

Isles of Scilly Sea Defences Environmental Statement Addendum

Volume I: Main Text

Final Report

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Council of the
ISLES OF SCILLY



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Contract

This report describes work commissioned by The Council of the Isles of Scilly. JBA Consulting carried out this work.

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Purpose

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Abbreviations

AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
ATL	Advance the Line
CEMP	Construction Environmental Management Plan

CIoS	Council of the Isles of Scilly
CISCAG	Cornwall and the Isles of Scilly Coastal Advisory Group
CSA	Cross sectional area
EA	Environment Agency
EC	European Commission
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management Strategy
HAT	High Astronomical Tide
HRA	Habitat Regulations Assessment
HTL	Hold The Line
IEMA	Institute of Environmental Management and Assessment
CIoS	Isles of Scilly Council
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LVIA	Landscape and Visual Impact Assessment
MCZ	Marine Conservation Zone
MHW	Mean High Water
MHWS	Mean High Water Springs
MR	Managed Realignment
NAI	No Active Intervention
NPPF	National Planning Policy Framework
NTS	Non-Technical Summary
OS	Ordnance Survey
PCO	Plymouth Coastal Observatory
PDZ	Policy Development Zone
PIA	Policy Intent Area
PU	Policy Unit
RLB	Red line boundary
SAC	Special Area of Conservation
SMP	Shoreline Management Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
WSI	Written Scheme of Investigation

Glossary

Term	Definition
AONB	Area of Outstanding Natural Beauty formally designated under the National Parks and Access to the Countryside Act 1949 to protect areas of the countryside of high scenic quality.
Archaeology	The study of material remains of past human life and activities.
Baseline data	Data collected to determine the existing conditions.
Biodiversity	A variety of life found in a place.
Coastal squeeze	The process where coastal habitats are progressively caught between coastal defences and sea-level rise, and lost as a result.
Conservation Area	An area designated for special architectural and historic interest under the Planning (Listed Buildings and Conservation Areas) Act 1990.
Cumulative impacts	The combined effects of multiple projects within an area.
Erosion	The geological process in which materials are worn away and transported by natural forces.
Flood defence	A structure (or system of defences) that reduces flooding.
Geodiversity	The variety of rocks, minerals and landforms and the processes which have formed these features over time.
Headland	A narrow piece of land which extends from a coastline into the sea.
Impermeable	Not allowing movement of fluid through substance.
Intertidal	An area of land which is covered at high tide and uncovered at low tide.
LNR	Local Nature Reserves are statutory designations for their natural value.
MCZ	Marine Conservation Zones are areas which protect a range of nationally important, rare or threatened habitats and species.
Mitigation	The action of reducing the severity of something.
PM	Particulate Matter are very small parts of solids or liquid materials which are suspended in the atmosphere.
Ramsar	Wetlands of international importance.
Receptor	A component of the natural or man-made environment which could be affected by an impact from the proposed works.
Residual	A quantity left over at the end of a process.

Term	Definition
Revetment	A passive structure which protects against erosion caused by wave action.
SAC	Special Areas of Conservation are designated for conserving the habitats and species in need of conservation at a European level.
Saline intrusion	The movement of saline water into freshwater aquifers.
Scheduled Monument	An archaeological site or historic whether above or below the surface of the land of national importance designated under the Ancient Monuments and Archaeological Areas Act 1979.
SPZ	Source Protection Zones are areas of protection around large and public potable groundwater abstraction sites.
SPA	Special Protection Area, protected areas for birds in the UK, under the Wildlife and Countryside Act 1981 and the Conservation Regulations 2010.
SSSI	Sites of Scientific Interest, a conservation designation legally protected under the Wildlife and Countryside Act 1981 (as amended). These sites are selected for wildlife and natural features in England.

1. Introduction

1.1 Background

- 1.1.1 The Council of the Isles of Scilly ('the Applicant') submitted an application for planning permission to the Council of the Isles of Scilly for the proposed construction and maintenance of a series of coastal defences at nine sites across the islands of Bryher, St Agnes and St Martin's. The application was submitted in November 2022 and was accompanied by an Environmental Statement ('ES') (herein referred to as 'the submitted ES') and the ES Non-Technical Summary ('the submitted NTS') prepared in accordance with the Town and Country Planning (EIA) Regulations 2017 and the Marine Works (EIA) Regulations 2007.
- 1.1.2 The planning application is currently being determined by the Council of the Isles of Scilly. During the planning determination period, several comments from consultees have been received, including requests for additional information and/or technical assessment.
- 1.1.3 This ES Addendum (the 'ES Addendum') has been prepared to provide the Council of the Isles of Scilly with additional information. The scope of this additional information is in response to comments made by statutory consultees. Updates to the proposed development design have also been made in two locations in response to these comments, with an additional two updates made to the red line boundaries.
- 1.1.4 This ES Addendum should be read in conjunction with the submitted ES.

Purpose of the ES Addendum

- 1.1.5 The purpose of this ES Addendum is to present an assessment of any new or different significant effects that are likely to result from the Proposed Development design changes. It also provides consultees with further information on points they have raised to support them in developing an informed view of the likely significant environmental effects of the Proposed Development.
- 1.1.6 The Applicant has taken into consideration comments received through this consultation and has reviewed opportunities to amend the design of the Proposed Development at two sites accordingly.
- 1.1.7 This ES Addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared; if no change is listed then conditions and potential effects are the same as those presented in the submitted ES.

1.2 Structure of this ES Addendum

- 1.2.1 This ES Addendum comprises two volumes:
- ES Volume I - describes the changes to the Proposed Development, any additional information available, and whether these have affected the submitted ES technical chapters.
 - ES Volume II – presents any updates to appendices included as part of the submitted ES, along with any additional appendices to present further information available.
- 1.2.2 The structure of this ES Addendum (Volume I) is as outlined below:

- Section 2 – presents an overview of the proposed design changes since the submission of the previous ES.
- Section 3 – presents an update to Environmental Statement chapters 1-3 as required (Introduction, Description of the Proposed Development and Environmental Impact Assessment Methodology).
- Section 4 – presents an updated assessment of Coastal Processes, Geomorphology, Flood Risk and Erosion. This includes updated baseline information to provide a more representative assessment of the coastal processes that affect change at the locations where defence works are proposed, and assessment of coastal squeeze following requests from consultees.
- Section 5 – presents an updated assessment of biodiversity and nature to reflect changes in design and additional information in response to comments from consultees.
- Section 6 – presents an updated assessment of landscape and visual amenity to reflect changes in design.
- Section 7 – presents an updated assessment of historic environment to reflect changes in design and in response to comments from Historic England.
- Section 8 – presents an updated assessment of land use, tourism and recreation to reflect changes in design and an updated outline construction programme.
- Section 9 – confirms that there are no updates required to the assessment of climate change presented in the submitted ES.
- Section 10 – presents updated details relating to the outline construction programme and methodology.
- Section 11 – presents an update to the cumulative and combined effects assessment presented within the submitted ES.
- Section 12 – presents an updated summary of significant effects.

1.2.3 This ES Addendum is also accompanied by a NTS which provides a summary of the key findings from the ES Addendum in non-technical language. The ES Addendum NTS provides an update to the NTS submitted with the application.

2. Description of Proposed Development Changes

2.1 Introduction

2.1.1 This chapter of the ES Addendum presents a description of the Proposed Development changes since submission of the ES in November 2022.

2.1.2 Since the submission of the Application, five changes have been identified following consultee comments and further discussions with the proposed contractor. These Proposed Development changes are:

- Change 1 – design change at Great Porth (Great Par) North of Great Carn, Bryher: movement of proposed rock structure seawards by 4.1m to reduce overlap with the Scheduled Monument. Full detail of this design change will be subject to the outcomes of further investigation and discussion with Historic England. In addition, it is proposed that the existing beach access ramp be relocated to the north-west area of the existing location.
- Change 2 – design change at Periglis, St Agnes: offset of the current proposed design landwards of the dune by 3m.

- Change 3 – Green Bay, Bryher red line boundary change: realignment of access track in the centre of the bay to avoid the Scheduled Monument.
- Change 4 – Lower Town Beach, St Martin’s red line boundary alteration: the red line boundary for St Martin’s presented in the ES submitted in November 2022 included a rock recovery area where it was intended that rock could be stored and used across the islands. This is no longer included in the red line boundary for the works due to difficulties associated with the movement of the rock.
- Change 5 – removal of proposed boardwalk at Great Popplestone, Bryher: the ES submitted in November 2022 included the potential construction of a board walk in the description of the proposed development at Great Popplestone to facilitate access to the beach. This board walk is no longer included in the proposed works.

2.1.3 With the exception of the proposed development design changes outlined above, all other details of proposed development designs included in the Environmental Statement submitted in November 2022.

2.2 Scope and methodology of the ES Addendum

Overview

- 2.2.1 This section outlines the scope and methodology used in this ES Addendum. This ES Addendum should be read in conjunction with the ES submitted with the Application.
- 2.2.2 The general assessment methodology and topic-specific methodologies, relevant legislation, policy and guidance, key assumptions and limitations set out in submitted ES Volume I, Chapters 4-12 submitted with the Application remain unchanged, unless specifically stated in this ES Addendum.
- 2.2.3 A preliminary environmental assessment of whether there would be any new or materially different likely significant effects on the environment arising as a result of the Proposed Development changes has been undertaken based on the assumptions set out above, with reference to the previous assessments presented within the submitted ES (Volume I and Volume II).
- 2.2.4 The outcome of this scoping exercise is provided in Table 2-1 below.
- 2.2.5 Updates to technical chapters of the submitted ES, where these are required, are presented in the relevant sections of this ES Addendum. Updates to appendices of the submitted ES, where these are required, along with additional information are provided within Volume II of this ES Addendum

Table 2-1: Scoping of environmental assessments for proposed development changes and additional information requirements

Submitted ES Chapter	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes	Submitted ES Appendix	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes
Chapters 1-3	In	Changes in proposed development design, as detailed above.	Appendix 2.2: Outline CEMP	In	Outline CEMP to be updated to reflect updated mitigation measures included in technical assessments. Framework Site Waste Management Plan included in Outline CEMP following comment from Environment Agency.
Chapter 4: Coastal Processes, Geomorphology, Flood Risk and Erosion	In	Changes to the alignment of defences at Great Porth (Great Par) North of Great Carn and Periglis may impact upon coastal processes. Updates also required to present additional baseline information and findings of coastal squeeze assessment.	Appendix 4.1: Tidal diamond data	Out	Tidal diamond data presented will not be impacted by design changes.
Chapter 5: Biodiversity and Nature Conservation	In	Updates to assessment required to reflect changes to alignment of design at Great Porth (Great Par) North of Great Carn and Periglis and additional information requested by consultees, including findings of coastal squeeze assessment.	Appendix 5.1a to Appendix 5.1i (HRAs)	In	Updates to all appendices required to reflect additional information requirements from consultees, including consideration of impacts of coastal squeeze on designated sites. Additional appendices required following consultee comment including Marine Conservation Zone assessments, Water Framework Directive Assessments, and consideration of opportunities for net gain.
Chapter 6: Landscape and Visual Impact	In	Section 6.5 assessment of landscape and visual impacts to be updated for Great Porth (Great Par) North of Great Carn and Periglis to reflect design changes.	Appendix 6.1: Study Area for LVIA, Photographs and Viewpoints	Out	Changes are too minimal to affect information in figures within Appendix 6.1
			Appendix 6.2: Existing landscape	Out	Changes are too minimal to affect information in figures within in

Submitted ES Chapter	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes	Submitted ES Appendix	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes
			character Appendix 6.3: Topography Appendix 6.4: Viewpoint Assessment Sheets	Out In	Appendix 6.2 Changes are too minimal to affect information in figures within Appendix 6.3 Update to Viewpoints across Bryher [Figure 6.4.8] and St Agnes [Figure 6.4.24 & Figure 6.4.25] to reflect updated designs at Great Porth (Great Par) North of Great Carn and Periglis. Changes elsewhere do not affect the information in any other Viewpoint Assessment Sheets.
Chapter 7: Historic Environment	In	Updates to assessment required to reflect design changes at Great Porth (Great Par) North of Great Carn and Periglis and red line boundary change at Green Bay for access track to avoid Scheduled monument.	Appendix 7.1: Historic Landscape Character Figures Appendix 7.2: Cultural Heritage Gazetteers Appendix 7.3: Site Visit Photographs	In Out Out	Updates to figures required to reflect red line boundary updates. No change. No change.
Chapter 8: Land Use, Tourism and Recreation	In	Updates to assessment required to reflect design changes at Great Porth (Great Par) North of Great Carn and Periglis. Updates to programming of construction works.	n/a	n/a	n/a
Chapter 9: Climate Change	Out	It is not anticipated that there will be any alterations to the residual effects reported in the chapter as a result of the design changes. An updated bill of quantities is not available for the revised design at Great Porth (Great Par) North of Great Carn, and therefore estimations of emissions cannot be updated.	n/a	n/a	n/a

Submitted ES Chapter	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes	Submitted ES Appendix	Scoping decision	Rationale – potential for the environmental effects to be altered as a result of Proposed Development Changes
Chapter 10: Other Construction Related Effects	In	Updates to reflect construction programme. An updated bill of quantities is not available for the revised design at Great Porth (Great Par) North of Great Carn, and therefore estimations of numbers of construction vehicle journeys (if delivered by road) cannot be updated.	n/a	n/a	n/a
Chapter 11: Cumulative and In-Combination Effects	In	Updates to reflect other planning applications submitted since November 2022 to consider potential for cumulative impacts. Updates to potential combined effects from assessments.	n/a	n/a	n/a
Chapter 12: Conclusions	In	Updates to summary of likely significant effects, mitigation measures and residual effects to reflect updated assessments.	n/a	n/a	n/a

3 Changes to the Submitted Environmental Statement

3.1 Introduction

- 3.1.1 This chapter of the ES Addendum describes the changes to the chapters 1-3 of the submitted ES, which result from the Proposed Development changes or are in response to consultee comments. Feedback received from consultees has informed the approach to, and the findings presented in, this ES Addendum.

3.2 Changes to Chapters 1-3 of the Submitted ES

Chapter 1 - Introduction

- 3.2.1 There are no changes to Chapter 1: Introduction of the ES.

Chapter 2 – The Proposed Development

- 3.2.2 Section 2.1 of Chapter 2 details the strategic need for the Proposed Development. There are no changes to this section.
- 3.2.3 Section 2.2 of Chapter 2 details the relevant planning policy context. Paragraph 2.2.4 relates to the Cornwall and Isles of Scilly Shoreline Management Plan (SMP2) adopted in 2011. The SMP2 identifies the preferred policy for each site across the three islands.
- 3.2.4 The Shoreline Management Plan (SMP) is in a process of a 'refresh' by the Environment Agency. During this review, it has been recognised by the Cornwall and the Isles of Scilly Coastal Advisory Group (CISCAG) that some of the SMP policies for the Isles of Scilly needed fundamentally reviewing and updating to reflect better understanding, improved evidence and new proposals that had emerged since the policies were originally written in 2010. Policy sub-categories were added in the SMP Refresh in 2016 to clarify the policy intents, but only within the limitations of the definitions provided. CISCAG recognised that a more comprehensive review was needed.
- 3.2.5 CISCAG subsequently updated the SMP Action Plan to include the measure of completing a comprehensive Flood and Coastal Erosion Risk Management (FCERM) Strategy for the Isles of Scilly to consider how to address coastal flooding and erosion on the islands in the medium to long term, including responding to climate change. This Strategy (to be completed) will include a detailed review of SMP policies and intents and recommended changes where appropriate.
- 3.2.6 As part of the SMP refresh, policy intents have been provided with sub-categories for various frontages on the off-islands. The refreshed policy intents and sub-categories are discussed further in section 4: Coastal Processes, Geomorphology, Flood Risk and Erosion of this ES Addendum.
- 3.2.7 There have been no other changes in legislation, policy or guidance since the preparation of the submitted ES.
- 3.2.8 Section 2.3 of Chapter 2 of the submitted ES details environmental constraints surrounding the Proposed Development sites.
- 3.2.9 Table 2-5 details the proximity of key statutory and non-statutory environmental designations within 500m of Great Porth (Great Par) North of Great Carn. Based on the revised design of the proposed rock revetment, whereby the toe extends below Mean High

Water Springs, the proposed development is now within the Isles of Scilly Special Protection Area (SPA). It is also noted that the current design of the rock revetment is within the Scheduled Monument of the 'Gig shed on the north coast of Great Porth, Bryher'.

- 3.2.10 Table 2-8 details the proximity of key statutory and non-statutory environmental designations within 500m of Porth Killier. Based on updated mapping, the proposed development is located within the Isles of Scilly SPA and within the Big Pool and Browarth Point (St Agnes) SSSI. The Isles of Scilly: Smith Sound Tide Swept Channel Marine Coastal Zone (MCZ) is located approximately 480m south west of the proposed development.
- 3.2.11 Table 2-9 details the proximity of key statutory and non-statutory environmental designations within 500m of Porth Coose. Based on updated mapping, the proposed development is located within the Isles of Scilly SPA and Ramsar, and within the Big Pool and Browarth Point (St Agnes) SSSI. The Isles of Scilly: Smith Sound Tide Swept Channel MCZ is located approximately 390m south of the proposed development.
- 3.2.12 Table 2-10 details the proximity of key statutory and non-statutory environmental designations within 500m of Periglis. Based on updated mapping, the proposed development is located within the Isles of Scilly SPA and Ramsar, and within the Big Pool and Broward Point (St Agnes) SSSI. The Isles of Scilly: Smith Sound Tide Swept Channel MCZ is located approximately 200m south of the proposed development.
- 3.2.13 Table 2-11 details the proximity of key statutory and non-statutory environmental designations within 500m of Lower Town Beach. Based on updated mapping, the proposed development is located within the Isles of Scilly SPA and Ramsar. The proposed development is also located within the Isles of Scilly: Tean MCZ.
- 3.2.14 Section 2.4 of Chapter 2 details alternative options that were identified for each of the sites. There are no amendments to the information presented within this section. On the basis of the revised designs presented in this ES Addendum, the designs presented in the original ES submitted in November 2022 have been superseded due to consultee feedback, and are now considered to be alternatives to these. A summary of the previous designs and updated designs is contained in Table 3-1 below. All other designs not included in Table 3-1 remain as per the submitted ES.

