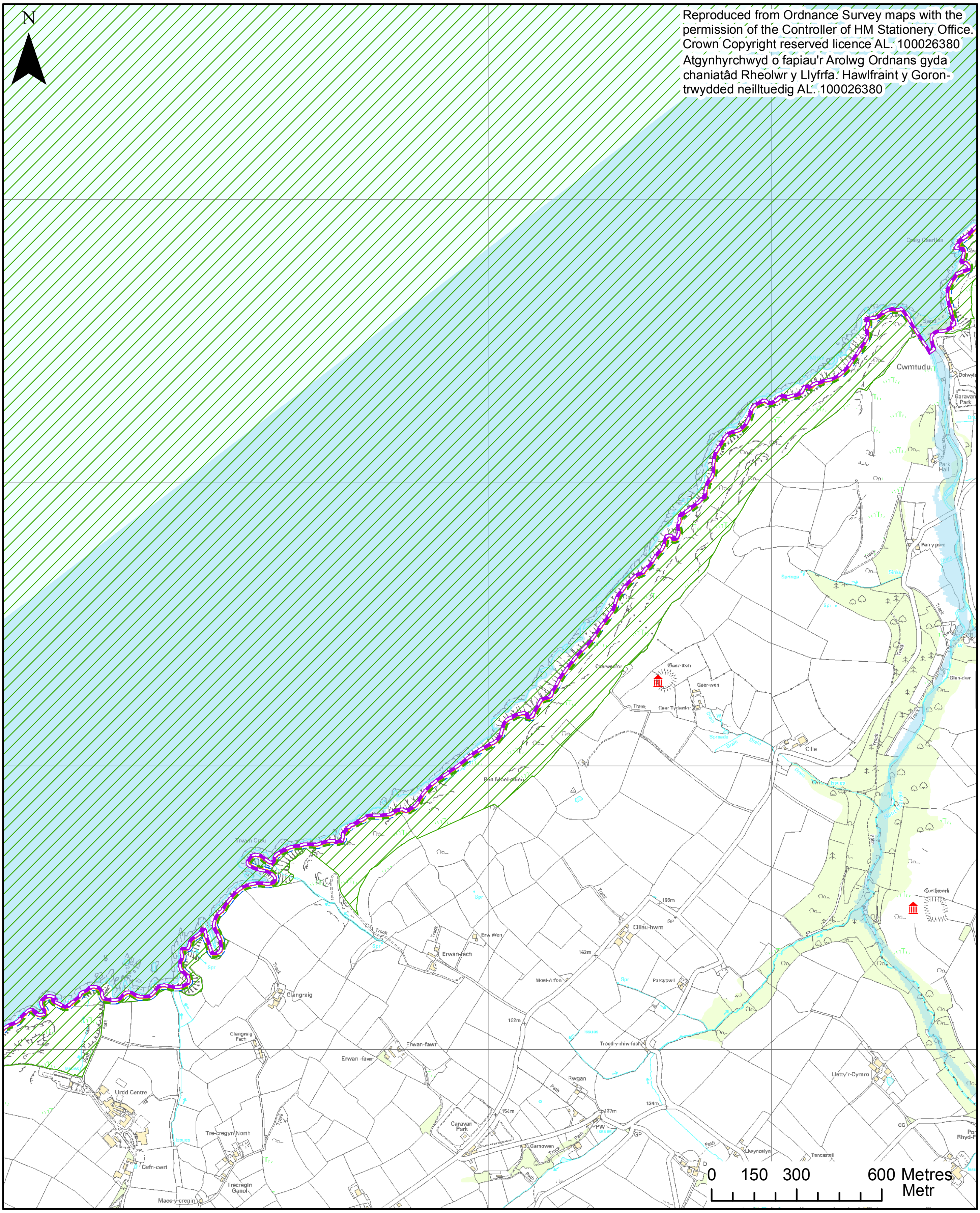
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 33



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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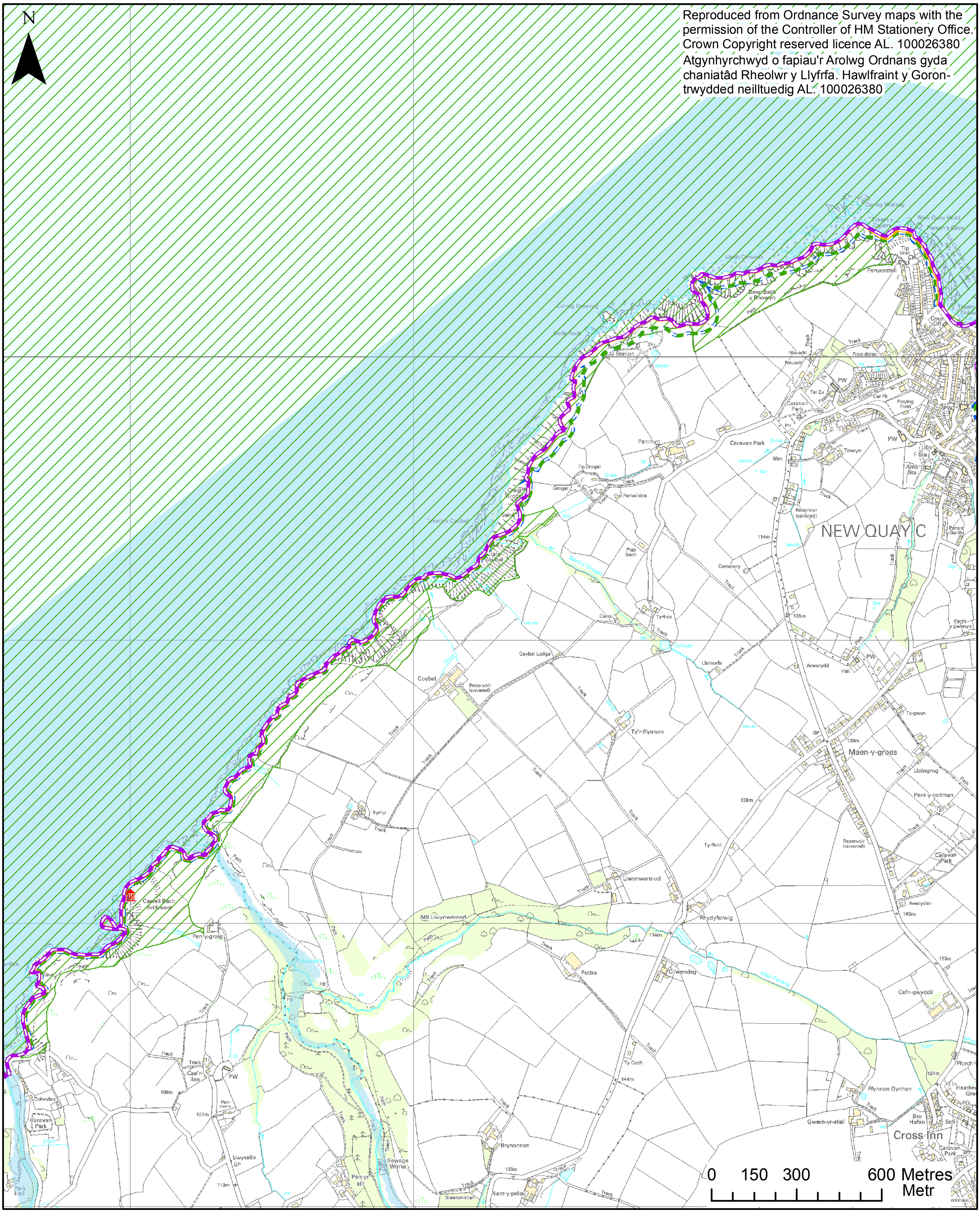
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 34



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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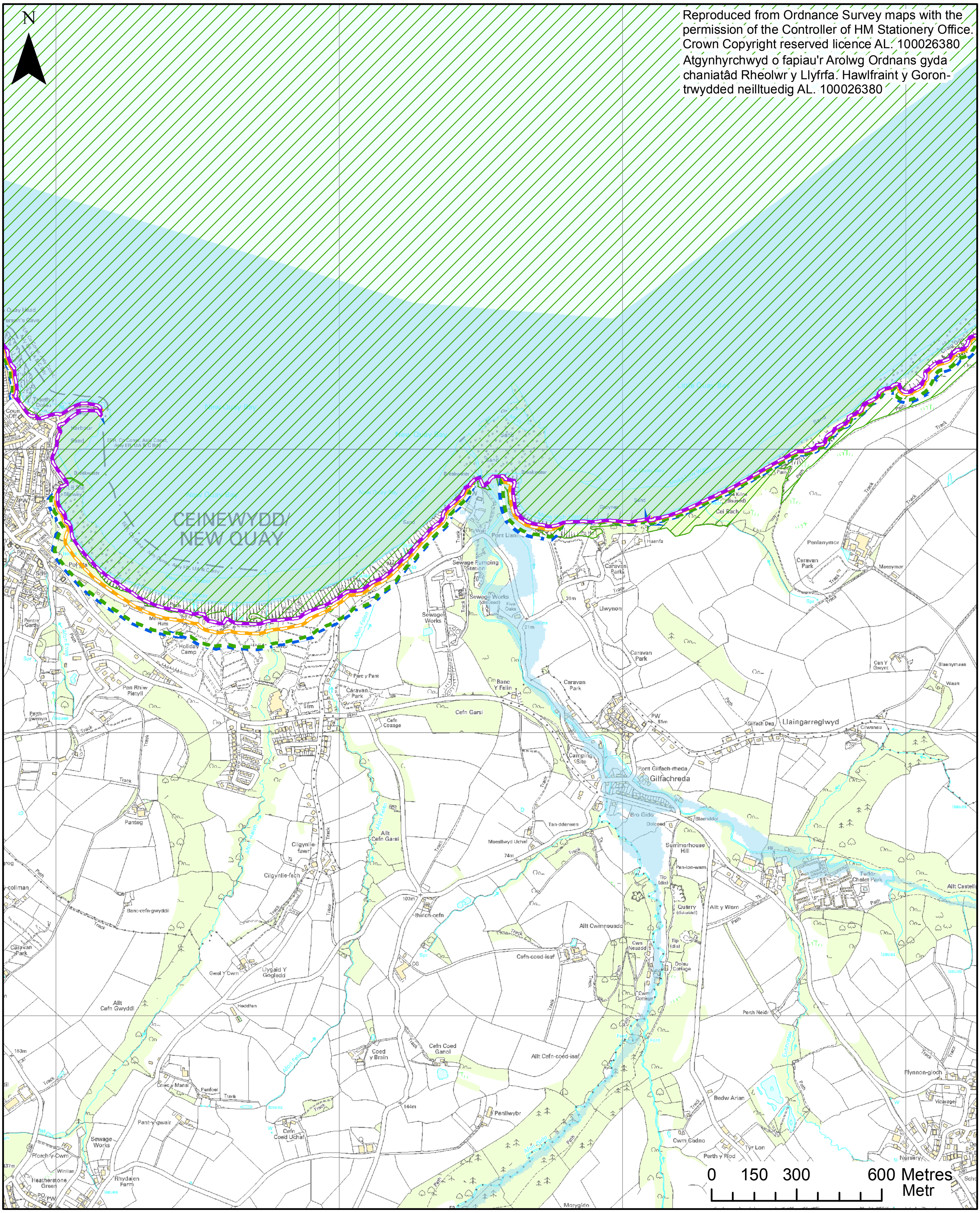
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 35



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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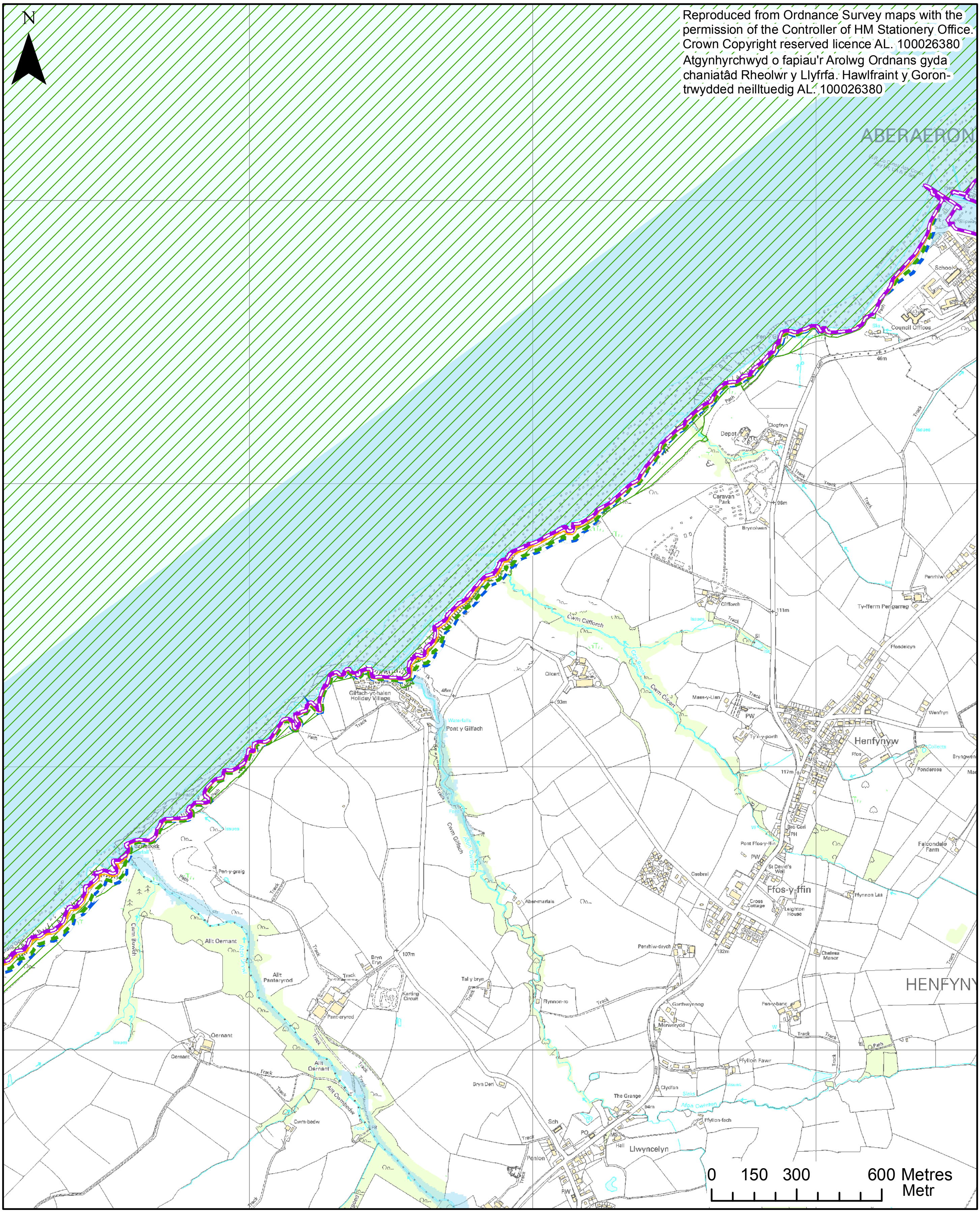
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 36



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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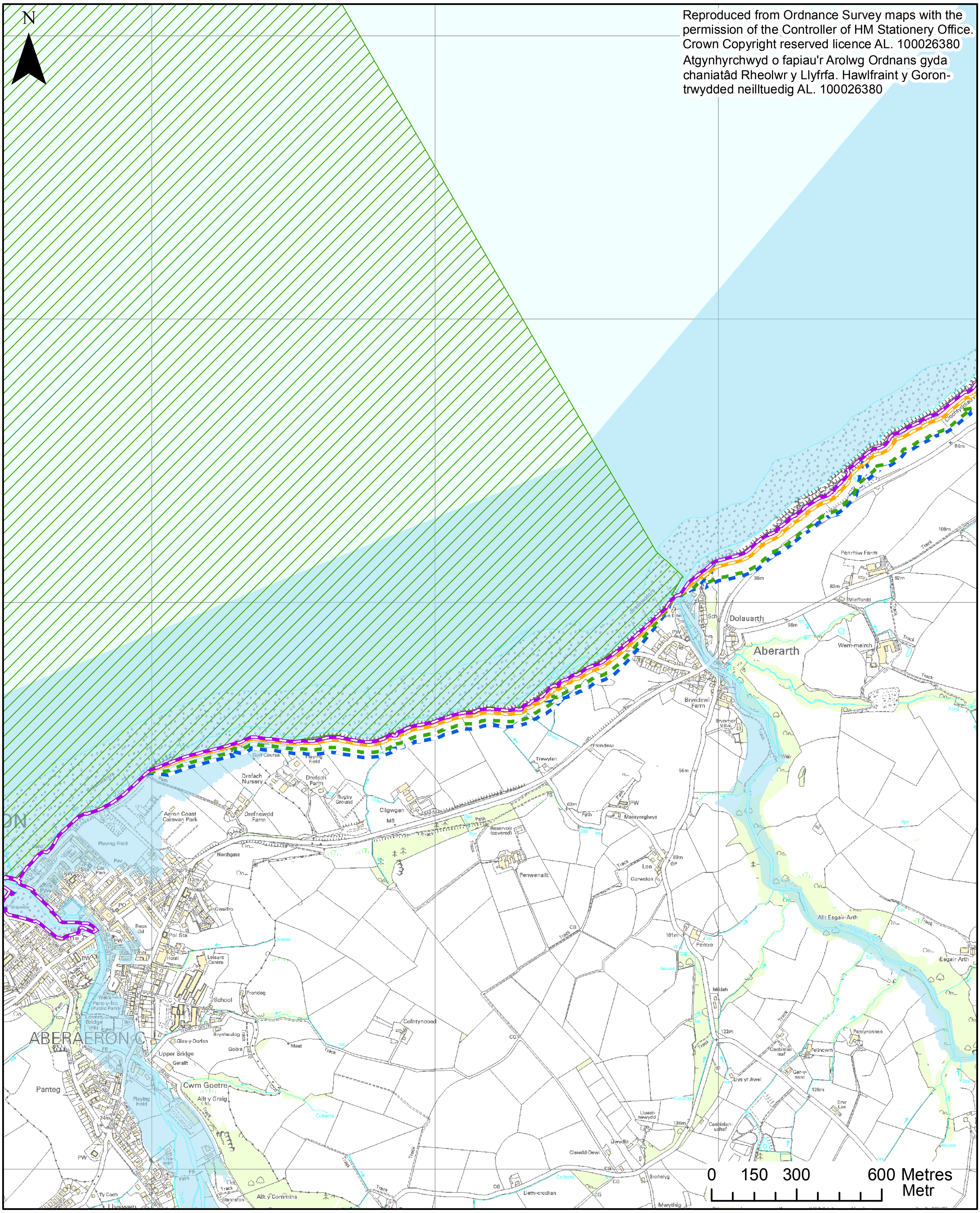
Shoreline Management Plan - West of Wales　Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management　Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 37



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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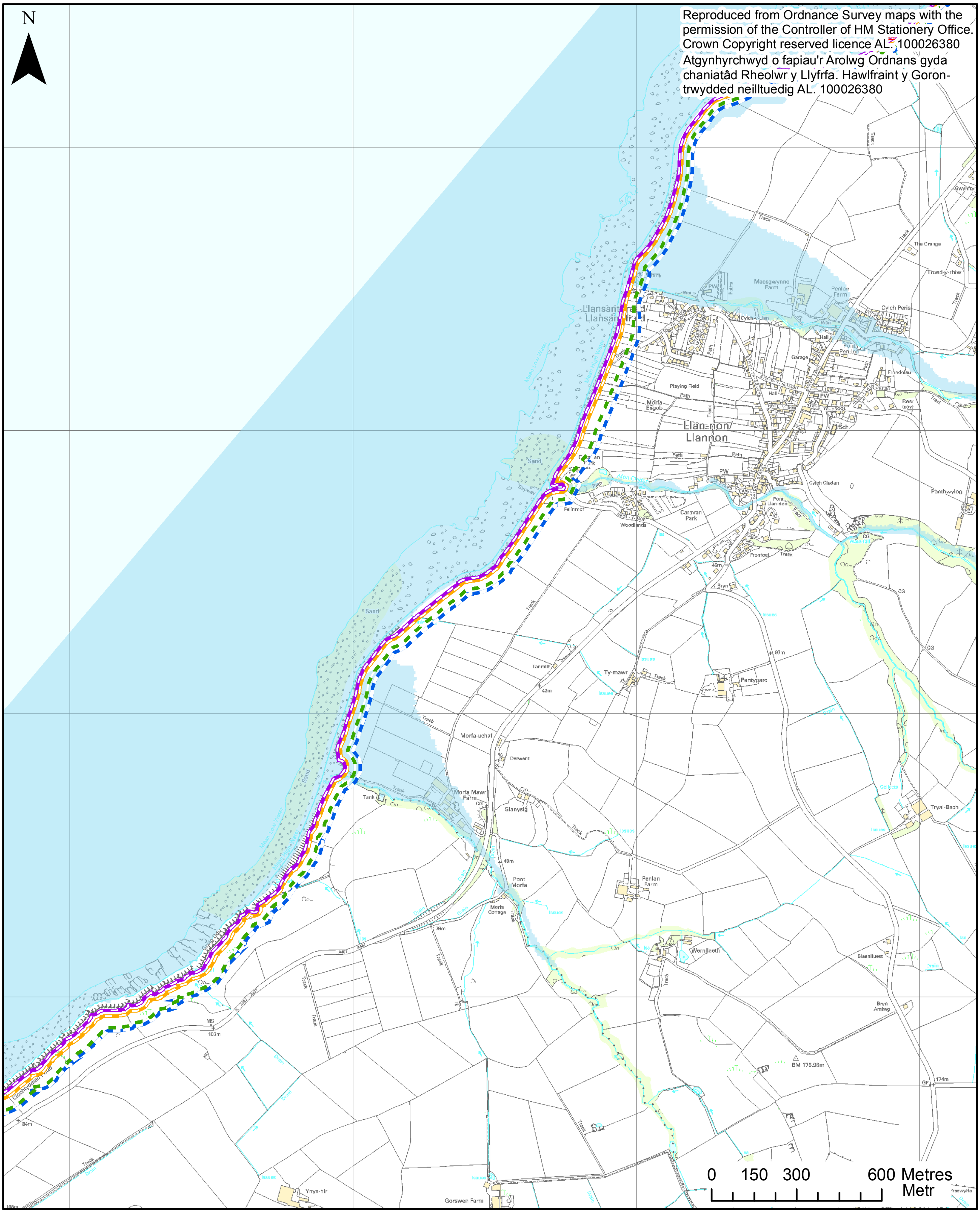
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 38



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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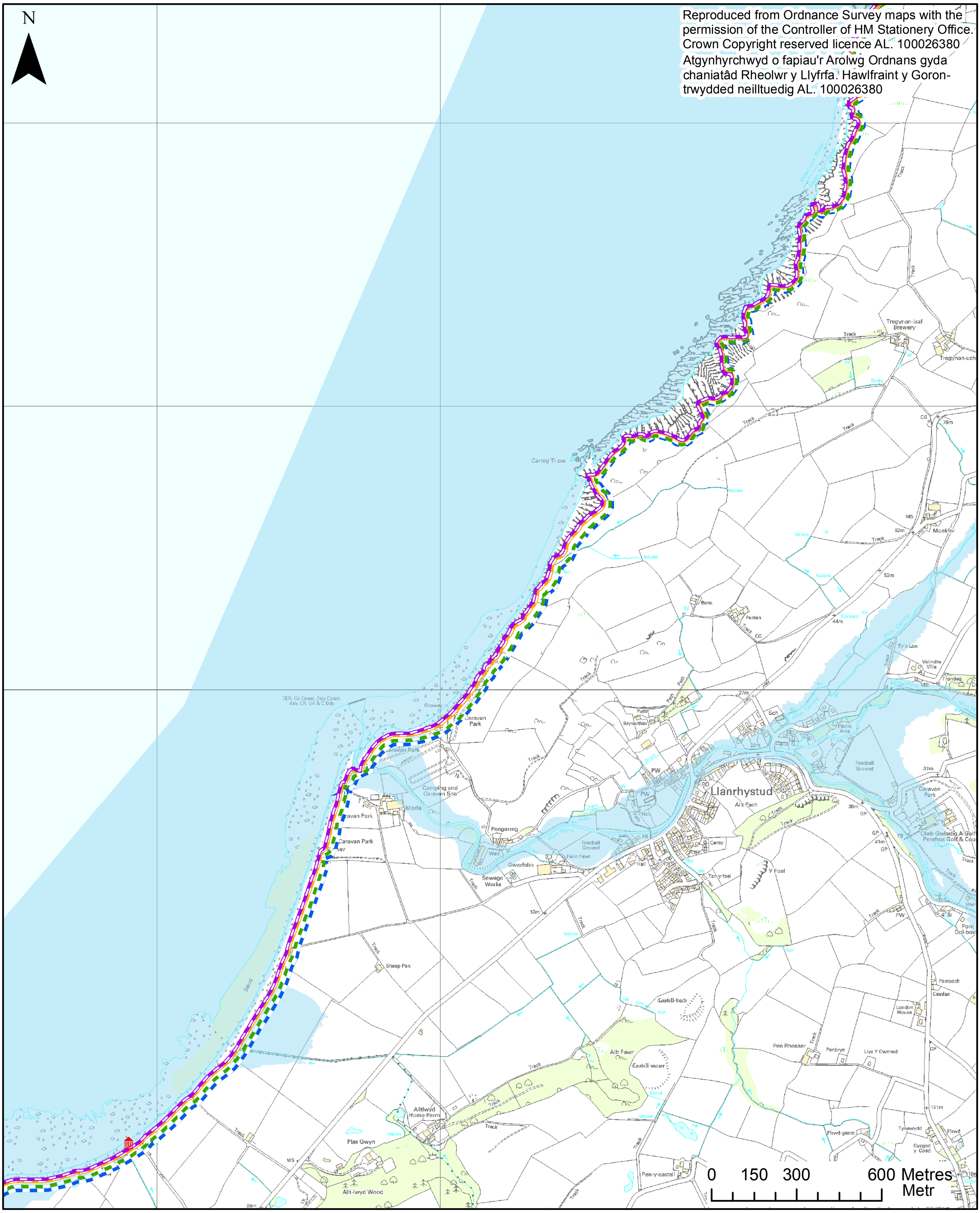
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 39



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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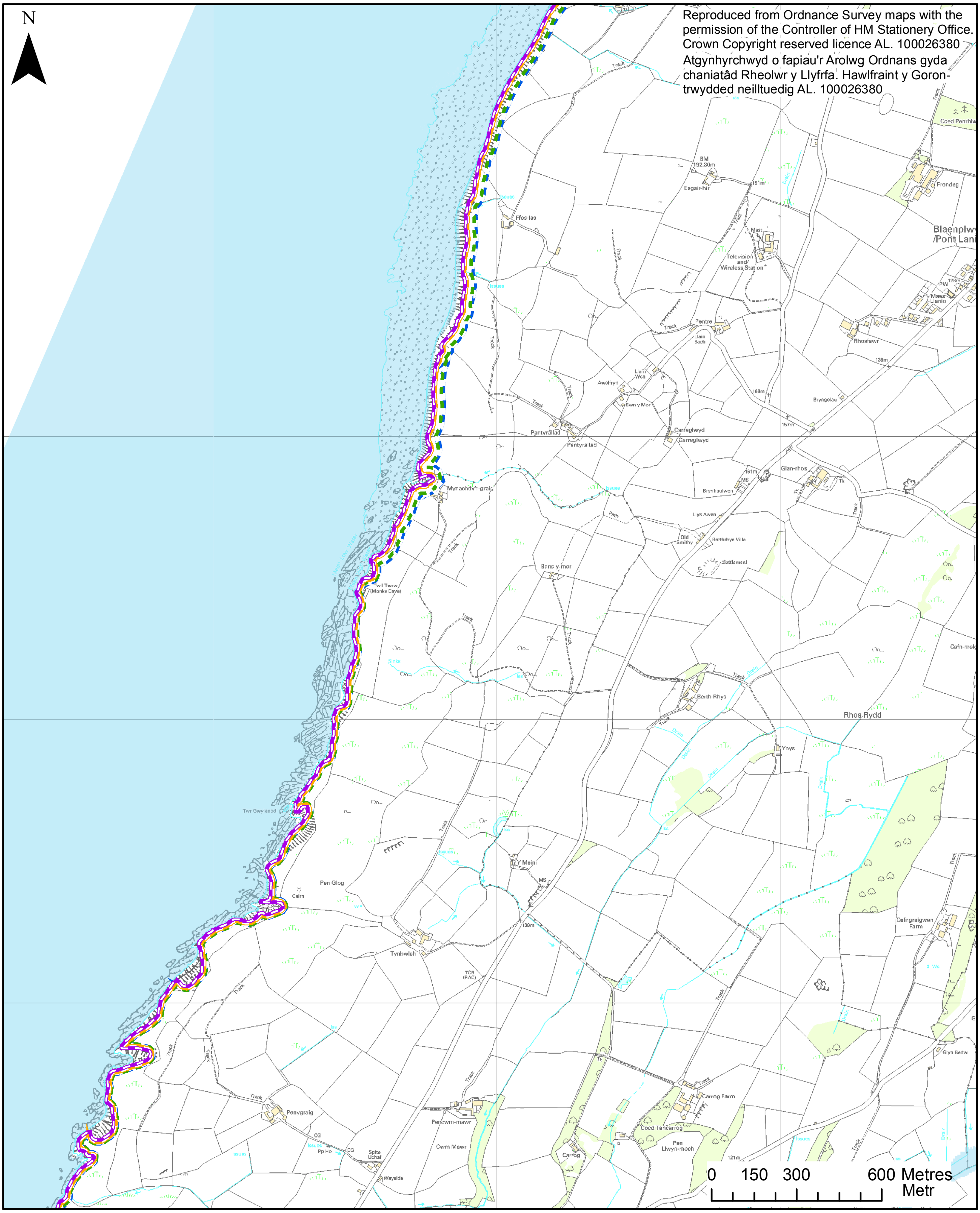
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 40



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🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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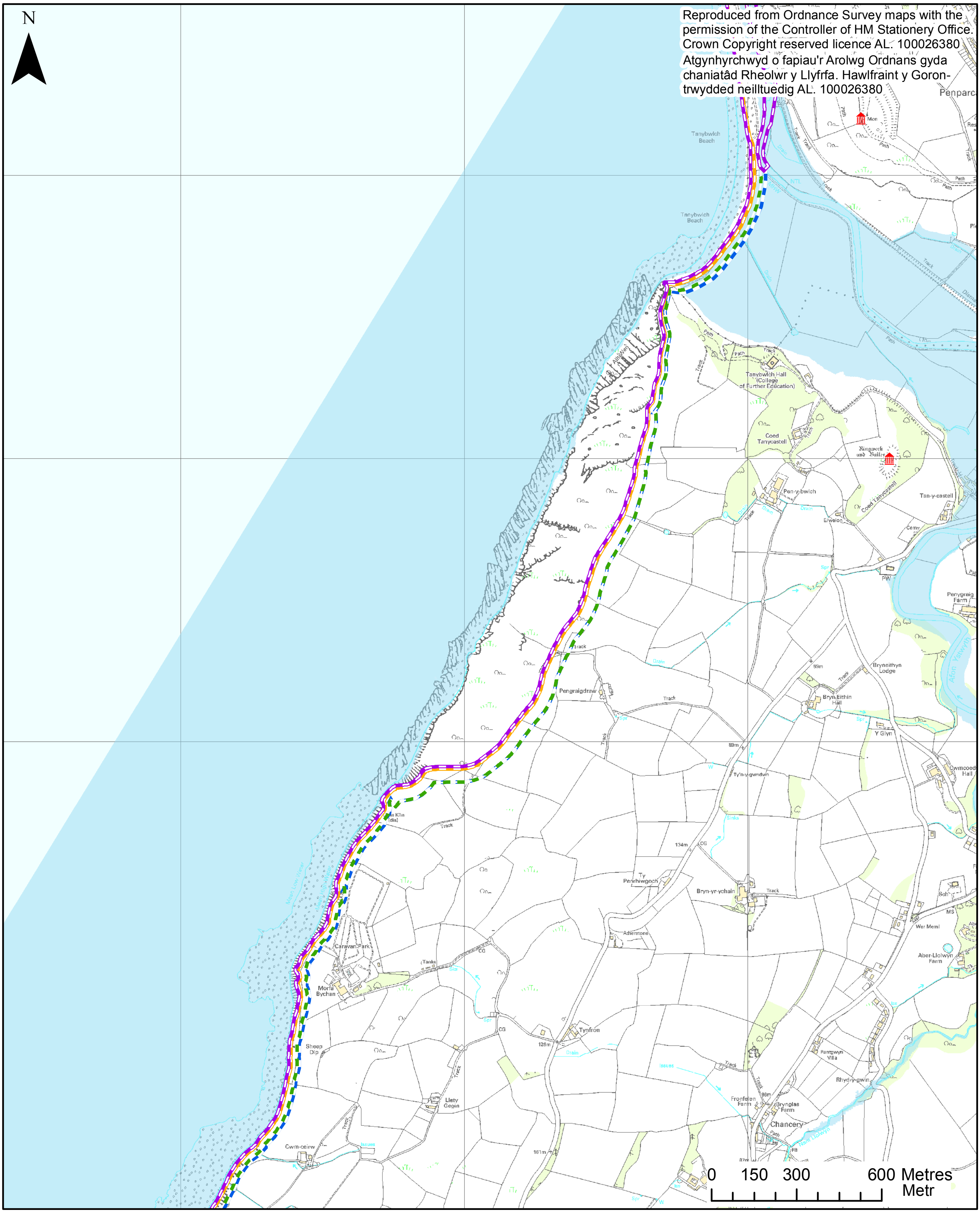
Shoreline Management Plan - West of Wales　Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 41



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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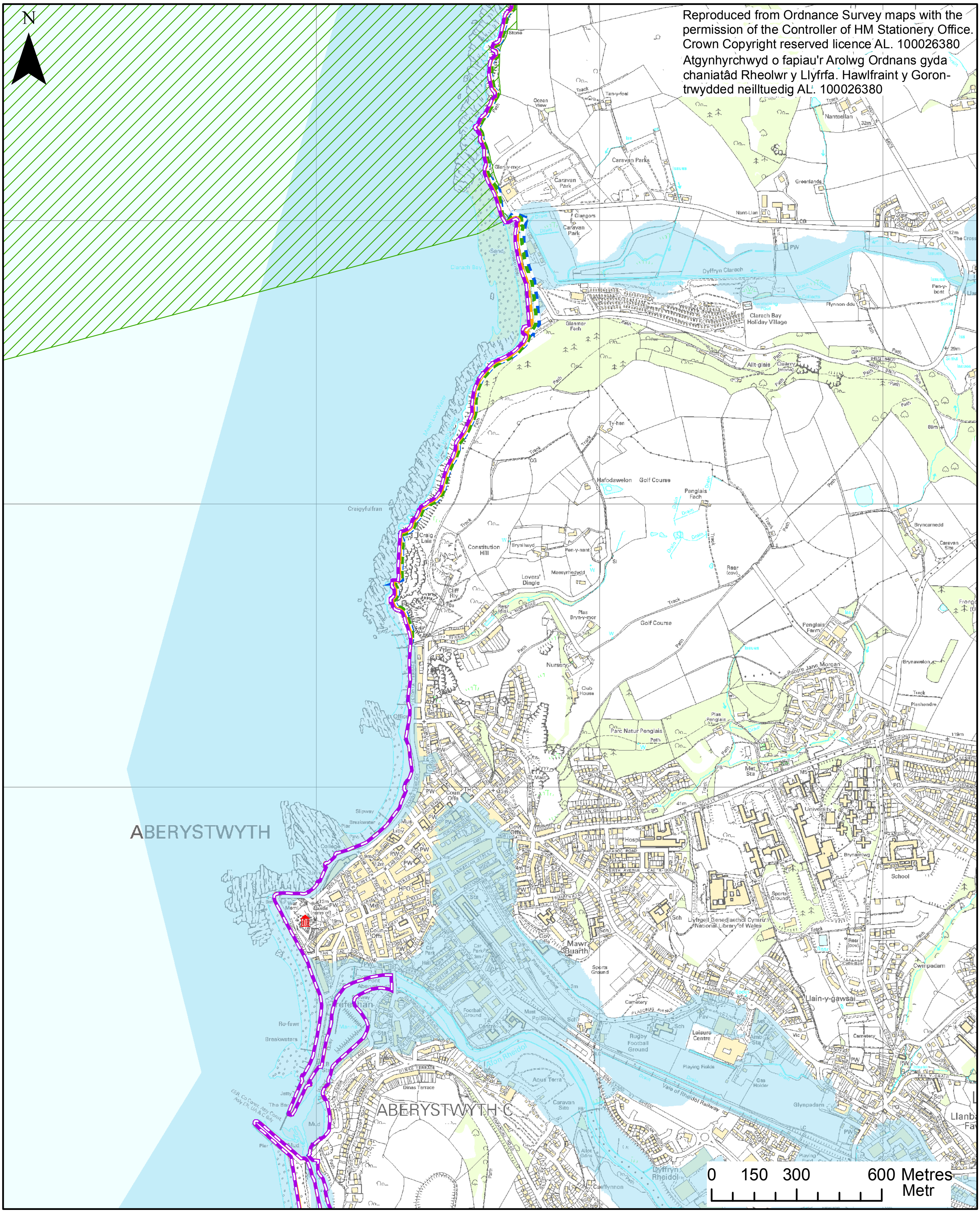
Shoreline Management Plan - West of Wales

Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru

Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 42



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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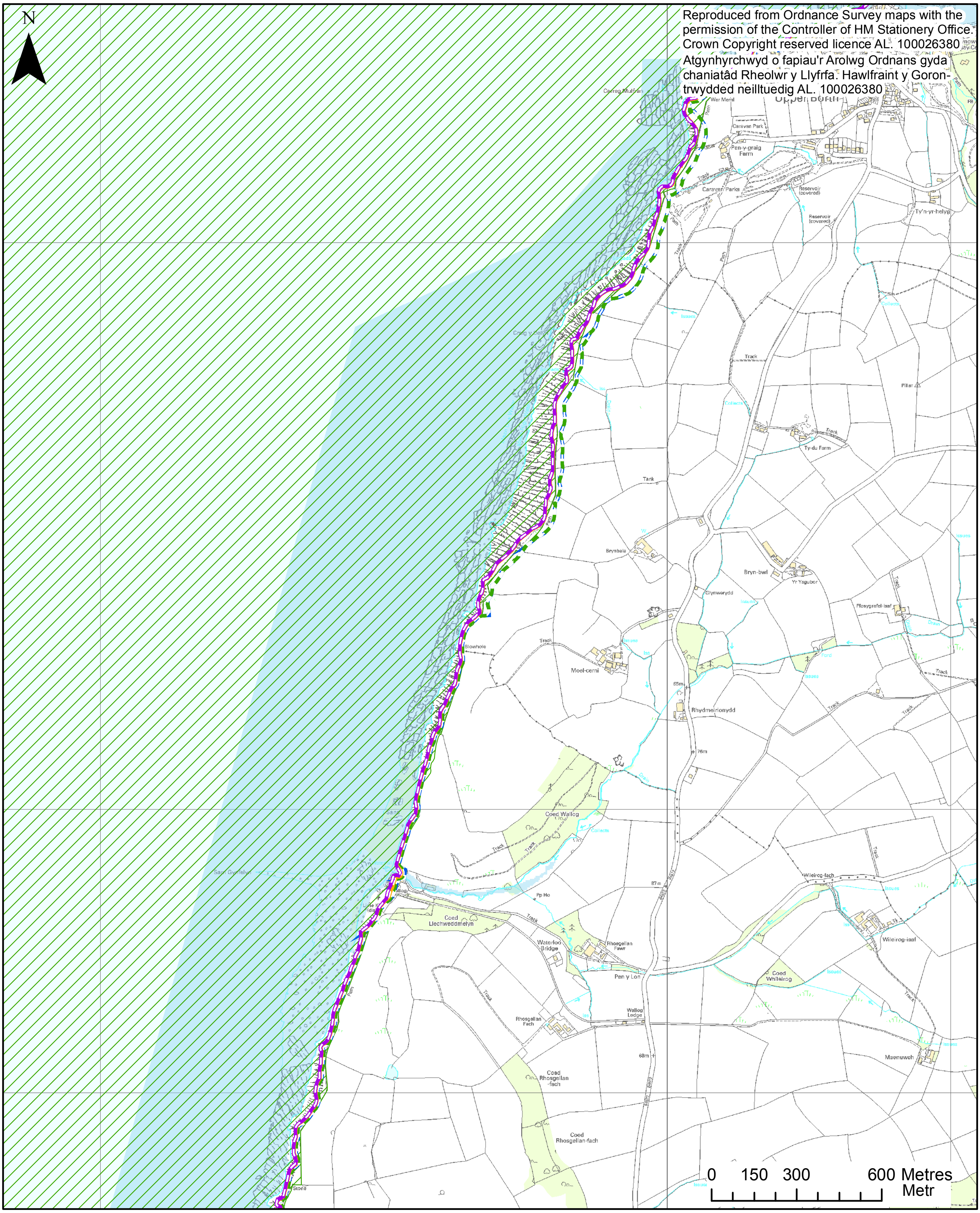
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 43



🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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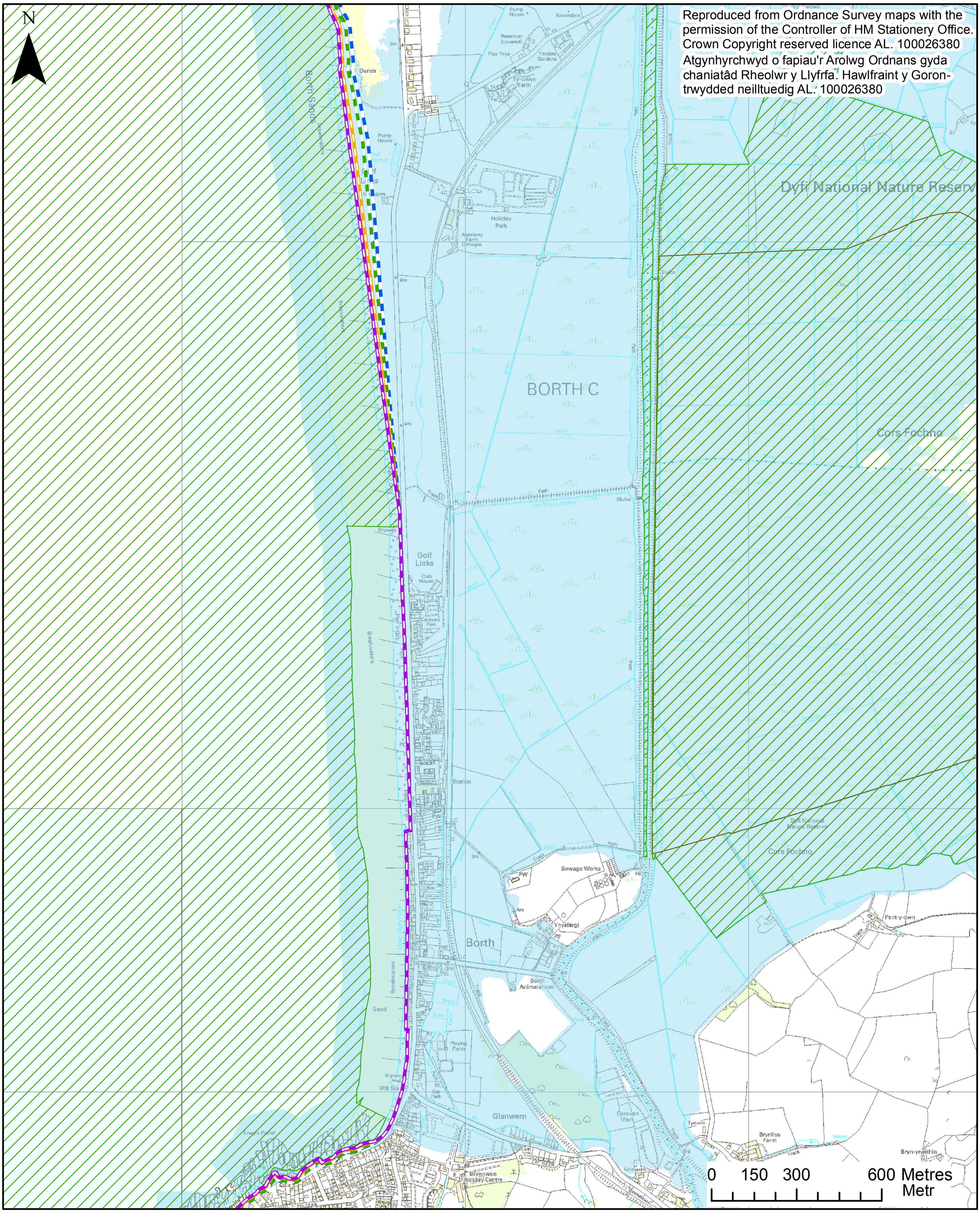
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 44



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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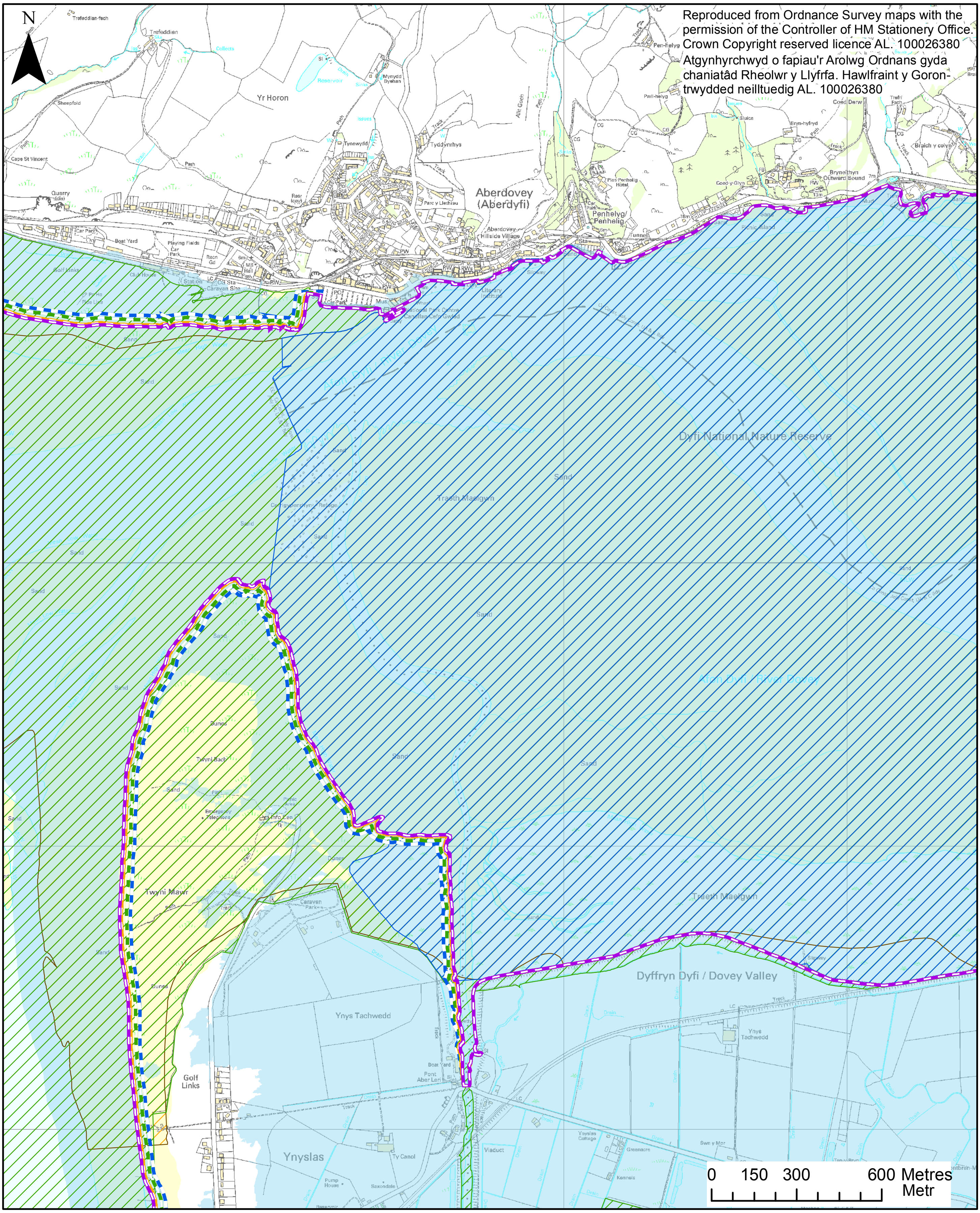
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 45



Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig

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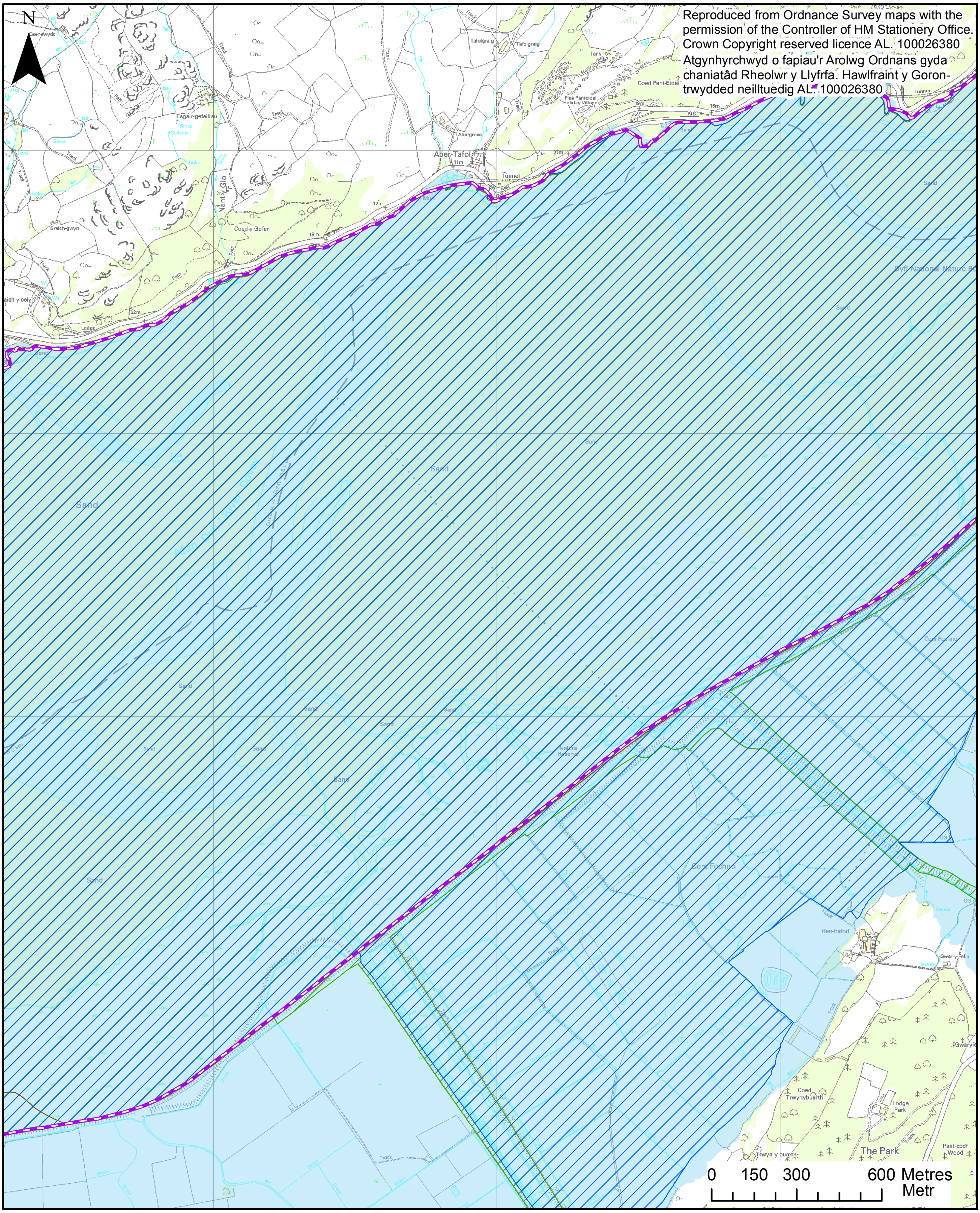
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 46



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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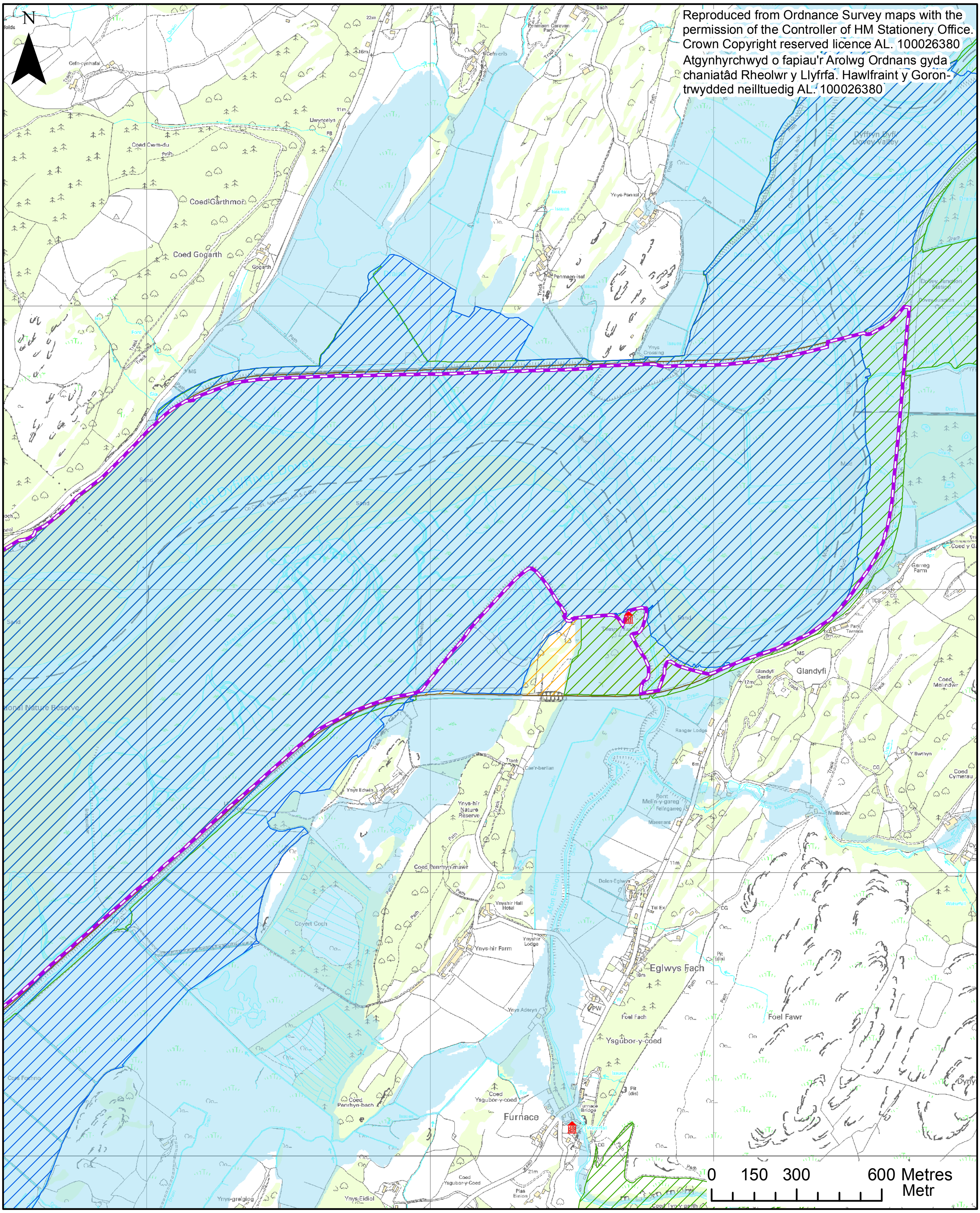
Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 47



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
⌂	Scheduled Monuments	Henebion Cofrestredig

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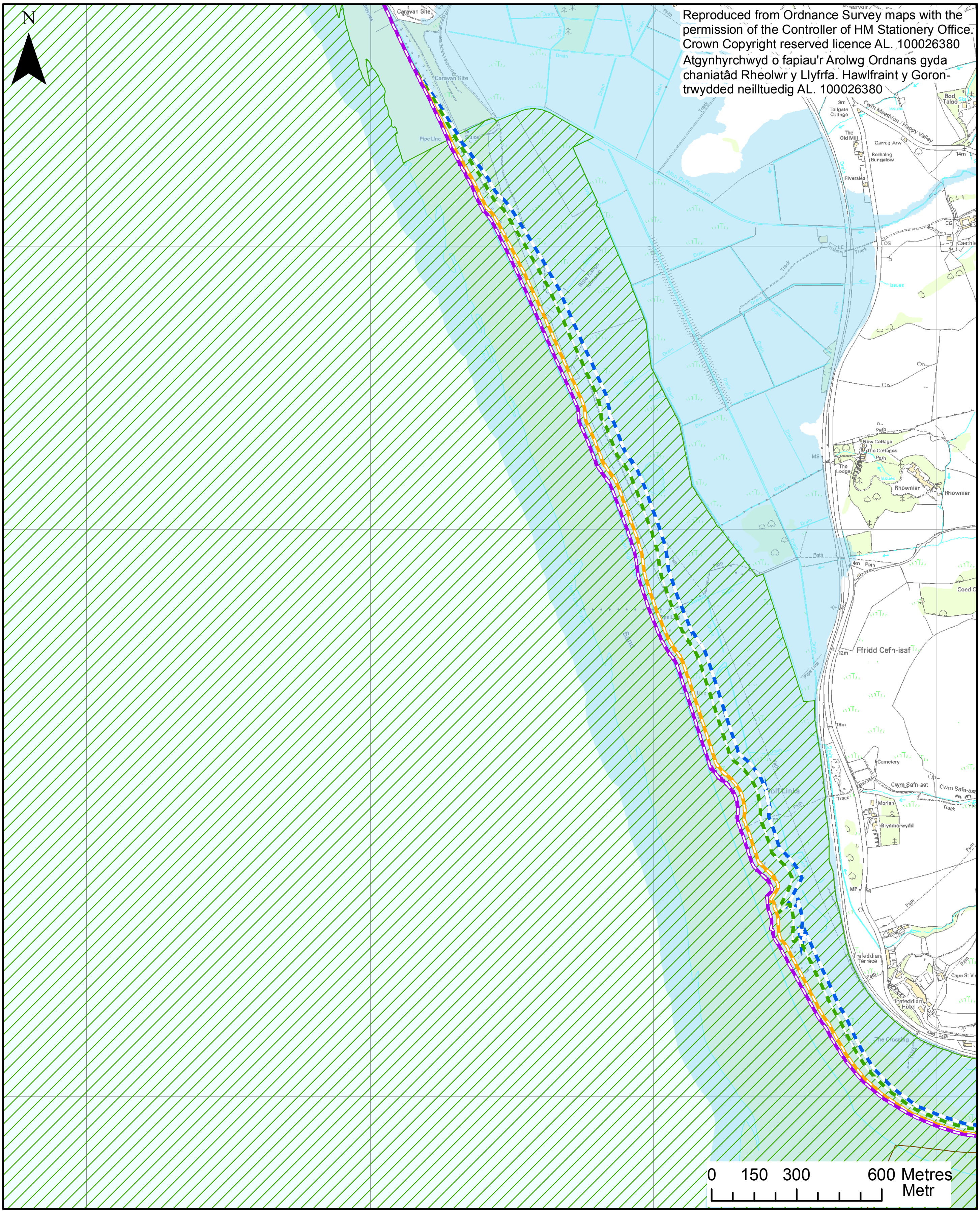
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 48



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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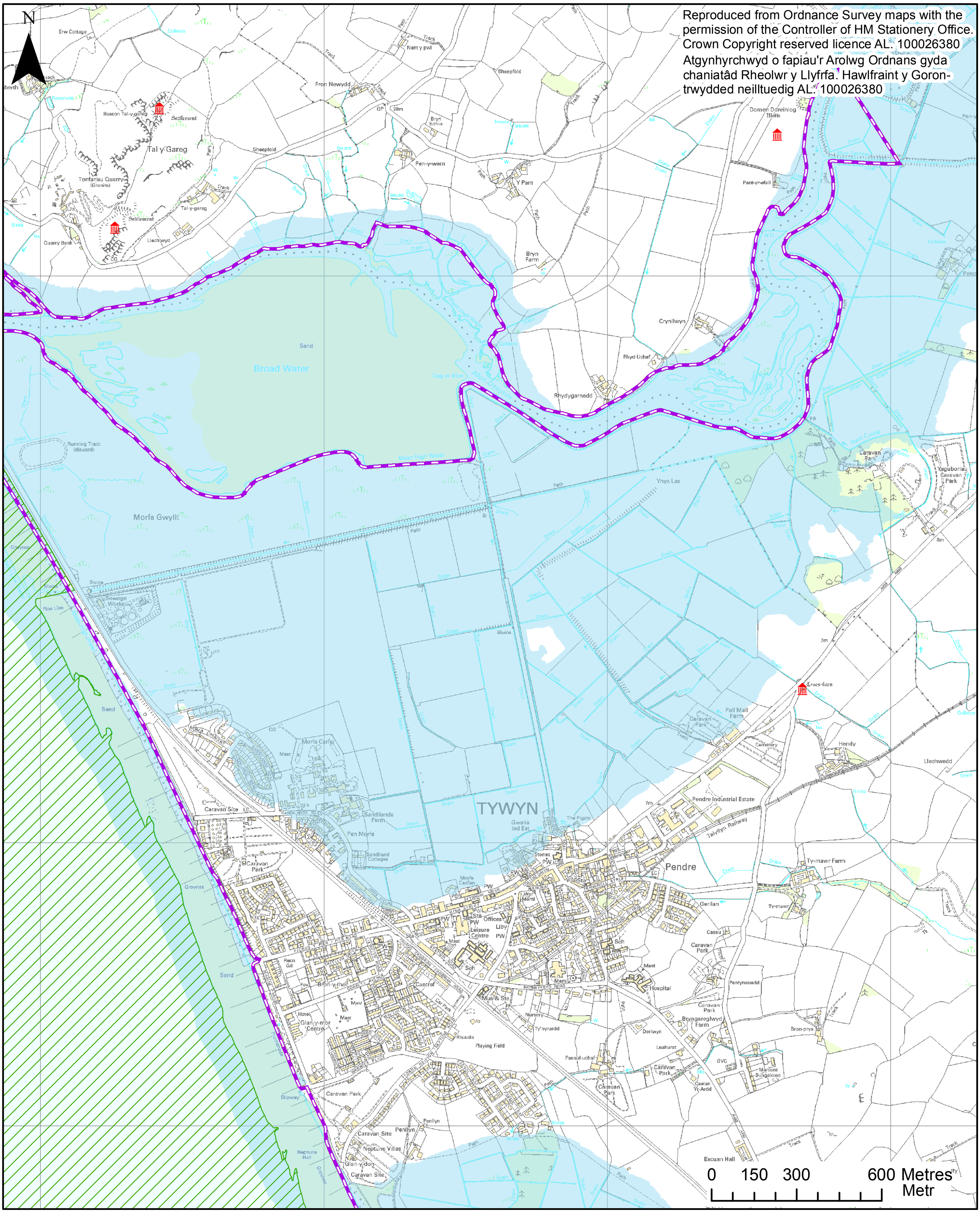
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 49



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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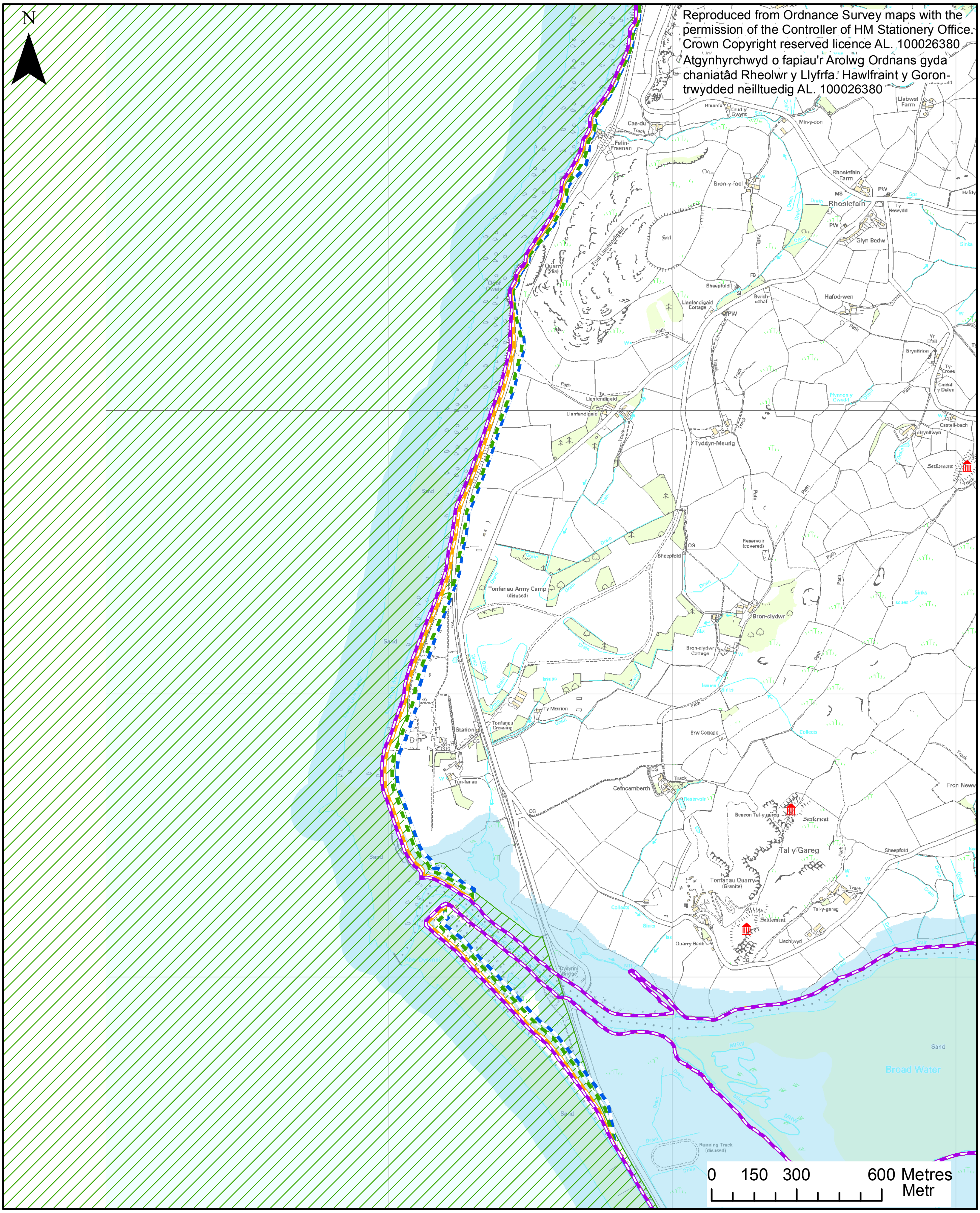
Shoreline Management Plan - West of Wales　Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management　Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 50



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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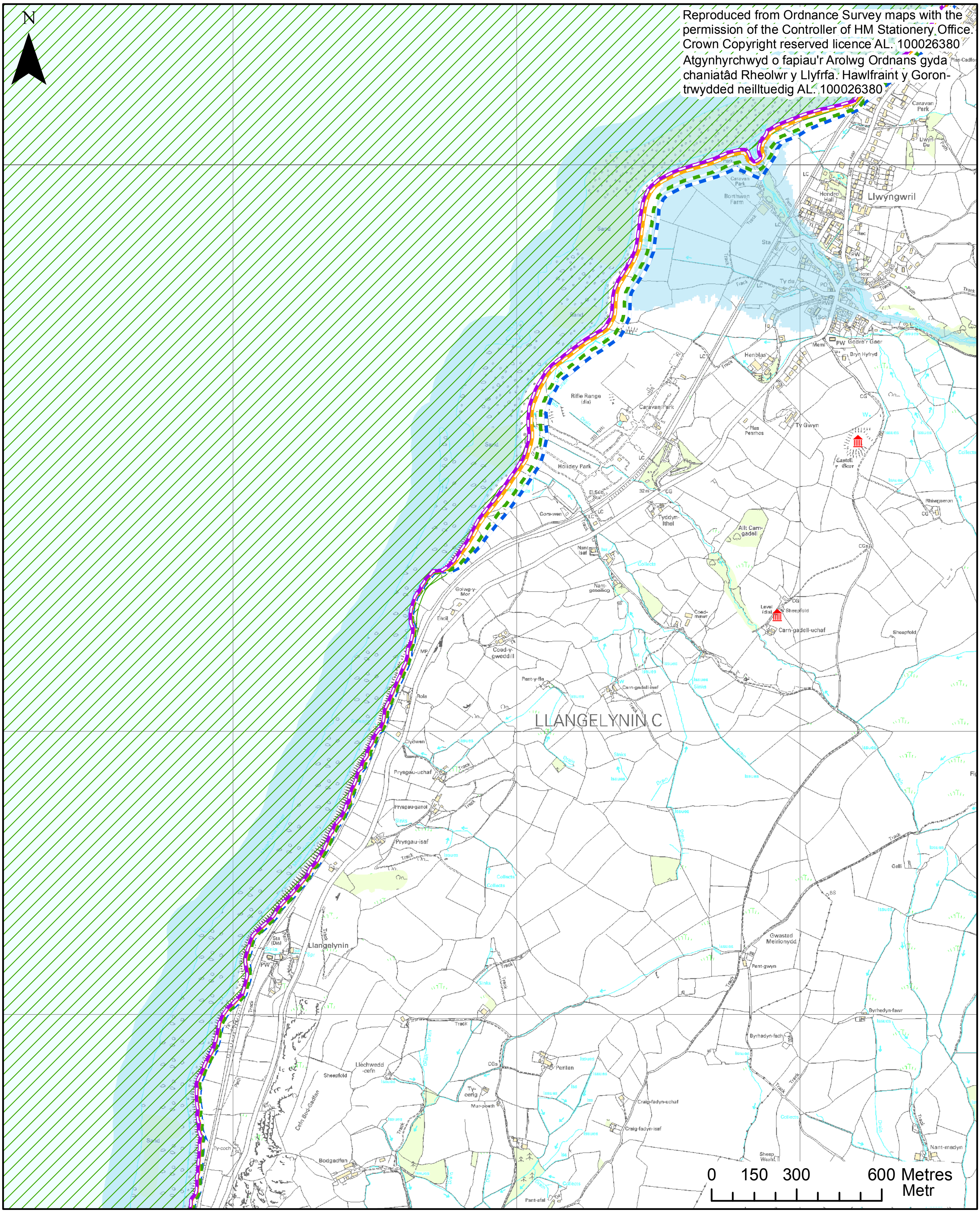
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 51



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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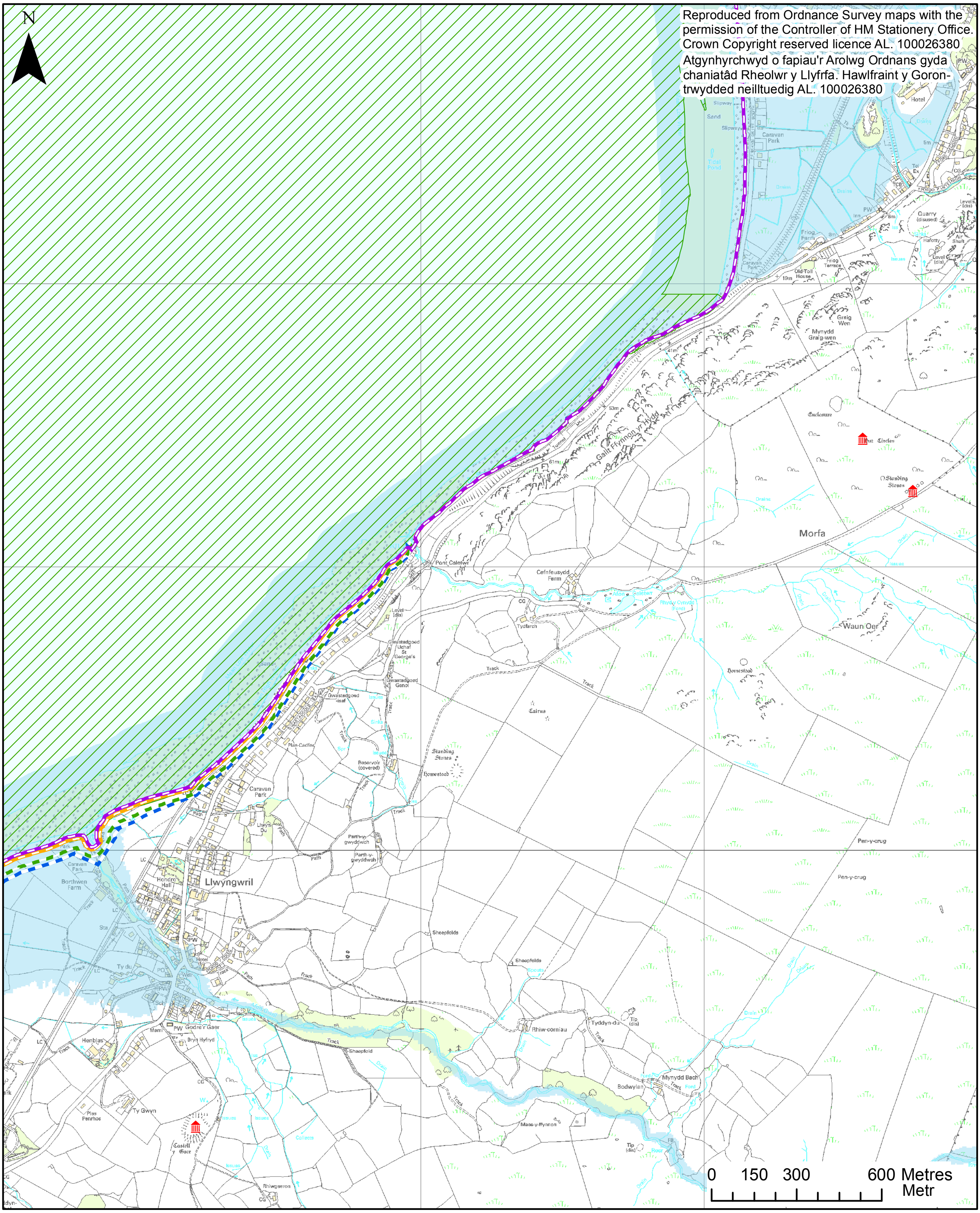
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 52



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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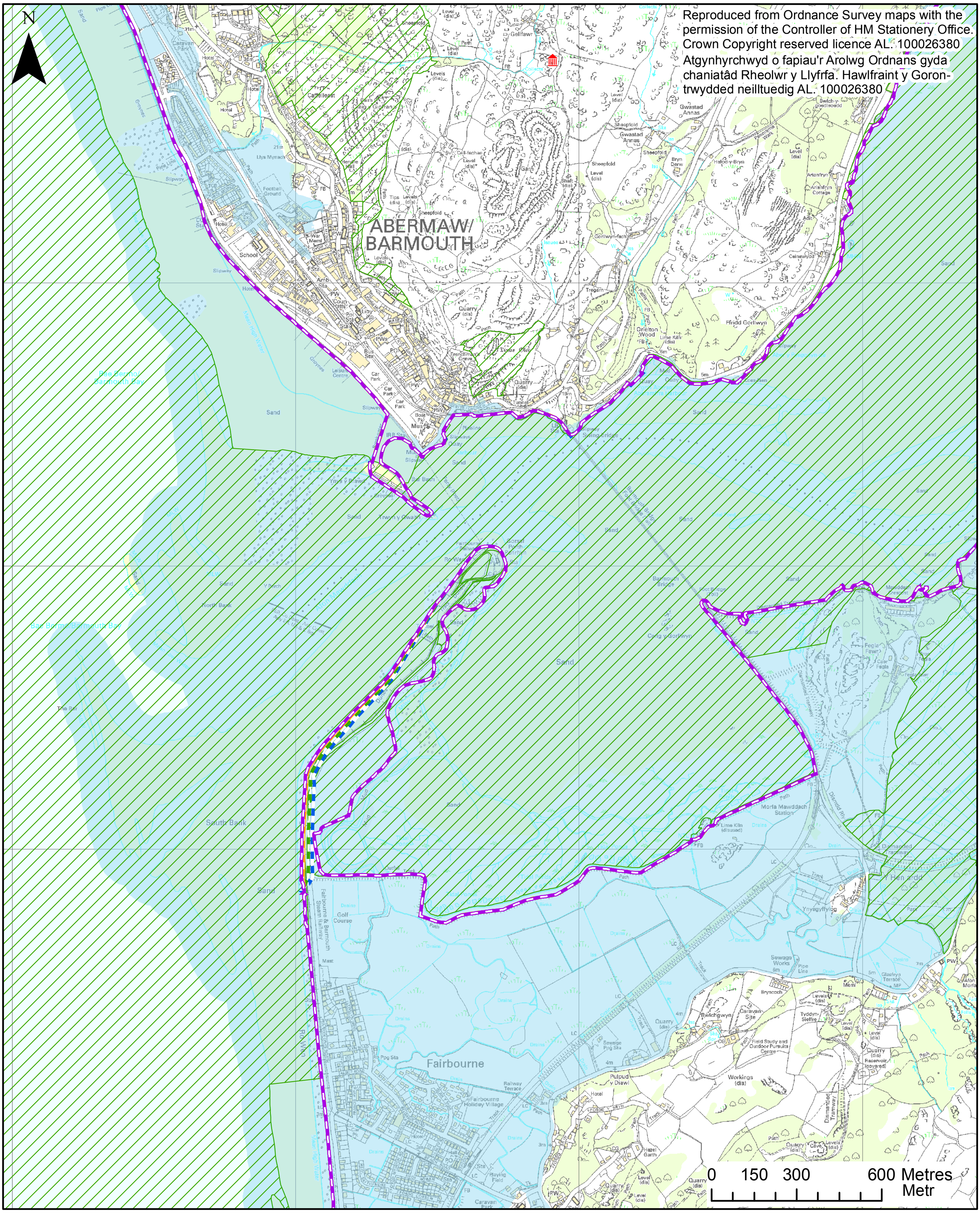
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 53