Table 3-1: Summary of design changes

Site	Previous design	Design change	Reasoning
Great Porth (Great Par) North of Great Carn	<p>Construction of a new 80m long rock revetment with an impermeable core, incorporating a vehicle and boat access point through a storm gate or demountable storm barrier.</p> <p>The slope of the main armour will be 1:2, comprising a mix of 1 to 3 tonne rocks.</p>	<p>Extension of the structure seawards by 4.1m.</p> <p>The slope angle will remain 1:2, comprising a mix of 1 to 3 tonne rocks.</p> <p>The depth of the toe will</p>	To reduce overlap with Scheduled Monument (gig shed on the north coast of Great Porth, Bryher).

Site	Previous design	Design change	Reasoning
	<p>The crest of the armour will be set at +6.0m, with a 3m wide crest to prevent overtopping. The depth of the toe (mAOD) will be +2.3m.</p> <p>Material to be placed on the rear of the rock crest to tie into existing ground levels.</p> <p>A demountable flood barrier, composed of a steel frame and stop log panel, to be implemented to protect the lower level crest of the boat ramp.</p> <p>Seeding/planting of grasses behind the crest.</p>	<p>reduce to +2.0m AOD and the crest level will increase to +6.5m</p> <p>Relocation of existing beach access ramp westwards.</p>	
Periglis	<p>Use of geobags, laid on a geomat, wrapped in geotextile and covered with excavated cobble/sand material. Part of the existing material at the top of the beach will be excavated from the seaward face to allow the positioning of the geobags in the existing footprint in the core of the dune/bank.</p> <p>The geobags will be covered/protected by a mix of local sand and cobbles and topped up by locally excavated material where available.</p> <p>Crest elevations will be raised to approximately +7.5m and crest widths increased to reach a minimum of 4m to prevent overtopping.</p>	Landward shift of proposed defence by 3m.	To protect shingle ridge frontage and avoid the risk of undermining within the intended design life of the structure.

Site	Previous design	Design change	Reasoning
Green Bay access track	Access track to Green Bay site passing through Scheduled Monument 'Prehistoric field system and Romano-British cist in Green Bay, Bryher'.	Access track realigned to rear of beach.	To avoid overlap with Scheduled Monument.
Lower Town Beach	Red line boundary includes Seven Stones rock storage area and access track to it	Removal of Seven Stones rock storage area and access track from red line boundary.	It is no longer considered feasible to move rock materials from the Seven Stones rock storage area for use at other sites.
Great Popplestone	<p>Raising of rock armour crest level to reduce overtopping.</p> <p>Two options considered for this: Option 1: import rock required to raise crest level. Option 2: Movement of scattered rocks from further north in the bay for this purpose.</p> <p>Soft measures proposed in northern extent of the beach where local erosion has occurred. Potential board walk over area proposed to retain access to beach.</p>	Removal of proposed board walk.	The board walk has been removed from proposed works as it is not considered necessary at present.

3.2.15 Section 2.5 of Chapter 2 details stakeholder engagement that has been undertaken to date. Further stakeholder engagement has been undertaken during the planning determination period including discussions with Historic England, Natural England, the Environment Agency and the Isles of Scilly Wildlife Trust. The outcomes of these discussions are reflected in the proposed development design changes and red line boundary changes. A summary of consultee feedback, where this has led to changes presented in this ES Addendum, is contained in Table 3-2 below. A full summary of feedback is presented in Appendix 1.1. Further engagement has also been undertaken with the residents of Bryher and St Agnes to discuss the potential opportunity for material delivery across the summer periods, which was been accepted.

Table 3-2: Summary of consultee feedback relevant to this ES Addendum

Consultee	Comment	Where addressed
Natural England	Natural England advise the Habitats Regulations Assessments provided contain insufficient information regarding the impacts of the proposed coastal defensive works on the designated features and therefore the applications should not be approved until it has been made 'certain' that they will not have adverse effects on site integrity. Currently insufficient information for all works proposed to determine the impacts of coastal squeeze on the SAC. HRAs do not refer to the updated SPA designation.	HRA assessments (Appendices 5.1a to 5.1i of ES Addendum Volume II) updated to contain a map of the development of any sites in relation to the features of designated sites and site boundaries. Further consideration of the impacts on the Isles of Scilly SPA and SAC contained within the HRAs, along with consideration of the impacts of coastal squeeze on the features of the SAC. References to the SPA designation updated and consideration of the potential impacts of the proposed schemes on recovery potential included.
	St Agnes – Natural England note there appears to be a misinterpretation of the extent of the SSSI. For all sites the SSSI extent is down to MHWS and therefore includes the upper beach and dune ridge. The direct impacts of defence construction on SSSI vascular plant assemblages should be considered.	Clarification of the extent of SSSI and an updated assessment included in Section 5 of this ES Addendum.
	St Martin's – St Martin's Sedimentary Shore is not only important for its geological interest. St Martin's flats form the largest area of sand exposed at low water within the Isles of Scilly.	Updated description of the SSSI included in Section 5 of this ES Addendum.
	St Martin's - The works are sited near to the Isles of Scilly Tean Marine Conservation Zone. Natural England advise that an MCZ assessment should be carried out to identify any potential pathway by which impacts from the development would affect interest features of the site.	An MCZ assessment has been undertaken, included as Appendix 5.2a in ES Addendum Volume II.
	The CEMP submitted will require	The outline CEMP included as

Consultee	Comment	Where addressed
	updating to reflect further assessments/information.	Appendix 2.2 in ES Addendum Volume II has been updated to reflect the outcomes of further assessments.
	Impacts on priority habitats and species should be thoroughly assessed and further detail provided on how any loss of priority habitat will be avoided, mitigated or compensated.	Further consideration of impacts on priority habitats and species has been included in Section 5 of this ES Addendum. Further detail on opportunities for compensation and net gain are included in Appendix 5.4 (ES Volume II).
	Further mitigation for seals and birds to be included.	Further mitigation for seals and birds included in Section 5 of this ES Addendum and within the HRAs (Appendices 5.1a to 5.1i).
Environment Agency	The Environment Agency raise concerns that the proposals may be contrary to the SMP policy.	Further detail relating to SMP conformity and the SMP refresh is contained within Section 4 of this ES Addendum.
	St Agnes – the Environment Agency object to the proposed design at Pergilis due to an understanding of an erosional trend.	Baseline in Section 4 of this ES Addendum updated to reflect accurate baseline of accretion. Design changed to move geobags in dune back 3m landwards.
	St Agnes – the Environment Agency have concerns over the design at Porth Coose and the potential resilience of the rock bag design.	Section 4 of this ES Addendum includes further consideration of the standard of protection and design life provided by the rock bag.
	The Environment Agency note the proposed activity needs to identify and correctly manage any waste produced as a result of work on the islands.	A Framework Site Waste Management Plan (SWMP) has been produced (included as part of Appendix 2.2). It is anticipated that the appointed contractor will produce a full SWMP.
	The Environment Agency support the proposals to protect drinking waters and request an assessment as to how the applicant will ensure no adverse impact on water quality in general.	A Water Framework Directive Assessment has been produced for each island to consider the impacts on water quality (Appendices 5.3a, 5.3b and 5.3c of ES Addendum Volume II).
Historic England	Bryher - Concerns the proposed scheme would cause substantial harm to Scheduled Monument No. 1016173 Gig shed on the north coast of Great	Revised design for Great Porth (Great Par) North of Great Carn has been produced by HR Wallingford to reduce overlap with the scheduled gig shed.

Consultee	Comment	Where addressed
	<p>Porth. Concerns the works lie within the boundary of Scheduled Monuments Nos 1014987 Prehistoric field system and post-medieval quay in Great Porth, Bryher, and 1014989 Prehistoric field system and Romano-British cist in Green Bay, Bryher.</p>	<p>This revised design has been assessed within the ES Addendum. Additional mitigation measures may be required, subject to Historic England’s review of the Scheduled Monument Consent application.</p> <p>The access track at Green Bay has been amended to avoid overlap with the Scheduled Monument. The Applicant is applying for Scheduled Monument Consent and a separate Heritage Impact Assessment will be submitted as part of this, outlining public heritage benefits and other public benefits around flood protection associated with the proposed scheme as part of this.</p>
	<p>St Agnes – concerns the access track for Porth Killier would inadvertently cause harm to Scheduled Monument No. 1014998 prehistoric settlement and field system at Porth Killer, St Agnes, through repeated movement of heavy plant and vehicles.</p>	<p>An outline Construction Environmental Management Plan is included as Appendix 2.2. It is anticipated that the appointed contractor will produce a full CEMP setting out detail of management of vehicle movements.</p>

3.2.16 Section 2.6 of Chapter 2 describes the Proposed Development. Changes to the proposed design at Great Porth (Great Par) North of Great Carn and Periglis have been developed, these design changes are presented below, and updated detailed design drawings for these two interventions are included in Appendix 2.1. There are no other changes to the descriptions of the proposed developments presented in Section 2.6 of the submitted ES.

Change 1 – Design change at Great Porth (Great Par) North of Great Carn.

3.2.17 The design of the proposed development at Great Porth (Great Par) North of Great Carn has been altered in response to comments received by Historic England. Comments received relate to concerns surrounding the impact on the Scheduled Monument ‘Gig shed on the north coast of Great Porth, Bryher’.

3.2.18 Three alternative designs were developed by HR Wallingford (2023), each of which with a seaward advancement to reduce or avoid overlap with the Scheduled Monument boundary. The preferred design change at Great Porth (Great Par) North of Great Carn includes the seaward advancement of the structure by 4.1m compared to the original design. Initial discussions have been undertaken with Historic England to address issues associated with the presence of the Scheduled Monument. Full details of this updated design will be subject to the outcome of Historic England’s review of the Scheduled Monument Consent application. A balance is to be achieved between minimising coastal squeeze and avoiding damage to the Scheduled Monument. It will not be feasible to achieve both whilst improving the resilience of the coastline at the site. Therefore preferred mitigation measures, including

offset mitigation, will be agreed with Historic England as part of the Scheduled Monument Consent process.

3.2.19 In addition, it is proposed that the existing ramp be relocated to the north-west area of the existing location. The revised design will have a greater overall length and volume compared to the current design. Table 3-3 below presents a summary of the key characteristics of the revised design compared to the original design.

Table 3-3: Key characteristics of the revised design at Great Porth (Great Par) North of Great Carn

Design Option	Seaward advance relative to original (m)	Seaward slope of structure	Depth of toe (mAOD)	Rock size (t)	Crest level* (mAOD)
Original	-	1:2.5	+2.3	1 to 3	+6.0
Revised	4.1	1:2	+2.0	1 to 3	+6.5

* Required to achieve overtopping discharge threshold of 5 l/m/s

3.2.20 Figure 3-1 below shows the revised design at Great Porth (Great Par) North of Great Carn.

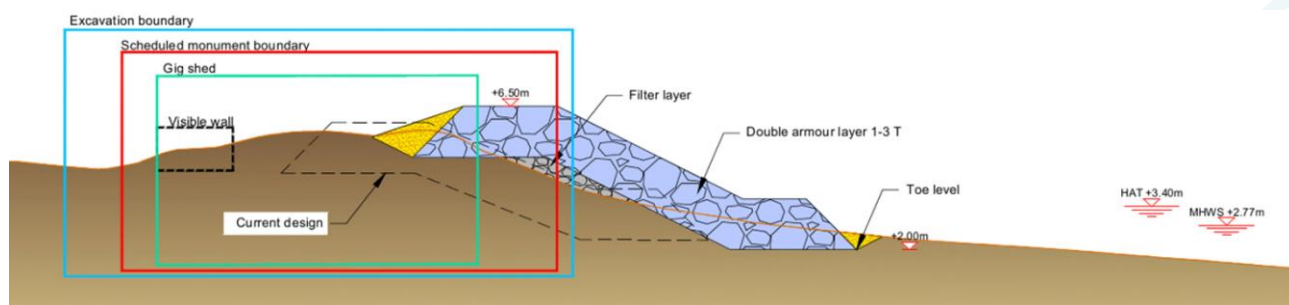


Figure 3-1: updated design drawing for Great Porth (Great Par) North of Great Carn (HR Wallingford, 2023)

Change 2 – Design change at Periglis.

3.2.21 The design of the proposed development at Periglis has been altered in response to comments received by the Environment Agency and Natural England. Comments received related to concerns surrounding the impact on designated habitats and concerns that the design of the proposed works would not provide the intended protection for the drinking water supply and would be prone to undermining and failure in future.

3.2.22 The design has therefore been amended to construct the geobags into the rear of the dune ridge (3m landward) rather than towards the seaward face to avoid disturbance to the shingle ridge frontage and avoid the risk of undermining within the intended design life of the structure.

3.2.23 An updated design drawing for Periglis is included as Figure 3-2 below, with cross-sections shown in Figure 3-3. Full detailed design drawings are included in Appendix 2.1.

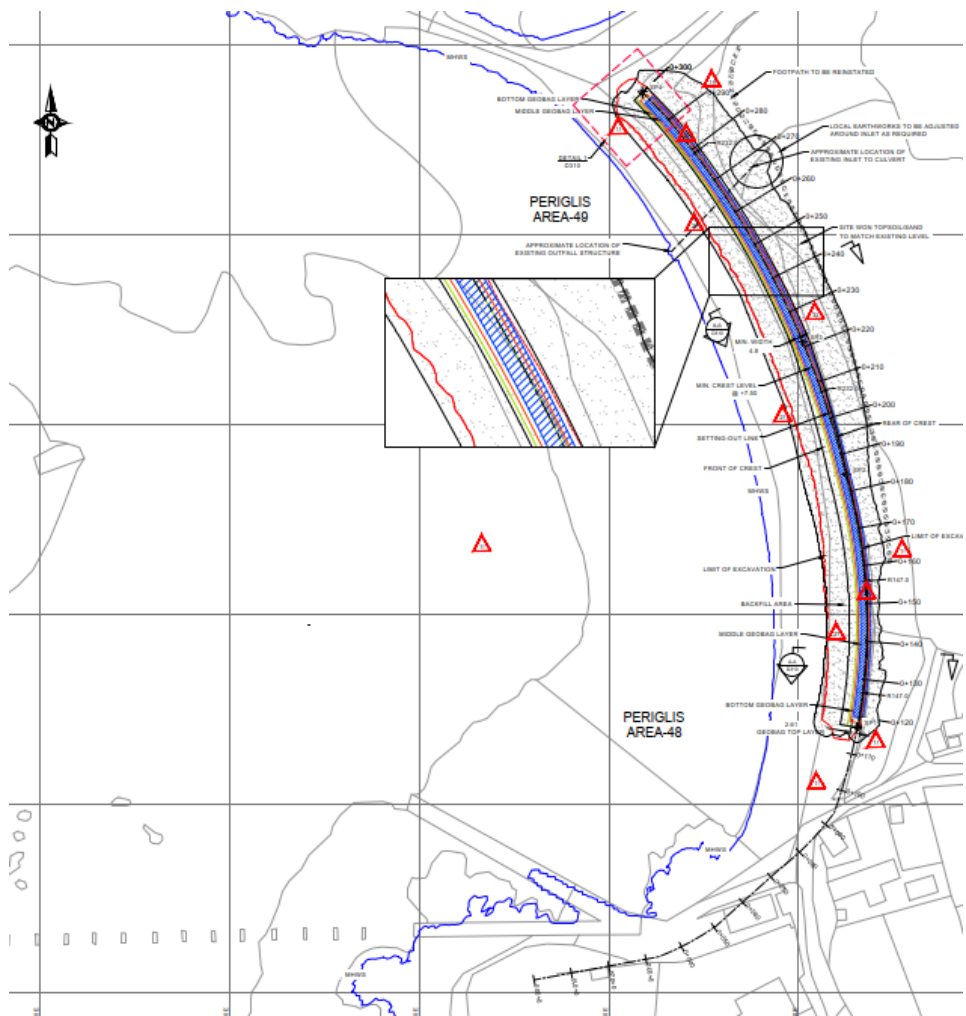
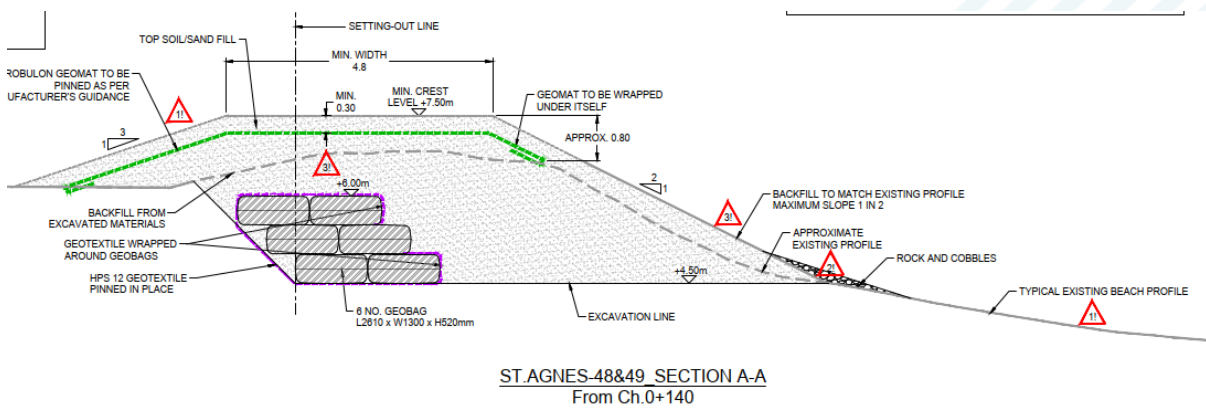


Figure 3-2: Updated design drawing for Periglis (HR Wallingford, 2023).



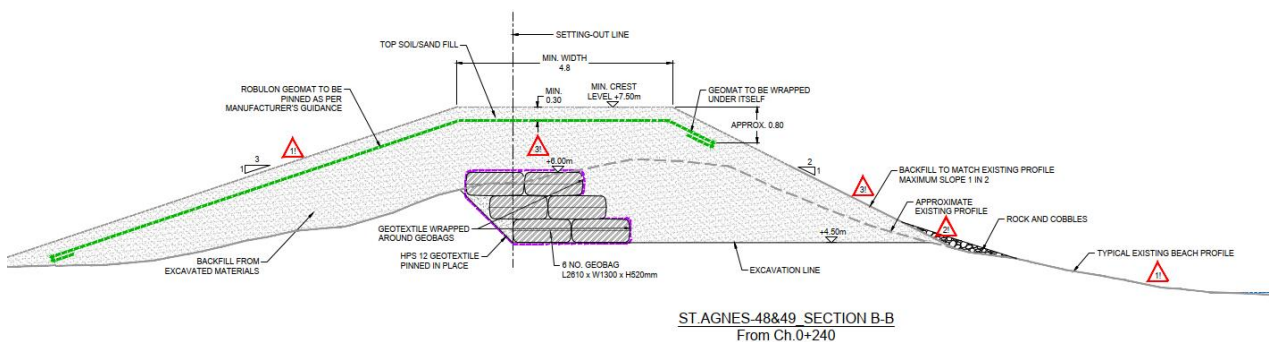


Figure 3-3: Cross-sections for revised design at Periglis (HR Wallingford, 2023)

Change 3 – Design change at Green Bay

3.2.24 The design of the proposed development at Green Bay remains the same as was previously detailed in the submitted ES. Following consultation with Historic England, the proposed access track for the Green Bay site has been realigned to avoid passing through the Scheduled Monument 'Prehistoric field system and Romano-British cist in Green Bay, Bryher.'

3.2.25 Figure 3-4 below shows the alteration of the access track for Green Bay to avoid the Scheduled Monument.



Figure 3-4: Realigned access track at Green Bay, Bryher

Maps data: Google Earth CNES / Airbus Maxar Technologies © 2023

Change 4 – RLB change at St Martin’s

3.2.26 The red line boundary at St Martin’s has been altered to remove the Seven Stones rock storage area and access track. It was originally intended that rock stored here would be used in the construction of the proposed developments, but this has now been removed from the design proposals.

3.2.27 The revised red line boundary for the island of St Martin’s is shown in Figure 3-5 below.



Figure 3-5: Revised red line boundary for St Martin’s

Maps data: Google Earth CNES / Airbus Maxar Technologies © 2023

Change 5 – Removal of proposed board walk at Great Popplestone.

3.2.28 A potential board walk located in the northern extent of Great Popplestone beach has been removed from the proposed development as it is not currently considered necessary.

Outline Construction Methodology

3.2.29 Section 2.7 of Chapter 2 details an outline construction methodology for the construction of the proposed development and an outline construction programme for the works. Following further discussion with the proposed contractor and due to uncertainties surrounding timescales of obtaining licences, it has been determined that the proposed scheme falls into two different elements:

1. delivery of materials (sand, gravel, rock, fabrics)

2. construction

3.2.30 Table 2-21 of the submitted ES presents an outline construction programme. Table 3-4 below presents an updated outline of working periods to suit various constraints. Following further consultation with local residents and businesses across the islands of St Agnes and Bryher, previously stated seasonal constraints to the construction programme have been removed. Therefore, it is intended that material delivery would be undertaken across the summer, with construction works undertaken outside of the summer period.

Table 3-4: Outline construction programme

Site	Approximate duration	Notes
St Agnes		
Material deliveries to island	108 days	Material delivery between June and September 2023.
Porth Killier	41 days	Construction between September and October 2023.
Porth Coose	23 days	Construction between October and November 2023.
Periglis	62 days	Construction between November 2023 and January 2024.
Bryher		
Material deliveries to island	138 days	Material delivery between April and August 2024.
Great Popplestone	27 days	Construction in September 2024.
Kitchen Porth	20 days	Construction between September and October 2024.
Stinking Porth	48 days	Construction between October and December 2024.
Great Porth North	66 days	Construction between December 2024 and February 2025.
Green Bay	6 days	Construction in February 2025.
St Martin's		
Lower Town Beach	7 days	Construction in April 2025.

3.2.31 It was previously assumed that a 20-tonne excavator with grab attachment would be used to unload rock delivered from Falmouth, Cornwall by barge. It is now understood that a 30-tonne excavator will be used for lifting rock since it can better handle 1 to 3 tonne rocks.

Bryher

3.2.32 All information relating to the transportation of all construction materials and welfare units to the islands and across the islands remains unchanged.

3.2.33 It was reported in the Submitted ES that most works will be undertaken separately, with works completed at one site before moving onto the next with some overlap between the construction works at Great Popplestone and Kitchen Porth. A revised outline construction programme is presented in Table 3-4 above. Where parallel working is preferred to meet the project delivery schedule, it has been organised so that works do not take place on adjacent beaches (e.g. at Great Popplestone and Kitchen Porth). All other works will be undertaken sequentially.

3.2.34 Figure 2-28 included as part of the submitted ES showed the access routes, landing sites and temporary storage areas for construction of the proposed schemes across the island of Bryher. Figure 2-28 has been updated as Figure 3-1 (below) to reflect the updated red line boundary for Bryher, avoiding the Scheduled Monument adjacent to Green Bay.



Figure 3-6: Updated construction access routes across the island of Bryher

Maps data: Google Earth CNES / Airbus Maxar Technologies © 2023

3.2.35 Section 2.7.1 outlines the construction details for Great Popplestone. It is now considered that construction will take place over 27 days in September since the site is located the furthest away from accommodation providers. There remain two options under consideration for the scheme at Great Popplestone, with further clarification as follows. Option 1: importing rocks to fill the void would entail the import of 750m³ of 1-3 tonne rock. Option 2: recovery of rocks from northern Popplestones entails the recovery of a rock revetment composed of granite installed by the Council in 1994. This revetment is currently largely embedded in the sand dune and would require the void to be replaced with sand from the rear of the dune. It was previously assumed that a 20 tonne excavator would be used to move either the recovered or imported rock. It is now understood that a 30 tonne excavator will be used to move this rock. It is no longer intended that a board walk will be constructed.

- 3.2.36 Section 2.7.2 outlines the construction details for Stinking Porth. It is now considered that construction will take place over 48 days between October and December, avoiding adjacent site working. It was previously assumed that a 20 tonne excavator would be used to construct the revetment. It is now understood that a 30 tonne excavator would be used.
- 3.2.37 Section 2.7.3 of the submitted ES describes the construction methodology for Great Porth (Great Par) North of Great Carn. It is now considered that construction will take place over 66 days between December and February. It was previously assumed that a 20 tonne excavator would be used to construct the revetment. It is now understood that a 30 tonne excavator would be used. Further details relating to the construction methodology at Great Porth (Great Par) North of Great Carn may be subject to the outcomes of Historic England's review of the Scheduled Monument consent application and any mitigation requirements.
- 3.2.38 Section 2.7.4 outlines the construction details for Green Bay. It is now considered that construction works will be undertaken over 6 days in February. It was previously assumed that a 20 tonne excavator would be used on site. It is now understood that a 30 tonne excavator would be used.
- 3.2.39 Section 2.7.5 outlines the construction details for Kitchen Porth. It is now considered that construction works will be undertaken over 20 days between September and October, overlapping with works at Great Popplestone since the sites are a distance apart. It was previously assumed that a 20 tonne excavator would be used on site. It is now understood that a 30 tonne excavator would be used. It was previously stated that if materials cannot be delivered directly to the site, they would be 'landed and stored at the closest site'. It should be noted that the closest site may not be feasible, therefore if they cannot be delivered directly to the site, materials would be landed and stored at the closest feasible site.

St Agnes

- 3.2.40 All information relating to the transportation of all construction materials and welfare units to the islands and across the islands remains valid. The construction access routes across the island remain as per Figure 2-19 included in the submitted ES.
- 3.2.41 Section 2.7.6 outlines the construction details for Porth Killer. It was previously assumed that a 20 tonne excavator would be used on site. It is now understood that a 30 tonne excavator would be used. It was previously detailed that works would avoid July to September (inclusive), however, this constraint has now been removed since Porth Killier is not typically used for recreation and is a significant distance away from residential receptors. It is now considered that works will be undertaken over 41 days across September and October.
- 3.2.42 Section 2.7.7 outlines the construction details for Porth Coose. It was previously assumed that a 20 tonne excavator would be used on site. It is now understood that a 30 tonne excavator would be used. It is now considered that works will be undertaken over 23 days between October and November.
- 3.2.43 Section 2.7.8 outlines the details for Periglis. It was previously assumed that a 20 tonne excavator would be used on site. It is now understood that a 30 tonne excavator would be used. It was previously stated that geocontainers will be filled with dry sand or rocks and laced into the core of the dune. It should be noted that these will be dumpy bags filled with local sediment materials. Preparation for delivery of materials will be undertaken to establish a channel through moored vessels. Construction will commence over 62 days between November and January.

St Martin's

- 3.2.44 All information relating to the transportation of all construction materials and welfare units to the islands and across the islands remains valid. It is anticipated that delivery and construction of the beach access ramp and dune fen will be undertaken over approximately 7 days in April.
- 3.2.45 Figure 2-30 included as part of the submitted ES showed the access routes, landing sites and temporary storage areas for construction of the proposed schemes across the island of St Martin's. Figure 2-30 has been updated to reflect the updated red line boundary for St Martin's (See Figure 3-2), removing the Seven Stones track and Seven Stones rock pile since material stored there will no longer be used across the sites.

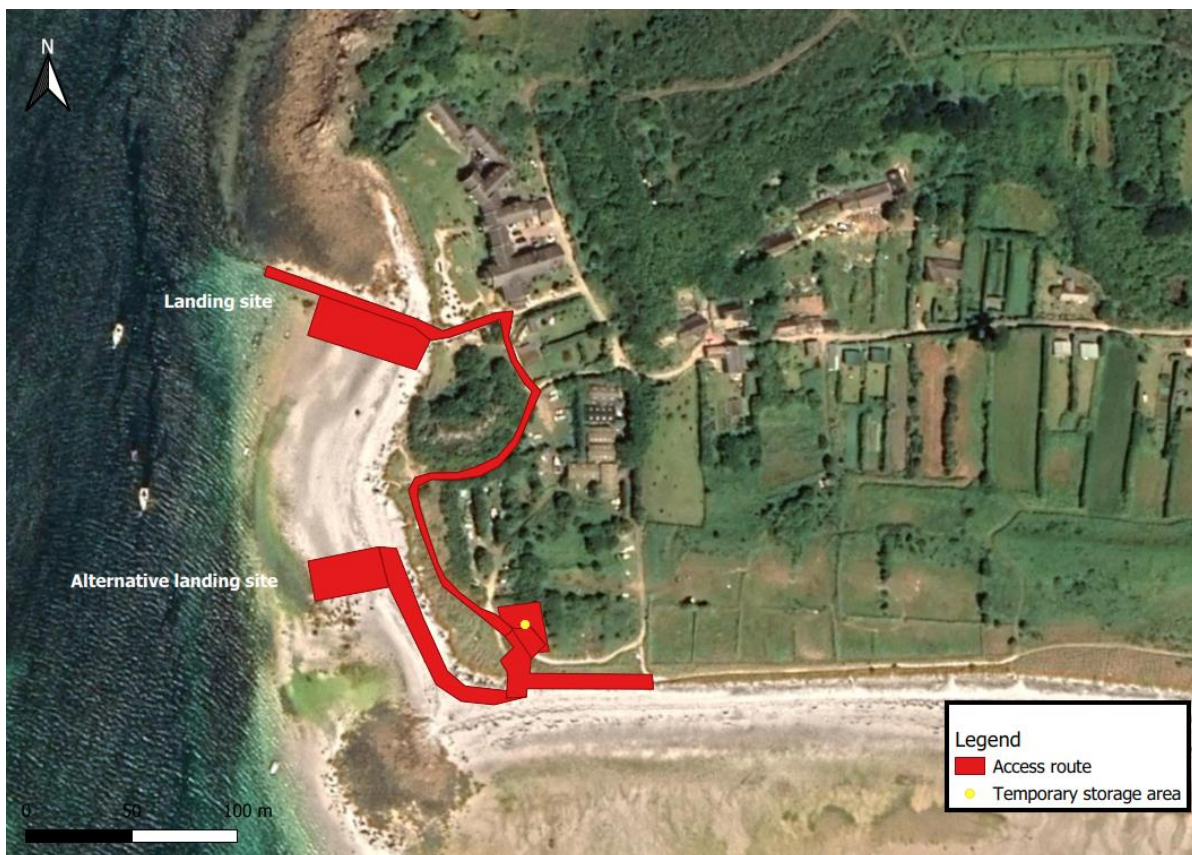


Figure 3-7: Updated construction access routes across the island of St Martin's

Maps data: Google Earth CNES / Airbus Maxar Technologies © 2023

- 3.2.46 Section 2.8 of Chapter 2 details the operational requirements and decommissioning. There are no changes to this section.

Chapter 3 – Environmental Impact Assessment Methodology

- 3.2.47 There are no changes to Chapter 3: Environmental Impact Assessment Methodology.

4 ES Addendum: Coastal Processes, Geomorphology and Flood Risk

4.1 Introduction

4.1.1 This chapter provides an addendum to the coastal processes, geomorphology and flood risk assessment included within the submitted ES and should be read in conjunction with the following documents submitted with the application:

- Chapter 4: Coastal Processes, Geomorphology and Flood Risk of the ES Volume I; and
- Appendix 4.1: Tidal diamond data of the ES Volume II.

4.1.2 This assessment considers the effects on coastal processes, geomorphology and flood risk arising from the proposed development design changes and the results from the inclusion of additional coastal data. This has been presented to provide a more representative assessment of beach conditions at the respective scheme locations. The submission also includes an assessment of coastal squeeze.

4.1.3 This ES Addendum considers changes in legislation, additional information made available regarding baseline conditions, and potential effects since the submitted ES was prepared. If no change is listed in the addendum then conditions are the same as those presented in the submitted ES.

4.2 Changes in Legislation, Planning Policy and Guidance

4.2.1 As outlined in Section 1.2 of this ES Addendum, the SMP is in a process of 'refresh' by the Environment Agency. The findings of this updated assessment have been incorporated into the updated baseline presented below.

4.2.2 There are no other changes in legislation, planning policy and guidance since the submitted ES was prepared.

4.3 Proposed development changes

4.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

4.3.2 The following Proposed Development changes have been considered within the revised assessment for coastal processes, geomorphology and flood risk:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn.
- Proposed development change number 2: revised design for Periglis

4.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of coastal processes, geomorphology and flood risk and have not been considered further.

4.4 Relevant Additional Information

4.4.1 Since the submission of the application, additional assessment has been undertaken, including assessment of coastal squeeze, following comments from consultees. This is discussed further below.

4.5 Updated Baseline Conditions

- 4.5.1 An update to the baseline conditions has been provided giving a more representative assessment of the coastal processes that affect change at the locations where defence works are proposed.
- 4.5.2 Section 4.2 of the submitted ES outlines the baseline conditions at, and in the vicinity of, each site. An update to the baseline assessment has been undertaken to build upon the information presented in Section 4.2 and better represent the current condition of the beaches upon which the proposed coastal defence works are taking place. This involves providing a context to the works by detailing the wider study area of the Isles of Scilly, followed by a more detailed assessment of the changing morphology of the beaches included in the Isles of Scilly Sea Defences project. The detail presented also includes the current status with regard to the SMP and the recent SMP refresh.
- 4.5.3 The coastline of the Isles of Scilly is characterised by the bedrock geology and overlying superficial deposits. The bedrock is formed of the Isles of Scilly granite intrusion which is resistant to the erosive forces of wave activity and weathering. The superficial deposits include windblown sands that help form and support several narrow sand dunes, and provide many of the islands beaches with a supply of sediment. Additional deposits provide an insight to the changing, past landscape of the islands with raised beach deposits indicating past higher sea levels and the mixed sedimentary head deposits, known locally as ram, that allude to the islands' glacial past.
- 4.5.4 The granite bedrock forms many headlands that extend seaward. The areas between these headlands form bays that allow for the accumulation of sediments forming coves and pocket beaches which are valued for their rich ecological diversity and in supporting recreation and the valuable tourist industry. There are also a large number of offshore granite island outcrops that provide partial shelter from the dominant south-westerly wave activity and large Atlantic swell waves.
- 4.5.5 The Isles of Scilly, as with coastlines globally, are experiencing contemporary coastal change in response to sea level rise and an increased frequency and intensity of storm activity which is attributed to climate change. This creates issues with coastal erosion and the need to protect infrastructure and valuable habitats that are threatened by climatic change.
- 4.5.6 Across the Isles of Scilly nine sites have been selected for proposed improvements to existing defence structure and/or new defences to mitigate the impacts of rising sea levels and increase storm wave activity (see Figure 1-2 of the submitted ES for a site location plan).
- 4.5.7 An updated assessment of these sites has been undertaken, drawing upon previously published data from the submitted ES and other sources including data from the South West Regional Coastal Monitoring Programme run by Plymouth Coastal Observatory (PCO). Data collection for the ongoing monitoring on the Isles of Scilly commenced in 2007 which acts as a baseline for subsequent surveys and provides a temporal insight to sedimentary processes and changes in beach morphology.
- 4.5.8 These data are collated and reported in the Annual Survey Report (PCO, 2021). Collectively, the most recent published data suggests the beaches on the Isles of Scilly show a general trend towards the accretion of sediment as opposed to

erosion. This is indicated by the near, island-wide sedimentary gains in percentage change of beach cross-sectional area (CSA) (Figure 4-1).