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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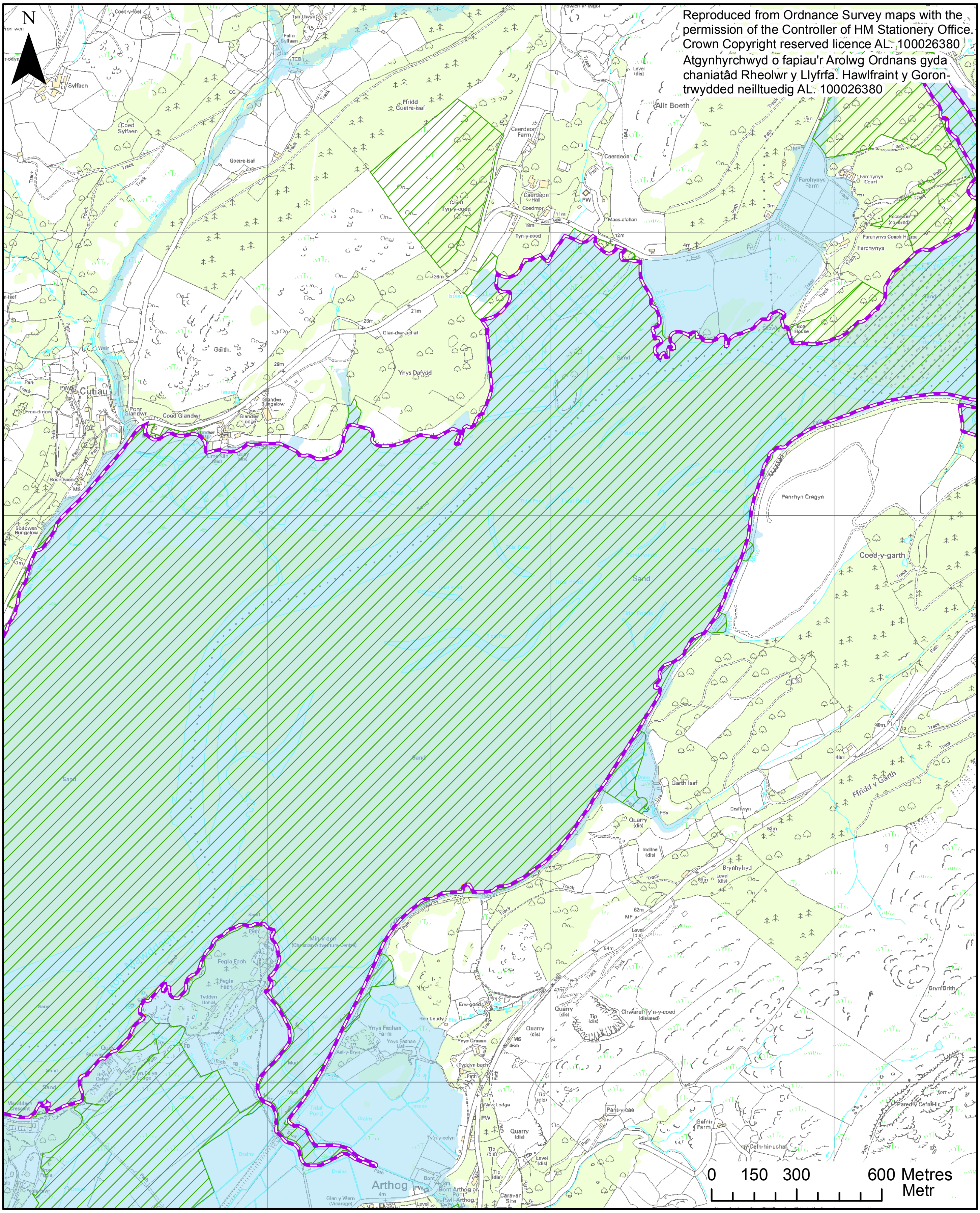
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 54



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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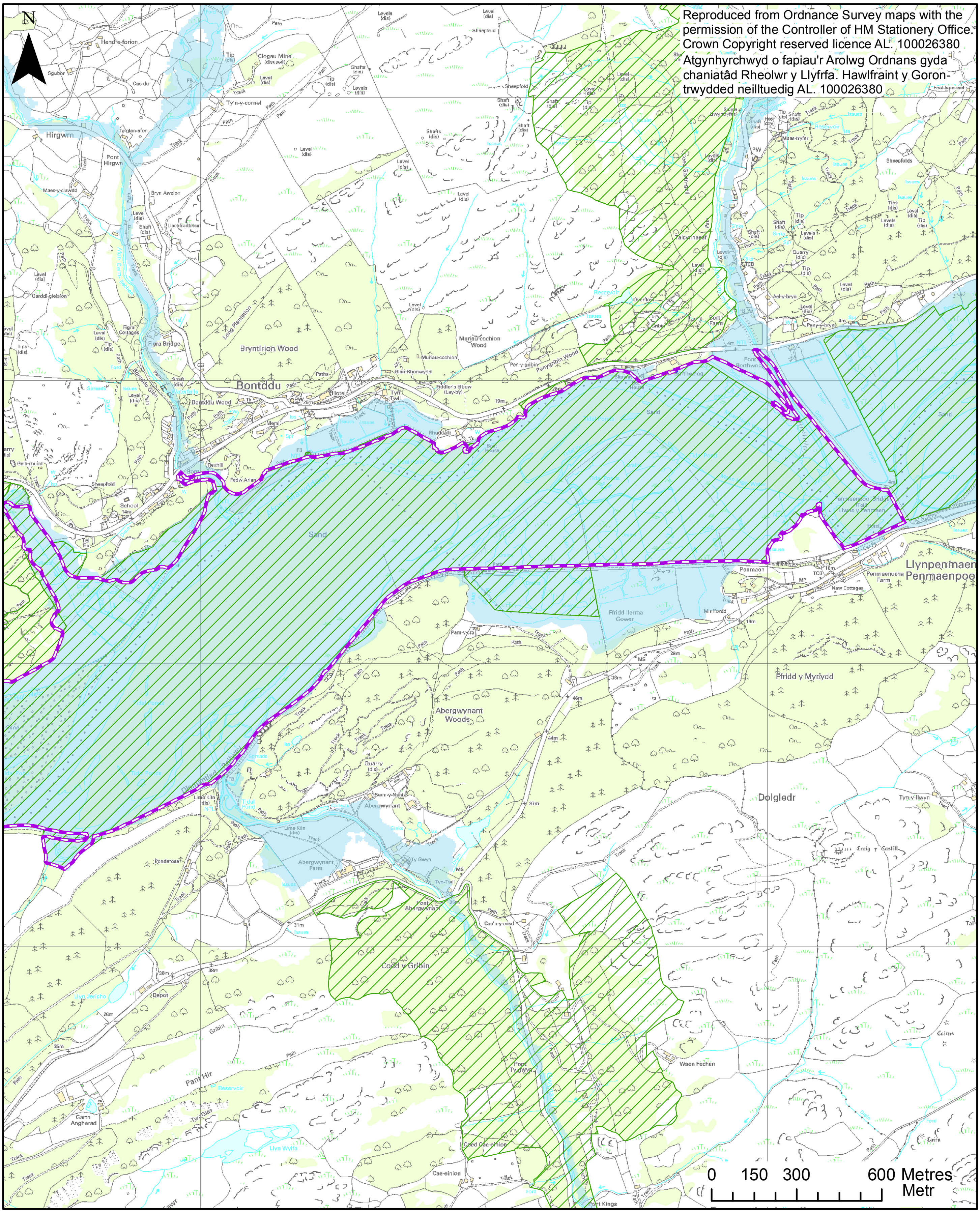
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 55



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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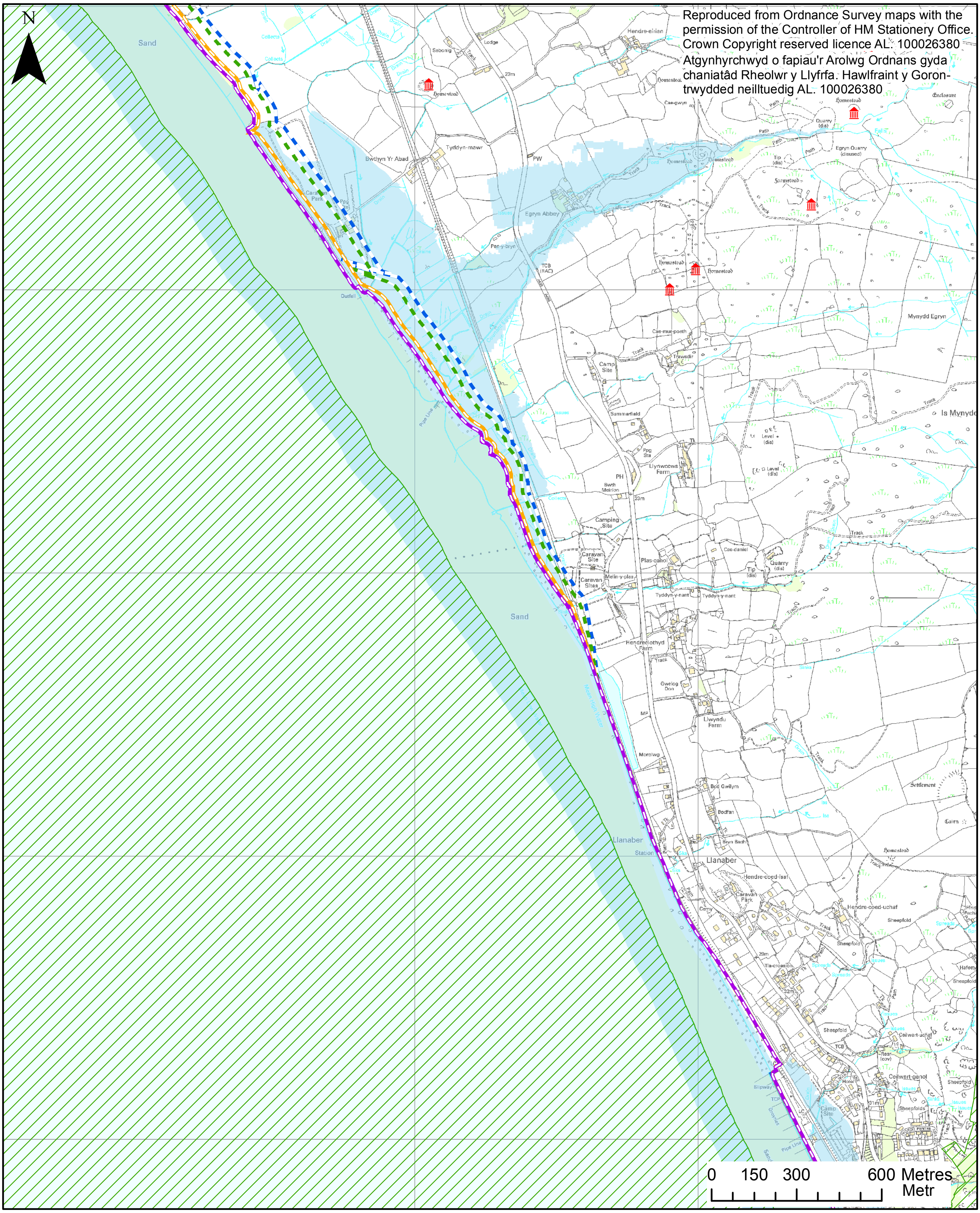
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 56



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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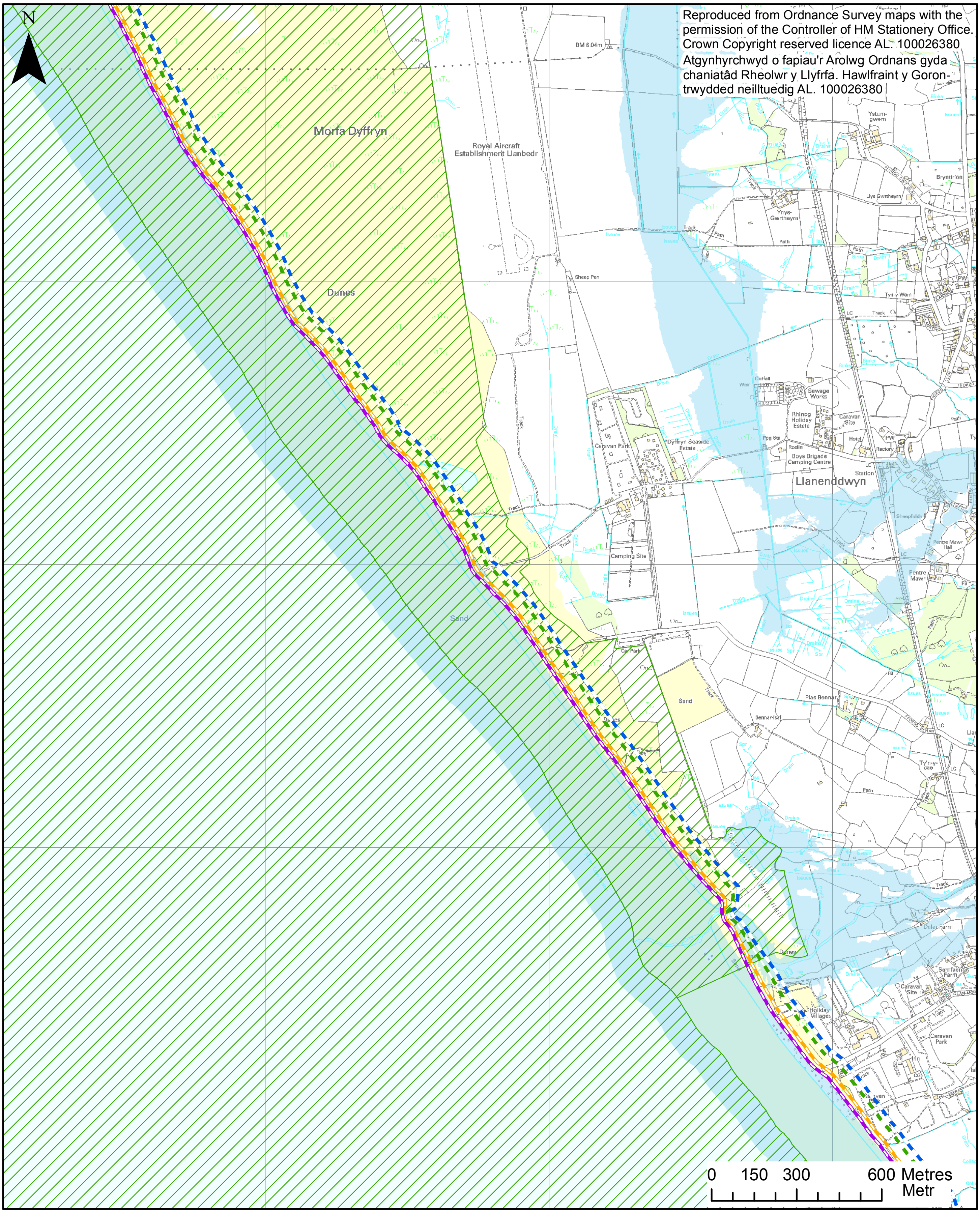
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 57



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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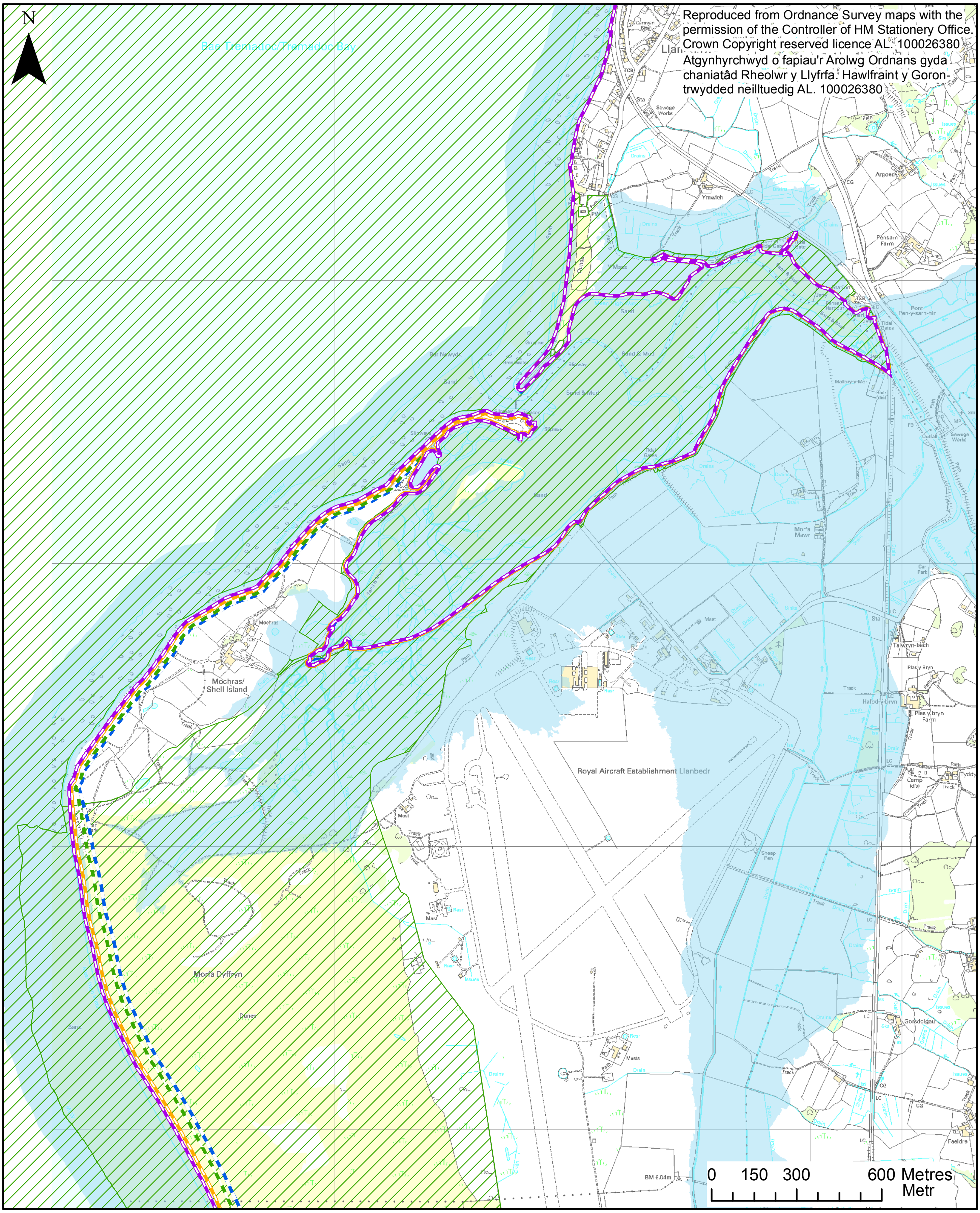
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 58



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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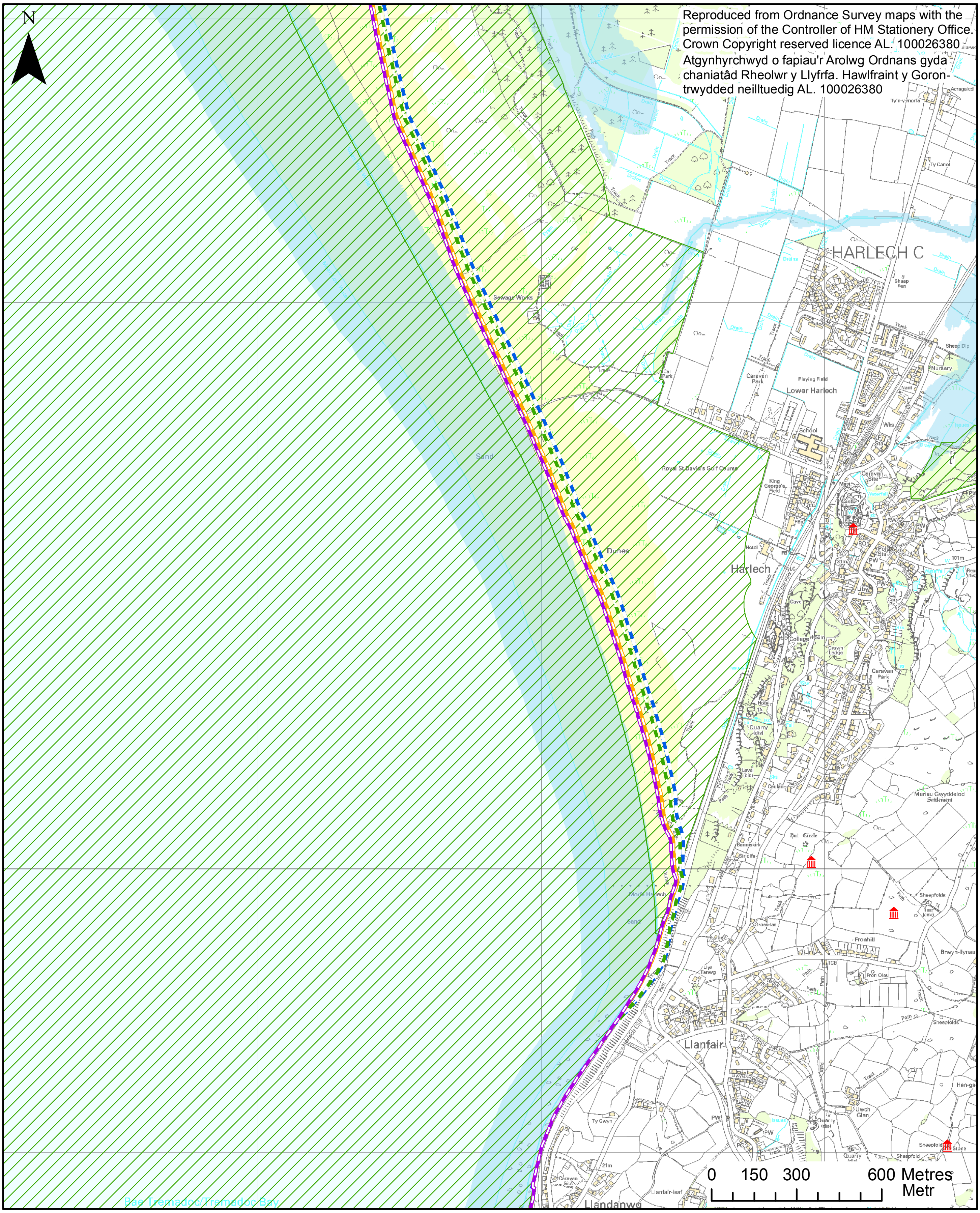
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 59



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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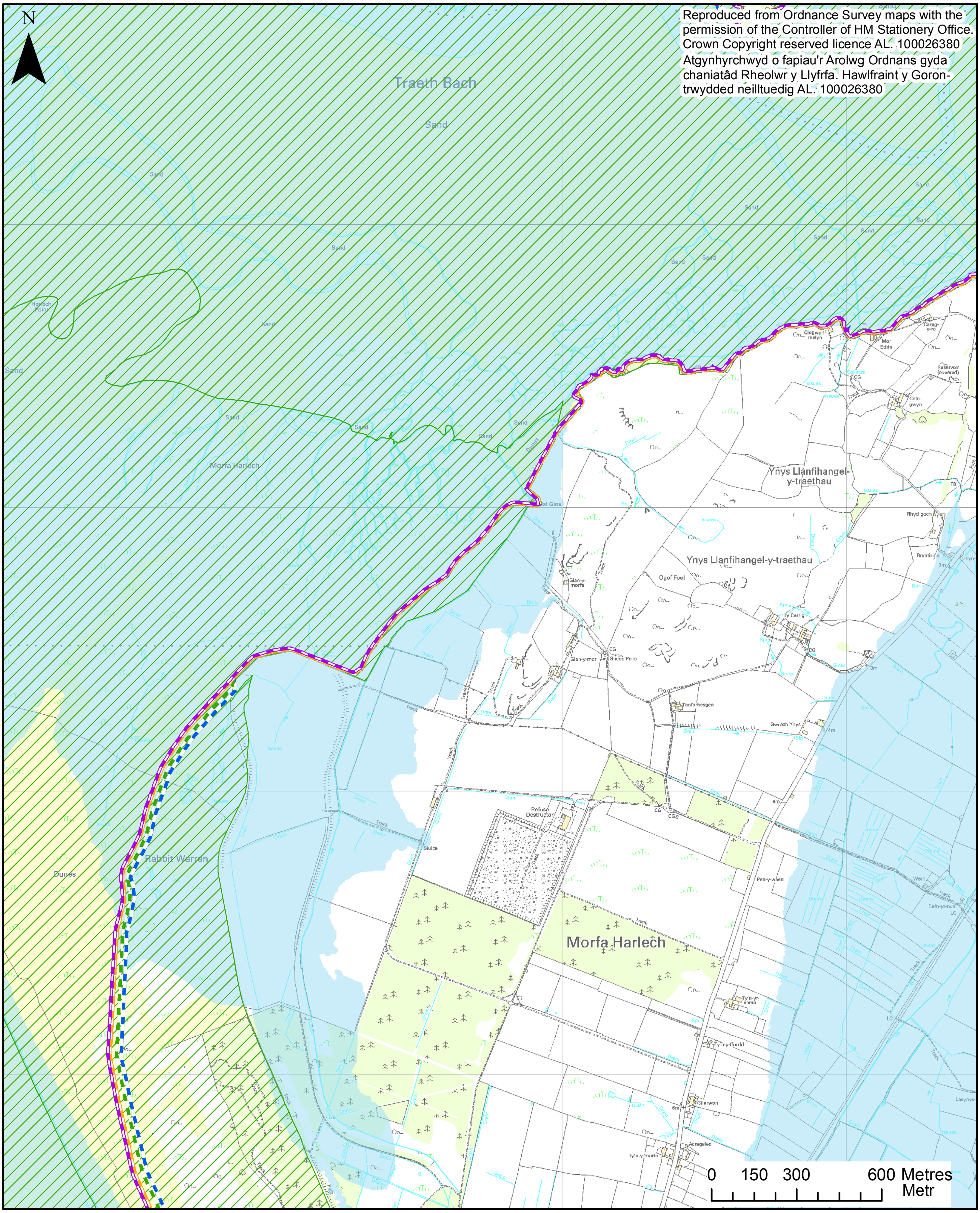
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 60



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig

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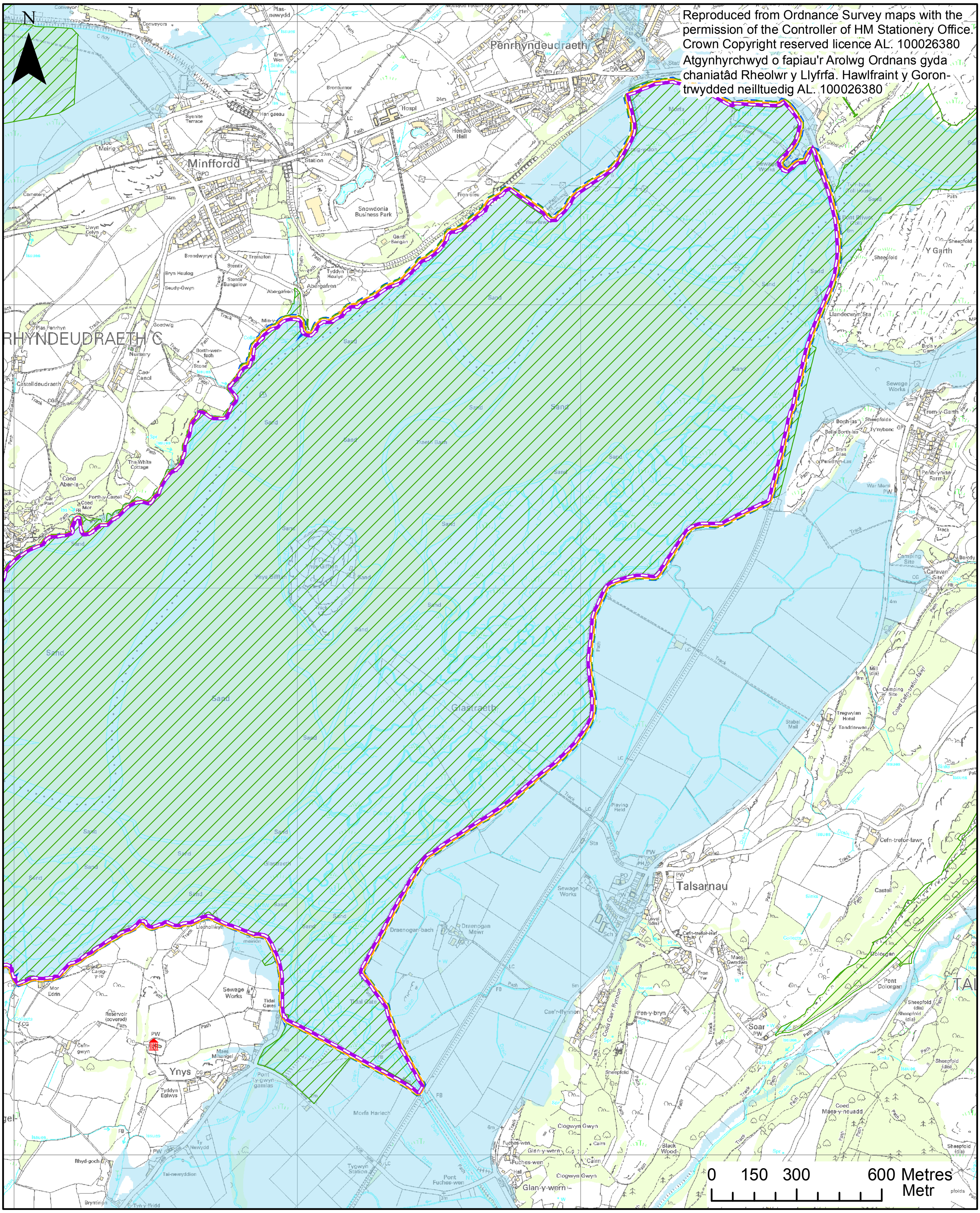
Shoreline Management Plan - West of Wales　Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management　Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 61



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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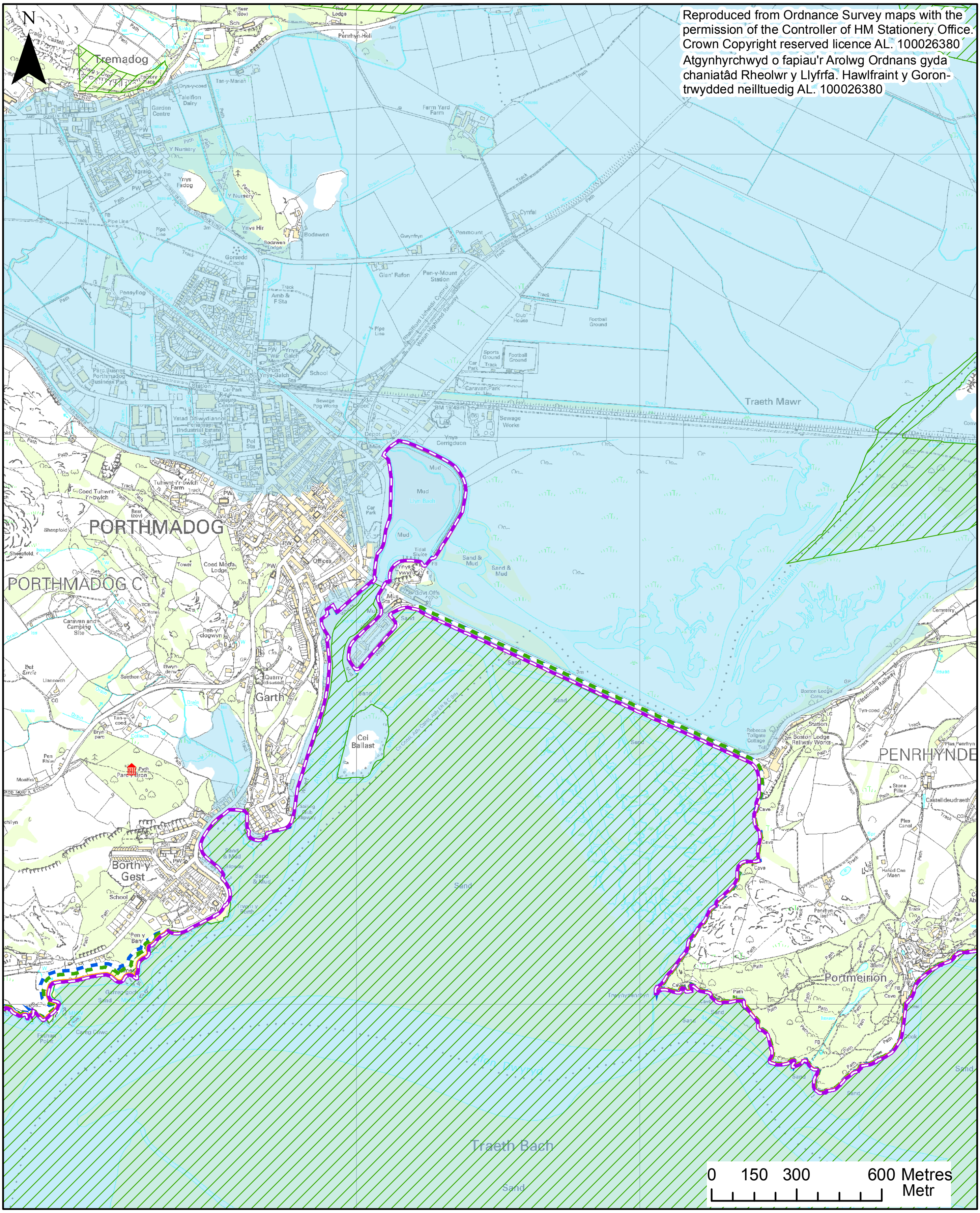
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 62



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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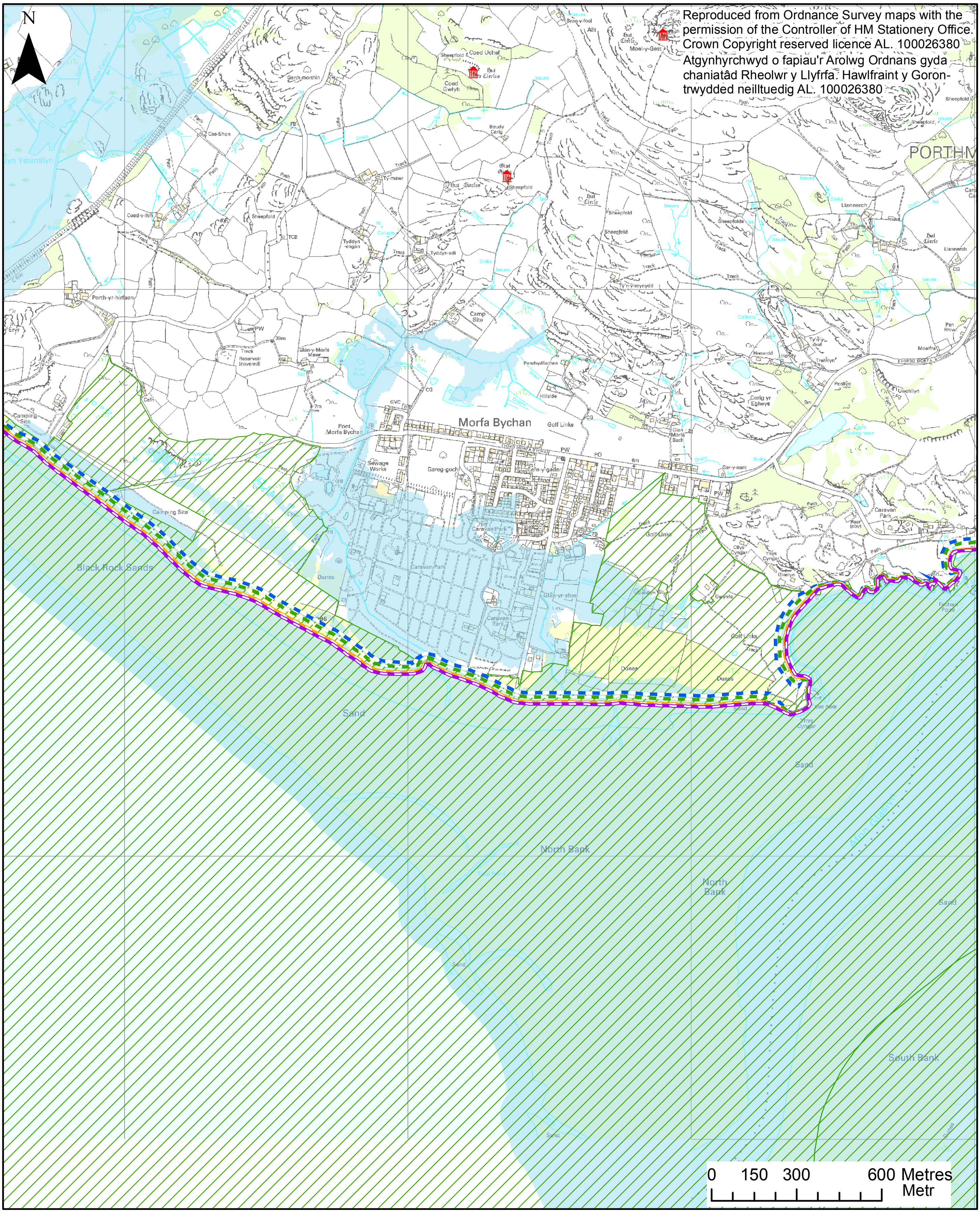
Shoreline Management Plan - West of Wales | Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management | Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 63



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▇	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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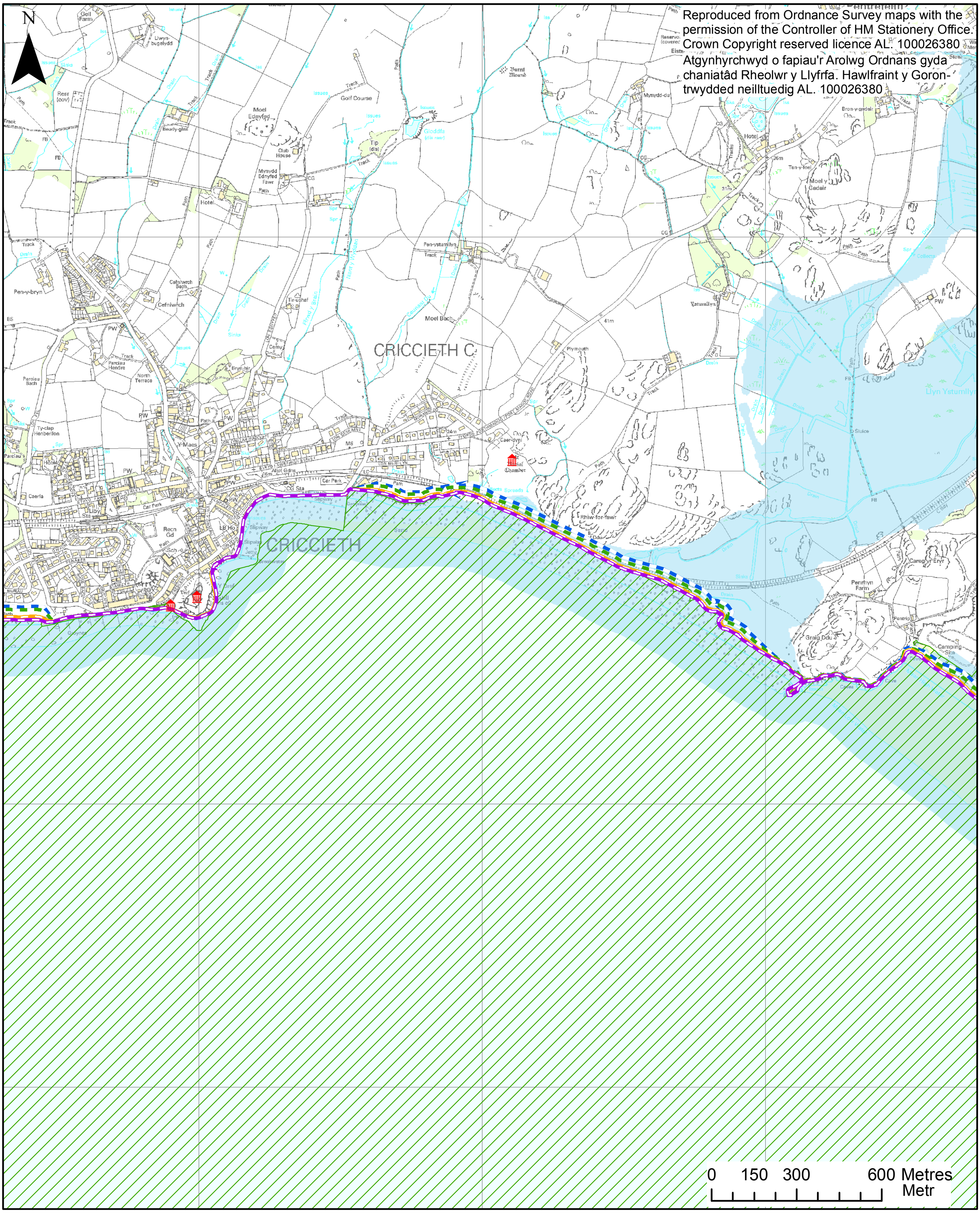
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 64



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 65

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 66

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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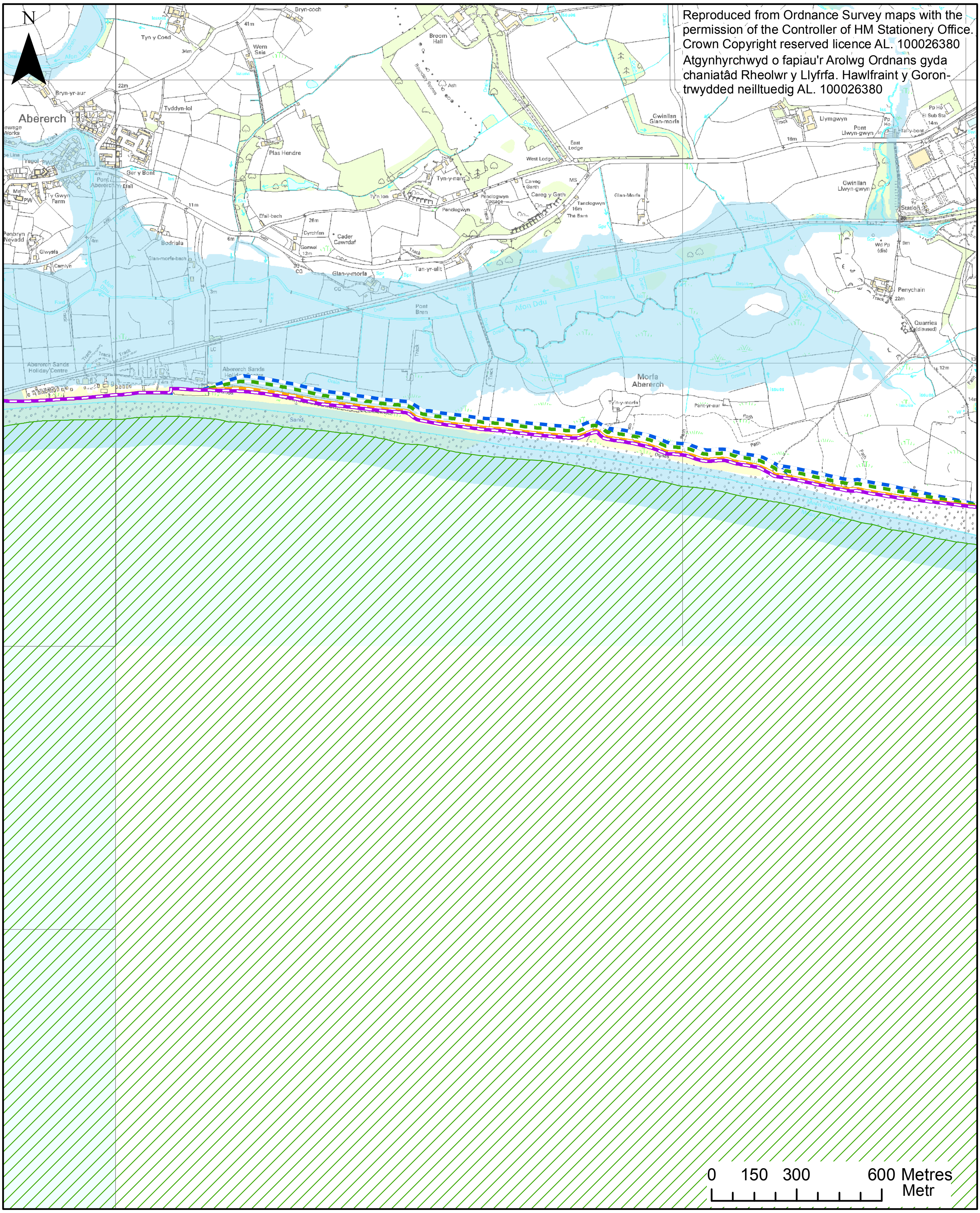
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 67



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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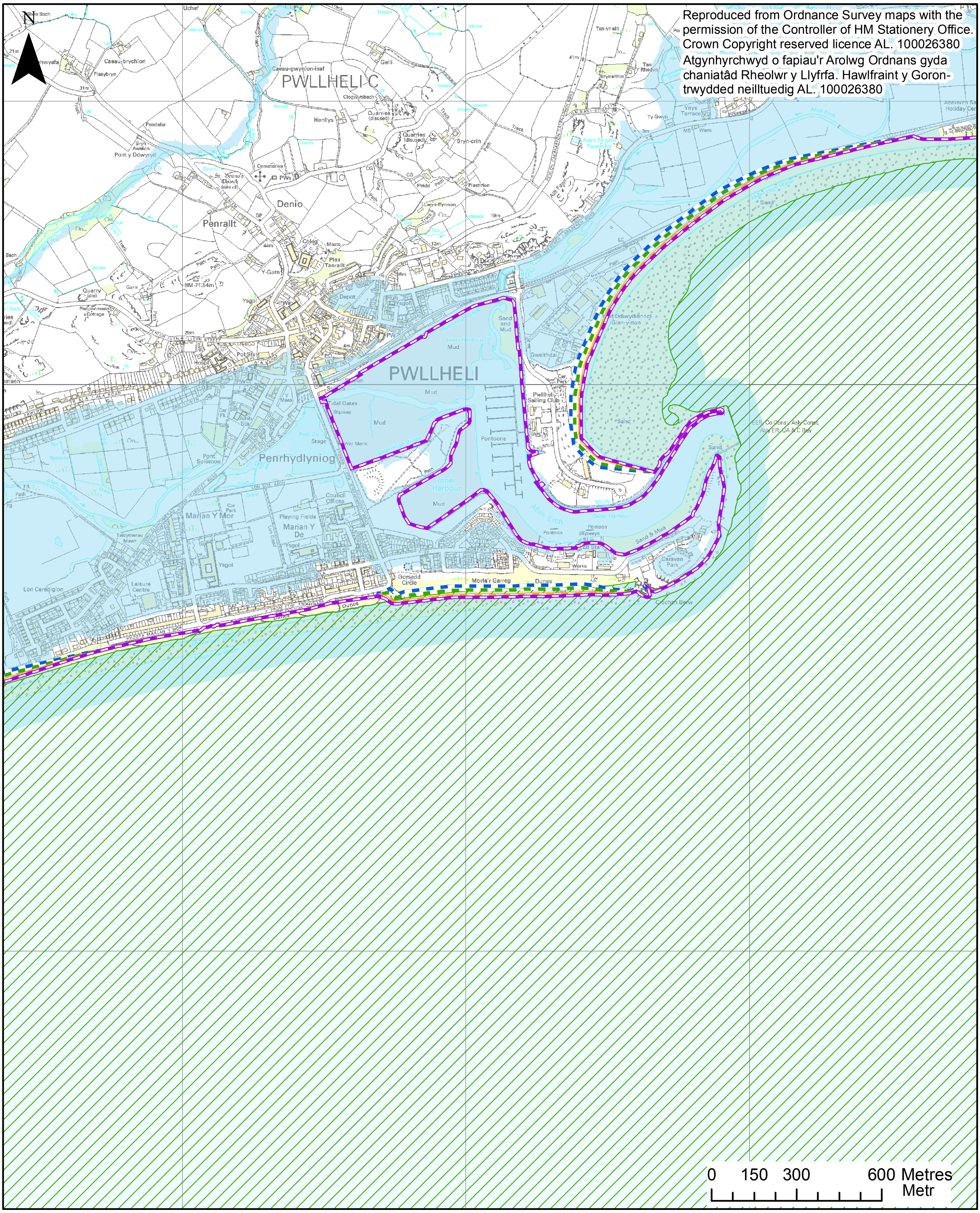
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 68



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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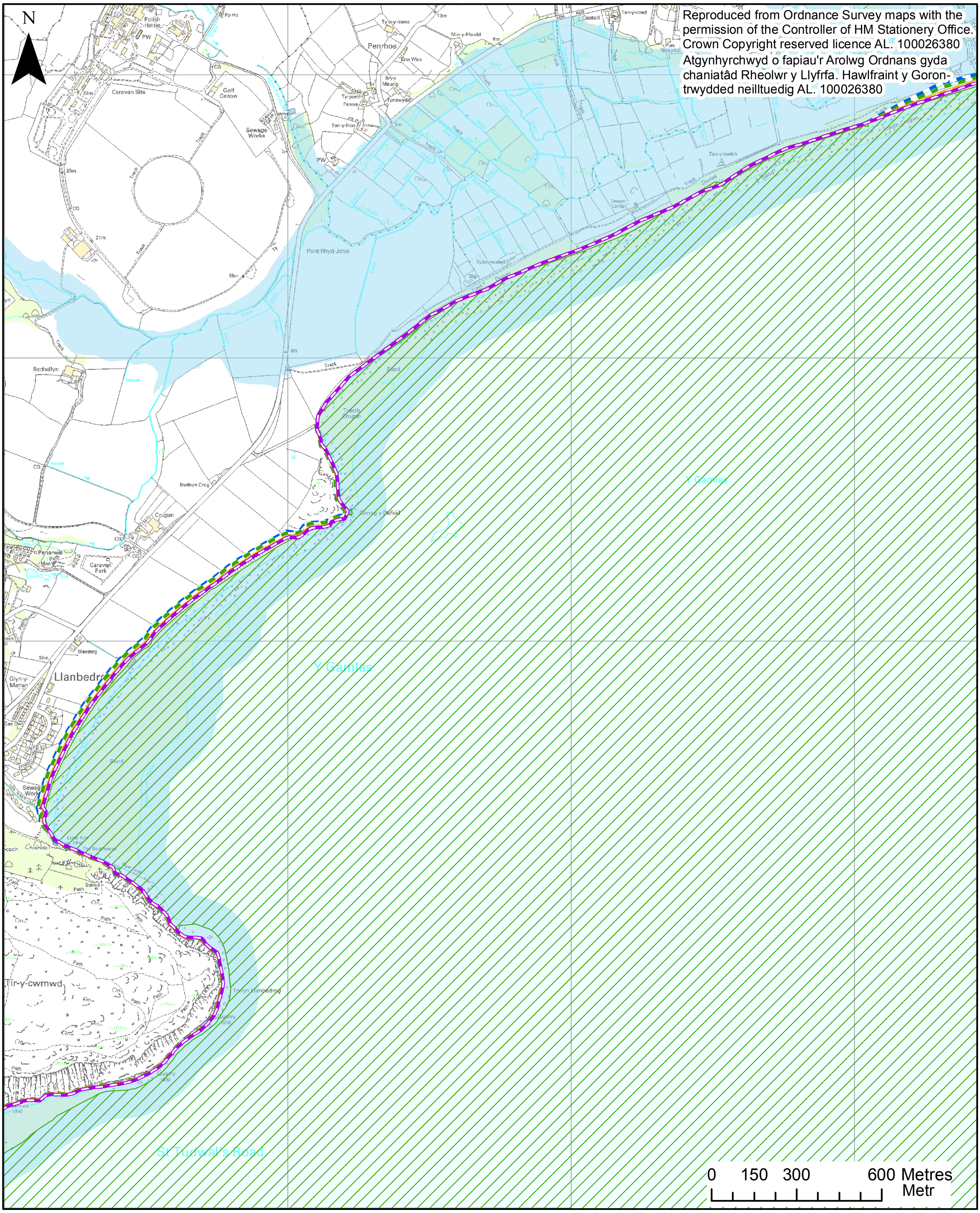
Shoreline Management Plan - West of Wales | Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management | Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 69



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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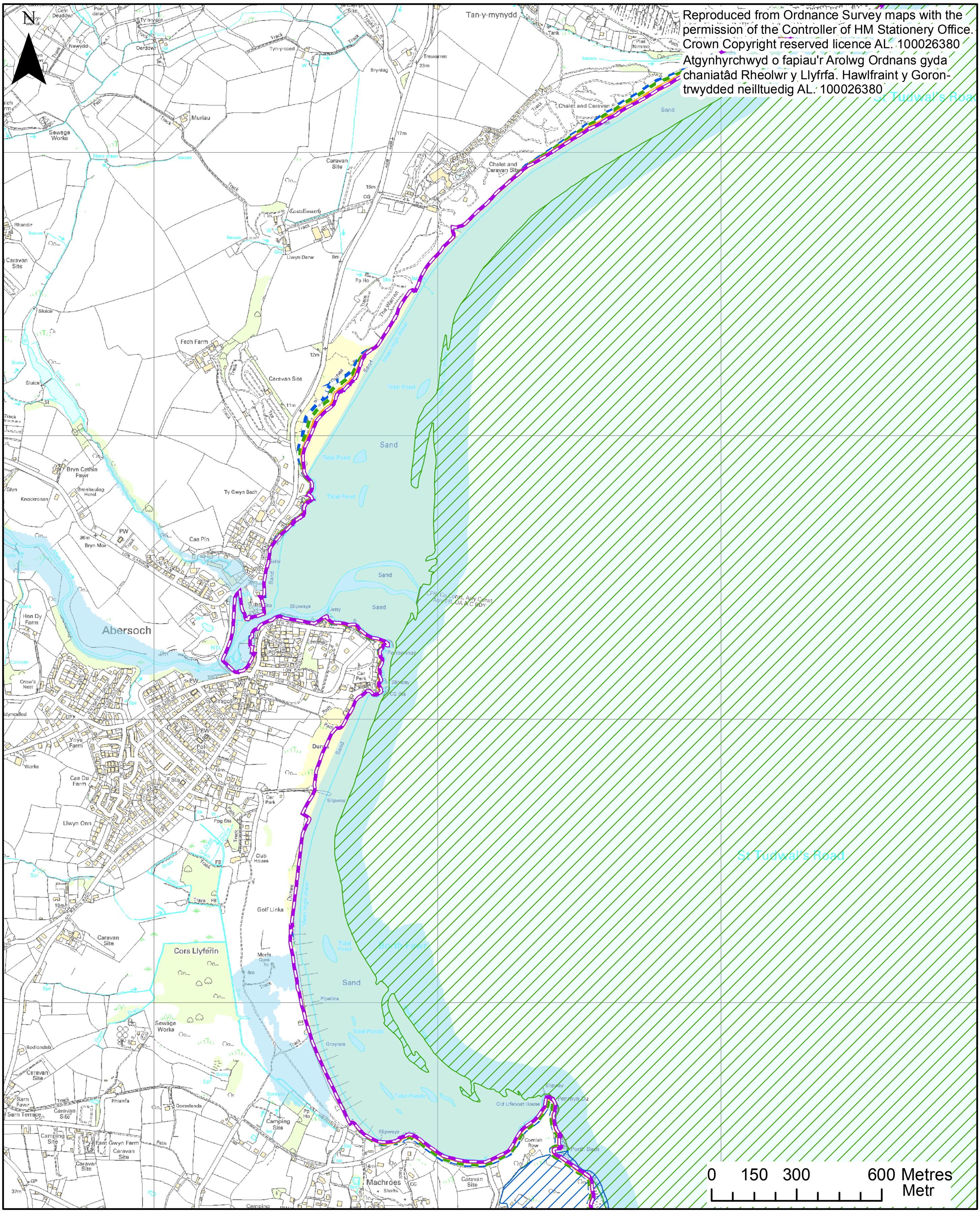
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 70



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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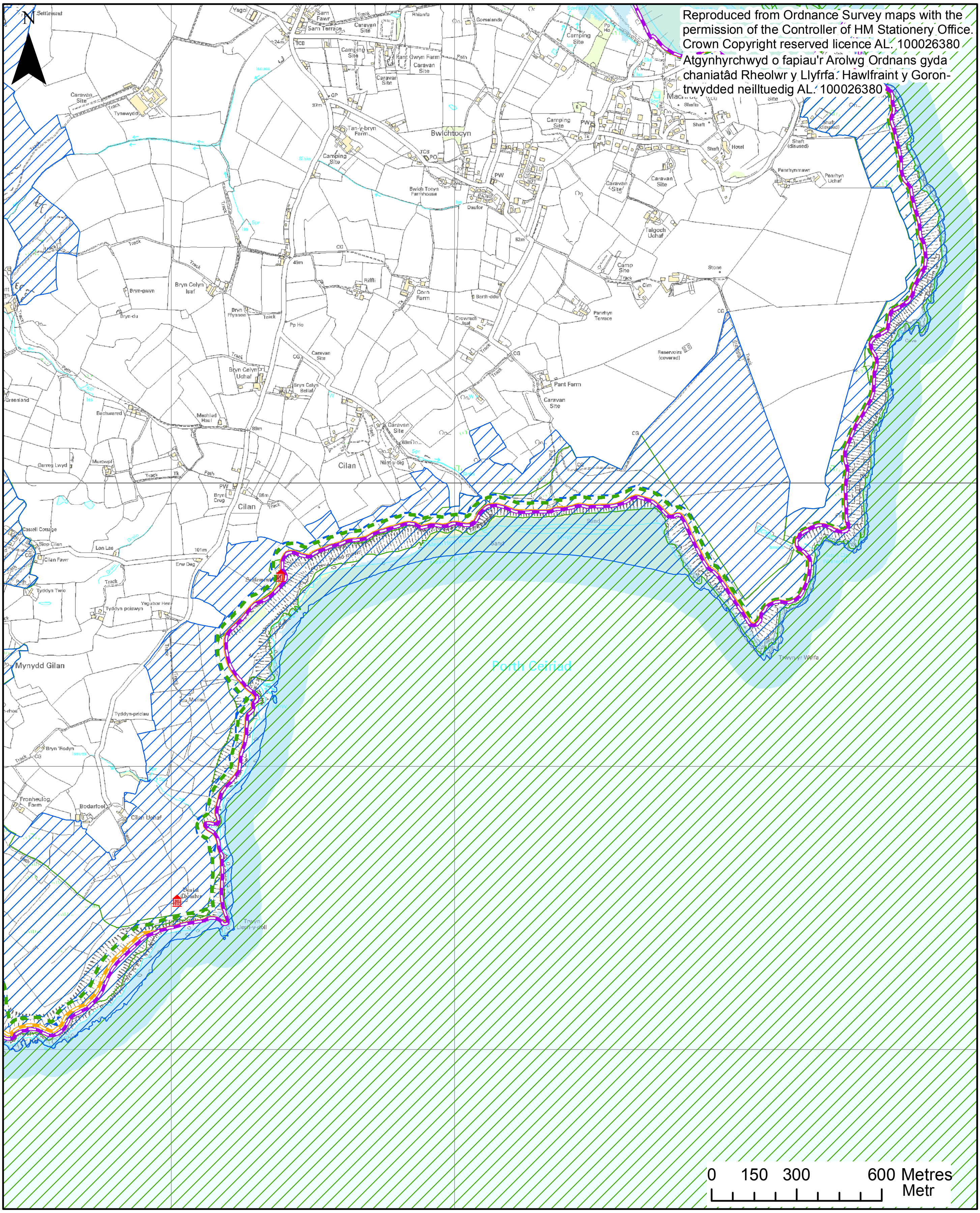
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 71



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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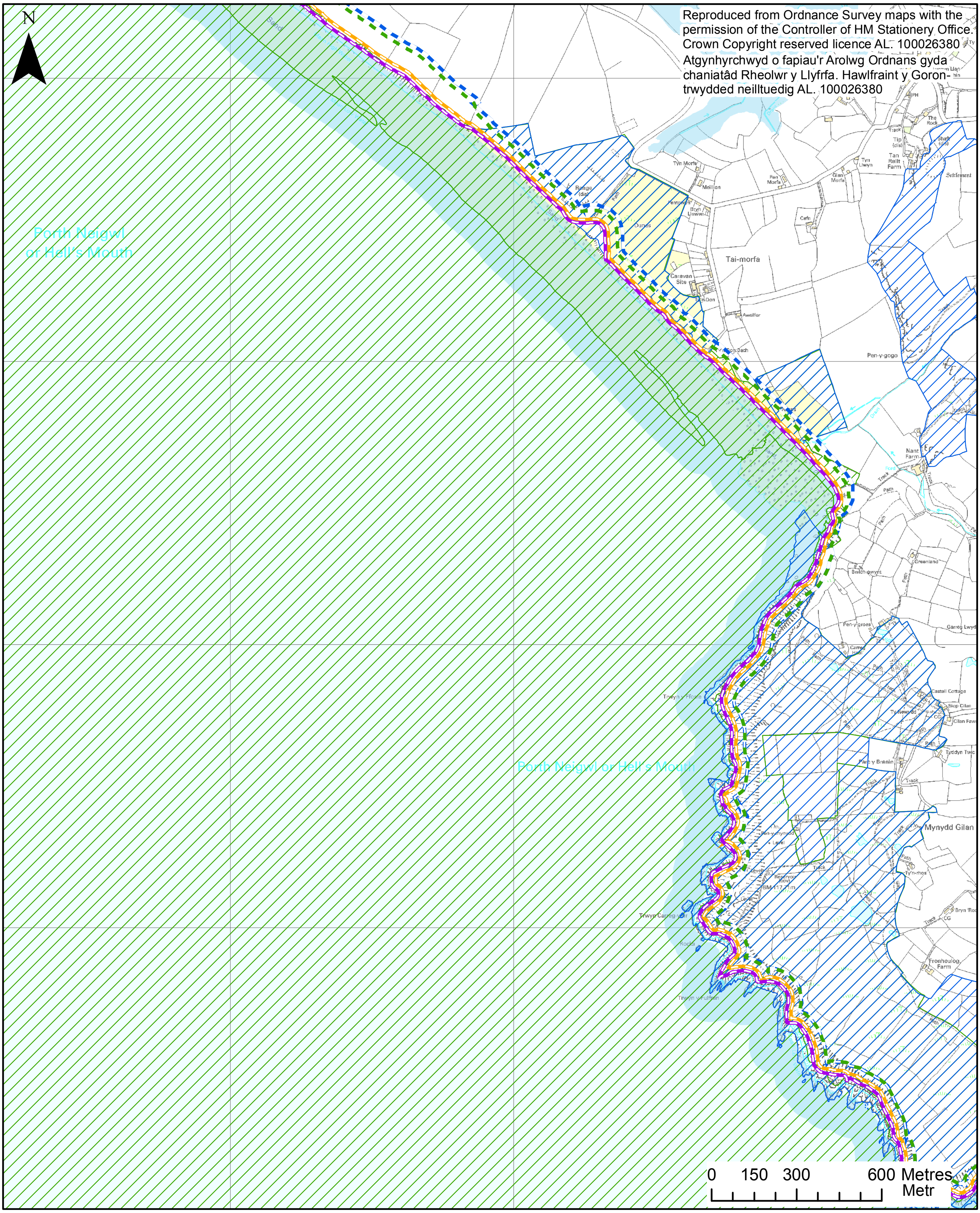
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 72



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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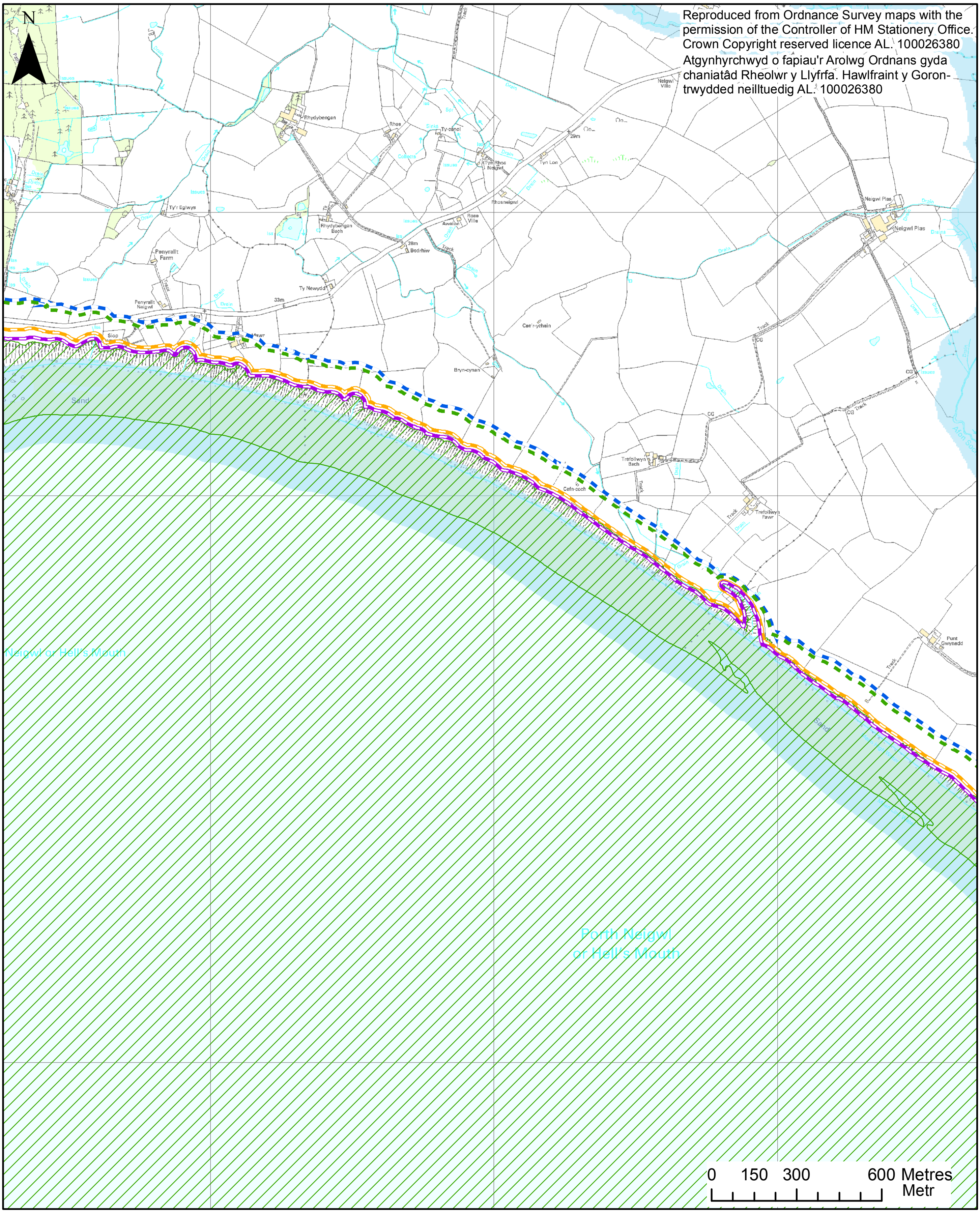
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 73



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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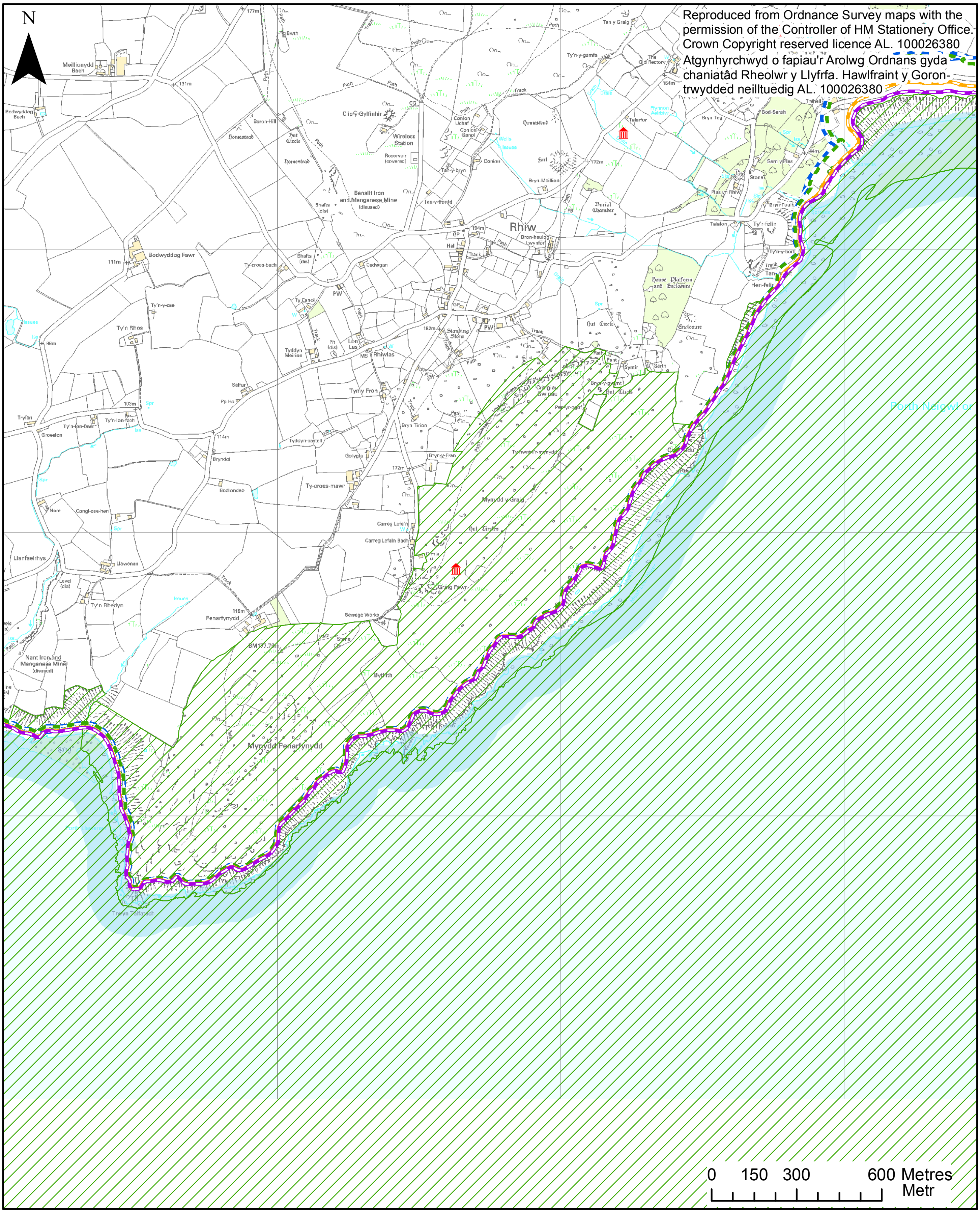
Shoreline Management Plan - West of Wales — Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management — Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 74



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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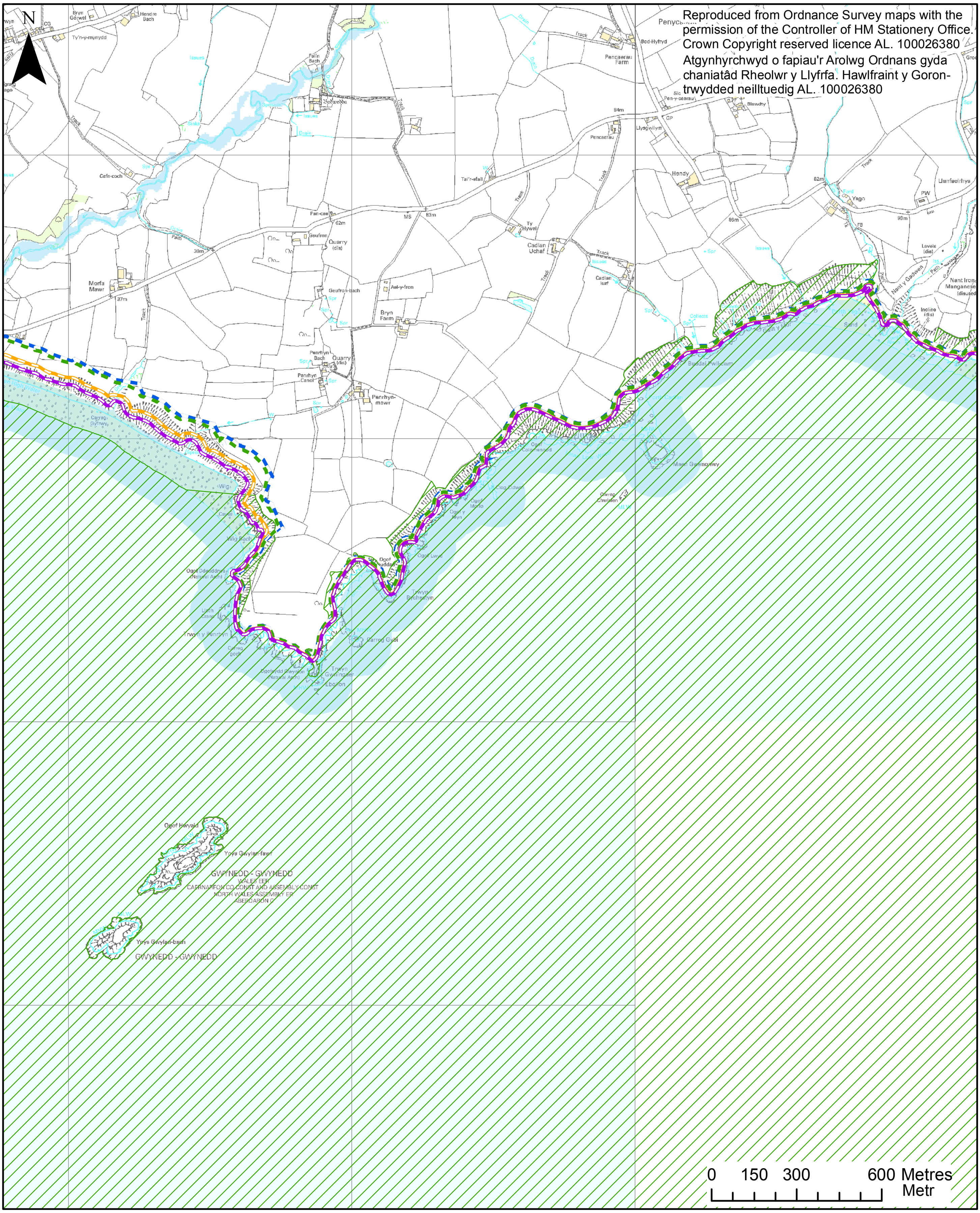
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 75



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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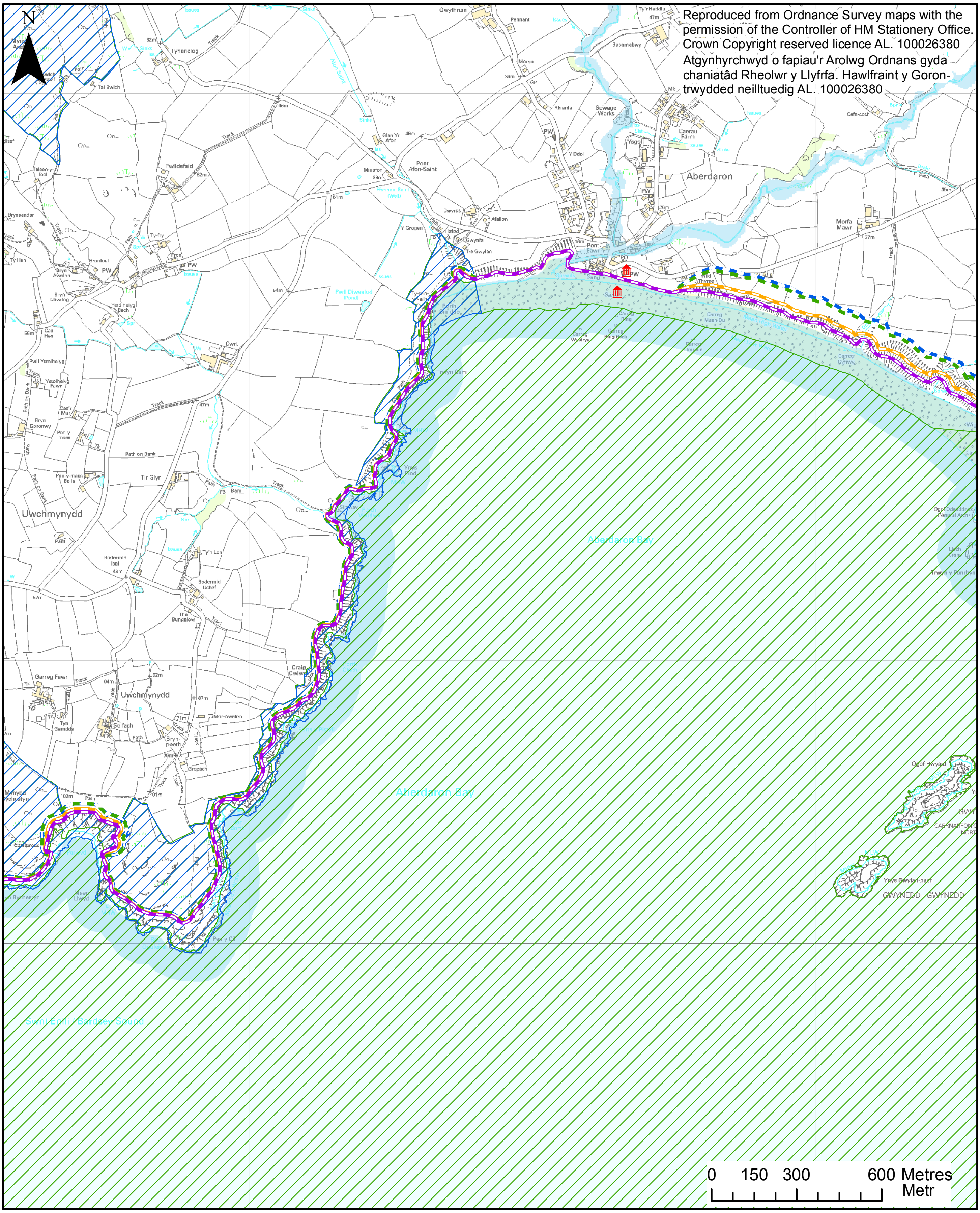
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 76



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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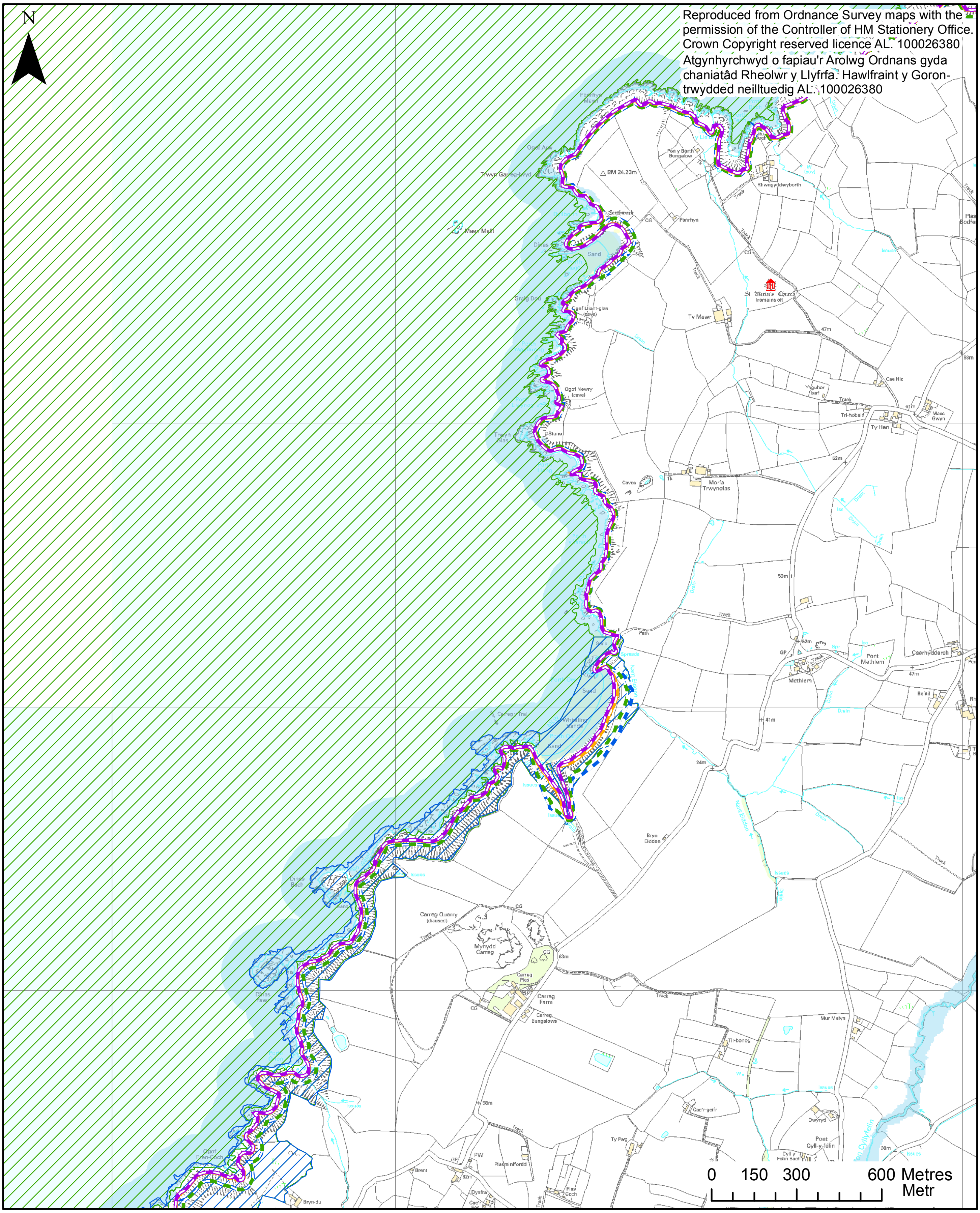
Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 78