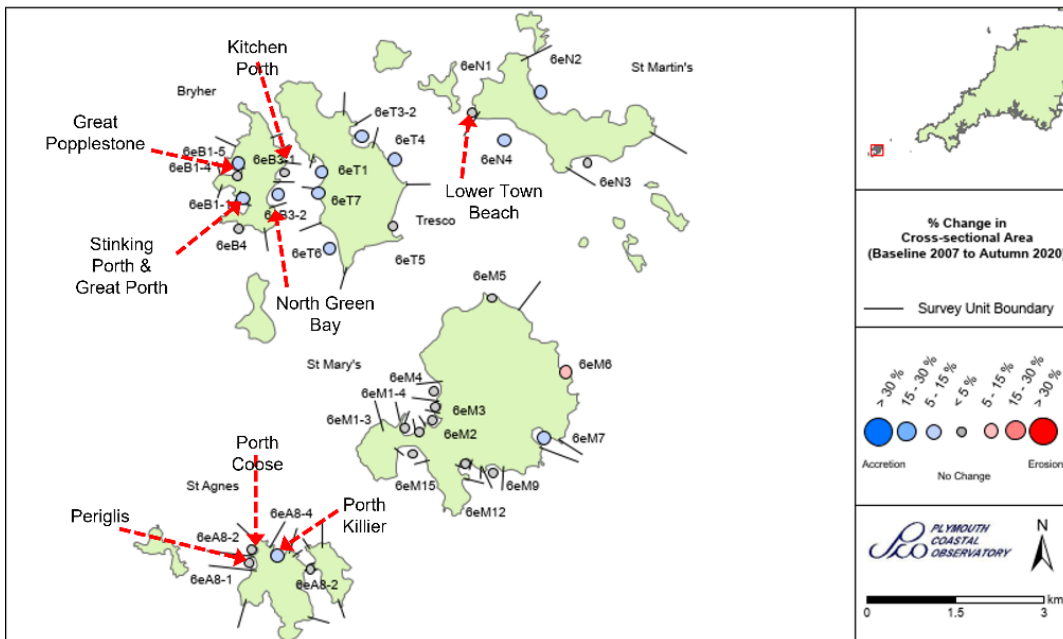


Figure 4-1: Isles of Scilly – percentage change in beach volume cross sectional area (PCO 2021)

St Martin's

4.5.9 The island of St Martin's is the most northeasterly of the islands and is partially sheltered as it sits in lee of the other islands that make up the archipelago (Figure 4-1). This means St Martin's is most distanced from the prevailing south-westerly storm wave activity and Atlantic swell waves. It is however, exposed to waves and swell generated in the Irish and Celtic Sea which approaches from within the northern quadrant.

4.5.10 There are currently no formal coastal defence structures on St Martin's, however, the sandy beaches that are located between the granite headlands are popular tourist destinations and support recreational activities. This level of human interaction often causes impacts in terms of erosion to the valuable sand dune systems that back many of the island's beaches. There is one site on St Martin's, at Lower Town Beach, where works are proposed to better manage beach access (see Figure 1-2 in the submitted ES for a location plan).

Lower Town (St Martin's)

4.5.11 The coastal frontage at Lower Town on the south-western coast of St Martin's is characterised by a long (ca. 700 m), thin sandy beach which is situated within the natural embayment of St Martin's Flats. The intertidal area to the west, known as Neck of the Pool stretches from Jack's Ledge to the western extremity of Lower Town. The bedrock geology of St Martin's is that of the resistant Isles of Scilly granite intrusion. Superficial deposits of gravel, sand and silt are located in the intertidal zone with landward deposits of windblown sand which form a sand dune system that is well developed and wider than the dune embankments at the back of the beaches elsewhere within the islands. The beach is predominantly composed of sandy material, although rocky granite outcrops and displaced boulders are

present within the intertidal zone. Being located on the inside of the archipelago and partially protected by a number of subtidal rocky outcrops, including Round Rock Ledge and Jack’s Ledge, the beach is less exposed than at the other sites. At the western end of the beach the coastline shifts northwards adjacent to Tean Sound. At this location a small rocky outcrop protrudes from the beach, sediment accretion has occurred on the leeward side forming a small tombolo-like feature which also provides a degree of protection from wave activity and likely contributes to the progradation of the beach.

4.5.12 However, waves with long periods are able to diffract between the islands, leaving the dune system at Neck of the Pool vulnerable to wave attack during more extreme events. The dune system was impacted by the 2014 storms although it is generally showing signs of self-repair as vegetation re-establishes. Areas of erosion are isolated along the frontage, with the western section of the Lower Town beach showing signs of erosion, as indicated by the presence of exposed cables.

Beach morphology

4.5.13 Figure 4-2 identifies the profile from the eastern end of the bay (6e01489) is wider and higher when compared with the western profile (6e01498). The beach frontages play an important role in dissipating wave energy and protecting the dune systems that are located at the rear of the beach. The eastern dune crest is over 8 mAOD compared with the western beach which has a crest height of 7 mAOD.

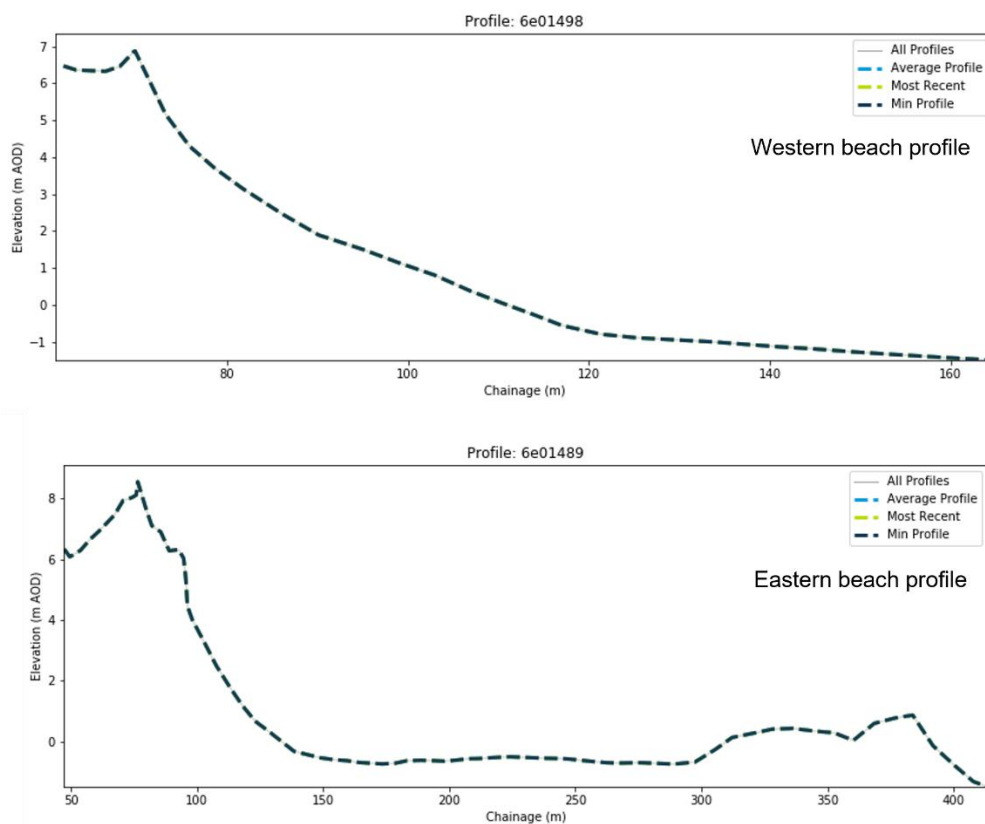


Figure 4-2: Lower Town beach profiles – West (6e1498) and East (6e1489) (PCO 2021)

4.5.14 Additional beach profile monitoring data taken at four intermittent transects along

the frontage at Lower Town indicates a general trend of sediment accretion from 2007 to 2020. (Figure 4-3).

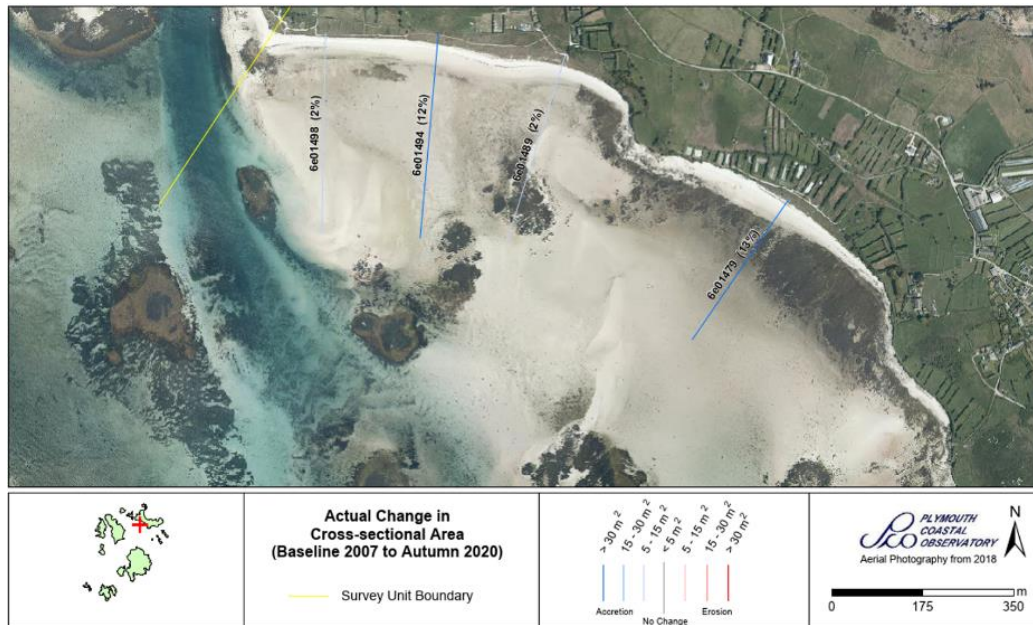


Figure 4-3: Lower Town beach profile transects (PCO, 2021)

4.5.15 The accretion of sediment is further supported by tabulated data which indicates the beach profile cross sectional area (CSA) has resulted in a positive percentage change since 2007 (baseline) with CSA increasing from between 2% and 13% along the monitored profiles. The profile at closest proximity to the proposed coastal defence work at Lower Town (6e01498) has accreted sediment and gained CSA at a rate of 2% against baseline conditions.

Table 4-1: Beach Profile Cross-Sectional Area (CSA) – September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e01479	41.4	13
6e01489	13.8	2
6e01494	44.9	12
6e01498	5.9	2

4.5.16 The tabulated data is also represented in graphical form (Figure 4-4) which reveals small sediment gains and losses across the four profiles. The largest changes are reflected to the rear of the beach outside of the master profile although these differences are attributed to detection of vegetation from LiDAR datasets and should not be considered as associated changes in beach morphology. The collated data indicates a continuous trend towards accretion with the beach having an accretion rate of 7.39 m² per year. Profiles 6e01479 and 6e01494 display an accretionary trend with up to 45 m² of material being gained along the entire profile. The profiles to the east, the area towards the proposed works (6e01494 and 6e01498) have

seen a progression in dune advancement of over 3 m. Profile 6e01498 has gained 6 m² in cross-sectional area, resulting in a build-up of sediment along the beach terrace (Plymouth Coastal Observatory, 2021). The trend towards sediment accretion is reflected in the advancement of the dune system to the west and the progradation of the beach CSA. This is attributed to sediment supply from the extensive accumulated sandflat (St Martin’s Flats) situated seaward of the beach.

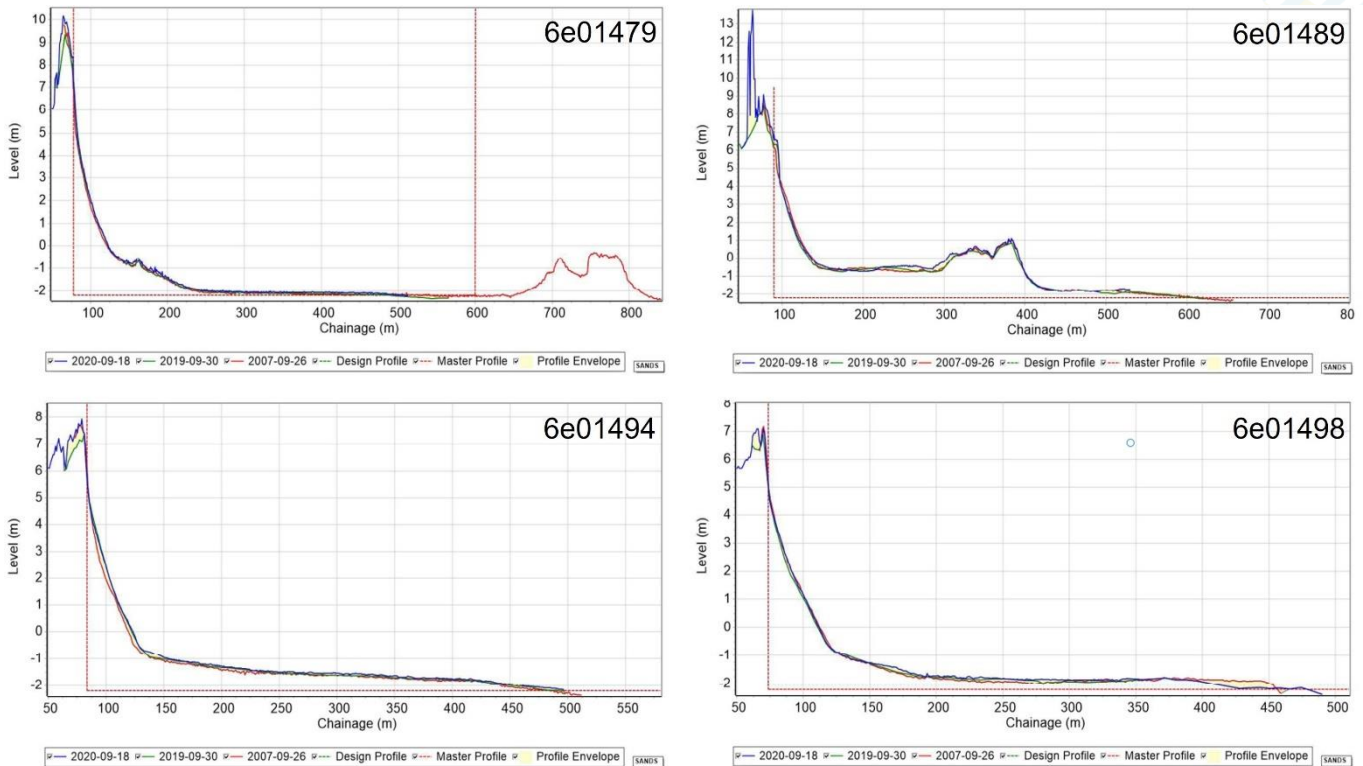


Figure 4-4: Lower Town topographic beach profiles (PCO, 2021)

Shoreline Management

4.5.17 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that the coastal area at St Martin’s is situated within the Coastal Management Unit (CMU) PU43.4. This area, as well as the entire island of St Martin’s, is not considered at risk and no impacts are anticipated on infrastructure and/or development on the island. Subsequently, a policy of No Active Intervention (NAI) along the entire coastal frontage has been applied. This policy is expected to satisfy the objectives relating to designated sites including the Isles of Scilly SPA and Isles of Scilly SAC. The recent SMP refresh 2022-23 does not include St Martin’s Flats as the proposed works are non-structural and are not considered immovable engineered defences which may have implications with regard to future erosion and coastal squeeze.

Bryher

4.5.18 Bryher is the smallest inhabited island of the Isles of Scilly, located in the north-west of the archipelago. Being the most westerly island, the coast is exposed to the Atlantic Ocean on its western side. The island’s water supply is taken from three water abstraction boreholes located east of Great Popplestone. In the centre of the island is a brackish pond, Great Pool which is understood to be completely separate

from the groundwater aquifer (CH2M, 2017).

- 4.5.19 Coastal defences exist in several areas on Bryher, which are designed to prevent erosion of the sand dunes and embankments found at the rear of many sandy beaches and to prevent flooding of the lower-lying hinterland. There are five sites where defence works are proposed across Bryher (see Figure 1-3 in Submitted ES for location plan).

Great Popplestone (Bryher)

- 4.5.20 Great Popplestone is located on the west coast of Bryher. The embayment is situated between two granitic headlands, Popplestone Brow to the north and Gweal Hill to the south. The entrance to the bay is 130 m-wide, as measured between the mean high water (MHW) mark. The protruding headlands provide a degree of protection from the dominant south-westerly Atlantic swell wave activity whilst the granitic outcrop of Gweal, 250 m west of the bay entrance, provides further protection from wave exposure. The centre of the bay is characterised by a sandy beach, which is interrupted by a rocky outcrop and detached boulders, Little Popplestone is located to the north, Great Popplestone to the south. The backshore areas north and south are dominated by rock armour and detached granite boulders. The rear of the beach to the south has a dilapidated sea wall with a rock revetment on the seaward face which acts to protect the toe and structure of the sea wall. Previous overtopping of the wall has displaced blocks from the revetment and sea wall depositing them on the landward side. The wall itself is in a state of disrepair with missing blocks, cracks and loss of mortar. Additional rock revetment works are present at the northern end of the bay where rock armour blocks have been placed within the sandy beach sediments.
- 4.5.21 At the rear of the beach is a narrow sand dune system which is partially fragmented by a number of informal pedestrian paths that branch off from a track (ca. 2 m wide) that runs from north to south of the bay. This is particularly evident at the southern end of the beach where several paths provide access/egress to the beach. These pathways have created low points within the dune which would be expected to channel flow facilitating inundation and flooding during overtopping events. In the south, where the beach crest is naturally lower, rock armour defence provides protection to the Great Pool Site of Special Scientific Interest (SSSI). Great Pool covers an area of 13,343 m² and boreholes within the low-lying ground in the area provide freshwater supplies to the island. Great Pool is located approximately 30 m from the rear of Great Popplestone beach and the boreholes are further distanced (ca. 150 m) yet there exists a future risk of groundwater contamination. Despite the existing defences at Great Popplestone, historic inundation has occurred with overtopping of the dune system being recorded six times between 1990 and 2014. Following the winter storms of 2014, the low-lying grassland behind the beach, including Big Pool was flooded for 2-3 weeks. (CH2M, 2017).

Beach Morphology

- 4.5.22 The PCO beach profile data from Great Popplestone has been obtained from three profile transects (Figure 4-5).