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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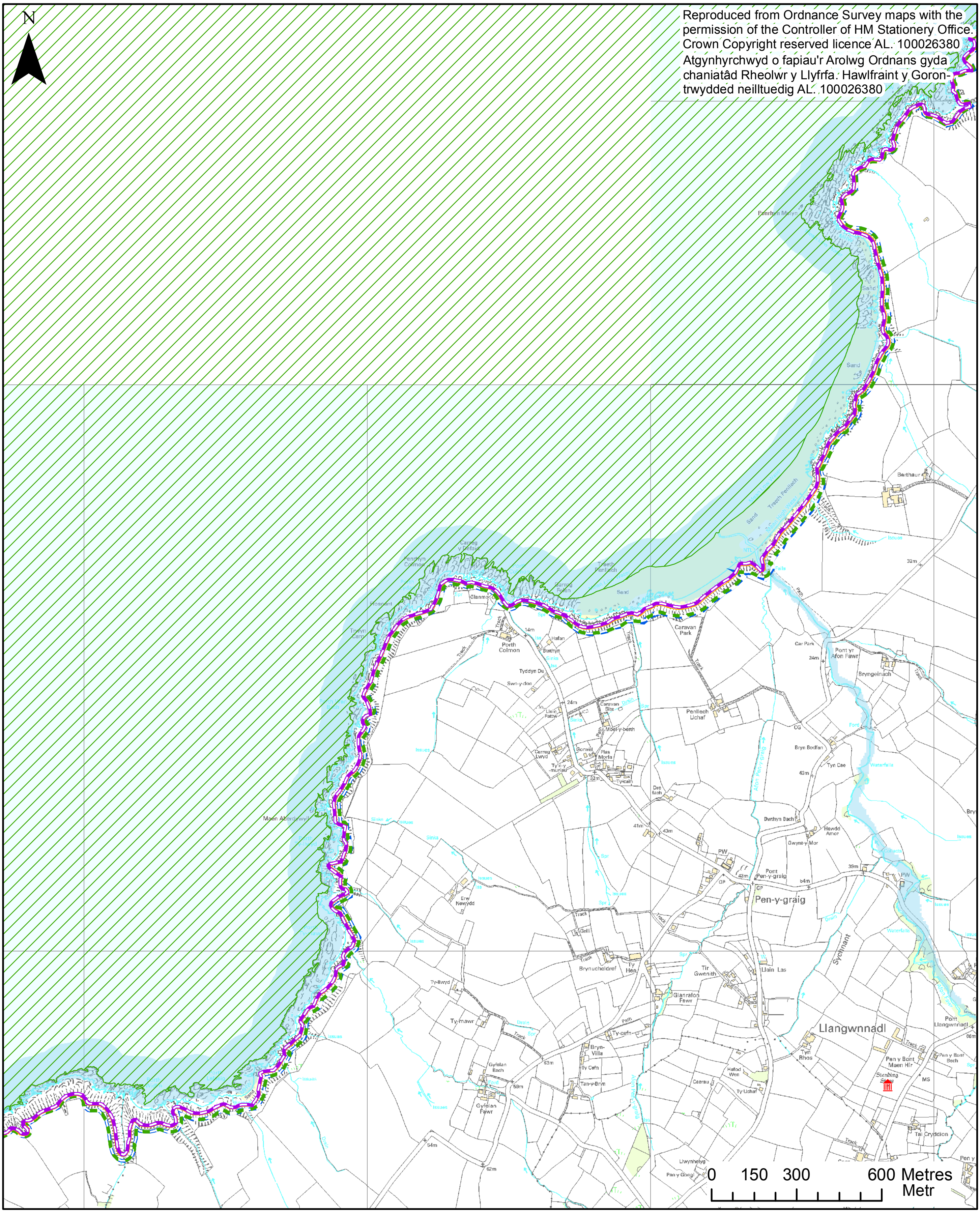
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 79



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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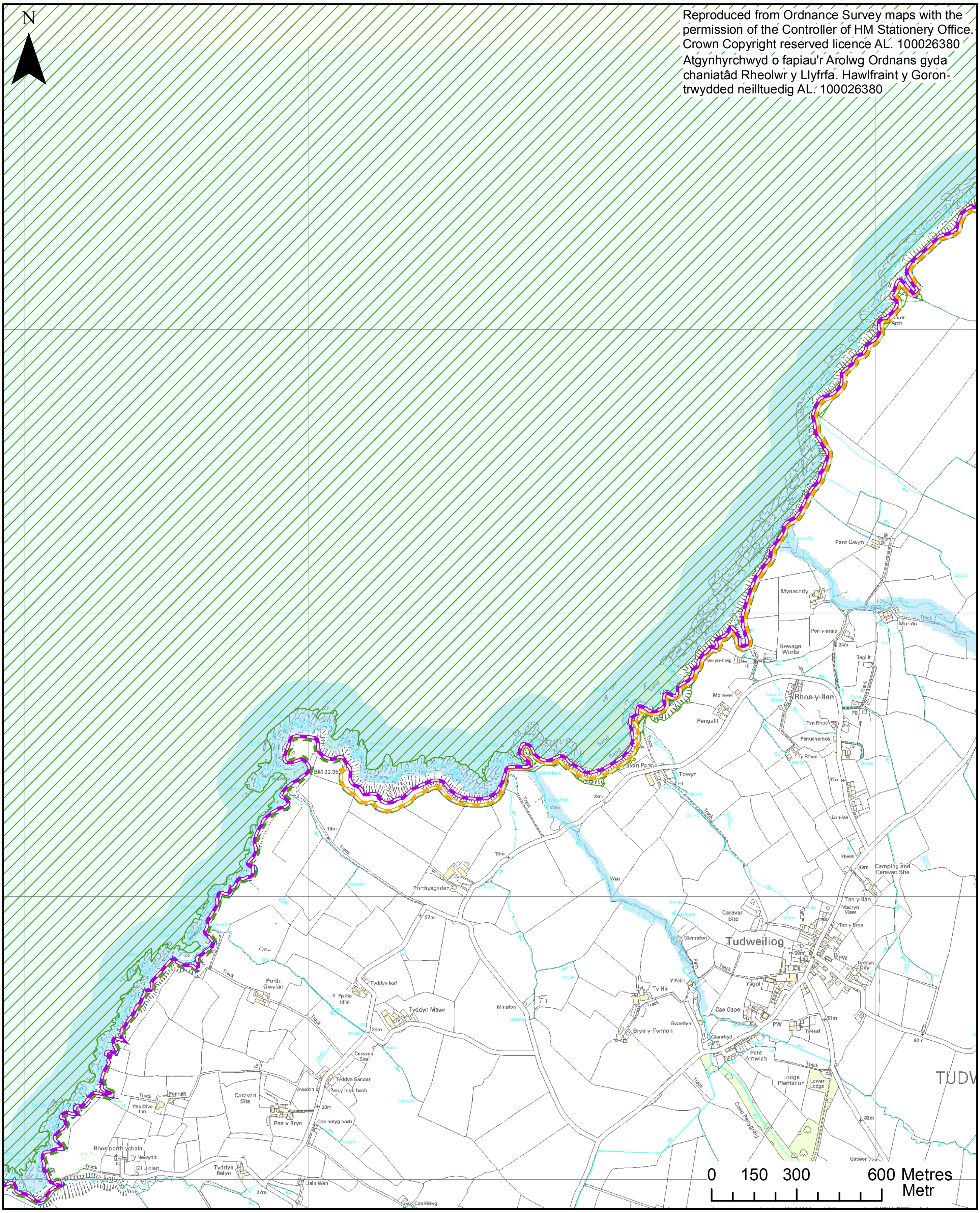
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 80



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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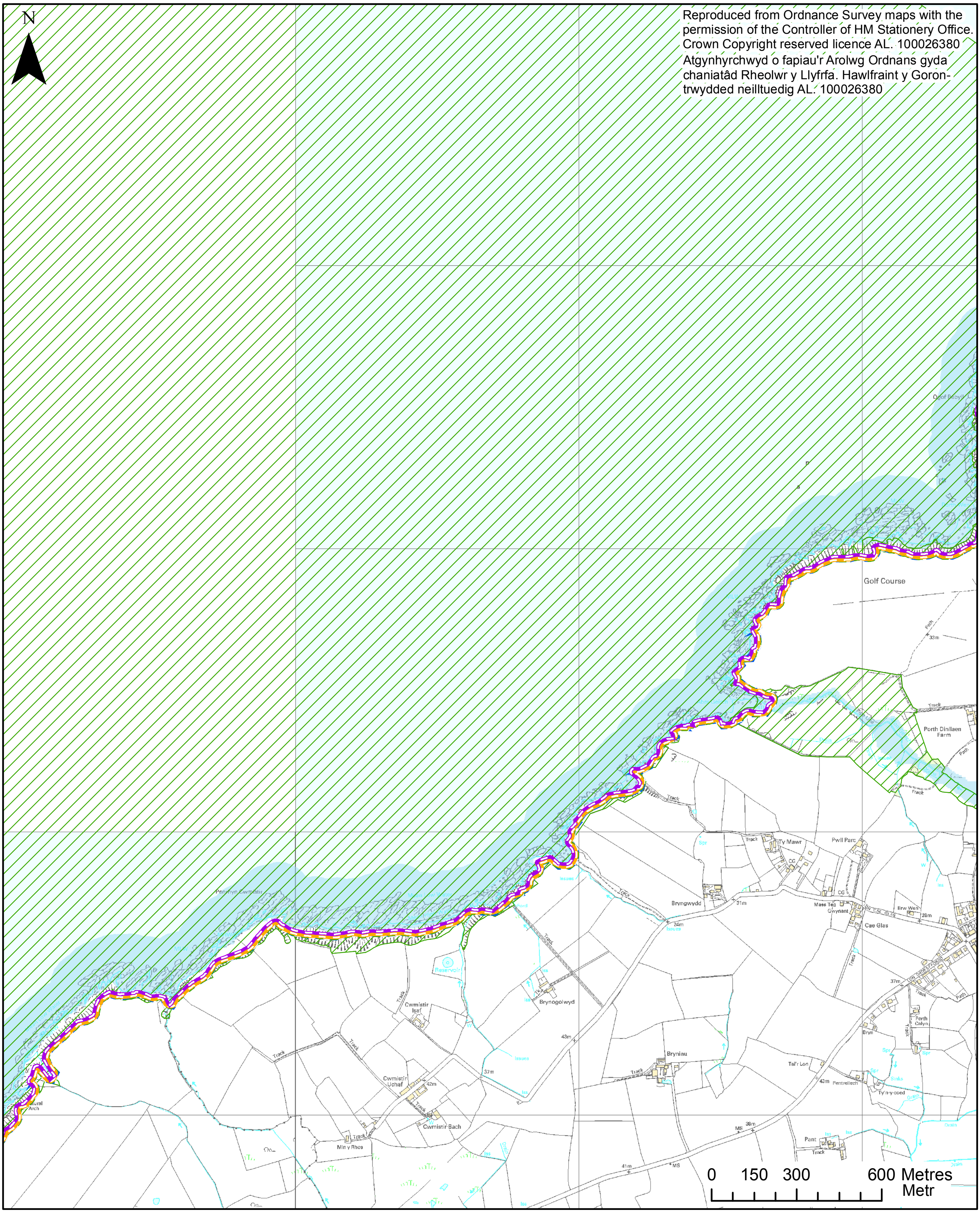
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 81



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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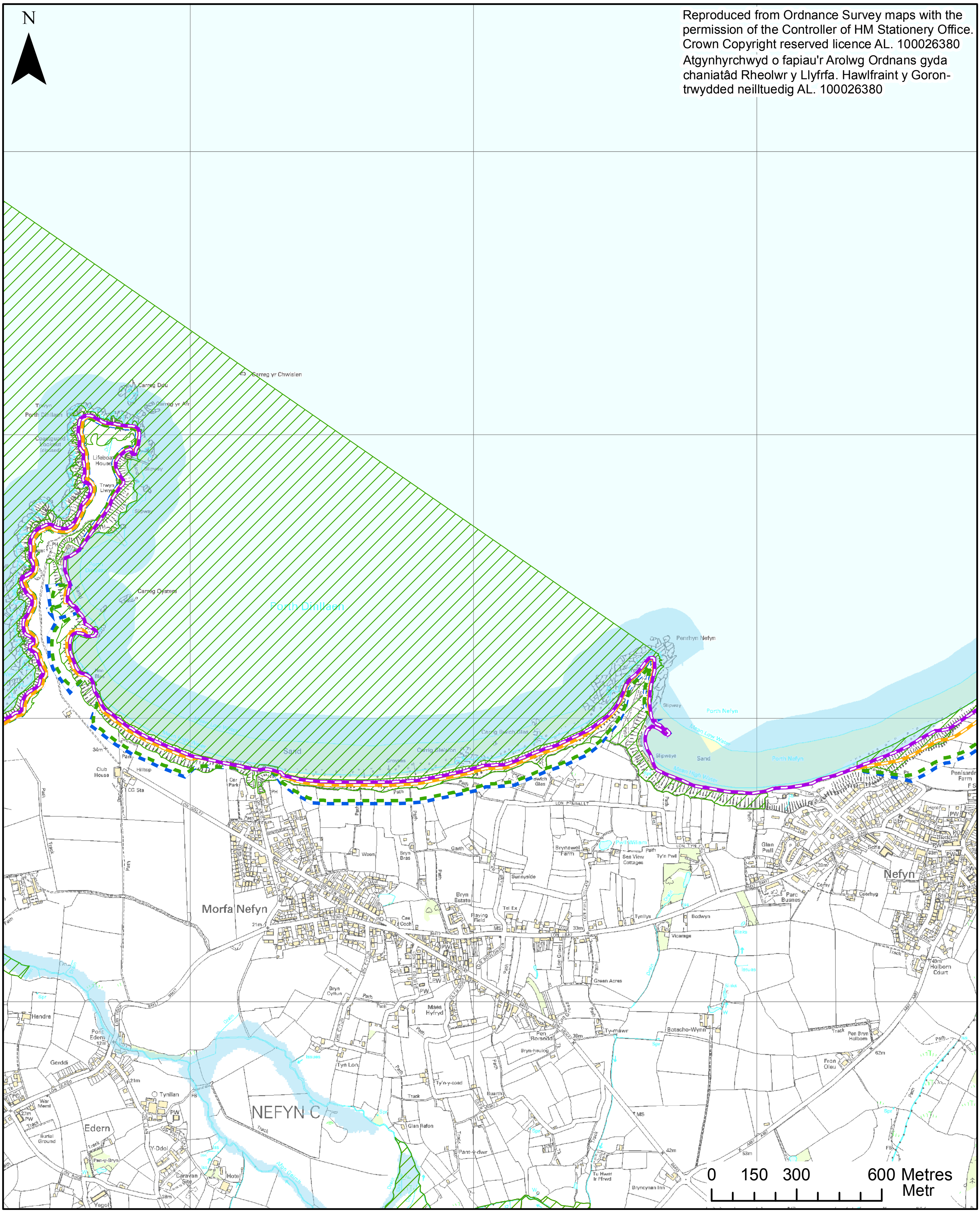
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 82



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	Scheduled Monuments	Henebion Cofrestredig

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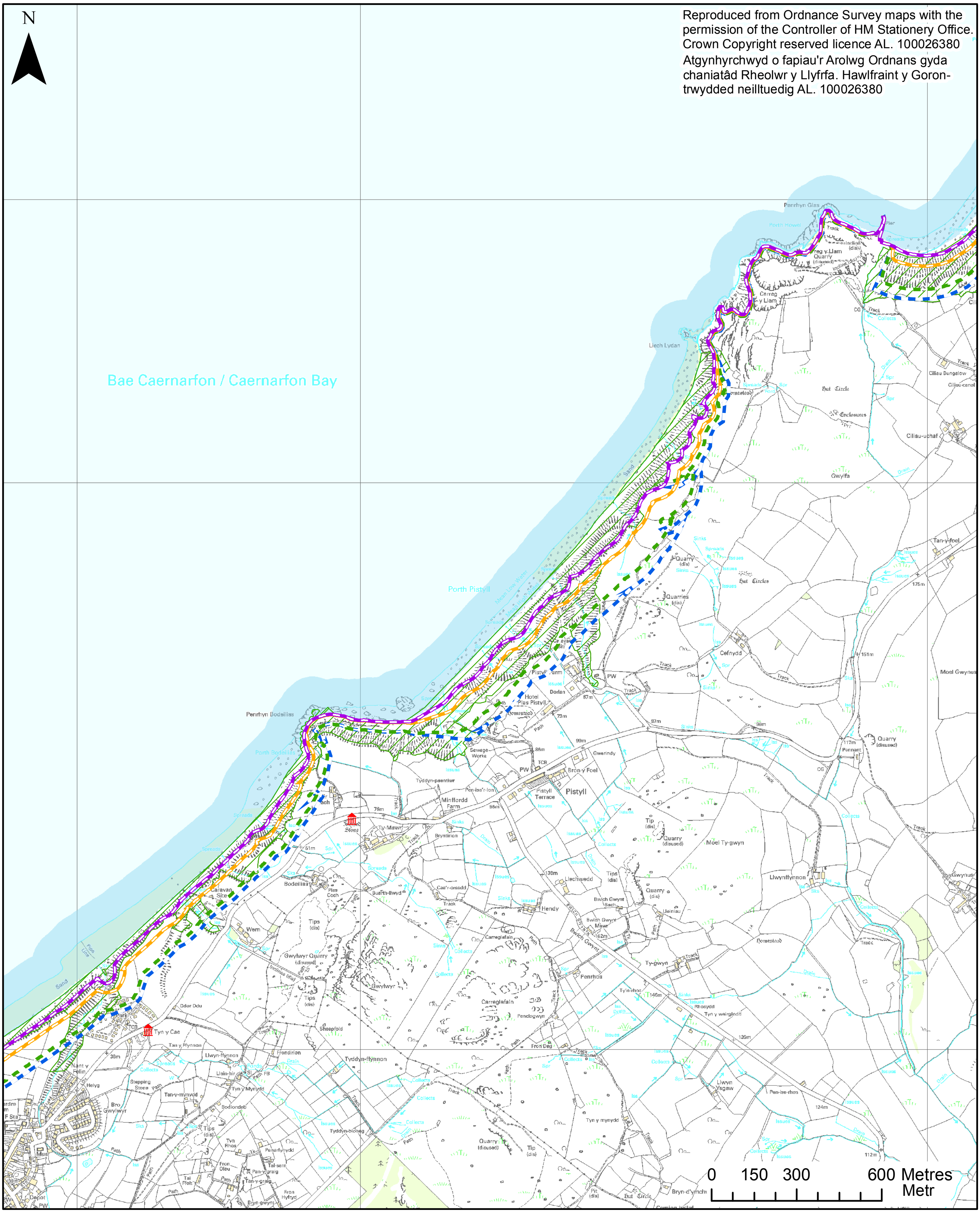
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 83



🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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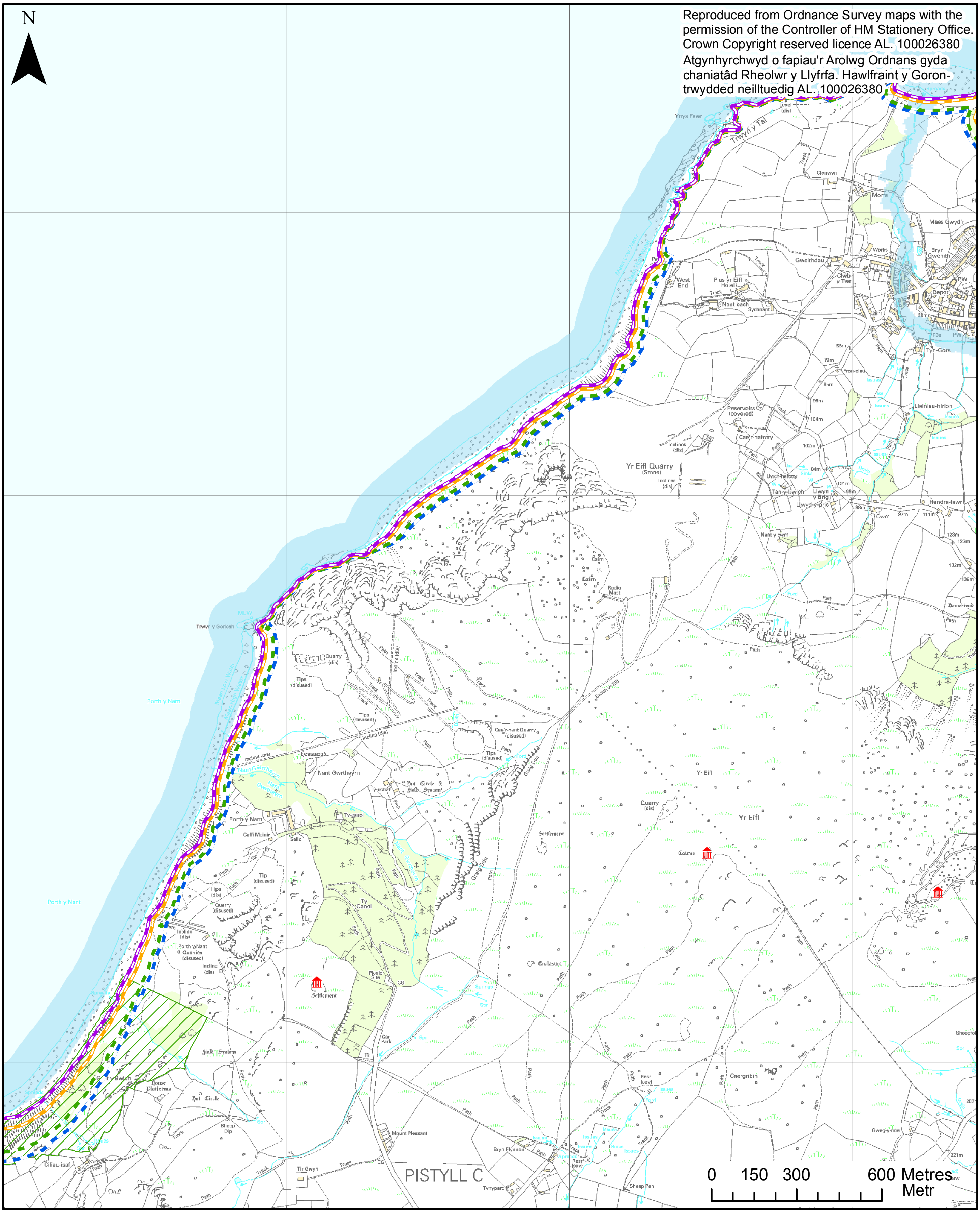
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 84



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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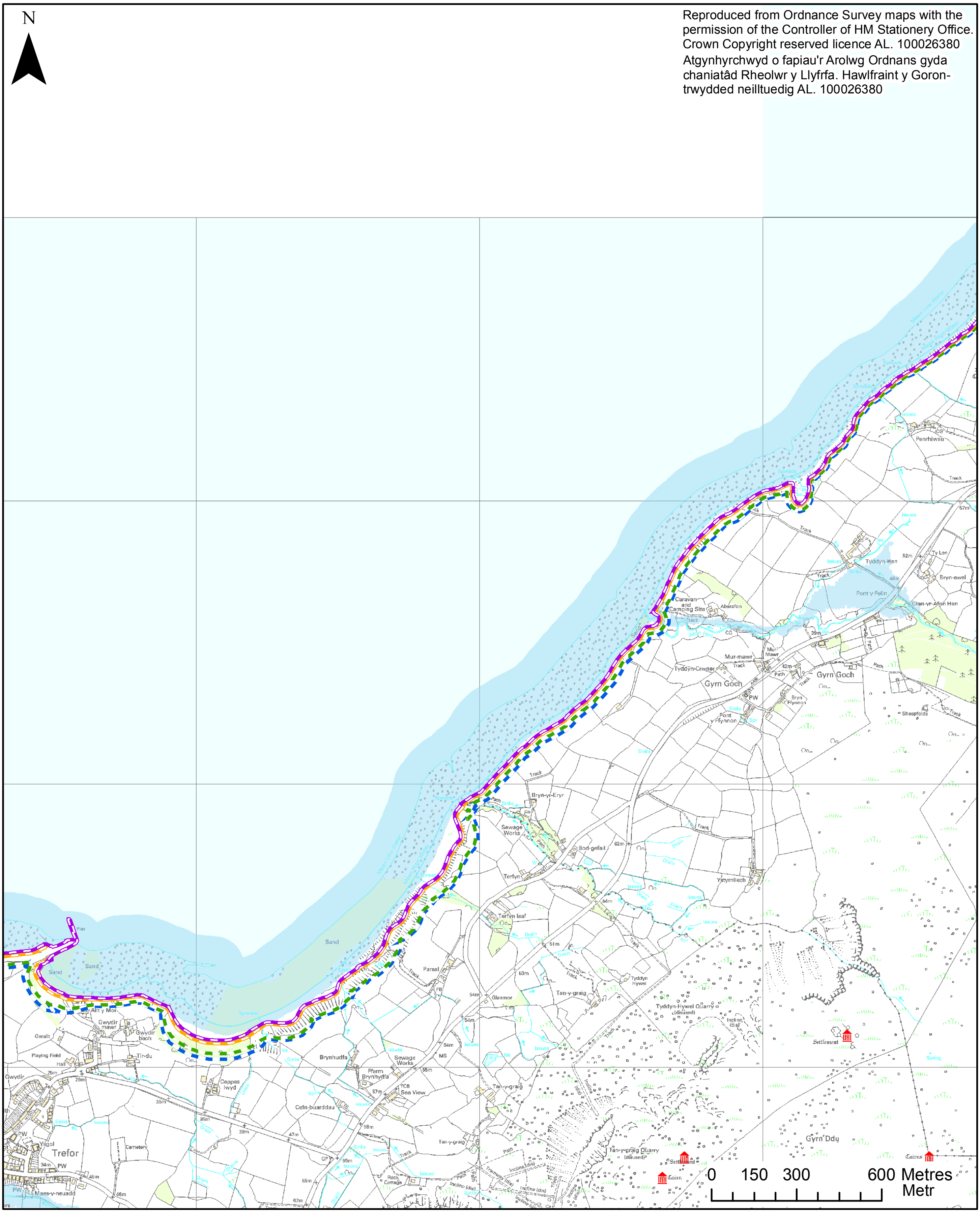
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 85



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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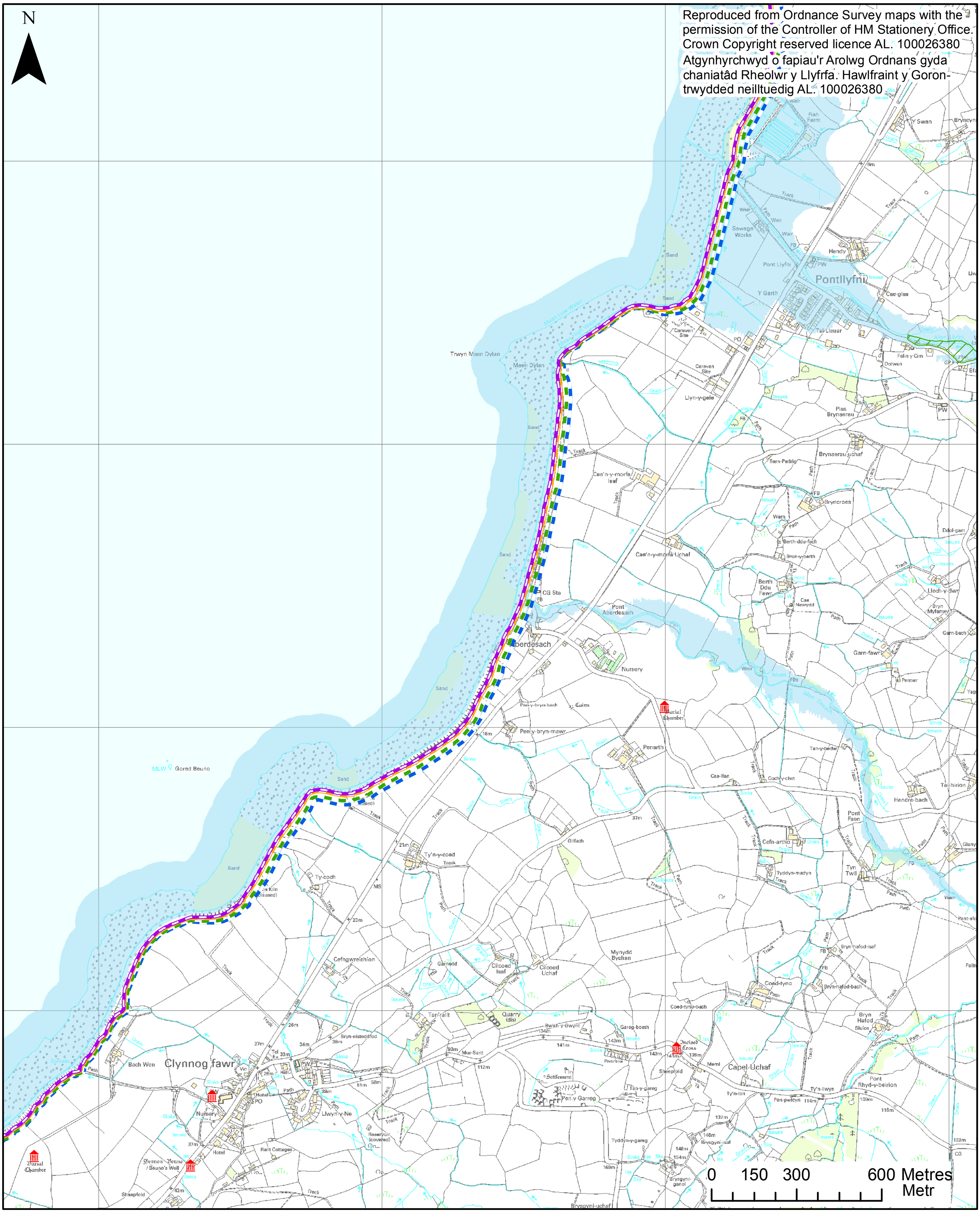
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 86



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
⌂	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 87

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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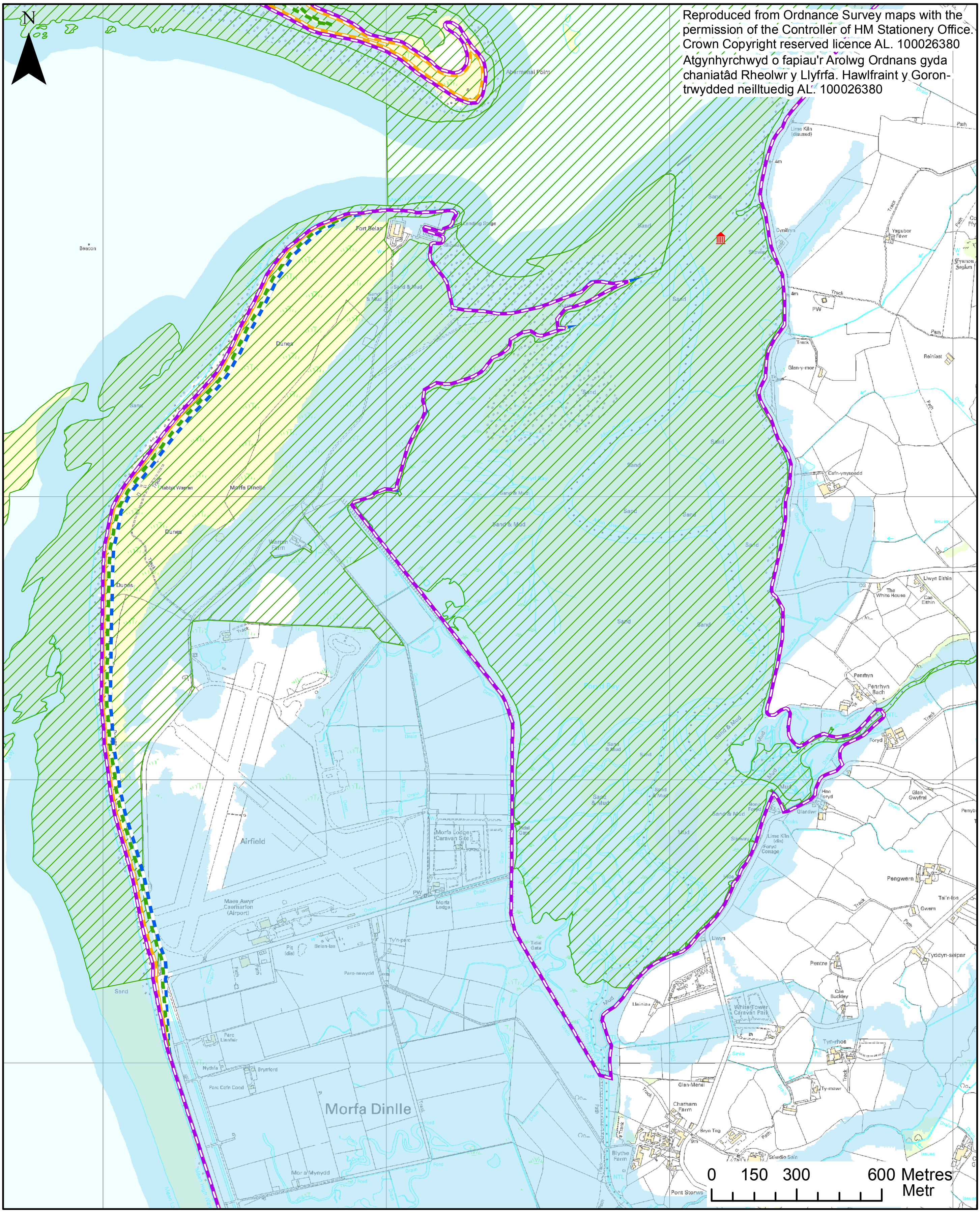
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 88



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 89

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig

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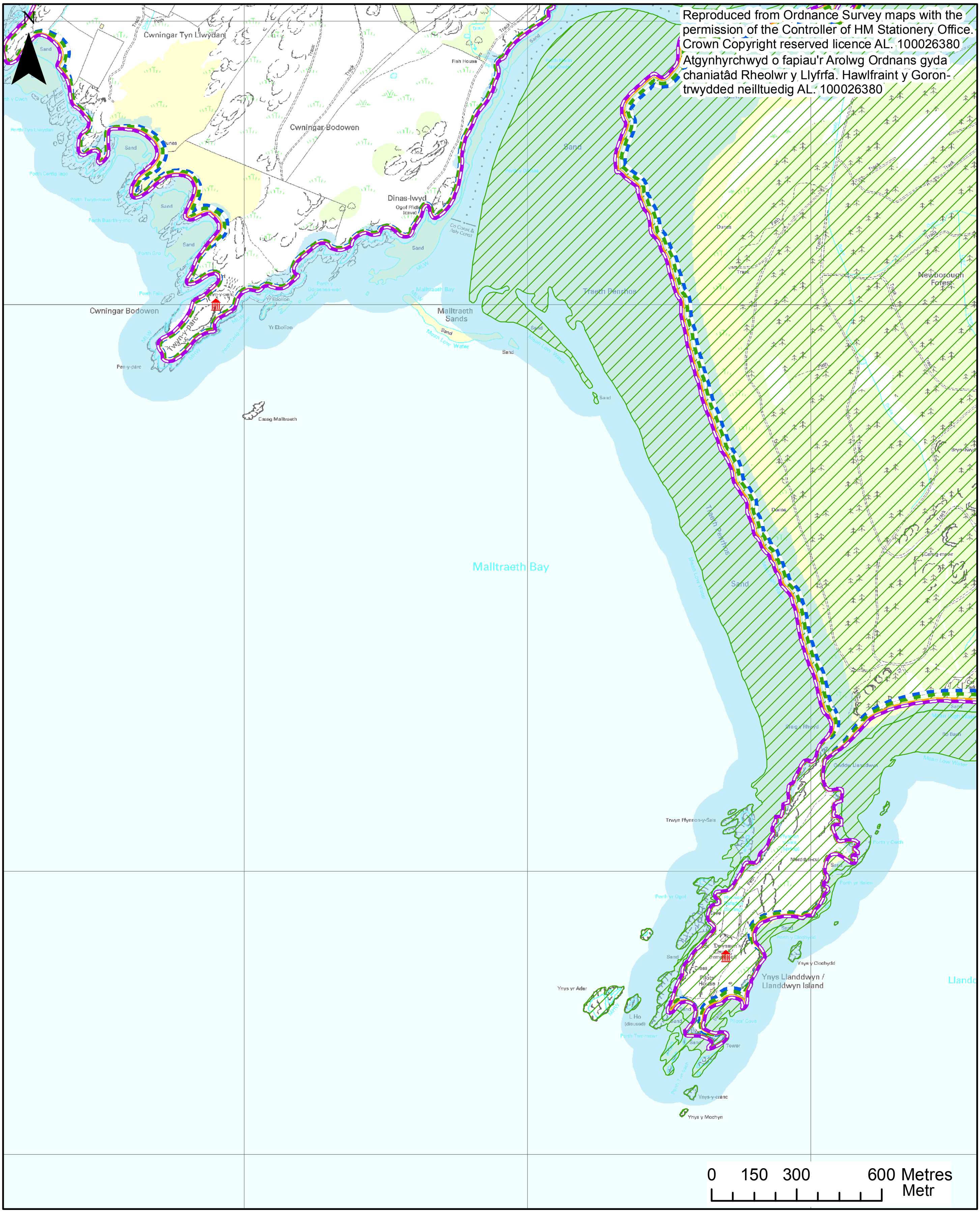
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 90



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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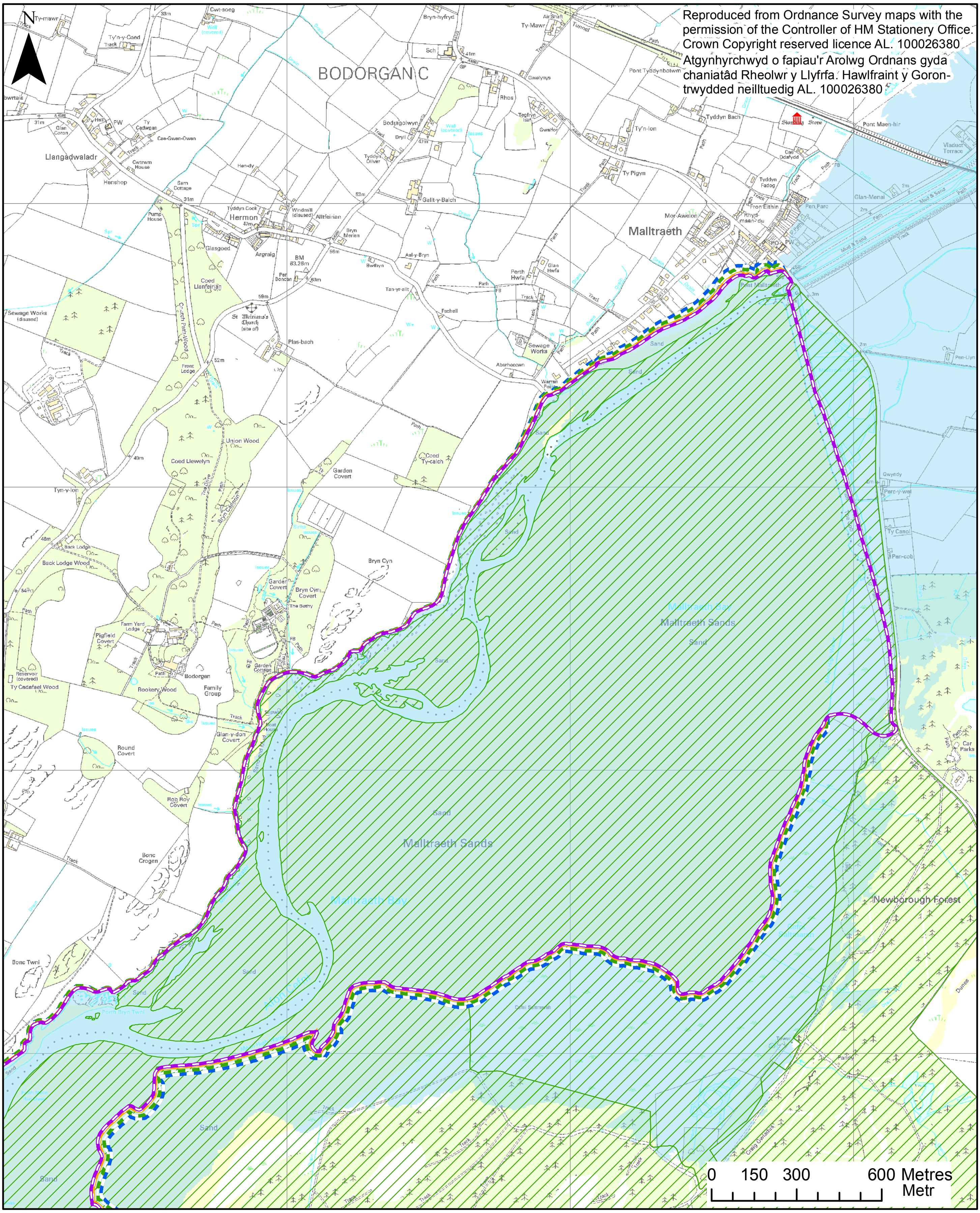
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 91



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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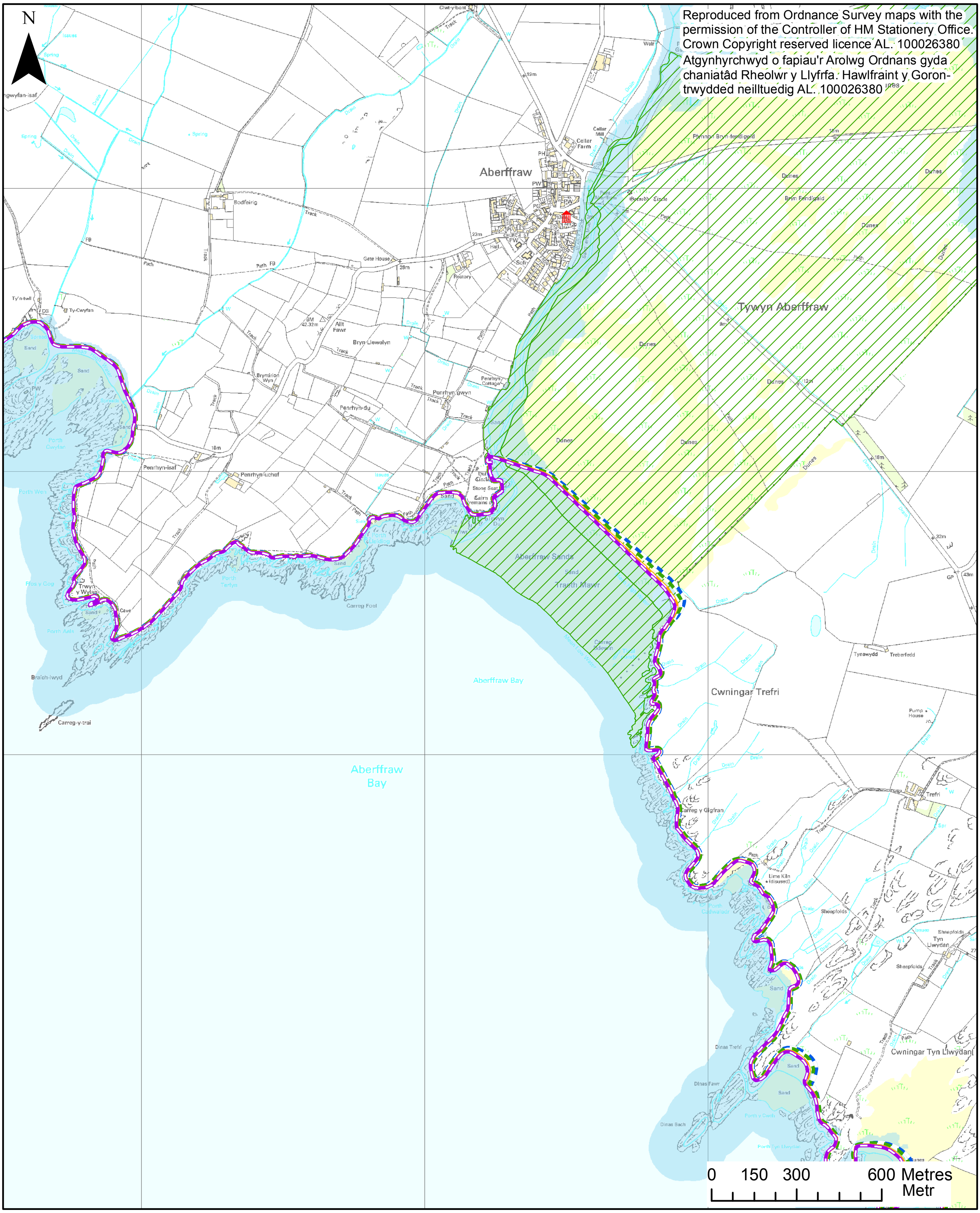
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 92



▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 93

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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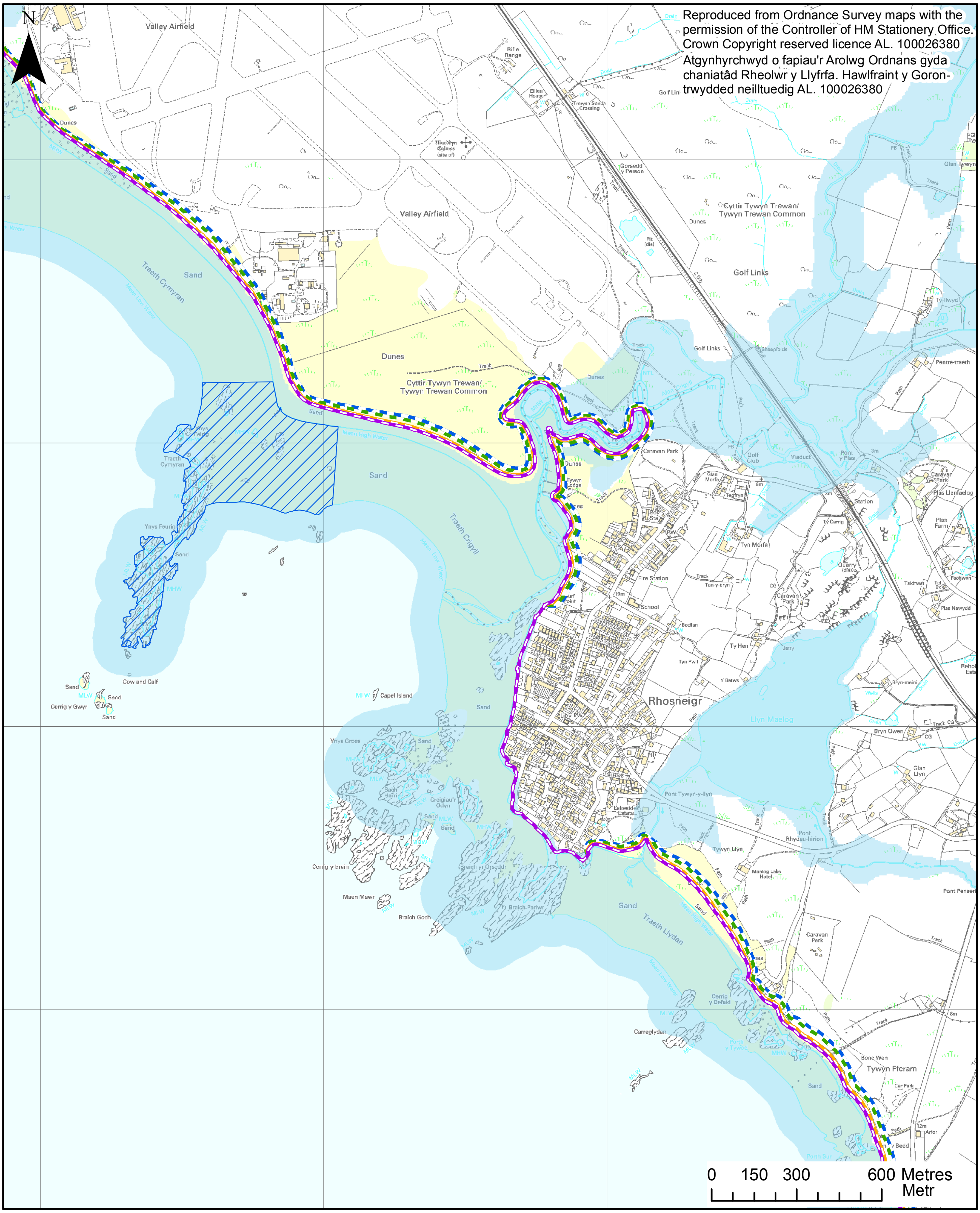
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 94



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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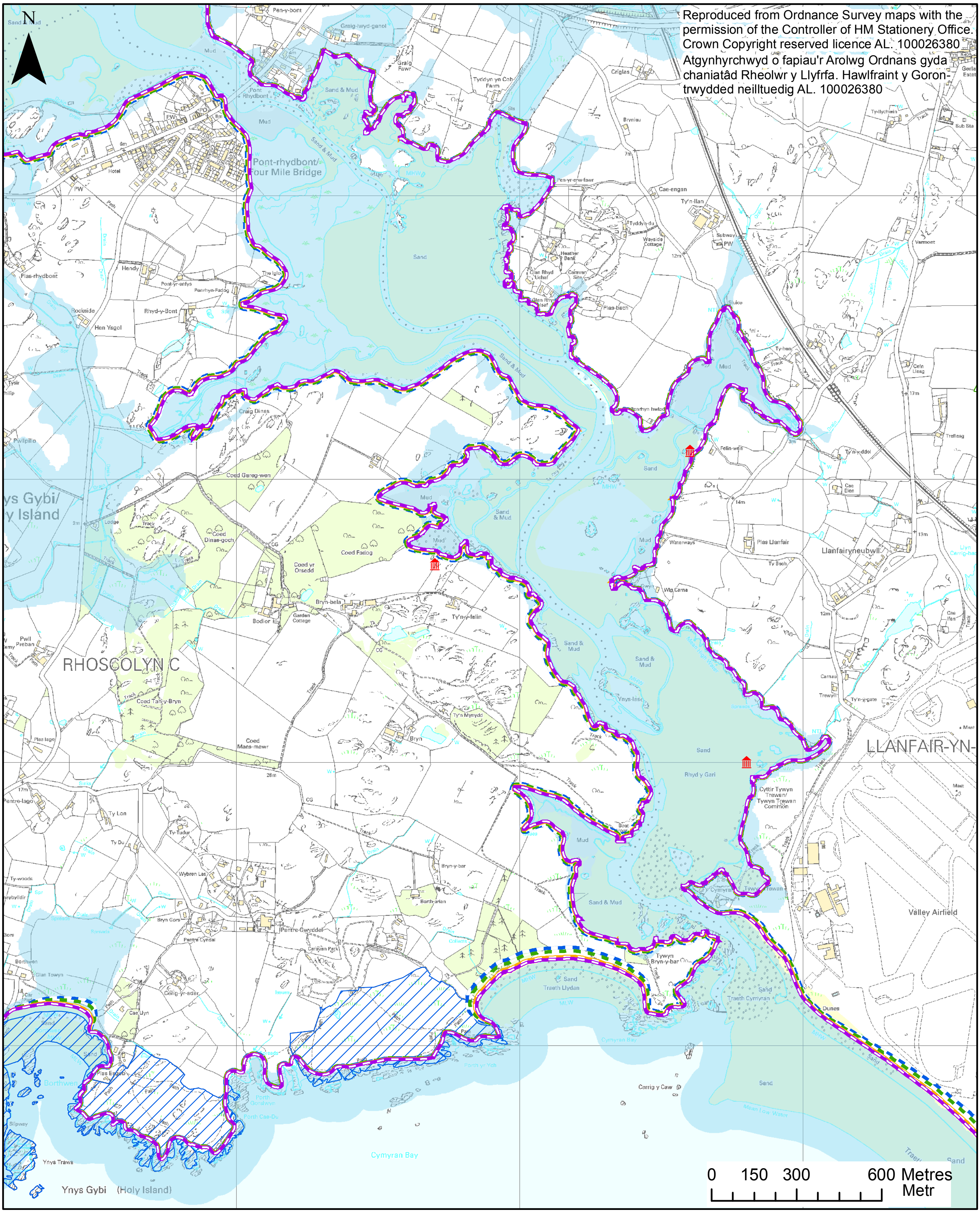
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 95



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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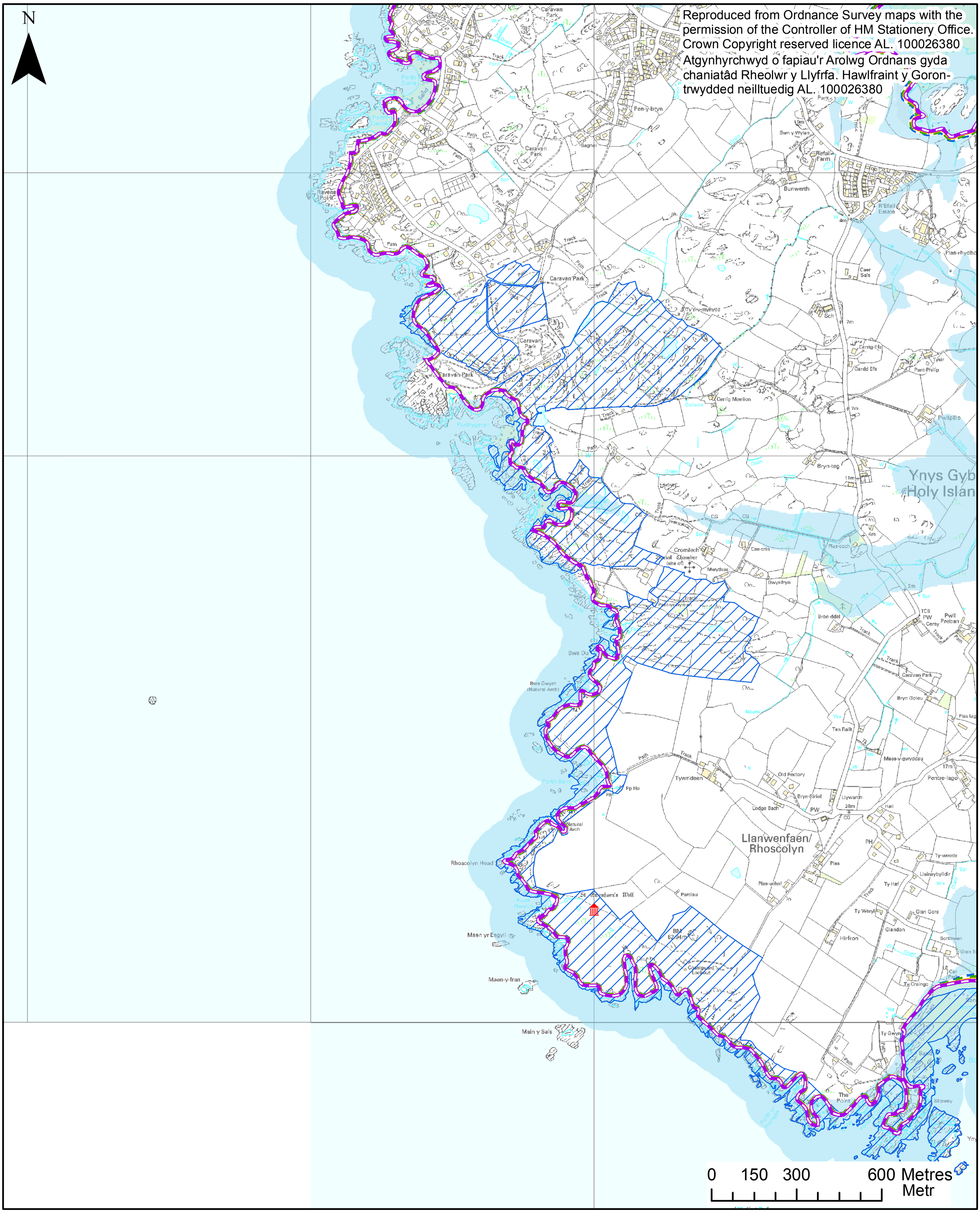
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 96



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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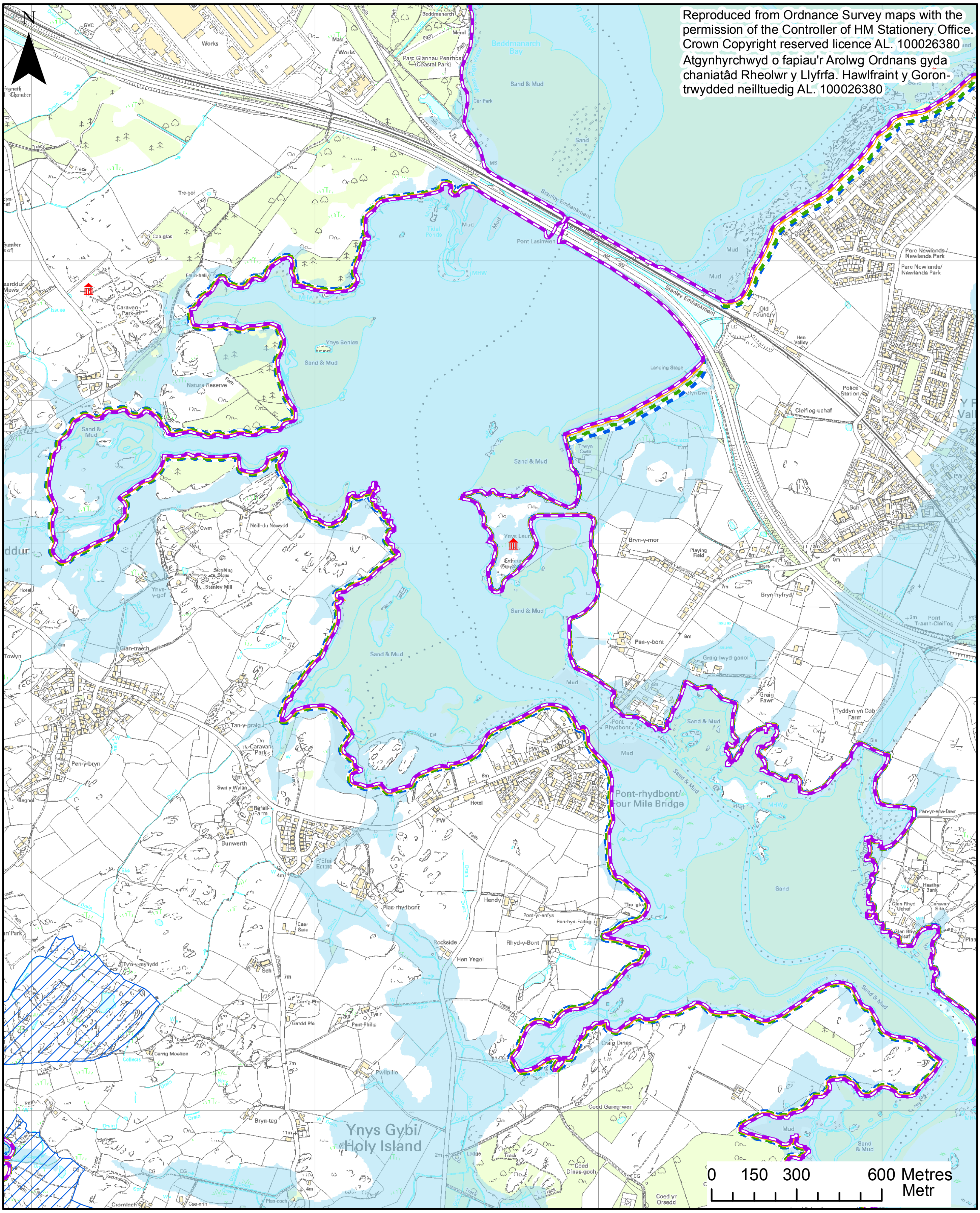
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 97



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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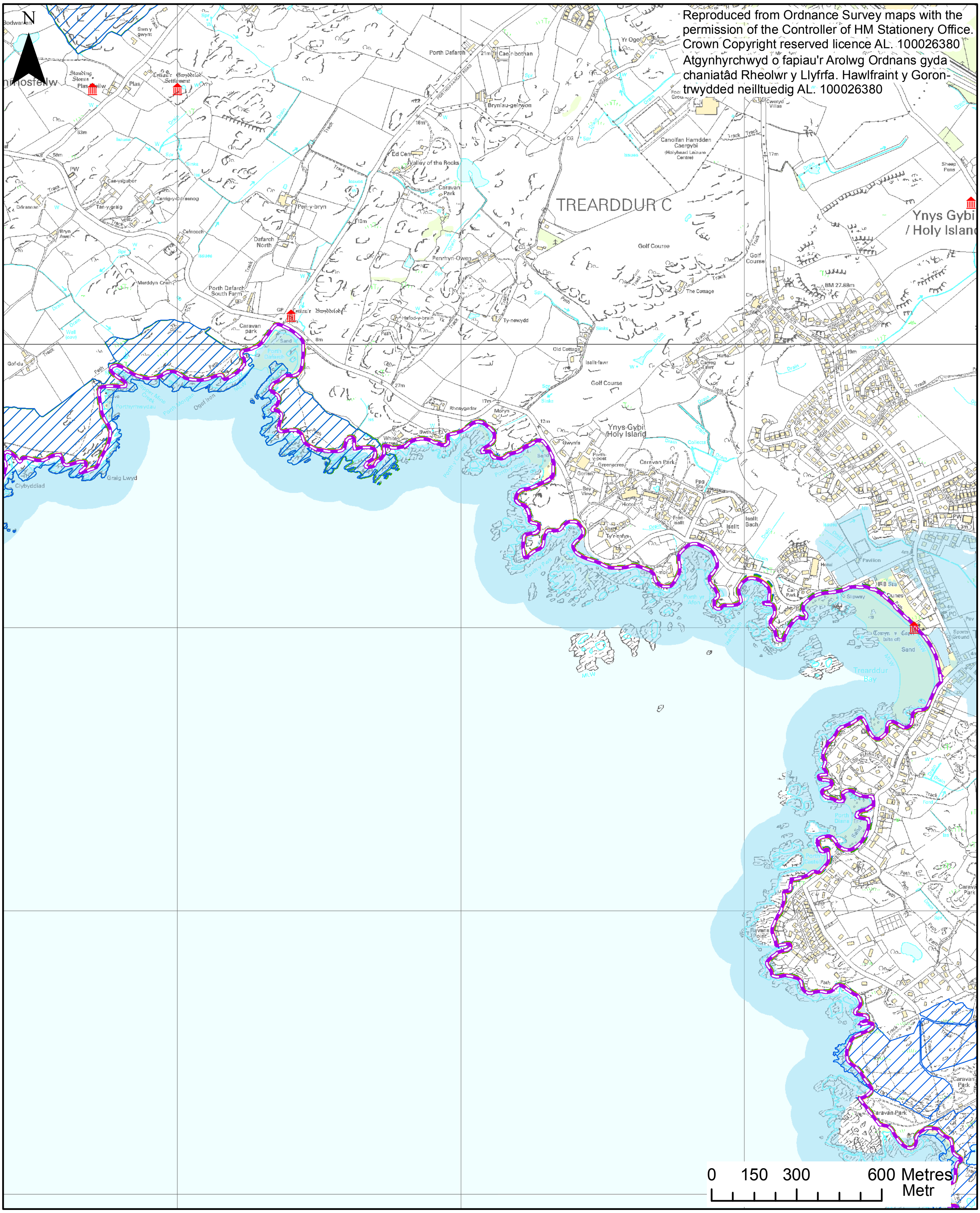
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 98



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol

▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 99

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

🟪	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
🟧	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
🟩	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
🟦	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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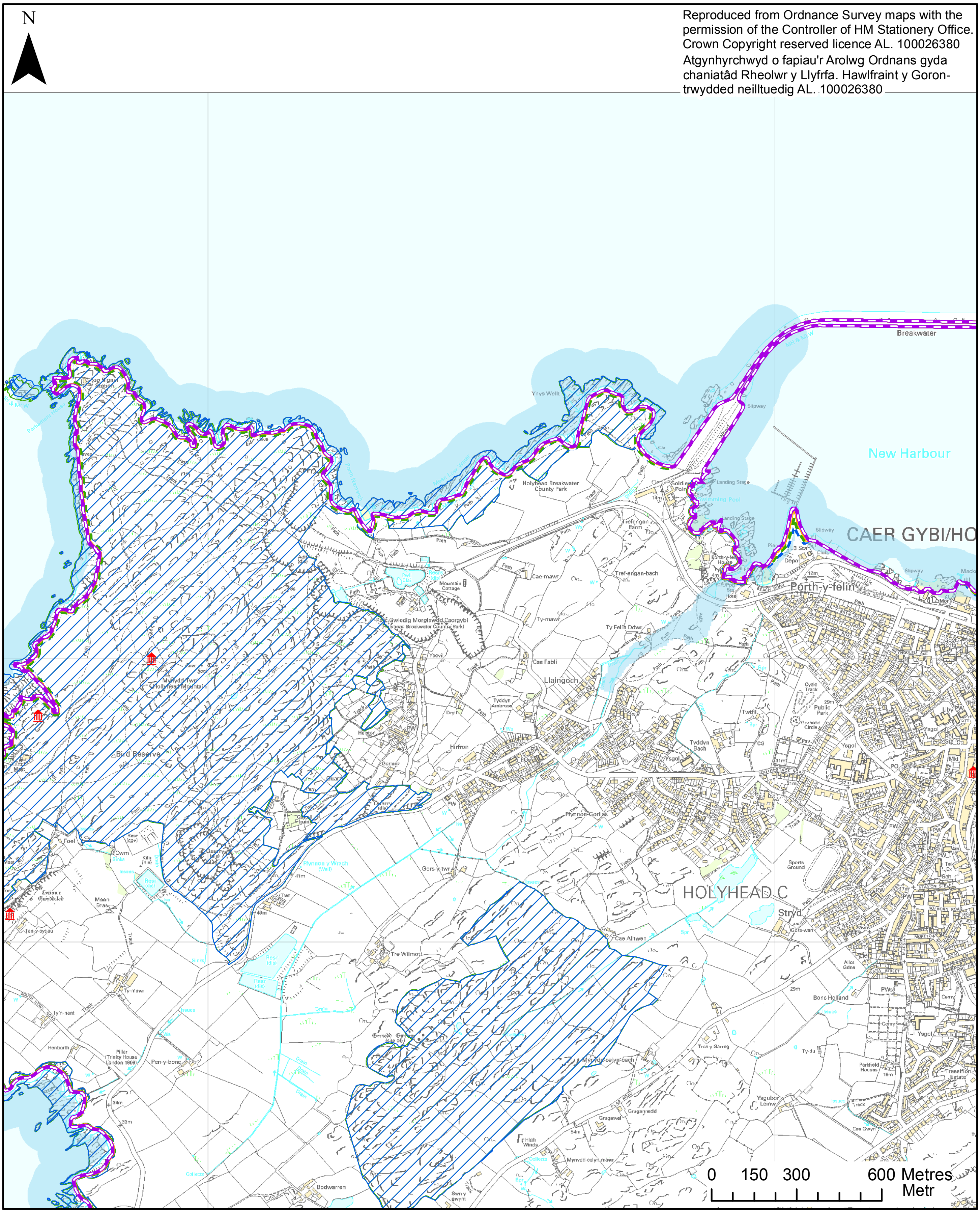
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 100



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales   Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 101

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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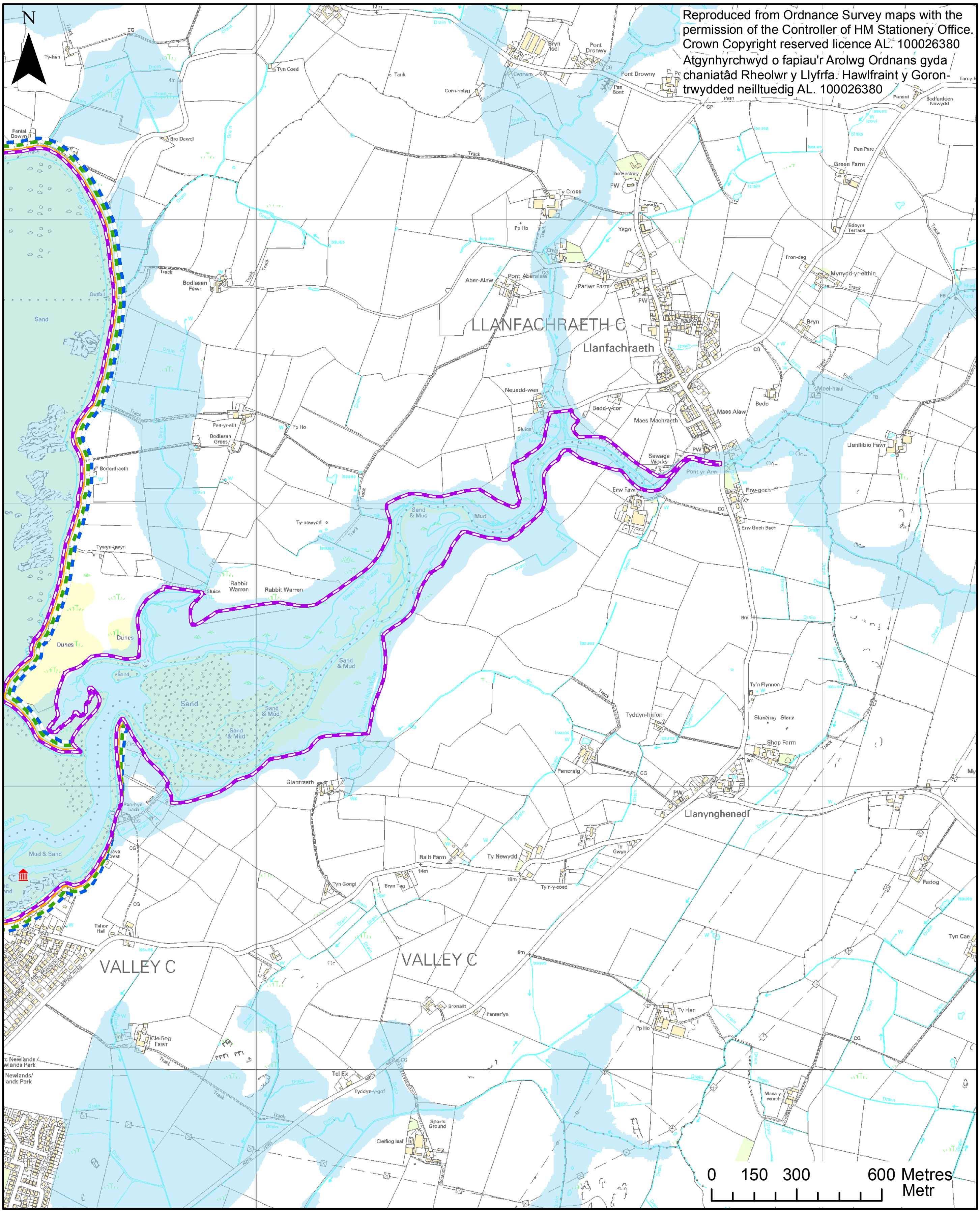
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 102



Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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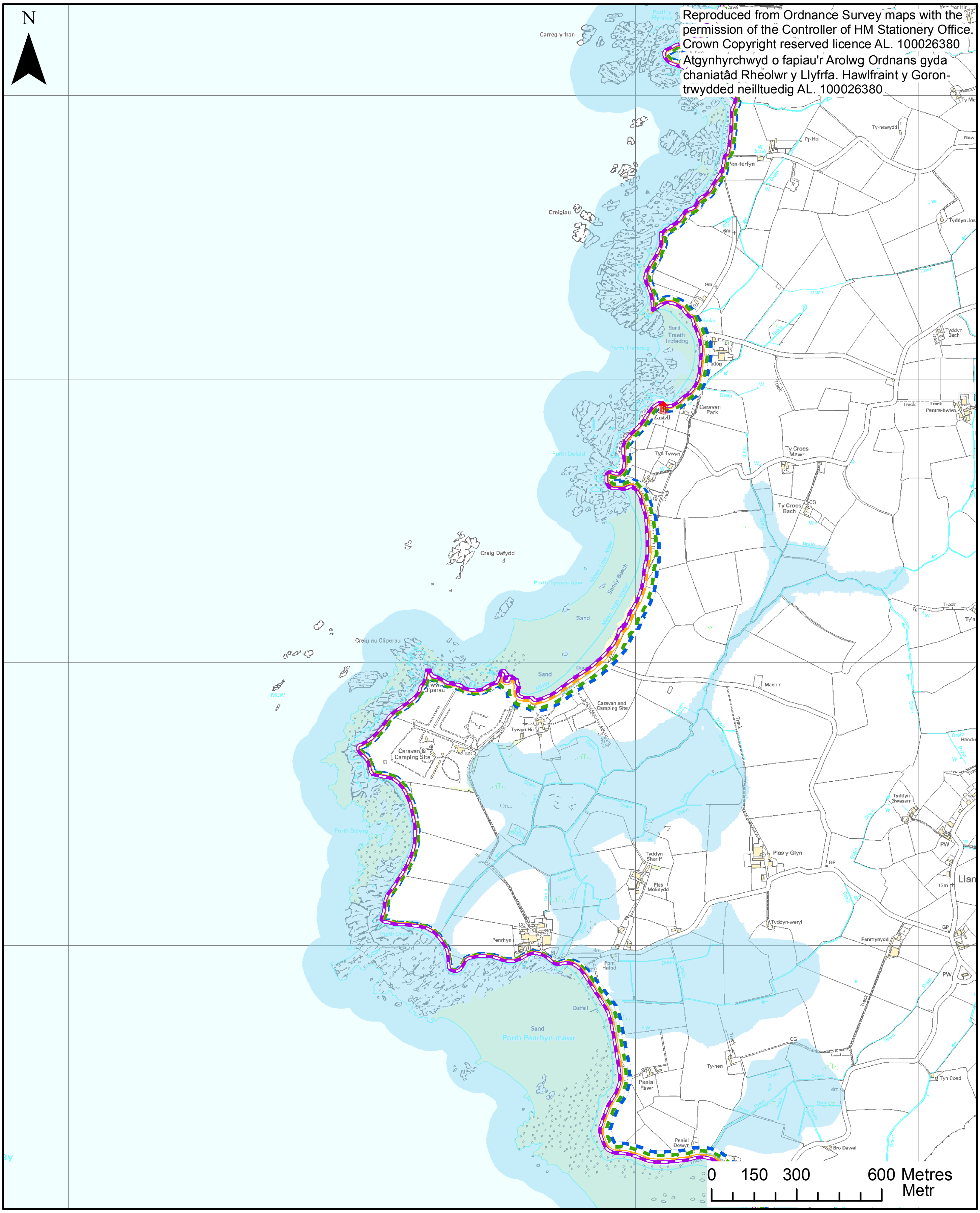
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 103



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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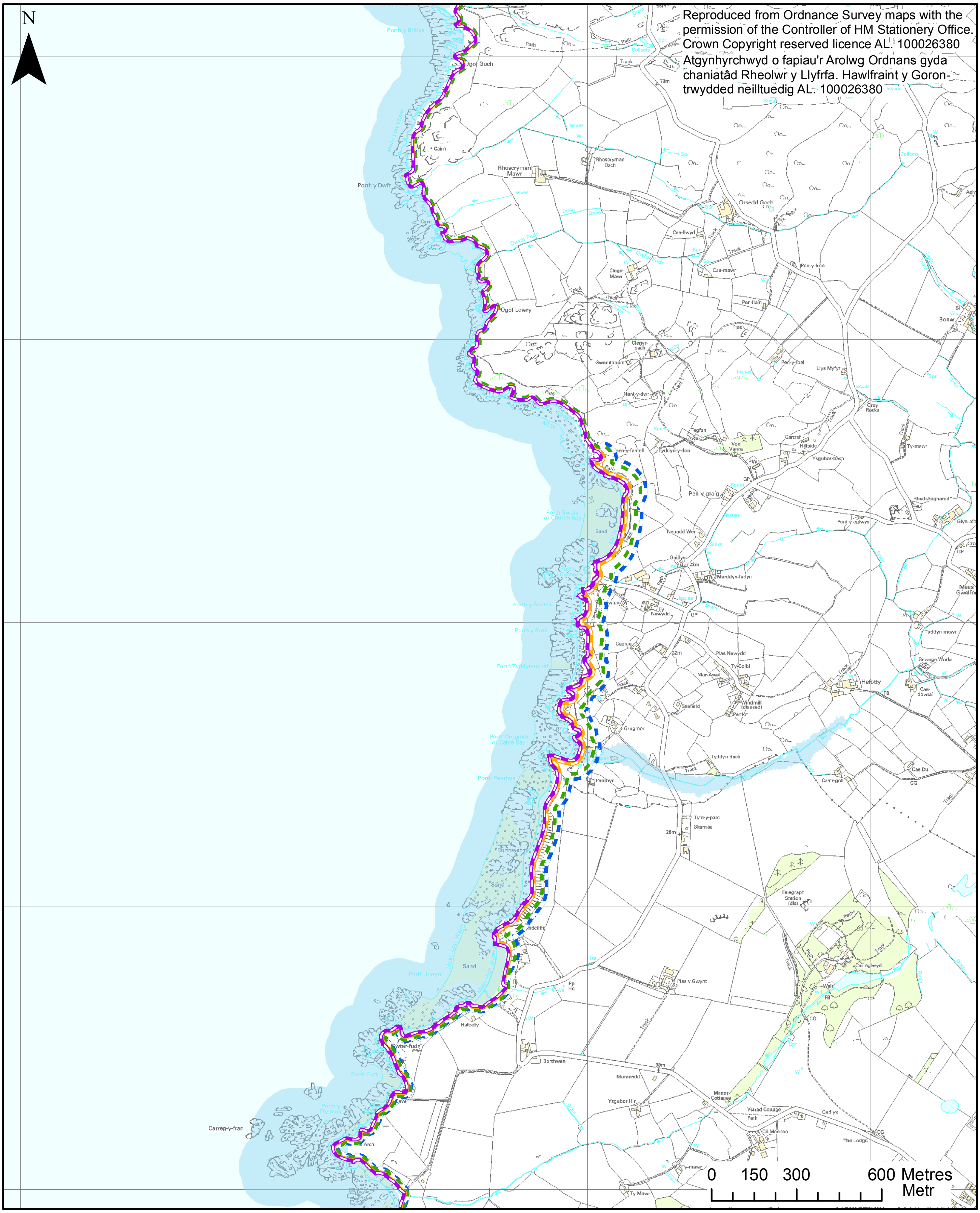
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 104