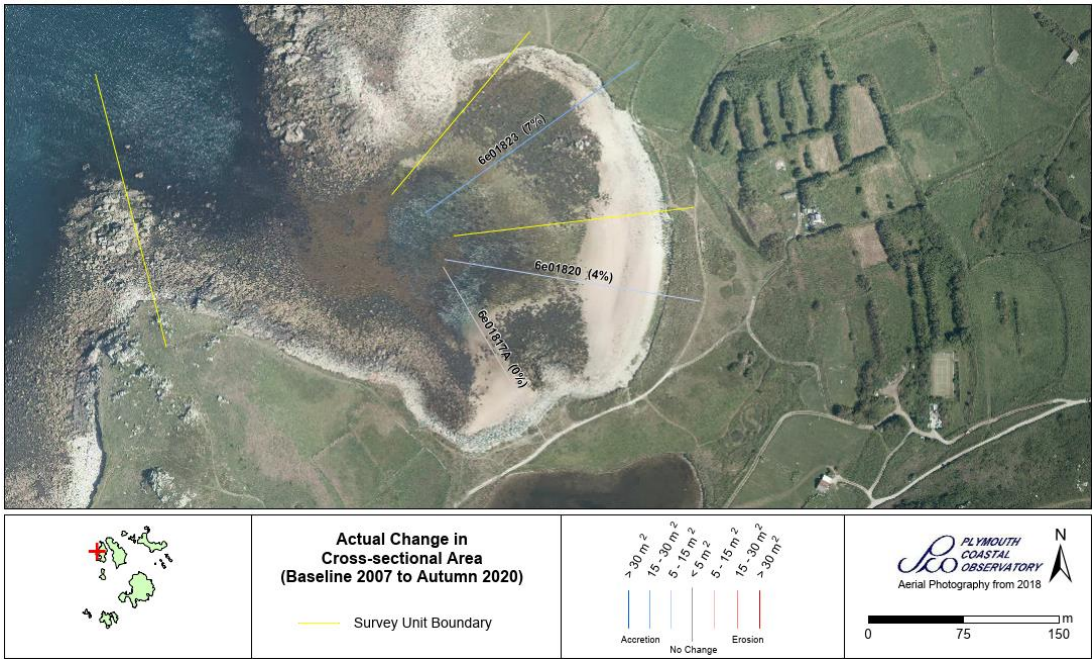


Figure 4-5: Great Popplestone beach profile transects (PCO, 2021)

4.5.23 The data suggests that the CSA has generally increased by accreting sediment relative to the baseline data collection in 2007 (Table 4-2). The largest sediment gains have been recorded in the north of the bay (6e01823) with a 16.4 m² increase in CSA which reflects a 7% increase relative to 2007. Marginal CSA gains of 0.7 m² have been made in the south (6e01817A).

Table 4-2: Great Popplestone – Beach Profile Cross-Sectional Area (CSA): September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e01817A	0.7	0
6e01820	10.2	4
6e01823	16.4	7

4.5.24 The topographic profile data reveals the beach crest is lower in the north (6e01823: <6 mAOD) and south (6e01817A: <7 mAOD) when compared with the middle profile (6e01820: >7 m). The lower elevation in the south makes this area susceptible to overtopping and associated impacts on Great Pool. Profiles 6e01817A, and 6e01820 both reveal the draw down and associated loss of sediment from the upper beach and accumulation lower in the profile. This has resulted in the landward migration of the beach crest between 2007 and 2020, profile 6e01817A has moved approximately 5 m landward. The northern profile (6e01823) is more concave and sediment gains/losses in the upper beach profile are negligible. Sediment accumulation has occurred within the mid-profile beyond the extent of the sandy beach. This accretion may be more attributed to reworking of larger sedimentary blocks that are found lower in the tidal frame.

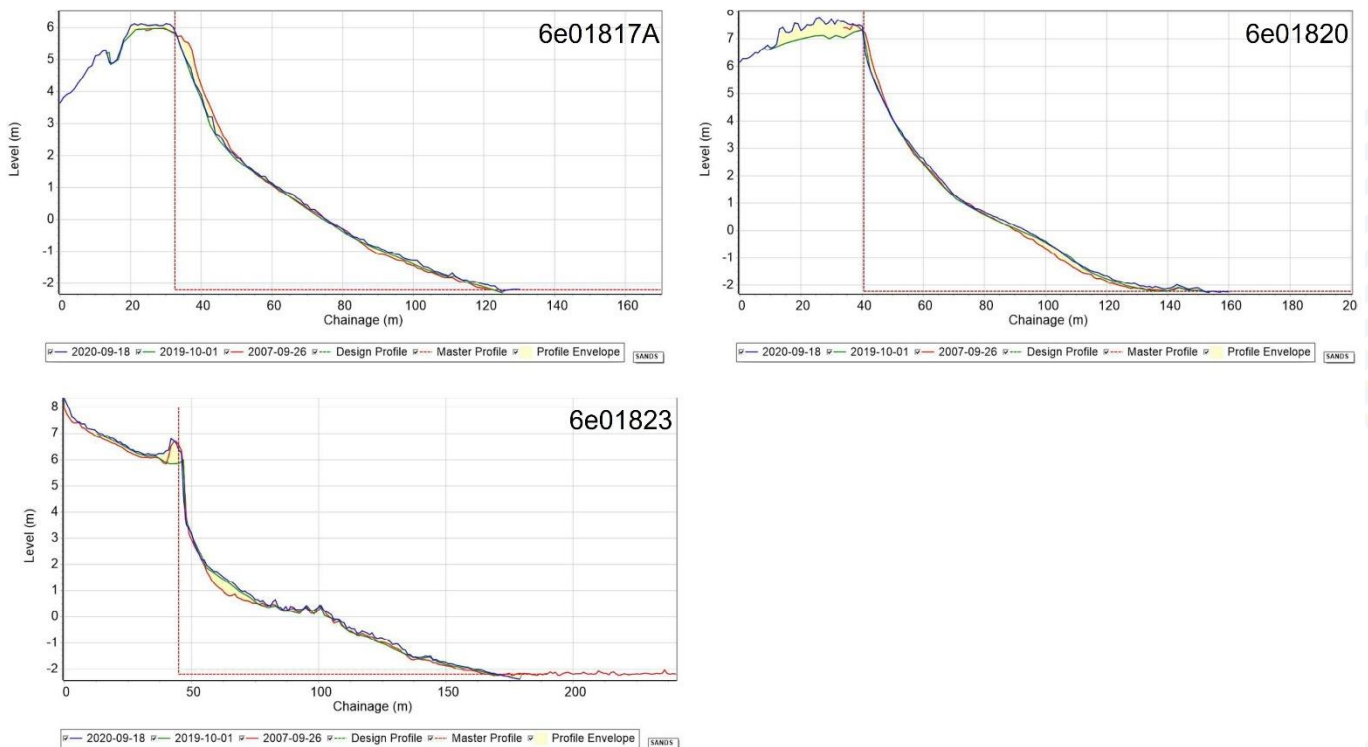


Figure 4-6: Great Popplestone topographic beach profiles (PCO 2021)

Shoreline Management

4.5.25 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that Great Popplestone is situated within the CMU PU45.4. The SMP2 identifies that only a small amount of recession is expected adjacent to Great Pool in the south of the bay. It states a preferred policy of Hold the Line (HTL) up to 2025, with NAI up to 2105. However, there are potential concerns with regards to water resources with a potential impact on groundwater supply.

4.5.26 The SMP Refresh 2022-23 also reflects that only a small amount of recession is likely and supports the short term HTL policy along with a need to establish whether NAI is sustainable in the long term.

Great Porth (Great Par) North of Great Carn (Bryher)

4.5.27 Great Porth is located on the western side of Bryher. The bay sits between the extensive rocky outcrops of Heathy Hill in the south and the smaller Carn of Bars in the north. The beach is oriented to the west and is therefore partially exposed to the dominant south-westerly wave activity and long period Atlantic swell waves. Several offshore islands, located to the southwest and the Heathy Hill headland offer partial protection from storm exposure.

4.5.28 The beach at Great Porth is characterised by a sandy foreshore with occasional cobble deposits. The centre of the beach is dominated by the granite outcrop of Great Carn. To the north, the rear of the beach has a large amount of rock armour protection in the form of large granite boulders which protect the beach embankment from erosion, although crest levels remain low and are subject to overtopping. A drain that flows into Great Pool (100 m north) is only 20 m from the

rear of the beach. The area to the north is where the proposed defence structure is to be positioned. A narrow-vegetated dune crest separates the beach from a track that runs from north to south adjacent to the bay.

4.5.29 Towards the centre of the bay the beach embankment consists of exposures of the ram deposits with an overlaying dune habitat. This central area is not protected and is subject to episodic erosion and retreat under storm conditions. During the storms of 2014 overtopping occurred at Great Porth leading to water ponding and extensive overwashing of beach sediments. This was accompanied by severe dune face erosion and disturbance to the boulder revetment in the north.

Beach morphology

4.5.30 The PCO beach profile data from Great Porth is limited to a single profile transect located in the north of the bay near to the proposed defence works (Figure 4-7).

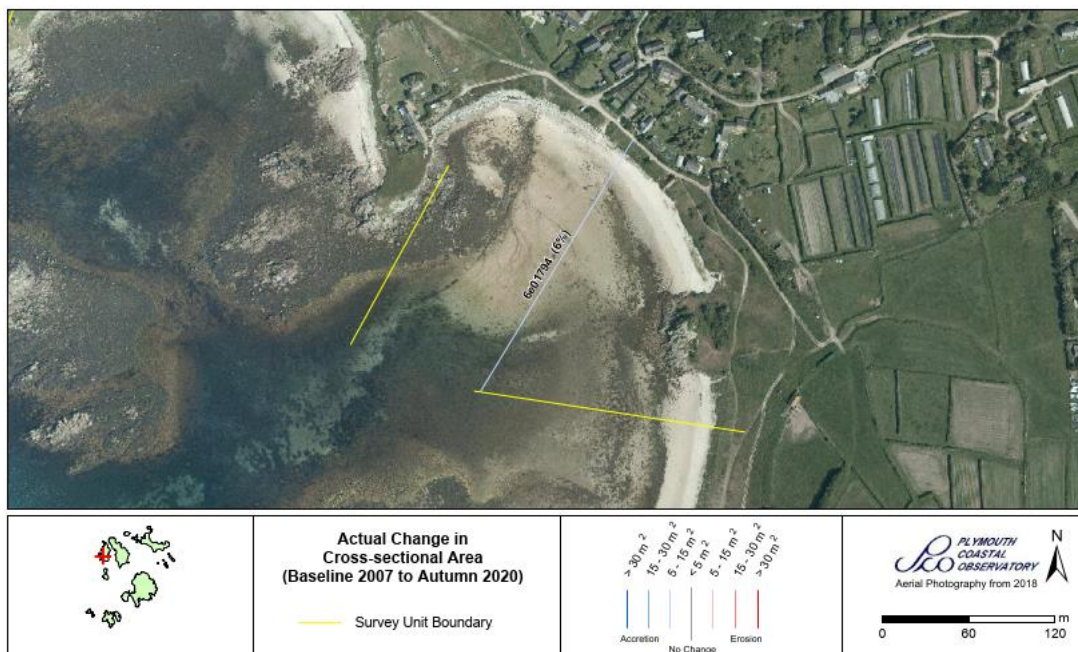


Figure 4-7: Great Porth beach profile transect (PCO 2021)

4.5.31 The data suggests that the CSA has increased by accreting sediment relative to the baseline data collection in 2007 (Table 4-3). The profile has increased in CSA by 14.2 m² which reflects a 6% increase relative to 2007.

Table 4-3: Beach Profile Cross-Sectional Area (CSA) – September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e01794	14.2	6

4.5.32 The topographic profile data reveals sediment accretion along the majority of the profile relative to the 2007 baseline (Figure 4-8). This has resulted in progradation of the beach. Sediment gains are evident at the top of the dune crest and the upper beach towards the backshore as well as notable gains lower in the tidal frame where

the beach profile has gained some 15 m in lengthening of its seaward extent.

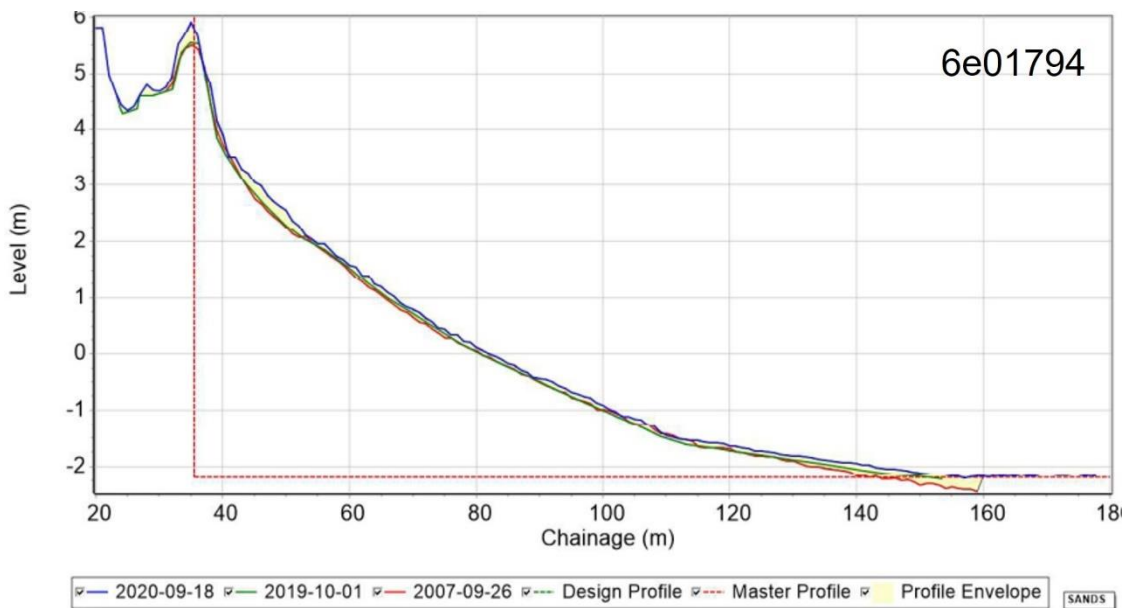


Figure 4-8: Great Porth topographic beach profile (PCO 2021)

Shoreline Management

4.5.33 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that Great Porth is situated within the CMU PU45.1. The SMP2 identifies that the coastline is predicted to recede by up to 35 m over 100 years based on a policy of NAI. The policy plan is to HTL until 2025 allowing for monitoring of shoreline recession to inform future policy. During epoch 2 (up to 2055) and epoch 3 (up to 2105) the policy is one of NAI with localised HTL. This would allow for the upper beach and vegetated zone at the rear to be managed under a NAI approach enabling the beach-dune system to respond and adapt naturally to sea level rise and increased storm exposure. A localised HTL policy may be justified to protect the local hotel which is of economic value to the tourist industry on the island.

4.5.34 The SMP Refresh 2022-23 also reflects the need to adopt a policy of NAI with localised HTL beyond 2025. However, given the uncertainty regarding retreat rates and the coastal response to future storm activity and sea level rise this policy may require further review in the medium to long term.

Stinking Porth (Bryher)

4.5.35 Stinking Porth is located on the west coast of Bryher adjacent, and to the north of Great Porth. As with Great Popplestone and Great Porth, Stinking Porth is orientated to the west and is therefore vulnerable to swell wave action generated in the Atlantic Ocean. There are a number of rocky outcrops that are located offshore that offer some protection from incoming wave activity, including Merrick Island which is 200 m southwest of Stinking Porth.

4.5.36 The beach at Stinking Porth is a coastal cove approximately 200 m in length situated between the headland of Gweal Hill to the north and a granitic outcrop (Carn of Bars) to the south. The beach is relatively narrow and steep in comparison to other beaches on Bryher and consists of mixed sediments with patches of bare

sand and cobbles scattered throughout. The rear of the beach is dominated by larger cobbles and a raised embankment. The exposed face of the embankment comprises a mix of rounded beach pebbles, cobbles and small boulders. The crest of the vegetated embankment is less than 3 m wide and comprises a combination of sandy soil and boulders. The embankment has previously been over washed, most notably in the winter storms of 2014 when considerable amounts of sediment (cobbles and small boulders) were washed over the crest to the land behind.

4.5.37 The beach embankment is approximately 30 m southwest of Great Pool, therefore there is an increased risk of saline intrusion and contamination to freshwater supplies. Sections of the mixed embankments have had rip rap, rock armour and a concrete crest wall constructed to prevent landward migration and protect the areas of water abstraction from seawater inundation.

Beach morphology

4.5.38 There is no PCO beach profile data recorded from Stinking Porth therefore a quantitative assessment of morphological change cannot be made. However, as demonstrated throughout the islands, and in particular the adjacent beach at Great Porth, the trend is one of sediment accretion. It is also noted that the SMP2 (2011) identifies no significant erosion risks at Stinking Porth. However, the key concern is wave overtopping and the risk of inundation and impacts on Great Pool. This is reflected in the proposed works to reduce overtopping and coastal flooding.

Shoreline Management

4.5.39 The second iteration of the Shoreline Management Plan (SMP2) (2011) identifies that Stinking Porth is situated within the CMU PU45.2. It states that there is no significant risk of erosion, although it does highlight the area as being a potential pathway for wave overtopping and inundation to Great Pool. NAI is the preferred policy across all epochs (up to 2105). This policy also satisfies the objectives of the Area of Outstanding Natural Beauty (AONB) and the Isles of Scilly Special Area of Conservation (SAC) designations.

4.5.40 The SMP Refresh 2022-23 also indicates that the policy intent is to allow natural coastal evolution to occur to support the conservation of designated features. It also identifies that the long-term policy may be difficult to address given the uncertainty regarding rates of coastal retreat and the associated impacts on Great Pool. This may require further review in the medium to long term.

Kitchen Porth (Bryher)

4.5.41 Kitchen Porth is small embayment with a mixed beach (sand, gravels and cobbles) located on the northeast coast of Bryher. Whilst the orientation of the site is protected from the dominant south-westerly wave activity, long period Atlantic swell waves are known to diffract around the north of Bryher impacting on the southern area of beach at Kitchen Porth. Despite the presence of a large granite outcrop (Hangman Island) 150 m north of the beach the area is also partially exposed to long period waves approaching from the north. This level of exposure to wave activity is reflected in evidence of erosion at the beach crest to the south of the beach. The beach foreshore gives way to a ridge at the backshore which is gently sloping and dissipative along the majority of the beach. However, the more open and exposed southern section of the beach is more dominated by sand with fewer cobbles present and a steeper and narrower beach crest. This area is subject to periodic erosion as evidenced by the exposed ram deposits and tree roots.

Beach morphology

- 4.5.42 There is no PCO beach profile data recorded from Kitchen Porth therefore a quantitative assessment of morphological change cannot be made. However, it is noted in the previously submitted Environmental Statement that the southern end of the beach has been subject to wave overtopping and erosion. Should this area continue to erode it is likely that the existing beach and crest embankment will encroach to the land behind in response to storm events. Wave overtopping and associated coastal flooding would also be expected to increase.
- 4.5.43 Sediment losses in the south may also be exacerbated by human factors. The main access point to the beach is adjacent to the exposed southern frontage and ongoing removal and reprofiling of existing beach material to enable continued access may contribute to the loss of sediment at this location. Any continued future loss of sediment from this area will likely contribute to a reduction in resilience of the dissipative beach allowing for overtopping of the beach crest to occur causing cobbles to wash over and accumulate beyond the backshore. The sheltered north westerly section of the beach is expected to accumulate sediments over time as is the general trend reflected across the archipelago. Under low energy wave conditions the shallow gradient of the beach profile to the south would also be expected to accrete sand adding to the beach volume and CSA under non-storm conditions.

Shoreline Management

- 4.5.44 The second iteration of the Shoreline Management Plan (SMP2) (2011) identifies that Kitchen Porth is situated within the CMU PU45.8. The report indicates that there is no significant erosion risk stating the shoreline is generally stable although erosion is expected to exceed 15 m over 100 years. This rate of retreat is likely to pose a potential risk to a discrete number of properties. The preferred management policy is one of NAI across all epochs (up to 2105) which satisfies the objectives relating to the AONB and SAC designations.
- 4.5.45 The SMP Refresh 2022-23 also specifies a NAI policy allowing natural coastal erosion to occur in support of the local designations. It does also highlight a need for local activity to defend critical assets including a freshwater well and electricity substation.

Green Bay (Bryher)

- 4.5.46 Green Bay is located on the east coast of Bryher sheltered from the dominant south-westerly wave activity and long period Atlantic swell waves although it is vulnerable to storm surge and swell effects that occur in the channel between Tresco and Bryher. The limited exposure to wave activity means the greatest threat at Green Bay is from overtopping and marine inundation to the hinterland behind the beach.
- 4.5.47 The beach comprises a sandy foreshore, with the backshore embankment comprising accumulated cobbles and boulders in the northern, and mid- beach area. This gives way to a well-established vegetated crest that fronts the coastal path, local road, The Green and boatyard. To the south the embankment decreases in height and is almost non-existent in places (CIoS, 2020). This reduced topographic profile therefore provides limited protection from overtopping. These low-lying areas within the beach crest provided pathways for overtopping leading to localised coastal flooding. Beach access points in the middle and south of the beach also provides opportunity for overtopping and inflow during storm surge

conditions. Measures are required to increase the crest height of the beach crest and improve the permeability to reduce the risk of overtopping and impacts on the local community and infrastructure.

Beach morphology

4.5.48 The PCO beach profile data obtained for Green Bay is limited to a single profile (6e01753) which is situated approximately 100 m north of the boatyard.

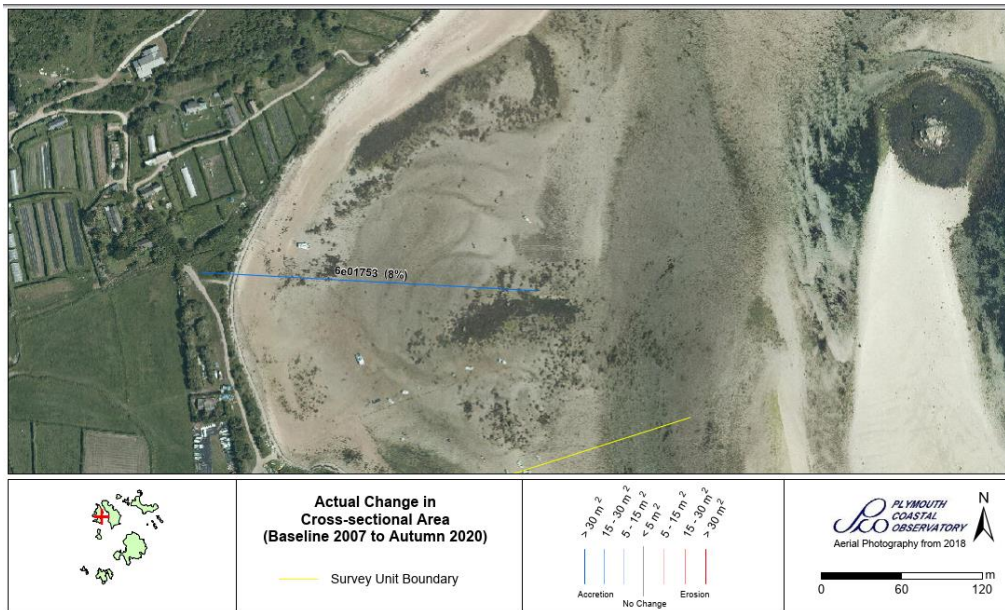


Figure 4-9: Green Bay beach profile transects (PCO 2021)

4.5.49 The data suggests that the CSA has increased since baseline data collection in 2007 with an increased CSA equating to 38.4 m² with gains made in the lower section of the beach profile; this reflects an 8% difference relative to 2007 (Table 4-4).

Table 4-4: Beach Profile Cross Sectional Area (CSA) – September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e01753	38.4	8

4.5.50 The topographic profile data reveals that the beach crest has remained consistent over the 13-year monitoring period. This suggests the beach is able to self-maintain and recover from episodes of erosion and sedimentary loss. Sediment has accreted over time predominantly in the mid-lower section of the profile. Notable sediment gains have been made at the end of the profile which represents an offshore sand bar that is formed in lee of Merrick Island. The topographic dip between the beach foreshore (up to 300 m) and the Merrick Island sand bar is part of the shallow channel between the islands of Bryher and Tresco.

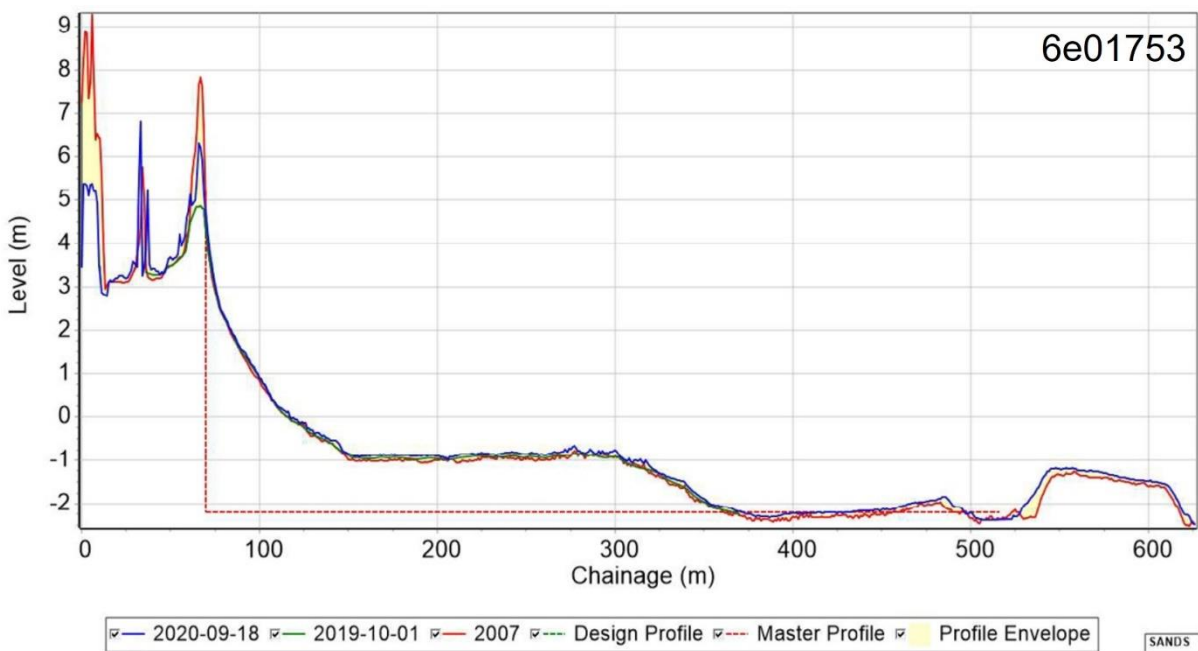


Figure 4-10: Green Bay topographic beach profile (PCO 2021)

Shoreline Management

- 4.5.51 The second iteration of the Shoreline Management Plan (SMP2) (2011) identifies that Green Bay is situated within the CMU PU45.12 (referred to as The Brow to Works Point). The report indicates that there are no significant risks identified and that the shoreline is generally stable although it states that erosion may exceed 20 m over 100 years which may affect some cliff top land use. The management policy is one of NAI across all epochs (up to 2105) which satisfies the objectives relating to the AONB and the Isles of Scilly SAC designations.
- 4.5.52 The SMP Refresh 2022-23 also specifies a NAI policy allowing natural coastal erosion to occur in support of the local designations although it highlights that the proposed works to protect locally critical infrastructure may not align with the SMP policy. It further suggests a possible realignment of the policy unit boundary to incorporate the current proposed works.

St Agnes

- 4.5.53 St Agnes is the most south-westerly inhabited island in the archipelago. Due to its location St Agnes is exposed to Atlantic swell waves and associated storm activity although some shelter is provided from the uninhabited granite islands, Annet and Hellweathers to the west. On the sheltered eastern side of the island a 150 m wide sandy tombolo has formed between St Agnes and the adjacent island of Gugh.
- 4.5.54 Three key sites are identified as requiring defence structures to reduce coastal erosion and flooding from wave overtopping. These locations are all situated in the north-west of the island and encircle the freshwater pools, Big Pool, and the nearby Little Pool. These mesotrophic freshwater habitats are designated within the Big Pool and Browarth Point (St Agnes) SSSI. The proximity of these pools to the coast makes them vulnerable to saline intrusion and during storm events they occasionally receive an influx of salt water. This also provides a relatively unique

habitat which supports some brackish influenced vegetation. Big Pool also lies adjacent to the island's main drinking water supply, which is obtained from the granite aquifer via borehole abstraction. The fractured granite allows rapid flow, therefore any saline intrusion to the area presents an additional threat to the provision of groundwater across the island.

4.5.55 The three sites where defence works are proposed across St Agnes are as shown on Figure 1-14 in the submitted ES.

Periglis

4.5.56 Periglis is located on the north-west of St Agnes, with the embayment being orientated west towards the Atlantic. The cove beach is situated between granite headlands, Burnt Island to the north and Bergecooth Carns to the south. There are also a number of additional granite outcrops located offshore, including the island of Annet, 1 km west of the beach at Periglis which provides some shelter from the dominant south-westerly wave conditions and long period Atlantic swell waves.

4.5.57 The foreshore of the beach is dominated by sand with particle size increasing landward to cobbles at the backshore. Sands dominate in the southern section of the beach, most likely the result of two concrete slipways that provide shelter to this area from swell wave propagation. To the north the cobbles at the rear of the beach are accompanied by larger granite boulders which form a defensive line between Periglis and the neighbouring beach of Porth Coose. To the rear of the beach is a narrow, vegetated beach crest that gives way to a drop in elevation to a recreational area and a freshwater pool (Big Pool). The pool is 60 m from rear of the beach and covers an area of approximately 4,500 m². The existing defences act to protect Big Pool from saline intrusion and reduce coastal flooding. They are formed of a mix of measures including a geotextile mesh that acts to stabilise the beach crest along with rocks and boulders that aim to reduce further erosion of the seaward embankment. The seaward face of the beach crest is subject to periodic erosion during storm events, particularly those that coincide with high tide. Previous measures employed to reduce erosion have been compromised following exposure to storm activity including the displacement of cobbles over the dune crest to the land behind and the partial exposure of the geotextile mesh that underpins some of the larger sedimentary assemblages.

Beach morphology

4.5.58 The PCO beach profile data obtained for Periglis covers four profiles (Figure 4-11) which are positioned at intervals along the beach face from the southern section to the mid- northern area.

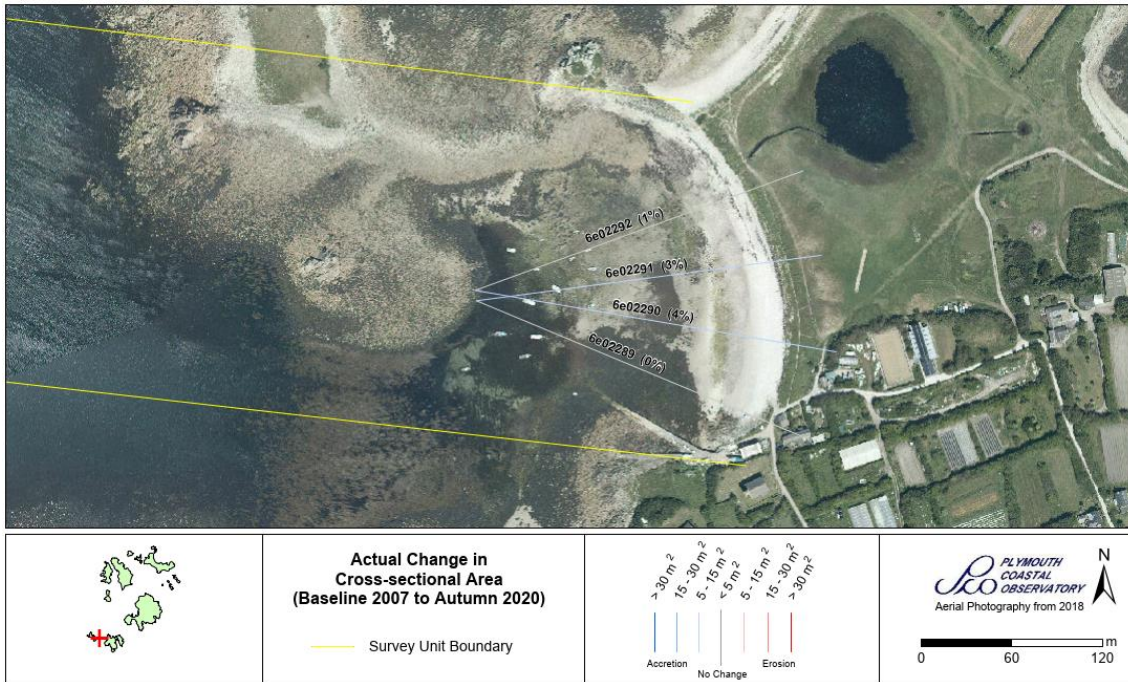


Figure 4-11: Periglis beach profile transects (PCO 2021)

4.5.59 As with other beaches across the islands, the profile data suggests that Periglis is accreting sediment adding to beach volume and CSA (Table 4-5). The largest gains are attributed to the profiles in the centre of the beach (6e02290 and 6e02291) with accretion reflected in an increase in CSA relative to the 2007 baseline of 10.8 m² and 8.4m², which equates to a 4% and 3% CSA increase respectively. The southerly (6e02289) and northerly profiles (6e02292) show limited change in CSA with percentage increase of 0% and 1% respectively.

Table 4-5: Periglis – Beach Profile Cross-Sectional Area (CSA): September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e02289	-1.3	0
6e02290	10.8	4
6e02291	8.4	3
6e02292	1.8	1

4.5.60 The topographic beach profile data reveals a marginal retreat of the beach crest from the southern portion of the beach (6e02289) relative to the 2007 baseline. The result is a net loss of CSA (-1.3m²). Negligible sediment gains and losses are evident along this profile with the largest gains being recorded at the most seaward extent of the profile. Similar retreat of the beach crest is evident along profile 6e02290 with gains in the mid and lower beach. Rates of retreat for the beach crest from the remaining two transects are less noticeable, although the crest height has increased most notably in profile 6e02291 which appears to have gained 0.75 m in elevation. Minor sedimentary gains and losses are also recorded in the most northerly profile (6e02292), however the upper beach crest remains static relative

to the baseline with some loss of sediment and retreat in the backshore.