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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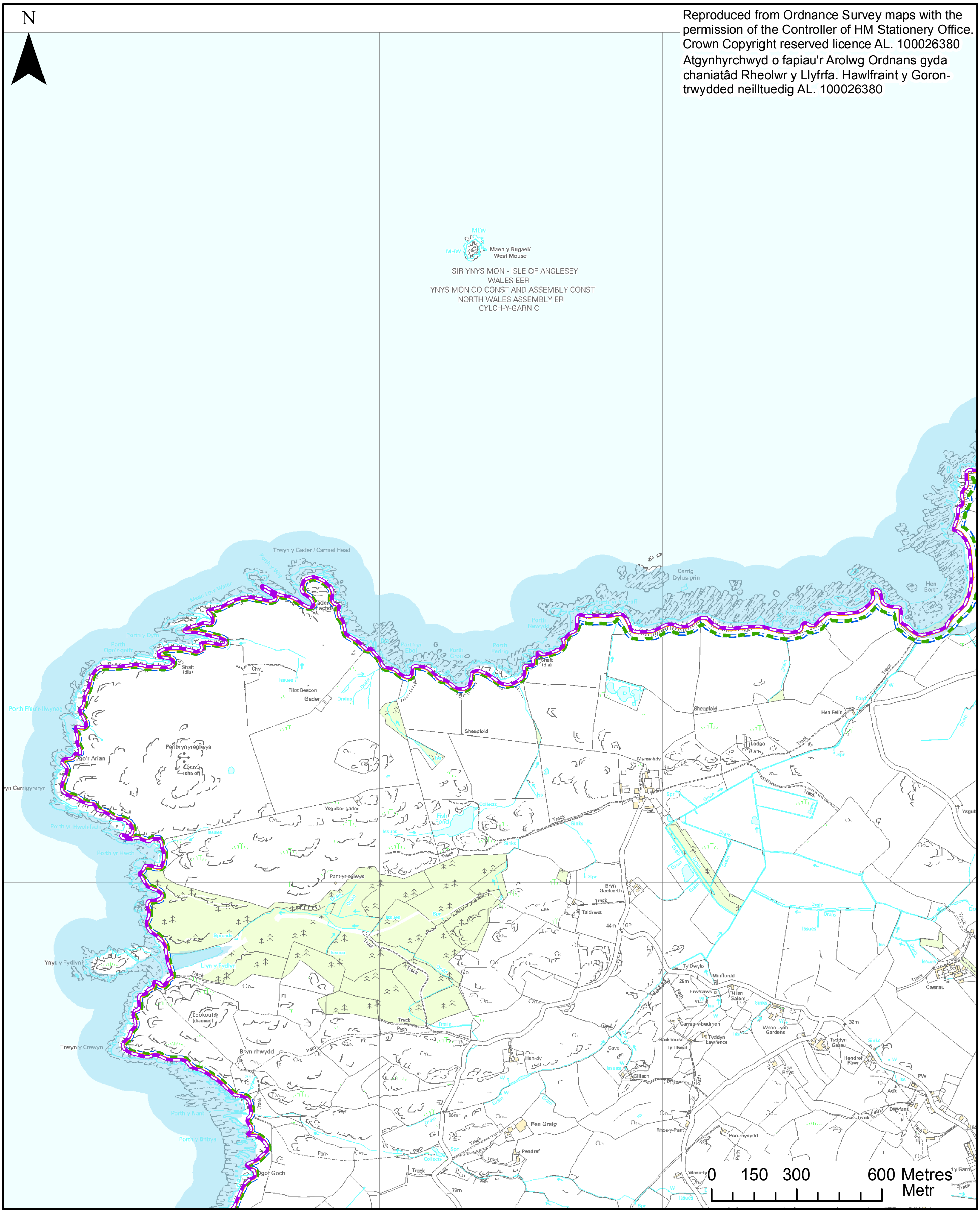
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 105



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 106

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 107

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 108

Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 109

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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 110

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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neillituedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⛫	Scheduled Monuments	Henebion Cofrestredig

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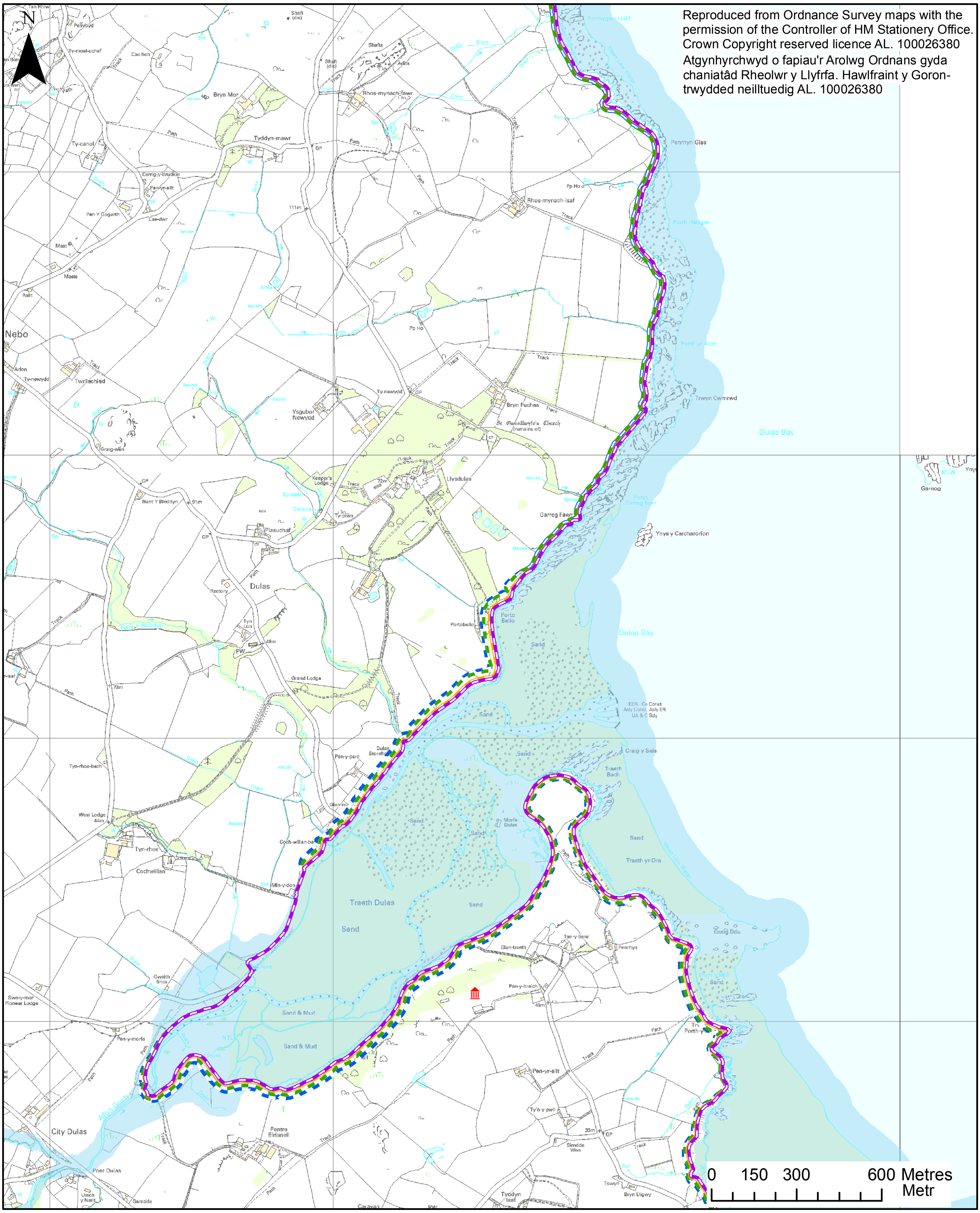
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 111



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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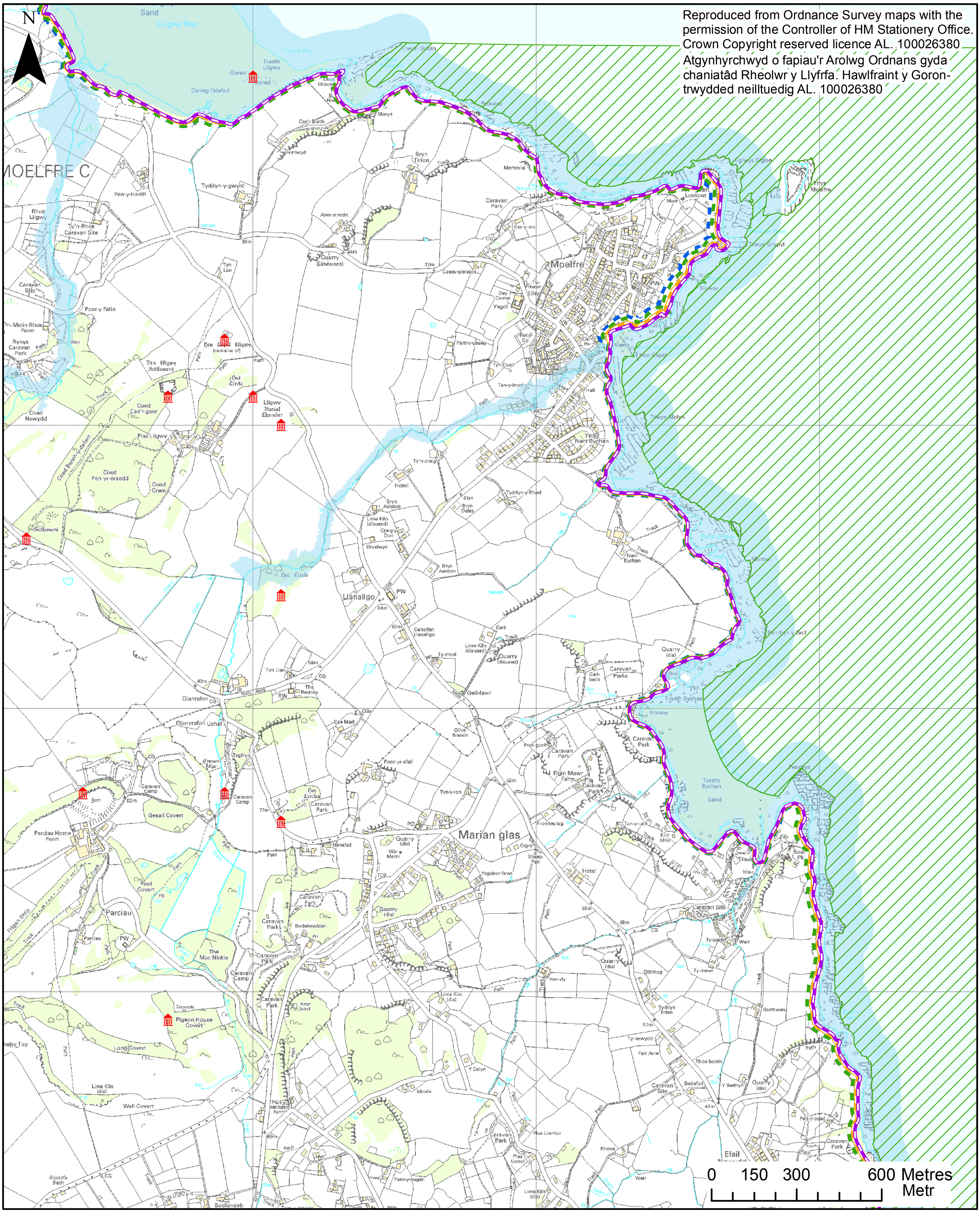
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 112



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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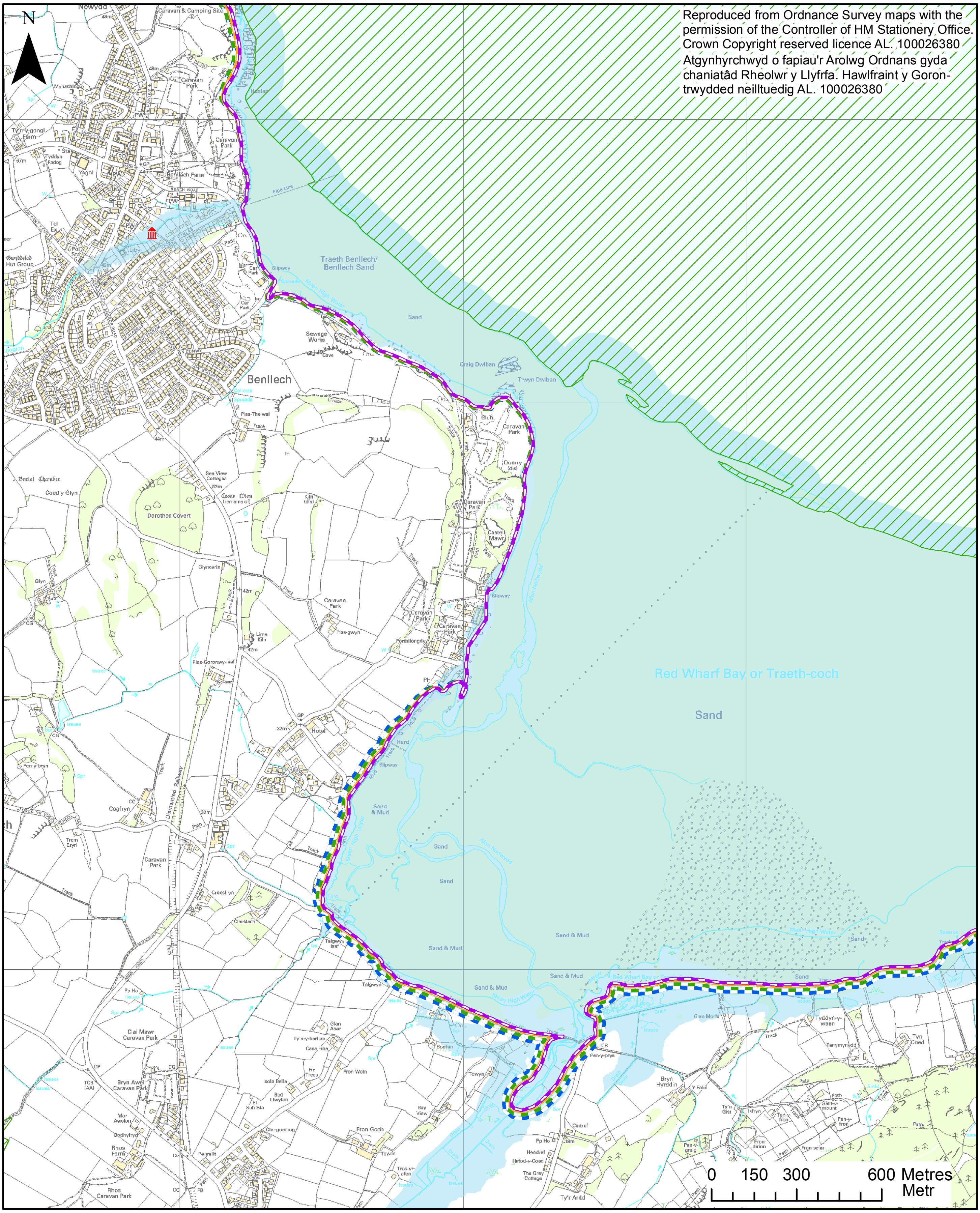
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 113



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 114

▭	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▭	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▭	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▭	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▭	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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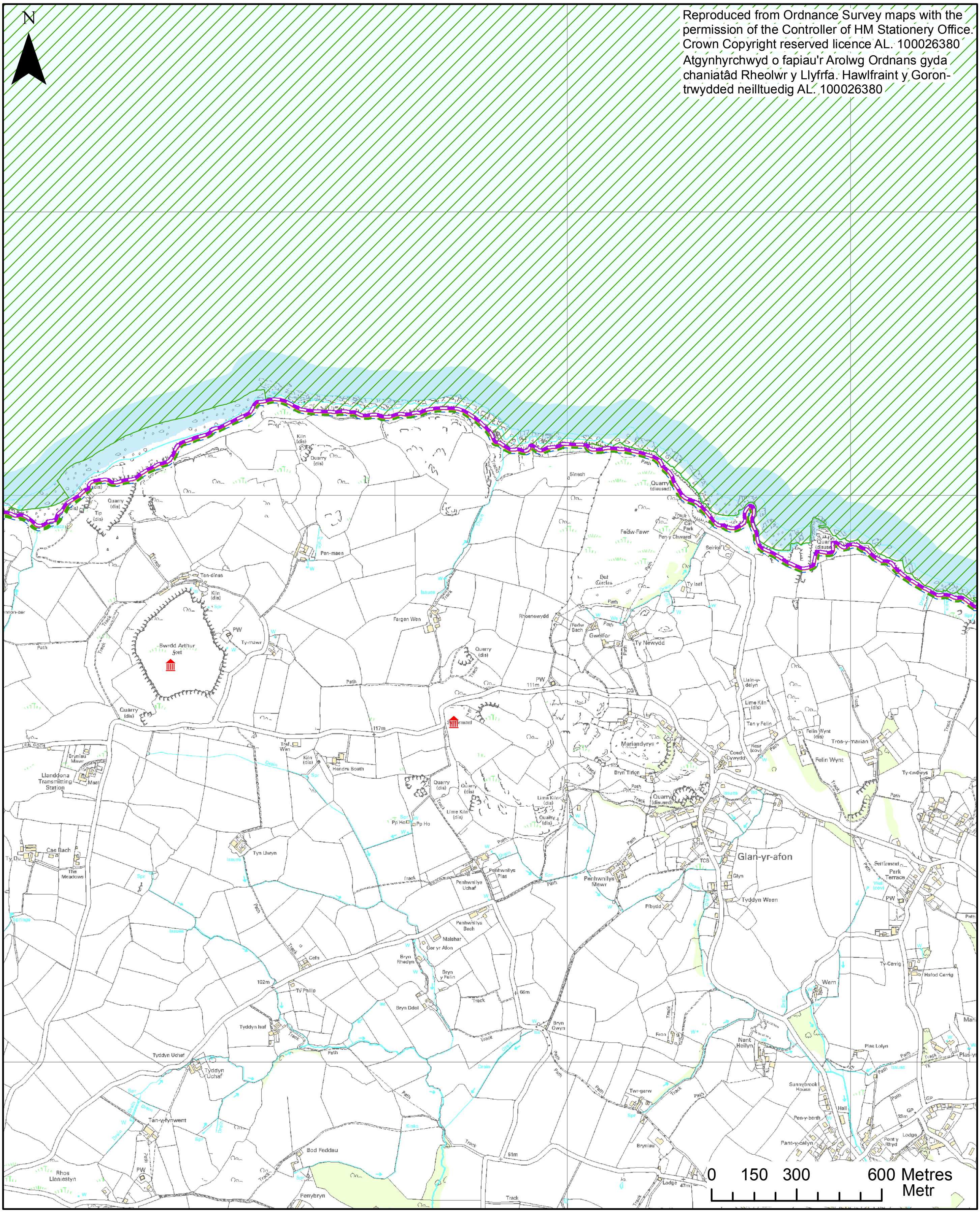
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 115



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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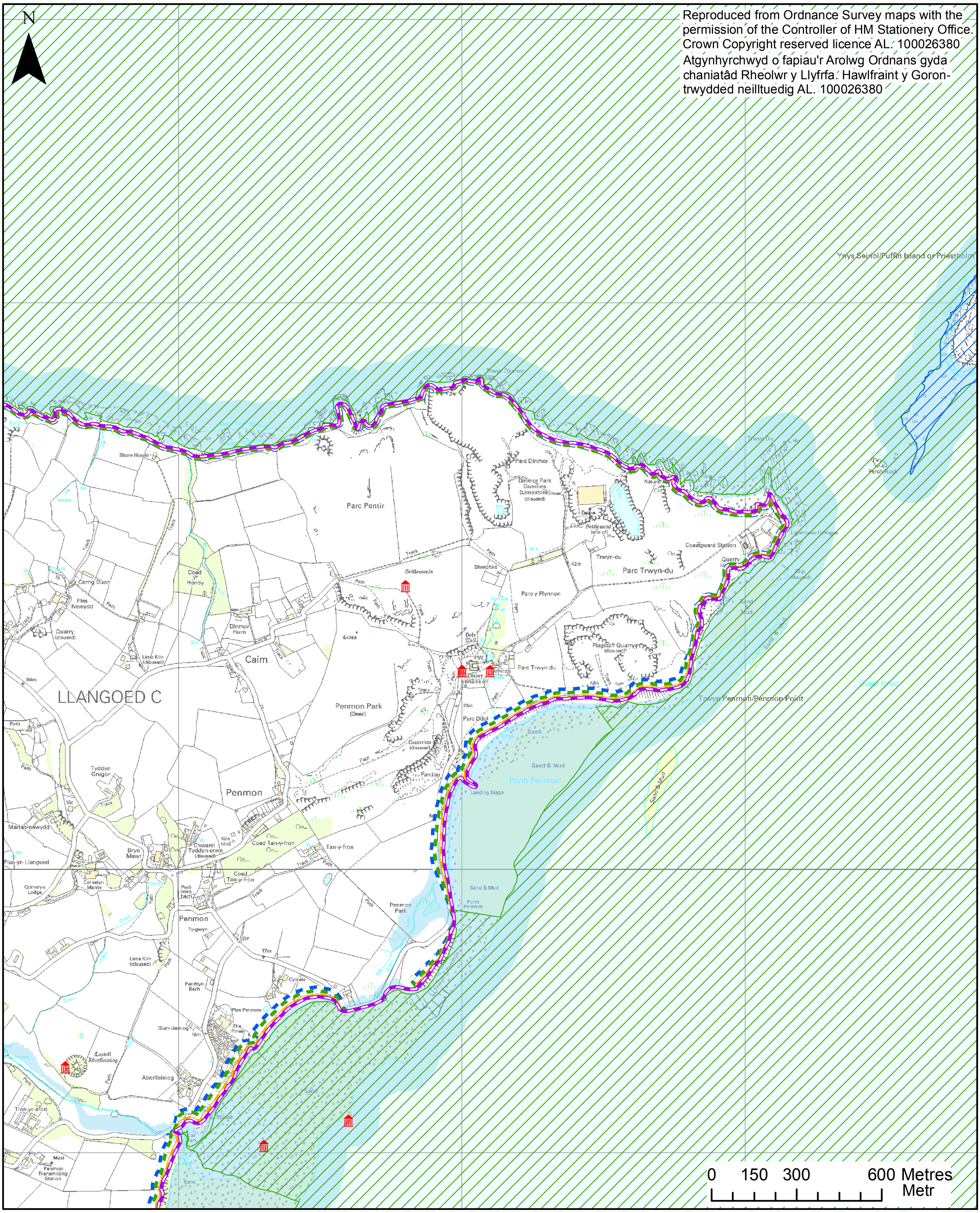
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 116



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig

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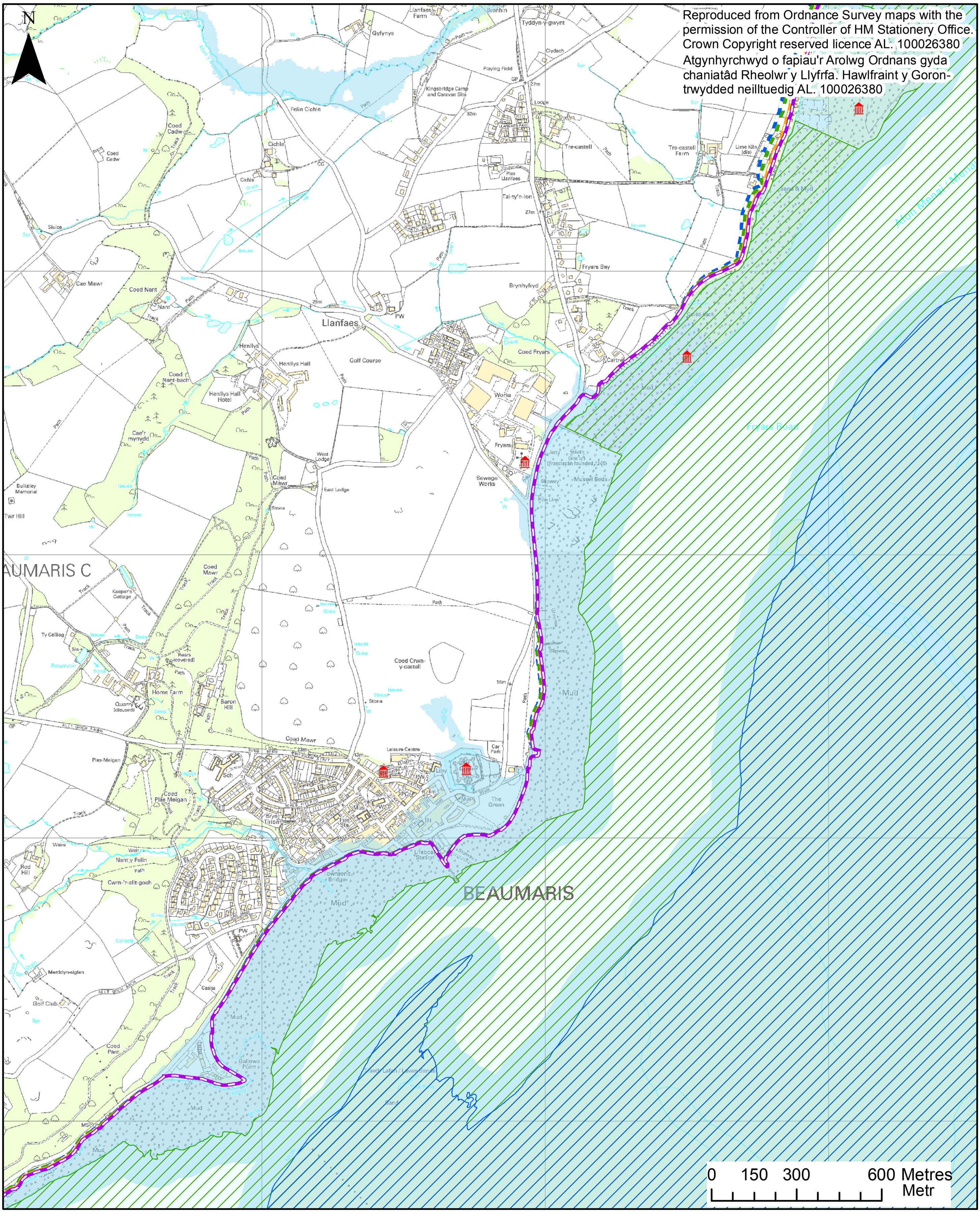
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 117



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▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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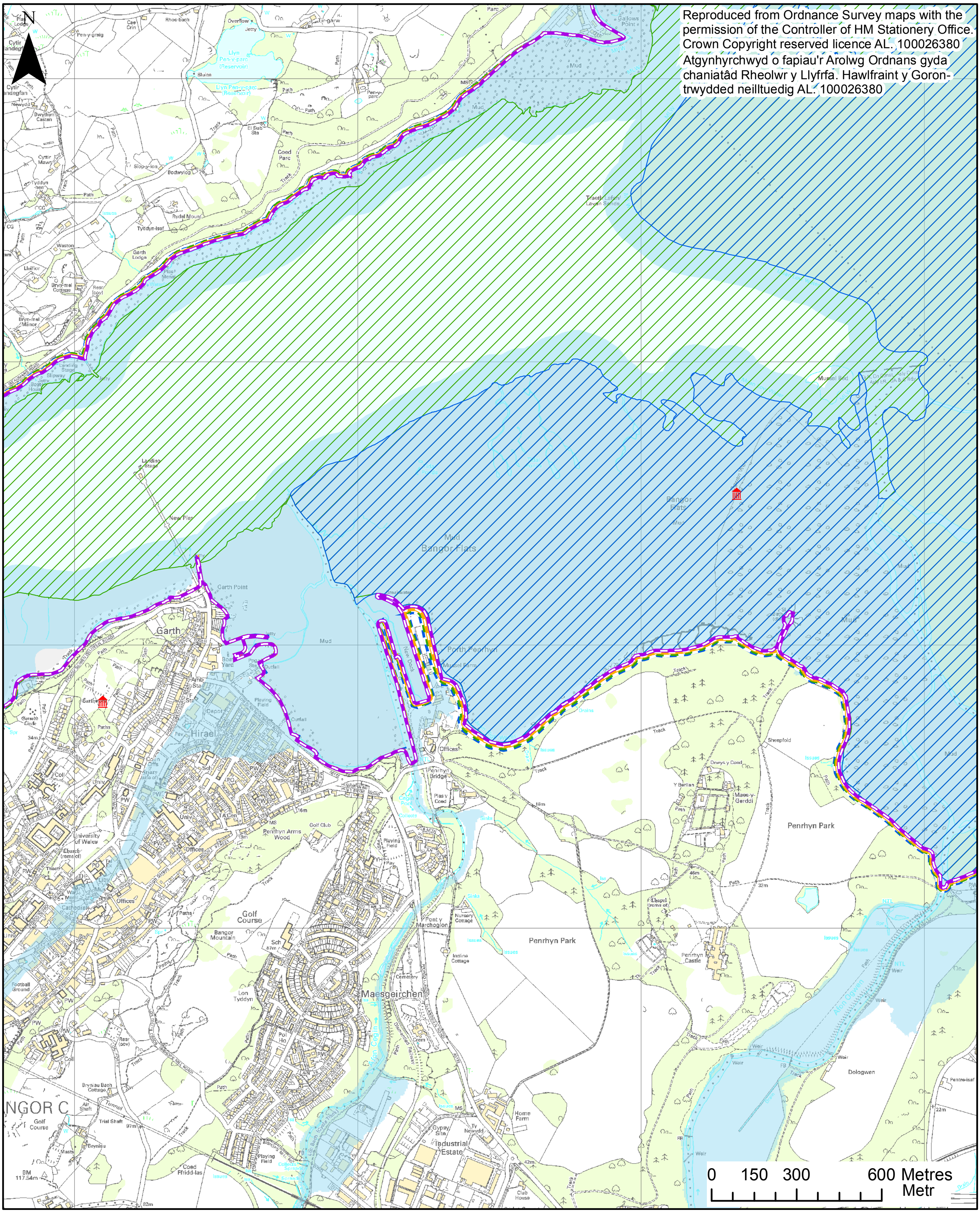
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 118



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Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR		
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig	

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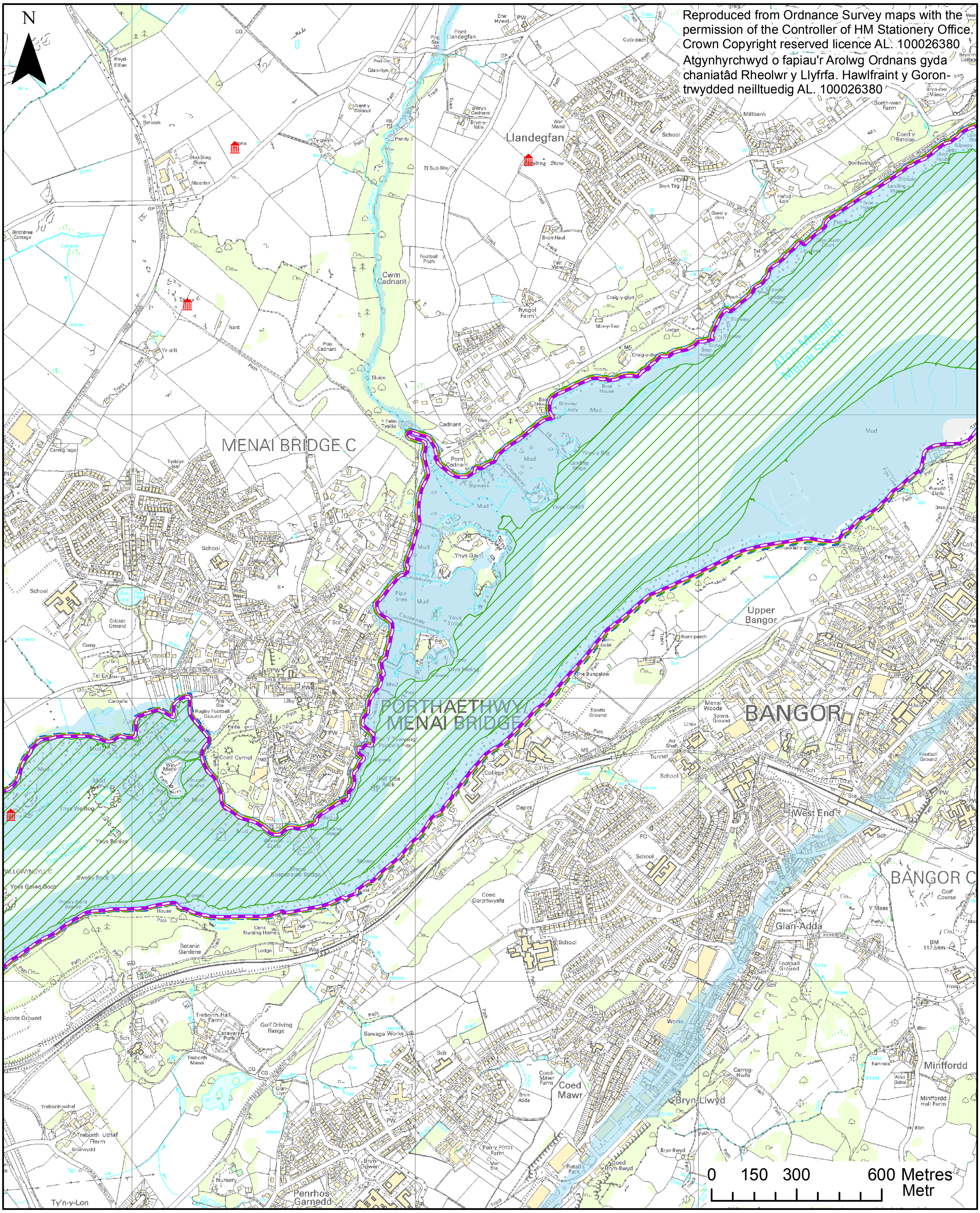
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 119



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▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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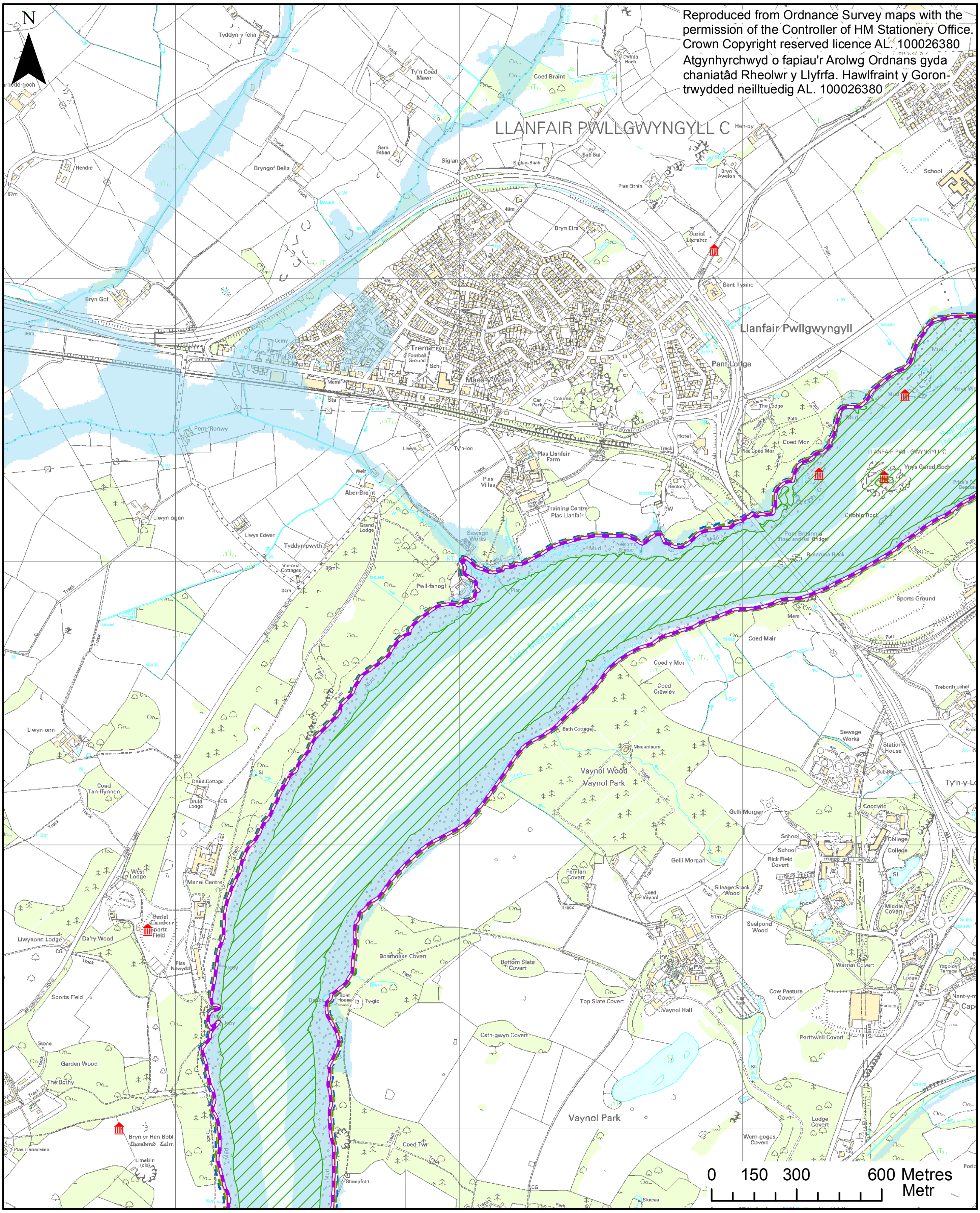
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 120