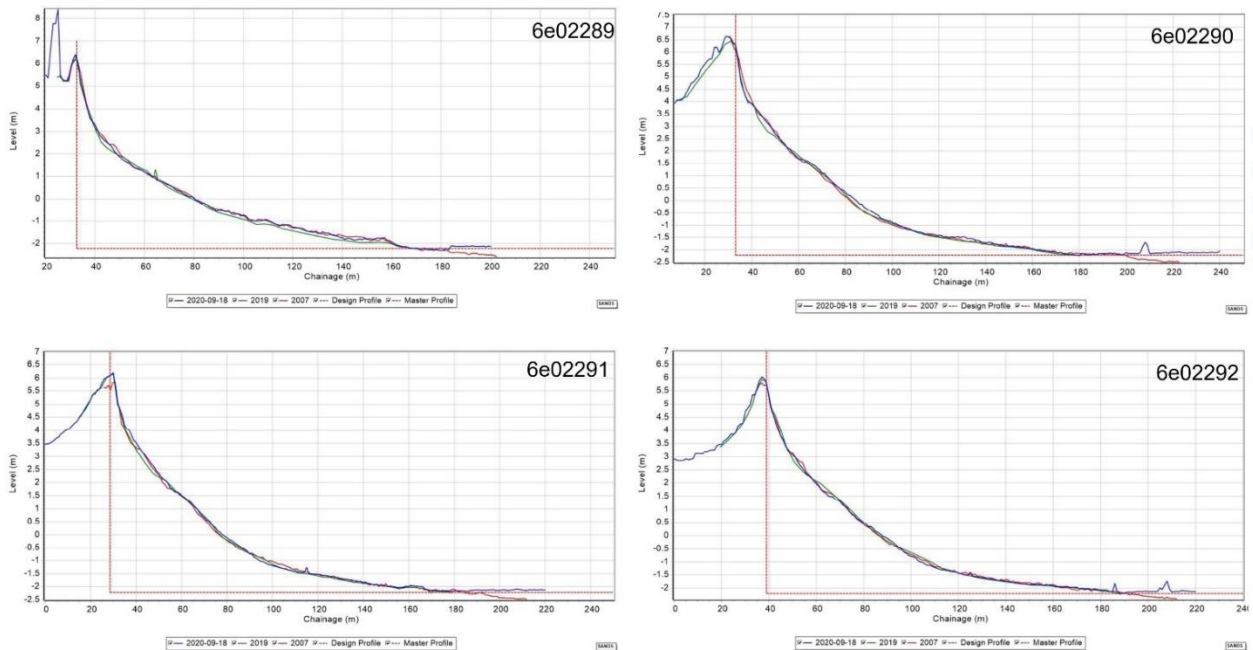


Figure 4-12: Periglis topographic beach profiles (PCO 2021)

Shoreline Management

4.5.61 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that Periglis is situated within the CMU PU46.11. The SMP2 identifies the main concern on St Agnes as erosion and saline intrusion to Big Pool. This is accounted for in the preferred policy of HTL across all epochs, up to 2105. Adopting this policy will help reduce the likelihood of saline contamination to the islands drinking water supply. The SMP also notes that this approach may prove unsustainable in the future and highlights the potential for groundwater contamination relating to percolation of seawater through defence embankments as sea levels rise. The future impacts on the groundwater supply are as yet unknown although this is likely to require periodic review in response to environmental change.

4.5.62 The SMP Refresh 2022-23 also supports the HTL policy, to maintain and replace defences where required in support of the over-riding policy and to protect the integrity of the islands freshwater supply.

Porth Coose

4.5.63 Porth Coose is located adjacent to Periglis on the northwestern side of St Agnes. It is separated from Periglis by a 60 m boulder groyne consisting of granite boulders which stretches from between the two beaches to the elevated granite outcrop of Ginamoney Carn. A collective scattering of boulders upon the bedrock exposure then extends further seaward to connect with the headland of Burnt Island which protects the beach at Porth Coose from the dominant south-westerly wave conditions and long period Atlantic swell waves. The outcrop of Porth Coose Carn to the north further protects the beach from northerly wave activity.

4.5.64 As with Periglis, the beach at Porth Coose provides protection to the hinterland including Browarth Point SSSI and Isles of Scilly Ramsar site. It also limits groundwater contamination via saline intrusion to Big Pool, which is located

approximately 30 m southwest of the beach crest. The beach itself is predominantly constructed from sand although to the rear of the beach this transgresses to cobbles that rise to a partially vegetated dune system. Landward of the beach there are a number of informal pedestrian paths that permit access to the beach and focus localised erosion and fragmentation of the dune habitat.

4.5.65 Following historic storm events in 1989/1990 large 20 tonne boulders were placed in the weakest section of the dune. Additional defences were constructed in 1996 comprising a tied concrete block revetment reinforced with erosion control matting (Arup, 2011). Despite these measures the beach was overtopped during the winter storms of 2013/2014 which further reduced the elevation of the revetment increasing the likelihood of future overtopping.

Beach morphology

4.5.66 The PCO beach profile data obtained for Porth Coose is drawn from three profile transects positioned at intervals along the beach (Figure 4-13).

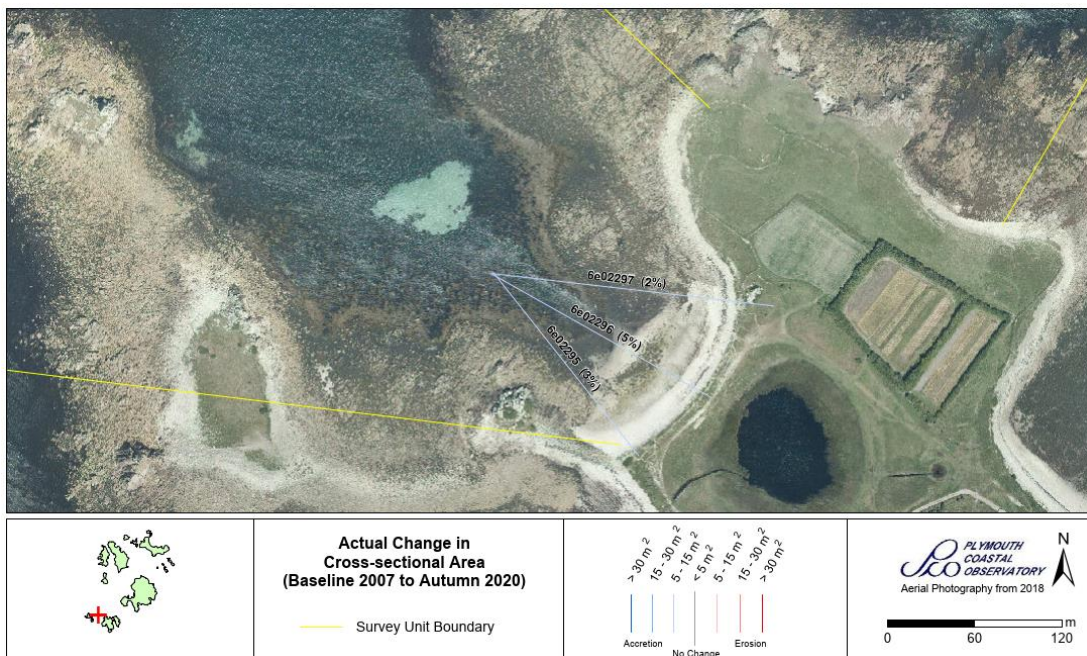


Figure 4-13: Porth Coose beach profile transects (PCO 2021)

4.5.67 As with other beaches across the islands, the profile data suggests Porth Coose is accreting sediment adding to beach volume and associated CSA at each profile location (Table 4-6). The largest gains are attributed to the profile in the centre of the beach (6e02296). This profile has gained 10.2 m² when compared with the 2007 baseline profile. The southerly and northerly profiles also indicate that the beach is accreting sediment and CSA with percentage gains of 3% and 2% respectively.

Table 4-6: Porth Coose – Beach Profile Cross Sectional Area (CSA): September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e02295	8.2	3
6e02296	10.2	5
6e02297	5.5	2

4.5.68 The profile graphs show profile 6e02295 has gained sediment in the lower half of the beach and at the backshore which has led to a steepening of the profile in this area. Similar gains are reflected in the middle (6e02296) of the beach whilst the northern profile (6e02297) has experienced losses in the middle, and upper-mid-profile. However, gains have been recorded at the backshore.

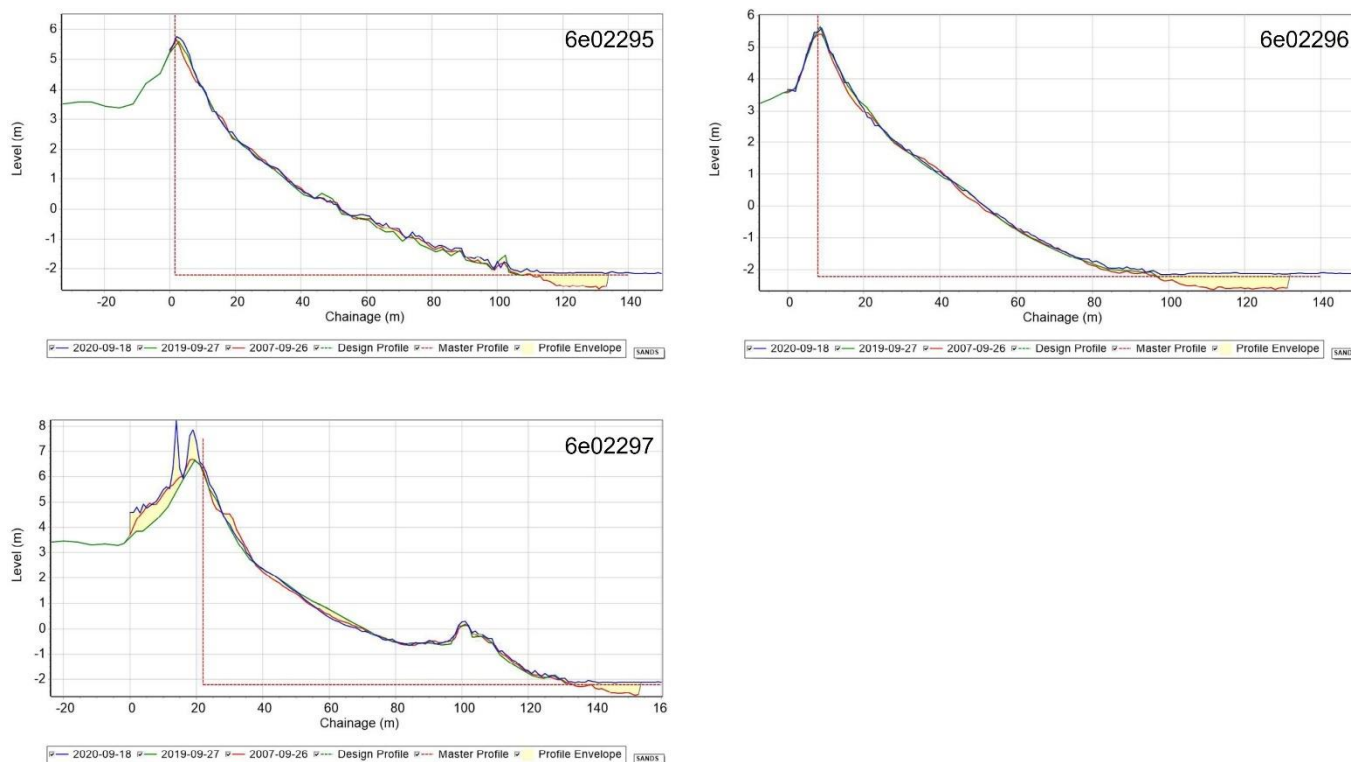


Figure 4-14: Porth Coose topographic beach profiles (PCO 2021)

Shoreline Management

4.5.69 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that Porth Coose is situated within the CMU PU46.12, referred to as Ginamoney Carn to Browarth Point. As with the policy unit for Periglis, the key concern is protecting the potable water supply to the island. Subsequently the same HTL policy is adopted across all epochs at Porth Coose.

4.5.70 The SMP Refresh 2022-23 also supports the HTL policy, to maintain and replace defences where required in support of the over-riding policy and to protect the integrity of the islands freshwater supply.

Porth Killier

4.5.71 Porth Killier is situated on the northern coast of St Agnes. It’s north-northeasterly aspect provides protection from the dominant south-westerly wave conditions and long period Atlantic swell waves. However, the beach is subject to long period swell waves from the north that are capable of mobilising coarse cobbles and boulders. The pocket beach is positioned between the headlands of Kallimay Point and Browarth Point. The beach matrix is dominated by coarse sediments including cobbles and boulders with a limited presence of sand. The beach presents a general trend towards sediment size increasing landward with larger cobbles located at the rear of the beach. The majority of the beach is backed by a raised, vegetated crest which provides limited protection to the hinterland behind, including Big Pool, 100 m west, and a smaller freshwater pond which is 40 m west of the backshore. The crest is underlain at its western end by a concrete mesh mattress. The land behind the low-lying embankment was subjected to significant overtopping during the winter storms of 2013/2014 whereby considerable amounts of sediment (cobbles) were deposited on the landward side of the beach crest.

4.5.72 In the eastern sector of the beach an 85 m long vertical concrete seawall protects a minor road and agricultural fields to the rear. The erosion and removal of cobbles from the toe of the wall has undercut the structure and lowered the beach leading to an increased risk of undermining. Ram deposits are also exposed in the eastern end of the beach where wave forces lead to episodic losses.

Beach morphology

4.5.73 The PCO beach profile data obtained for Porth Killier is drawn from two profile transects at the western and eastern extents of the beach (Figure 4-15).

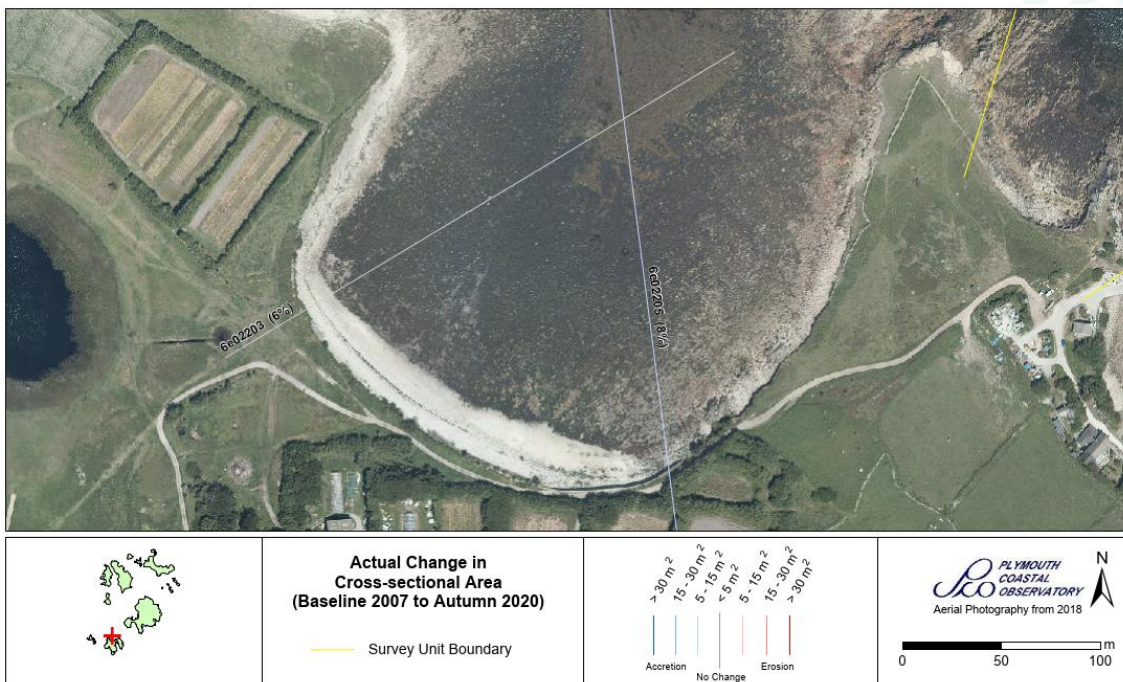


Figure 4-15: Porth Killier beach profile transects (PCO 2021)

4.5.74 Although the beach is dominated by coarser grained sediments (cobbles and boulders) both profiles identify the beach at Porth Killier is accreting as reflected in the increase in beach volume and associated CSA relative to the 2007 baseline (Table 4-7). The largest gains have been made in the east (6e02205) with a CSA increase of 8.2 m² which reflects an 8% increase against the baseline. The western profile (6e02203) has an increased CSA of 4.5 m² which reflects a 6% increase relative to the baseline.

Table 4-7: Porth Killier – Beach Profile Cross Sectional Area (CSA): September 2007 to September 2020

Profile	CSA difference (m ²)	CSA difference (% change)
6e02203	4.5	6
6e02205	8.2	8

4.5.75 The profile graphs (Figure 4-16) show the eastern profile (6e02205) has gained material in the upper beach area to the front of the vertical seawall, relative to 2007. Similarly, to the west, (6e02203) marginal gains are also apparent in the upper section of the beach leading to a steepening of the profile.

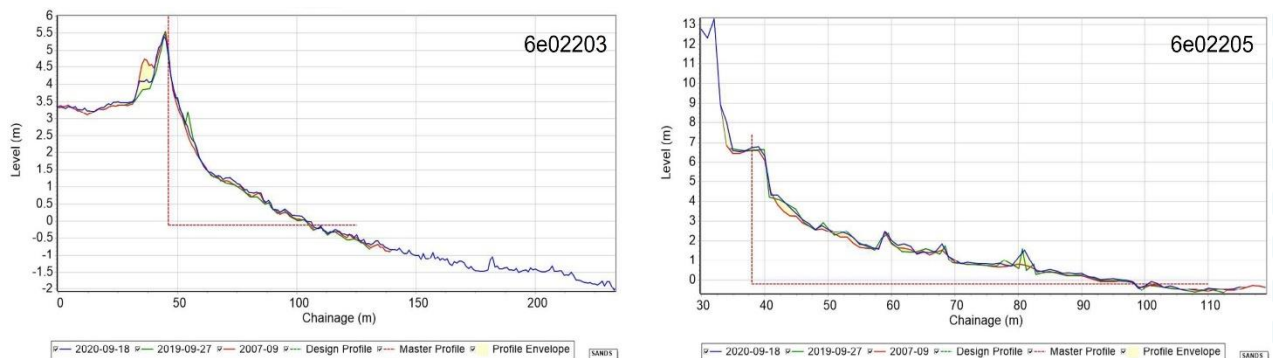


Figure 4-16: Porth Killier topographic beach profiles (PCO 2021)

Shoreline Management

4.5.76 The second iteration of the Shoreline Management Plan (SMP2) (2011) denotes that Porth Killier is situated within the CMU PU46.14, referred to as Browarth Point to Kallimay Point. Despite being located in the vicinity of Big Pool the more sheltered north-easterly orientation means Porth Killier is not considered to be as significant a risk and erosion. This results in a preferred policy of NAI up to 2025, an approach that satisfies the objectives of the AONB and the Isles of Scilly SAC. However, the policy changes in epochs 2 and 3 to NAI, with localised HTL. Whilst the SMP does not clarify the reason for this policy change it is assumed that this relates to the protection of Big Pool and maintaining the freshwater provision to the island.

4.5.77 The SMP Refresh 2022-23 also states NAI but supports local activity to prevent groundwater contamination to Big Pool to the west and to retain the existing seawall that protects a critical access road.