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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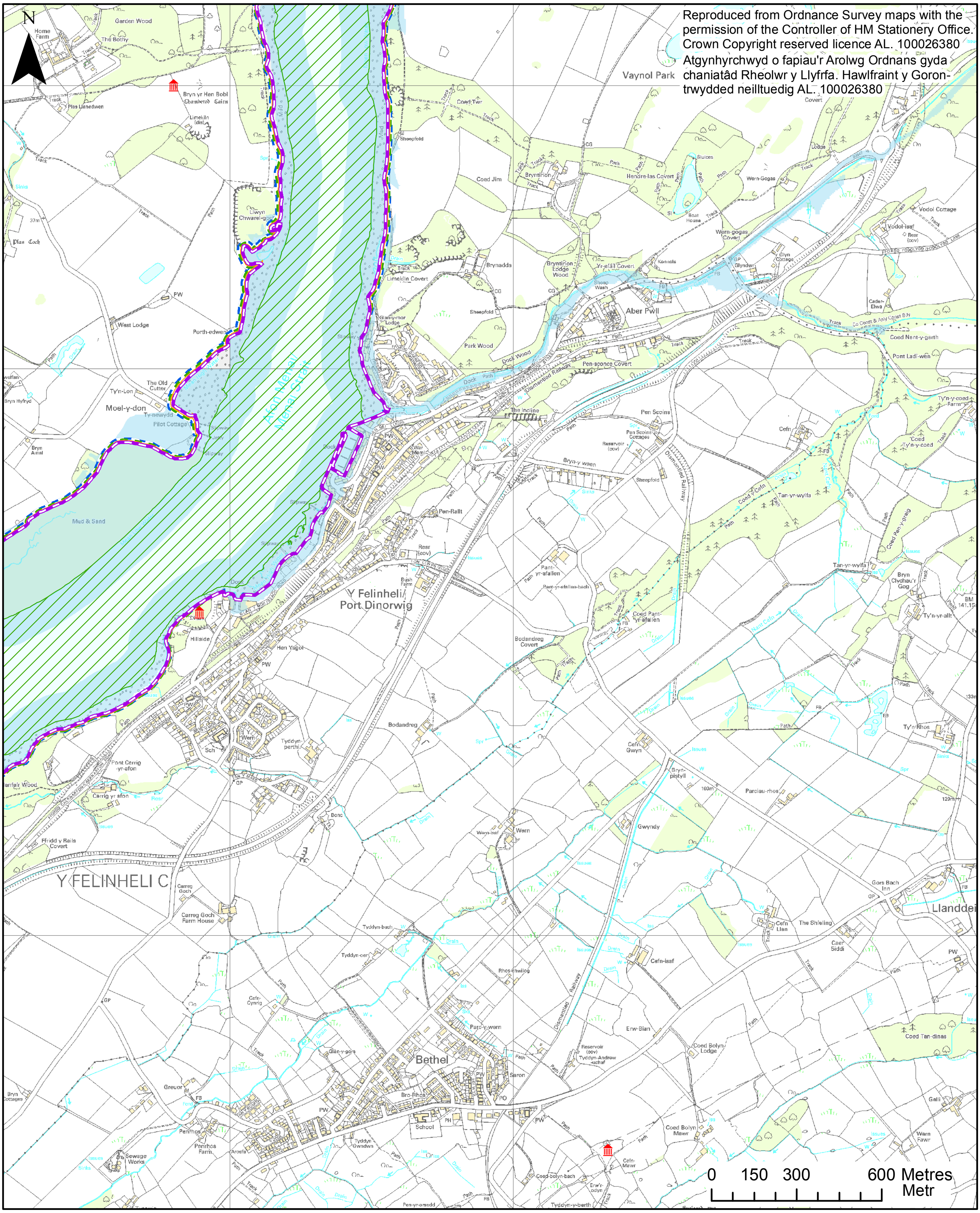
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 121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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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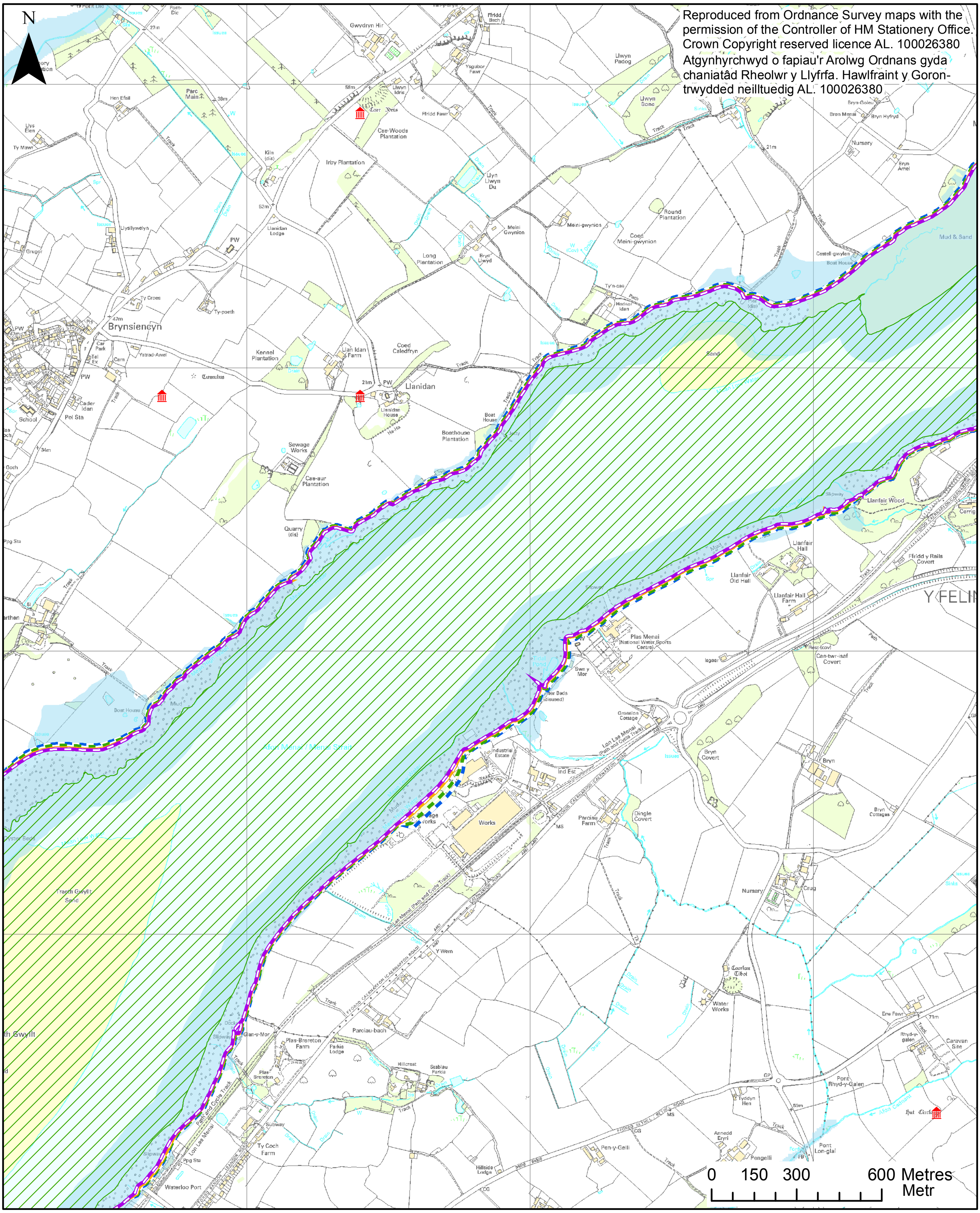
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 122



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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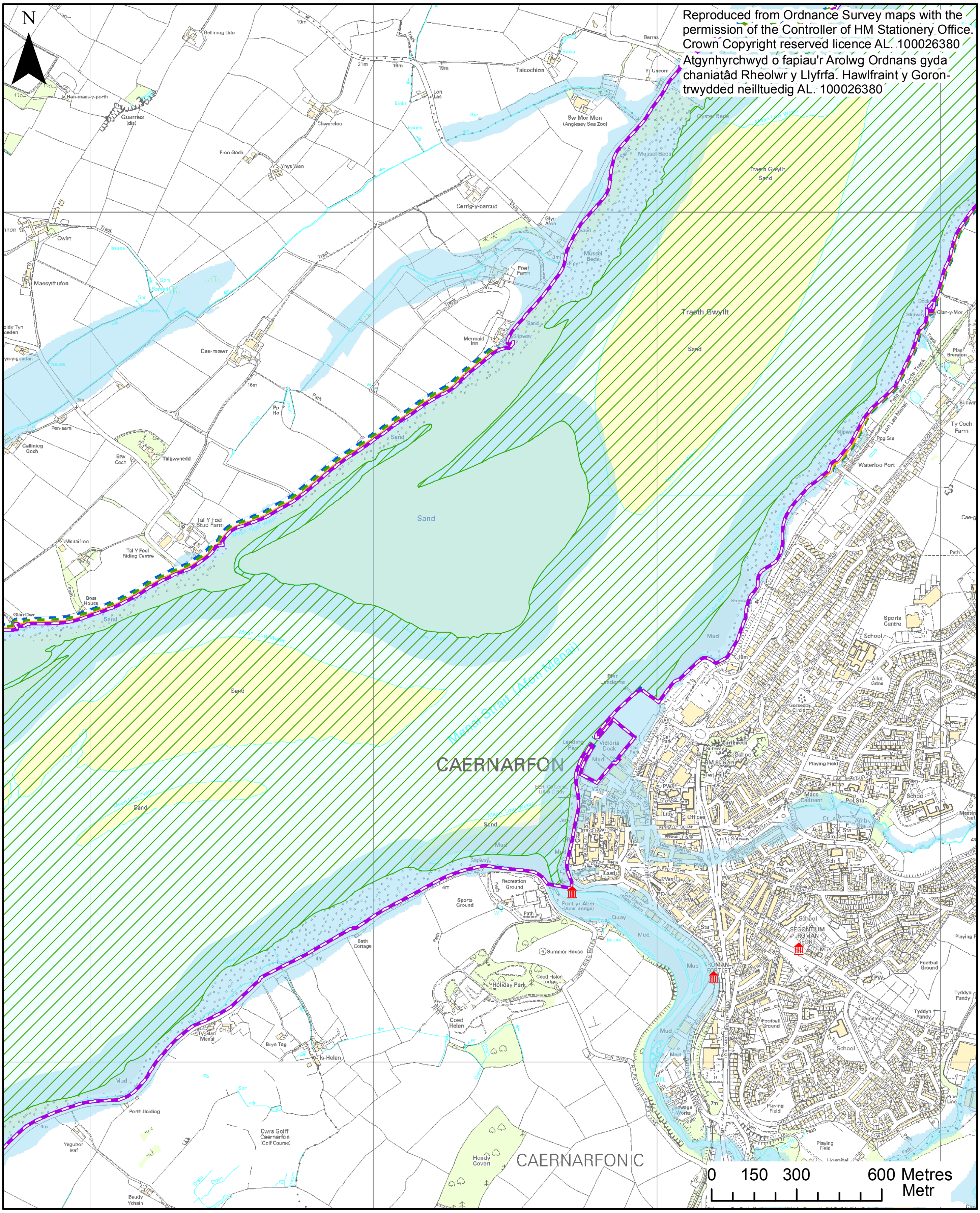
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 123



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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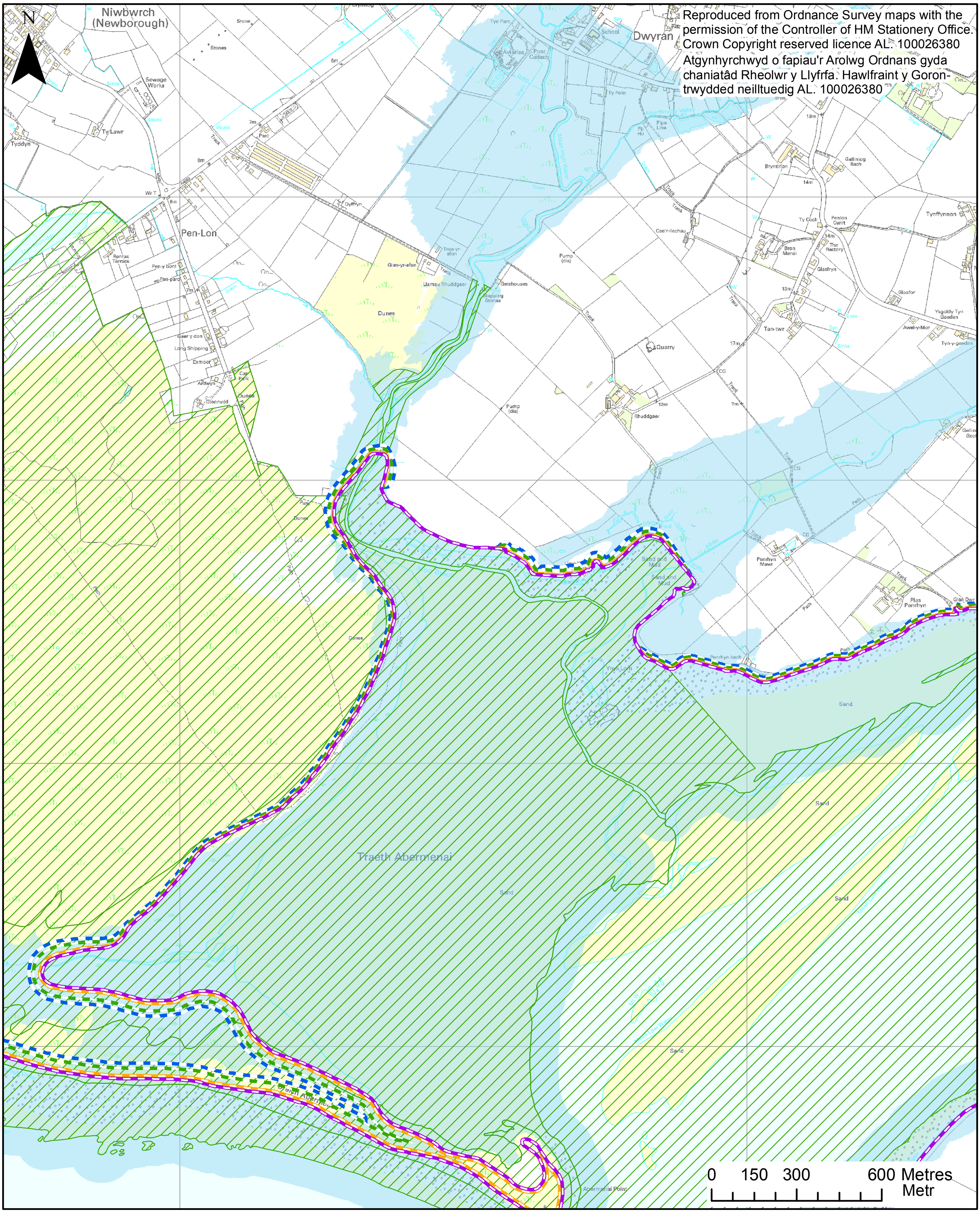
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 124



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	⌂	Scheduled Monuments	Henebion Cofrestredig

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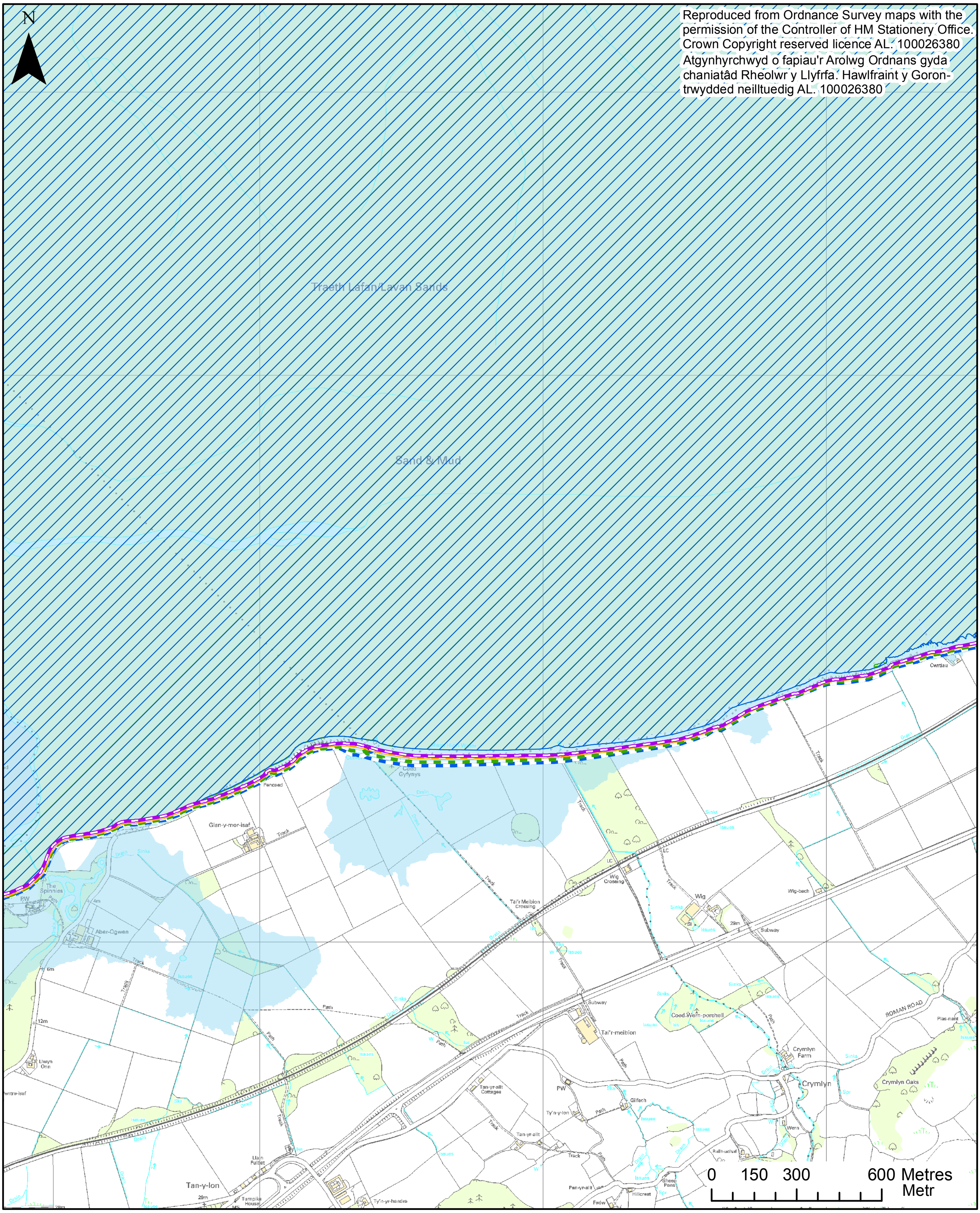
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 125



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
🟦	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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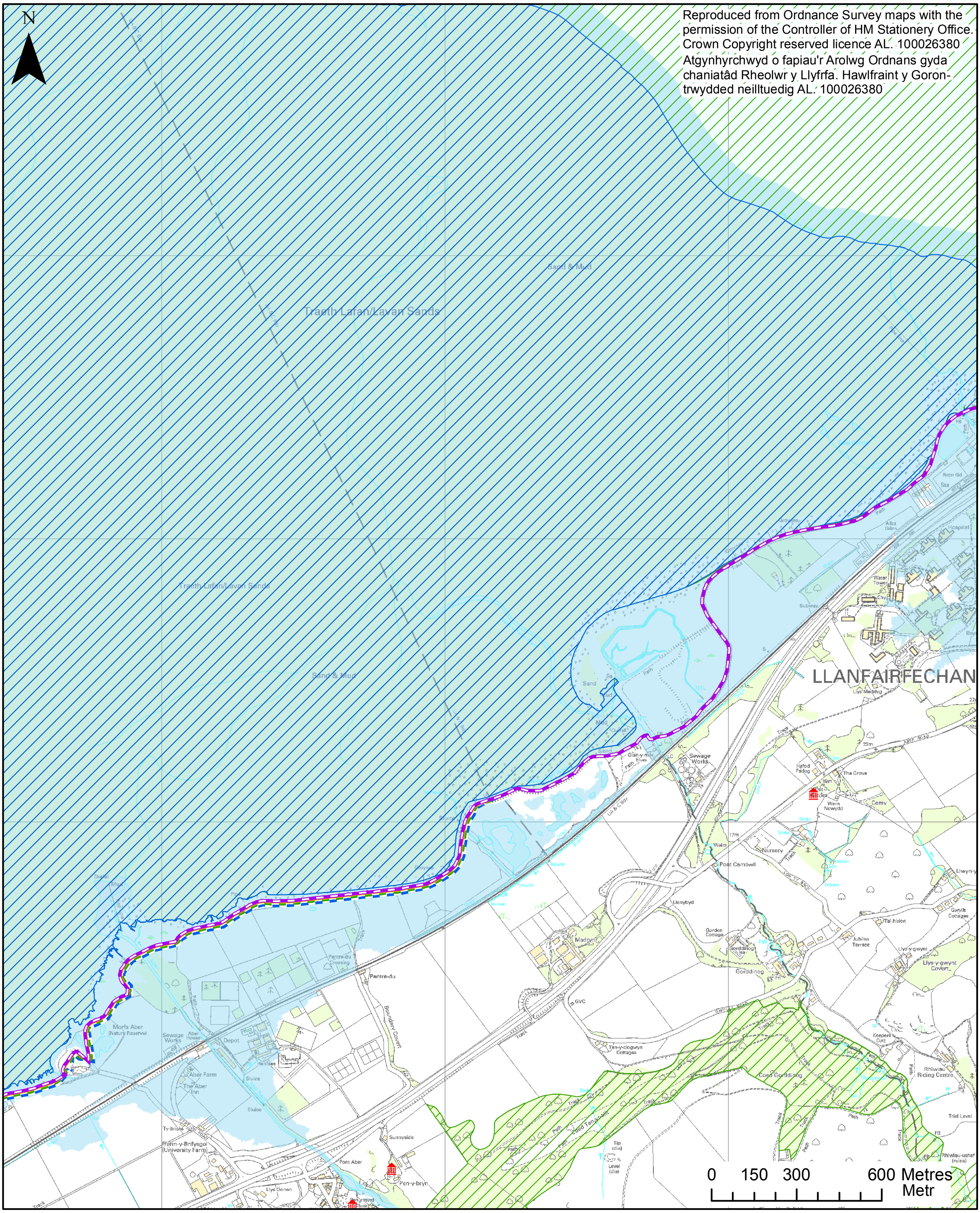
Shoreline Management Plan - West of Wales
Erosion and Flood Risk - With Present Management

Cynllun Rheoli Traethlin - Gorllewin Cymru
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 126



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▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 127

Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol		Scheduled Monuments	Henebion Cofrestredig

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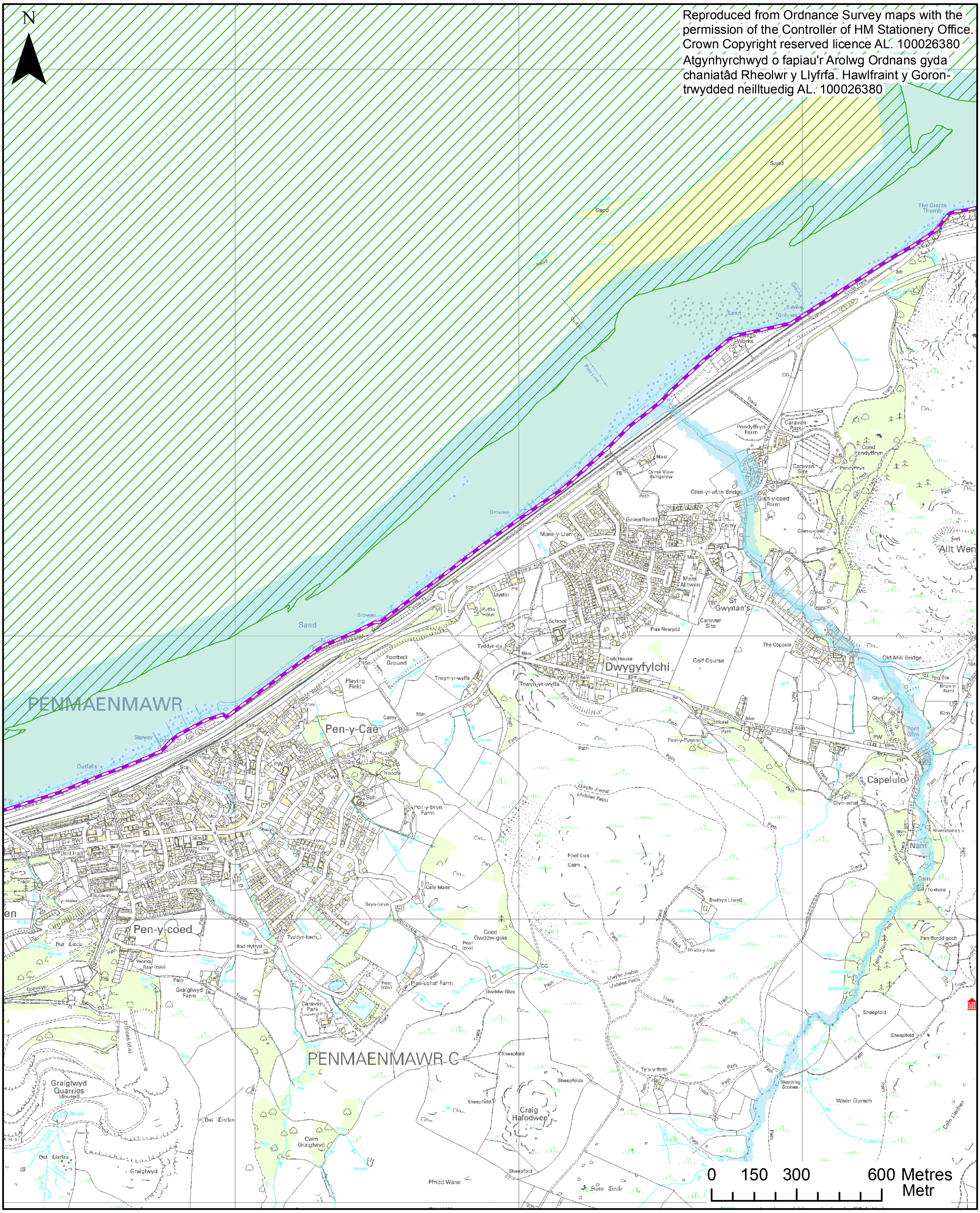
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 128



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron- trwydded neilltuedig AL. 100026380

▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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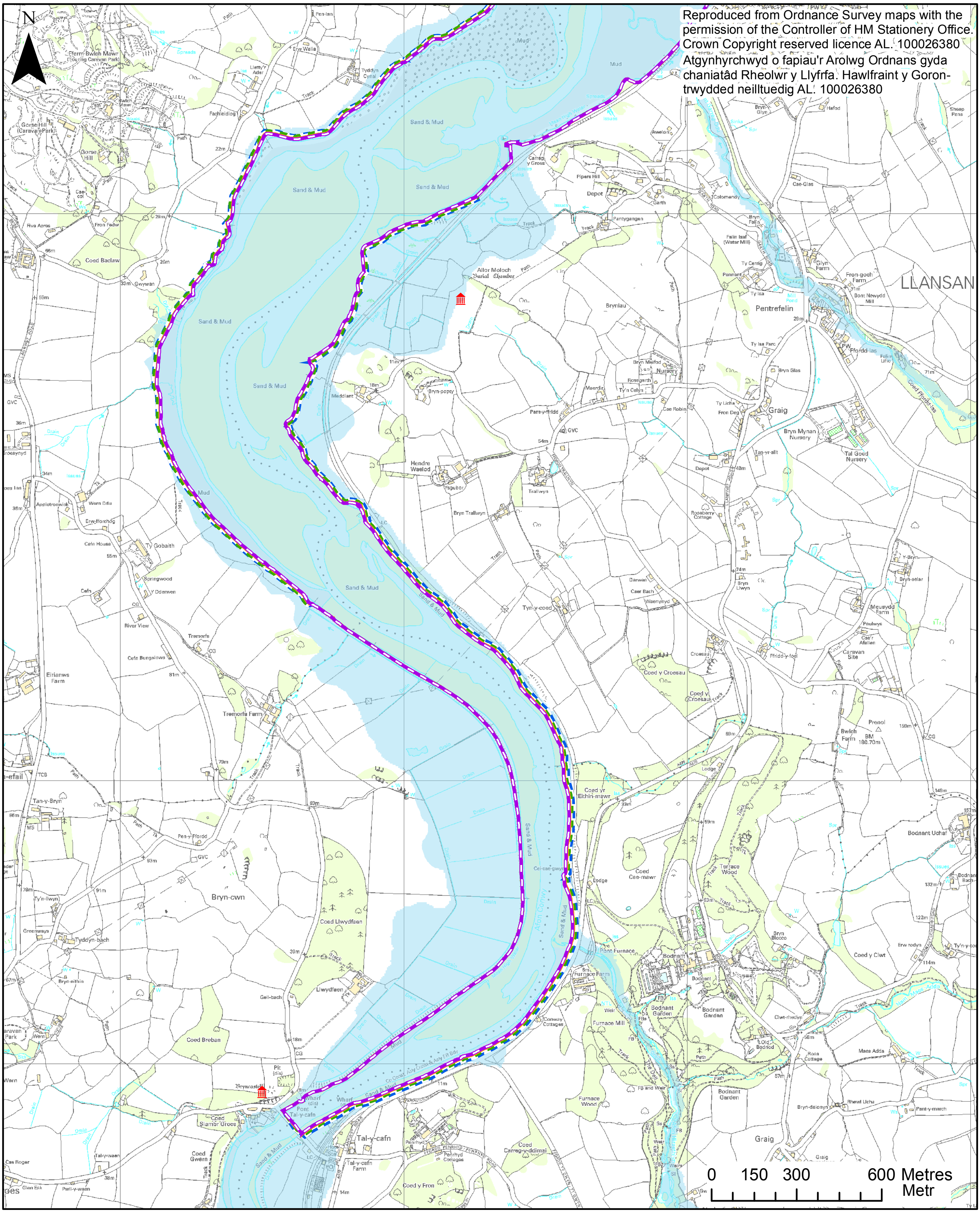
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 129



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	▲	Scheduled Monuments	Henebion Cofrestredig

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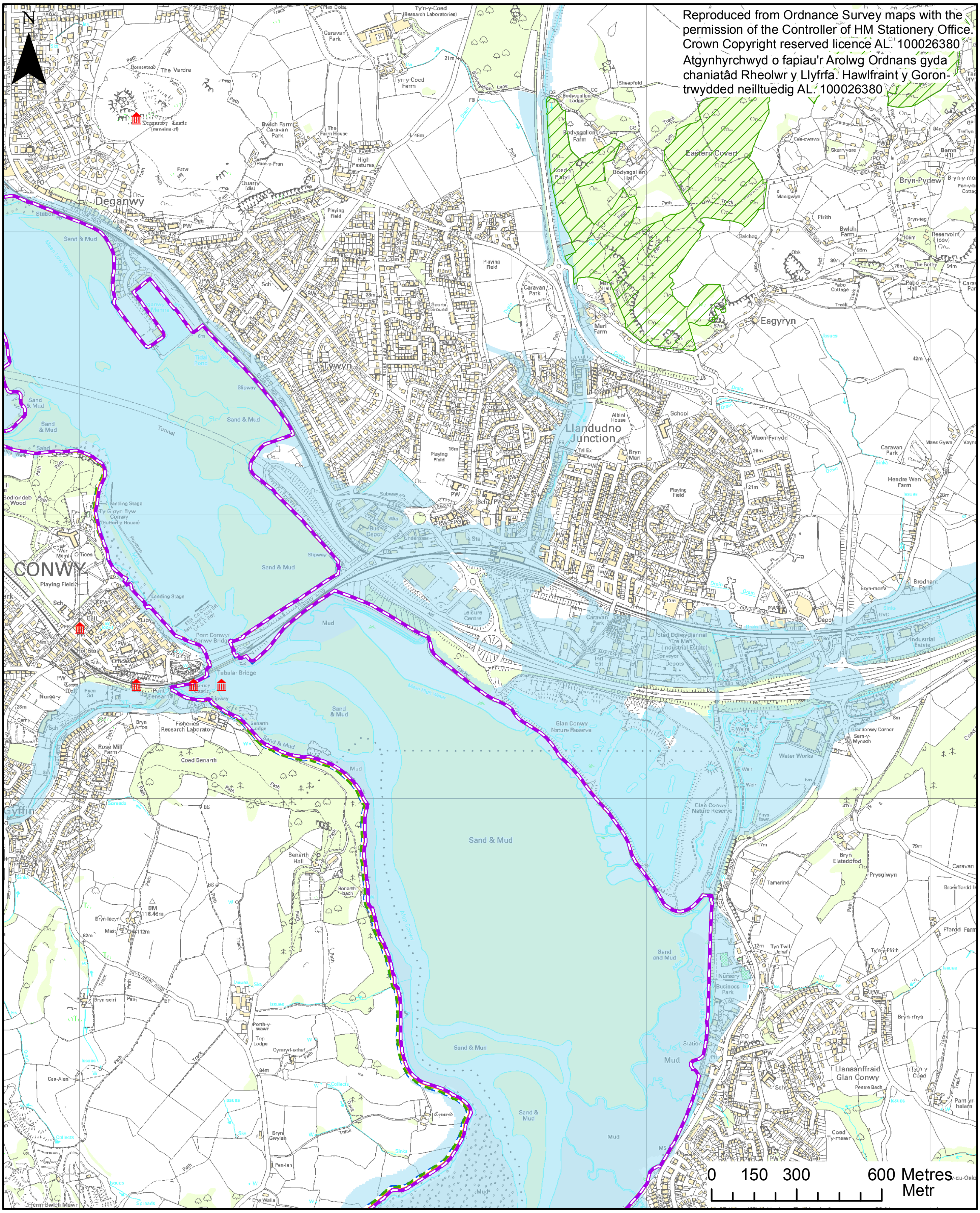
Shoreline Management Plan - West of Wales / Cynllun Rheoli Traethlin - Gorllewin Cymru

Erosion and Flood Risk - With Present Management / Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 130



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Atgynhyrchwyd o fapiau'r Arolwg Ordnans gyda chaniatâd Rheolwr y Llyfrfa. Hawlfraint y Goron-trwydded neilltuedig AL. 100026380

Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	
Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	
Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	
2m Scenario Erosion Line	Senario Llinell Erydu 2m	
Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	
▨	RAMSAR	
▨	SSSI	SoDdGa
▨	SAC	ACA
▨	SPA	AGA
	Scheduled Monuments	Henebion Cofrestredig

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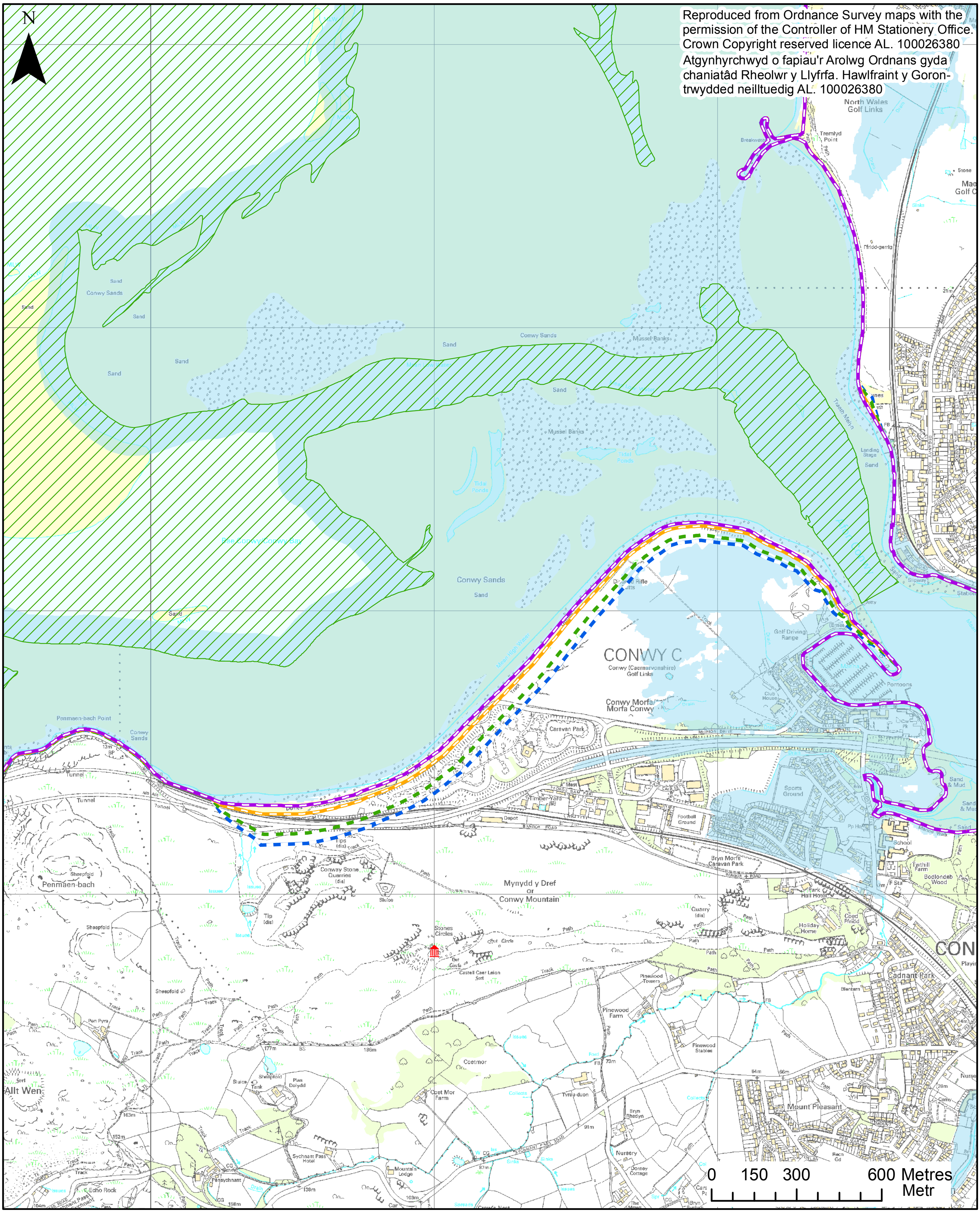
Shoreline Management Plan - West of Wales
Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management
Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 131



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
■	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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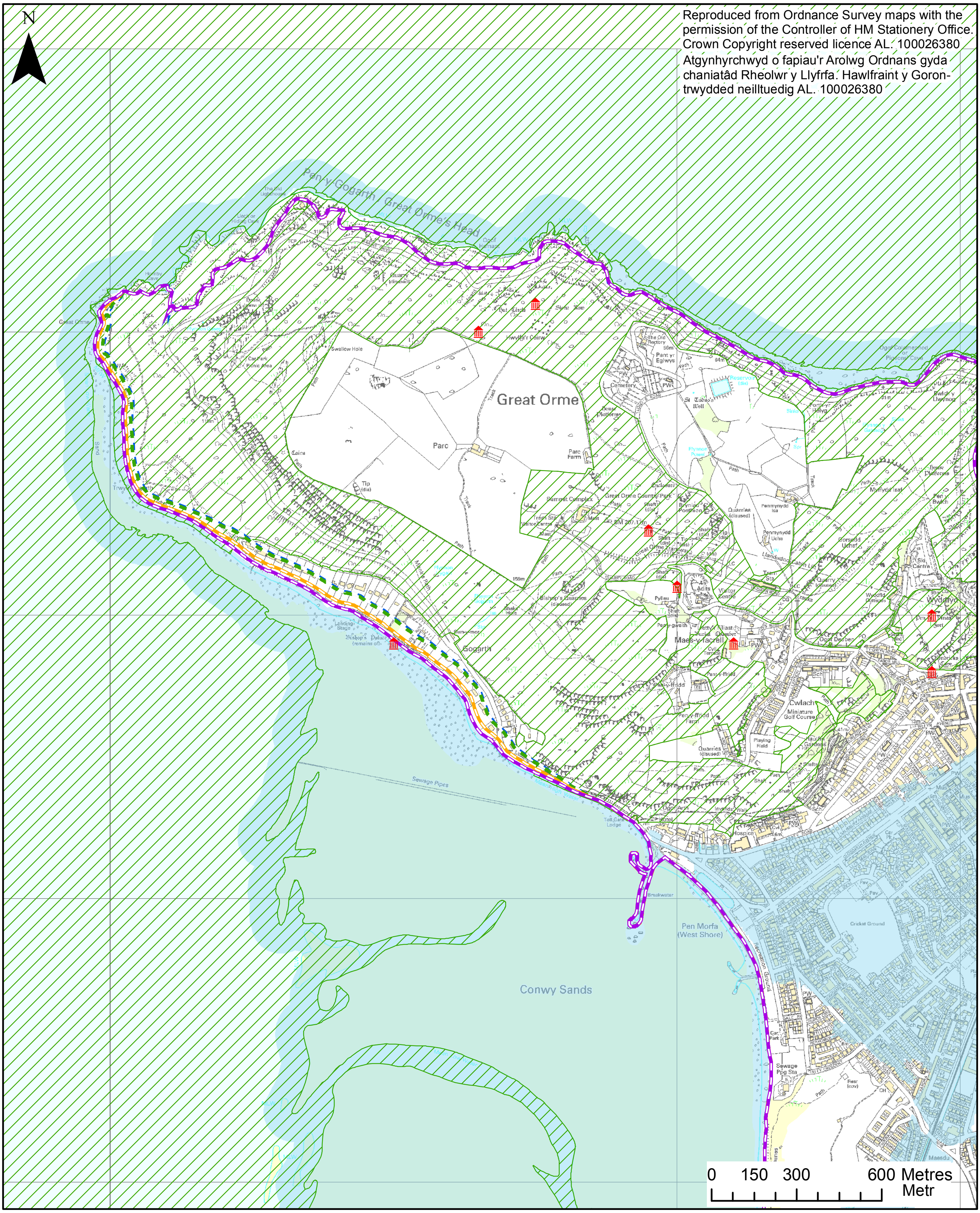
Shoreline Management Plan - West of Wales Cynllun Rheoli Traethlin - Gorllewin Cymru
Erosion and Flood Risk - With Present Management Pergl Erydiad a Llifogydd - Gyda Rheoli Presennol

Map 132



▬	Predicted Erosion 20yrs	Erydiad Disgwyliedig 25bl	▨	RAMSAR	
▬	Predicted Erosion 50yrs	Erydiad Disgwyliedig 50bl	▨	SSSI	SoDdGa
▬	Predicted Erosion 100yrs	Erydiad Disgwyliedig 100bl	▨	SAC	ACA
▬	2m Scenario Erosion Line	Senario Llinell Erydu 2m	▨	SPA	AGA
▬	Existing Indicative EA Flood Risk Zone	Parth Perygl Llifogydd AA Arwyddol Presennol	🏛	Scheduled Monuments	Henebion Cofrestredig

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