4.6 Assessment methodology and assessment criteria

4.6.1 The assessment methodology and assessment criteria used remain the same as the submitted ES from November 2022. Criteria for defining sensitivity of coastal processes and criteria for defining the magnitude of impact on coastal processes remain as per Table 4-26 and Table 4-27 contained in the submitted ES.

4.7 Potential Impacts and Significant Effects

4.7.1 An updated assessment of the potential impacts and significant effects on coastal processes, geomorphology, flood risk and erosion has been undertaken to reflect the proposed changes. These are summarised below.

Lower Town (St Martin's)

Construction impacts

4.7.2 Minor amendments have been incorporated into the original red line boundary at Lower Town, this relates to the removal of the Seven Stones storage area. The amended boundary does not adversely affect the construction impacts associated with the proposed works at Lower Town which remain as reported in the Environmental Statement. Based on the negligible magnitude of disturbance, and the low sensitivity of the scale at which coastal processes are likely to be affected, the effects arising from construction are deemed to be '**Not Significant**'.

Operational impacts

4.7.3 Operational impacts will not be affected by the removal of the Seven Stones storage area and remain as detailed in the Environmental Statement. Based on the negligible magnitude of disturbance, and the low sensitivity of the scale at which coastal processes are likely to be affected, the effects are deemed to be '**Not Significant**'. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.4 Whilst the proposed measures will act to prevent erosion of the sand dune network, they may contribute to coastal squeeze through limiting the opportunity for migration and adaptation of intertidal habitats in response to sea level rise. Historic evidence indicates that a landward migration of the Mean High Water Spring (MHWS) level at St Martin's has occurred over time. By implementing measures to protect the terrestrial habitat at the rear of the beach the intertidal habitat is effectively squeezed as sea levels rise. This effect is exaggerated in locations where hard engineered structures are constructed to prevent coastal erosion. However, at St Martin's the proposed measures adopt a softer engineered approach that may provide some capacity for landward migration in response to erosion rates of up to 40 m by 2105 at Middle Town (SMP, 2011). The lack of infrastructure along this stretch of coast means the sand dune system has increased capacity to move inland as sea levels rise and erosion continues to occur. Behind the existing sand dunes there are a number of coastal footpaths that may need to be re-routed in the future if increased erosion and sea level rise push the habitat inland. Should this occur there is opportunity for the intertidal habitat to migrate alongside the sand dunes meaning any habitat losses (both terrestrial and intertidal) will be minimised. Ordnance Survey (OS) map data indicates there is currently approximately 25 m between MHWS mark and the current cliff line suggesting there is capacity and time to allow for natural adaptation and migration of habitats in line with anticipated increases in sea level. The scale of sensitivity at St Martin's is considered low and

the magnitude of impact associated with coastal squeeze at St Martin's is considered to be minor, therefore the significance is considered to be '**Slight adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase over time.

Great Popplestone (Bryher)

Construction impacts

- 4.7.5 The construction impacts associated with the proposed works at Great Popplestone remain as reported in the Environmental Statement. Based on the negligible magnitude of disturbance, and the low sensitivity of the scale at which coastal processes are likely to be affected, the effects are deemed to be '**Not Significant**'.

Operational impacts

- 4.7.6 Operational impacts also remain as detailed in the Environmental Statement. Positive 'Minor impacts' were reported in relation to beach reprofiling following removal of rock armour from the northern revetment. As reported in the Environmental Statement, and detailed herein, the general trend towards sediment accretion at Great Popplestone would be expected to replenish any sediment losses during low energy wave conditions potentially resulting in future beach progradation. Based on the negligible magnitude of disturbance, and the low sensitivity of the scale at which coastal processes are likely to be affected, the effects are deemed to be '**Not Significant**'.
- 4.7.7 Additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze. Whilst reducing wave overtopping and having a beneficial impact by reducing coastal flooding, the proposed measures to place rock armour in the southern section of the bay may have a detrimental impact by contributing to coastal squeeze. Whilst the proposed defence structure currently sits above the MHWS mark with the anticipated rise in sea level it would be expected that in time the structure will fall within the tidal frame and will regularly encounter wave activity. Although defence structures are currently situated at this location and would already contribute to coastal squeeze any advancement of the existing defence line will negatively impact on intertidal habitat and reduce the available space to allow for landward transgression. The proposed design indicates that there is expected to be approximately 2 m of intertidal habitat between the structure and the MHWS level. The proximity of the rock armour to the current tidal range is limited and provides little capacity for landward migration of the intertidal habitat within the proposed design life of the proposed structure. The narrow sand dune system at the rear of the beach also has a limited capacity to roll-back naturally given the proximity to Great Pool. Conversely, at the northern end of the beach, removal and repurposing of the granite rocks that formed part of a rock revetment installed in 1994 will prove beneficial in terms of reducing coastal squeeze. Removal of these boulders will allow for erosion to take place naturally which would provide increased capacity for both terrestrial and intertidal habitats to migrate landward in response to sea level rise and exposure to increased storm activity. There is limited infrastructure behind the beach although the coastal path may need to be rerouted in the future. Based on the low sensitivity of the scale at which coastal squeeze is likely to occur and the minor magnitude of disturbance, the effects at Great Popplestone are deemed to be '**Slight adverse**'.

Great Porth (Great Par) North of Great Carn (Bryher)

- 4.7.8 The construction and operational impacts documented in the submitted ES related to the design specification that was originally proposed. Due to the proximity of the original design to a Scheduled Monument (Gig Shed), an additional design option has been presented by HR Wallingford (2023). A summary of the revised design specification relative to the original design is presented in Table 2-1 in Section 2 of this ES Addendum. The revised design option provides a reduction in the level of encroachment on the Scheduled Monument boundary. However, the consequence is an increased footprint on the beach.
- 4.7.9 The revised design results in the seaward advancement of the rock armour structure by 4.1 m relative to the original design. The impact of this is increased encroachment below the MHWS level. This is accompanied by an increase in the crest level from 6 m to 6.5 m which is required to maintain the necessary overtopping threshold below 5 l/m/s.
- 4.7.10 The revised design is expected to alter some of the construction and operational impacts on coastal processes that had previously been considered as 'not significant' in the original submission of the Environmental Statement. Additional consideration has been given to address the associated impacts arising from the design change. These are detailed below.

Construction impacts

- 4.7.11 As conveyed in the original Environmental Statement, the reported construction impacts remain. However, additional consideration will be required to accommodate the revised design specification as detailed. All works requiring beach access would be conducted under dry conditions (i.e., when tide levels expose the work areas). The length of the tidal cycle and therefore the working window would vary depending on the level of the tide each day. The seaward advancement of the structure into the tidal frame increases under the revised design option (4.1 m relative to the original design). With the revised design moving further below MHWS, the potential working window, under dry conditions will be reduced. Consideration should be given to the published tidal data and meteorological conditions that may impact on the ability to work in the dry.
- 4.7.12 The rock revetment would be constructed from the toe to the crest in sections along its length so that the toe excavation can be backfilled with site won sand within a single tidal window (before the next incoming tide) to minimise the potential for mobilisation of construction materials or excavated materials. As the revised design encroaches below MHWS, consideration of tidal levels prior to construction is required. The scale of coastal processes is considered low and the magnitude of impacts associated with the construction of the rock revetment are considered negligible. It is therefore considered that the effects on coastal processes are deemed to be '**Not Significant**'.
- 4.7.13 During construction, existing boulders will be used within the revetment, but additional rock will also be delivered to the beach by barge or land. The rock may be temporarily stored in the adjacent materials storage area or on the foreshore of the working area prior to installation. The storage of the material could cause small-scale changes to current flows over and around the rock piles during extreme events, which could increase turbulence around the rock piles, resulting in increased localised sediment mobilisation on the lee side of the piles. The potential rate of erosion will depend on the current velocity, and will therefore be dependent

on the tidal state, wave height and the duration that the piles remain on the beach. Given the increased volume of rock required to fulfil the revised design specification, a greater amount of rock armour will be required and will therefore need a suitable storage option. Therefore, to mitigate this impact, any rock storage areas on the beach should be situated above the MHWS level to reduce the potential for interaction between the structure and wave activity. Following removal of the rock pile, where necessary the beach level should be regraded to tie in with the proposed design. The scale of coastal processes is considered to be of low sensitivity and the magnitude of impacts associated with the temporary storage and placement of the rock armourstone on the beach is considered to be negligible. Therefore, the impacts on coastal processes, including the local hydrodynamic and sediment regimes are deemed to be **'Not Significant'**.

4.7.14 The construction impacts reported in the original Environmental Statement submission remain relevant. The construction of the revised design is not expected to alter the previously documented impacts and based on the low sensitivity of the scale at which coastal processes are likely to be affected, and negligible magnitude of disturbance, the effects remain **'Not Significant'**.

Operational impacts

4.7.15 The previous impacts associated with the operation of the original design concluded that there were no significant effects on coastal processes detailing that the proposed coastal defence would have an effect on the hydrodynamic regime and sediment dynamics that was deemed to be **'Not Significant'**.

4.7.16 However, the proposed re-design option is likely to present opportunity for increased impact on coastal processes. These are considered herein.

4.7.17 Although the proposed revised design does not present an increased flood risk, it has been designed to accommodate a seaward progression of the defence structure further encroaching into a more dynamic intertidal coastal zone. The toe and frontal face of the rock armour defence will encroach into an area of greater water depth and exposure to larger wave heights. Subsequently it is anticipated that any impacts associated with the interaction of the structure with wave forces (e.g. hydrodynamic regime and sediment dynamics) are likely to be greater than had previously been assessed under the original design. This would require a revision to the previous impacts associated with the original design which were considered to be of low sensitivity and at a magnitude that was considered 'Not Significant'.

4.7.18 The revised design includes the toe of the structure moving 4.1 m seaward and crest height increasing by 0.5 m to limit wave overtopping. The elevated crest height will likely increase the degree of disconnection with natural processes between the beach and the narrow, depleted dune system restricting the accumulation of wind-blown sand. However, the narrow dune is already severely eroded in the vicinity of the works and fails to function as an effective trap for the accretion of wind-blown sand. The coastal processes at this small scale are considered to be of low sensitivity, and the magnitude of the change minor, therefore, the effect is considered to be **'Slight adverse'**.

4.7.19 The slope angle of the re-designed structure has also been amended from 1:2.5 in the original design to 1:2 presenting a more reflective gradient that may contribute to increased scour and beach lowering in front of the toe of the structure. Additionally, the encroachment into the tidal frame may compromise sediment transport processes that occur within the bay. The sensitivity of the scale of coastal

processes are considered low and the magnitude of change is considered to be minor, therefore, the significance of the effect is considered to be **'Slight adverse'**.

4.7.20 Additional consideration has been applied to the impacts of the proposed revised design specification with respect to coastal squeeze. The re-design will be expected to have a detrimental impact by contributing to coastal squeeze. The amended design specification will increase the footprint of the structure reducing beach width and contributing to coastal squeeze and loss of intertidal habitat availability. The permanency of the structure will prevent the landward transgression of intertidal habitats and the species they support as they respond spatially to rising sea levels. Following the seaward advancement of the defence by 4.1 m the rock armour will encroach further below MHWS. As the structure encroaches further beyond the MHWS level the capacity for landward migration of intertidal habitats diminishes further contributing to coastal squeeze. Additionally, the protection provided by the rock armour structure to manage coastal erosion of the beach crest/dune embankment will also affect coastal squeeze. Placement of the structure in front of dune crest will prevent the process of shoreline retreat. Under natural processes shoreline retreat would provide opportunity and space for intertidal habitat to move landward. By reducing erosion at the rear of the beach the effects of coastal squeeze will be increased. Therefore, the proposed revised design will contribute negatively to coastal squeeze and loss of intertidal habitat availability. Based on the low sensitivity of the scale at which coastal squeeze is likely to occur and the likely magnitude of change as moderate, the significance of the effects of coastal squeeze are considered to be **'Moderate adverse'**.

Green Bay (Bryher)

Construction impacts

4.7.21 Minor amendments have been incorporated into the original red line boundary at Green Bay, this relates to the realignment of an access track. The amended boundary does not adversely affect the construction impacts associated with the proposed works which remain as reported in the Environmental Statement. Based on the low sensitivity of the associated impacts on coastal processes, and the negligible magnitude of disturbance, it is considered that the significance of the effect is **'Not Significant'**.

Operational impacts

4.7.22 Operational impacts will not be affected by changes to the red line boundary and remain as detailed in the Environmental Statement. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of disturbance, the effects are deemed to be **'Not Significant'**. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.23 The proposed measures to reduce coastal flooding at Green Bay may only have a limited impact on coastal squeeze. Whilst the core of the design is based upon the use of geobags they are due to be covered with reclaimed material to form a natural embankment that blends with the existing habitat. The proposed design drawings indicate that the structure will be located outside of the tidal frame, above the Highest Astronomical Tide (HAT) level. The northern end of the defence structure is expected to be approximately 10 m from the current MHWS mark, reducing to 6 m in the south. This will provide increased opportunity for intertidal habitats to migrate landward in response to the anticipated rise in sea level. Given that the

proposed design will use granular fill to reflect the natural environment the expectation is that intertidal habitats will not be adversely affected by the structure in the short-term. However, should sea levels continue to rise a review of the existing design and management policy may be required. Based on the low sensitivity of the scale at which coastal squeeze is likely to occur, and the magnitude of change considered to be minor, the significance of the effects are considered to be '**Slight adverse**'.

Stinking Porth (Bryher)

Construction impacts

4.7.24 The construction impacts associated with the proposed works at Stinking Porth remain as reported in the Environmental Statement. Based on the low sensitivity of the location and the negligible magnitude of disturbance, it is considered that the effects arising from construction are deemed to be '**Not Significant**'.

Operational impacts

4.7.25 Operational impacts also remain as detailed in the Environmental Statement. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of change, the effects are deemed to be '**Not Significant**'. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.26 Increasing the crest height within this low-lying area of Stinking Porth will have a beneficial impact with regard to coastal flooding. However, placement of rock armour will have potential impacts with respect to coastal squeeze. There are currently no formal defences at Stinking Porth which provides opportunity for the vegetated beach crest to naturally migrate landward in response to coastal erosion and sea level rise. Whilst the proposed defences would prevent erosion from occurring, as well as reducing coastal inundation, they will prevent intertidal habitats from unimpeded landward transgression in response to rising sea levels. The proposed measures at Stinking Porth will see an advancement of the defence line relative to the existing beach crest. This will reduce beach width and encroach into the space currently available for landward habitat migration. Whilst the proposed defence structure currently sits above the MHWS mark with the anticipated rise in sea level it would be expected that in time the structure will sit within the intertidal zone.

4.7.27 Current design drawings indicate that the structure is between approximately 2 m in the south and up to 8-10 m in the north, from the current MHWS mark. However, the proposed rock armour structure only covers a 55 m section of Stinking Porth which is approximately 200 m in length. The remaining undefended areas provide opportunity for erosion to occur enabling both terrestrial and intertidal habitats to advance landward as a natural response to sea level rise. Aside from Great Pool there is limited infrastructure at the rear of the beach, other than coastal paths, allowing for coastal retreat although the narrow track and coastal paths may need to be rerouted in the future. Based on the low sensitivity of the scale at which coastal squeeze is likely to occur and the minor magnitude of change anticipated, the significance is considered '**Slight adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

Kitchen Porth (Bryher)

Construction impacts

4.7.28 The construction impacts associated with the proposed works at Kitchen Porth remain as reported in the Environmental Statement. Based on the low sensitivity at the site scale and the negligible magnitude of change, the associated effects of construction at Kitchen Porth are deemed to be '**Not Significant**'.

Operational impacts

4.7.29 Operational impacts also remain as detailed in the Environmental Statement. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of change, the effects are deemed to be '**Not Significant**'. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.30 Although the proposed design is considered as an effective measure for reducing coastal erosion and flooding at Kitchen Porth, the structure will be expected to have a negative impact on intertidal habitats in terms of coastal squeeze. The proposed defence structure currently sits above the MHWS mark. Design drawings indicate that the toe of the defence is approximately 5 m from the current MHWS mark at the eastern end of the defence and 10 m to the west. This will provide a limited capacity for intertidal habitat to respond and adapt to the anticipated rise in sea levels. Additionally, placing the rock armour in front of the current beach crest will encroach approximately 5 m upon the sandy beach reducing beach width and further limiting available space for intertidal habitat to migrate landward. The magnitude of change associated with coastal squeeze at Kitchen Porth is considered to be minor, the sensitivity at the site scale, is deemed to be low. Therefore, the significance of the effect is considered as being '**Slight adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

Periglis (St Agnes)

Construction impacts

4.7.31 Amendments have been made to the original design at Periglis in that the core of the structure (formed of buried geobags) has been moved landward by 3 m. The specification of the seaward facing beach face and backshore remain as per the original design. Despite the amended design, the construction impacts remain consistent with those reported in the original Environmental Statement. Based on the low sensitivity of the site scale and the negligible magnitude of change, it is considered that any effects are deemed to be '**Not Significant**'.

Operational impacts

4.7.32 Despite changes to the original design proposal the operational impacts remain as detailed in the Environmental Statement. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of change, the effects are deemed to be '**Not Significant**'. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.33 The revised design of the proposed defence measure is likely to reduce the extent to which coastal squeeze will occur. The structural core will be approximately 25 m

from the existing MHWS level and the backfill that covers it approximately 10 m from the MHWS level. Placing the geobag core 3 m further back than was originally designed will provide additional space within which intertidal habitat and species will be able to migrate landward as sea levels rise. The sensitivity at the site scale, is deemed to be low and the magnitude of change associated with coastal squeeze is considered to be minor. Therefore, the significance of the effects of coastal squeeze are considered as '**Slight adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

Porth Coose (St Agnes)

Construction impacts

- 4.7.34 The construction impacts associated with the proposed works at Porth Coose remain as reported in the Environmental Statement. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of disturbance, the effects are deemed to be '**Not Significant**'.

Operational impacts

- 4.7.35 Operational impacts also remain as detailed in the Environmental Statement, these were deemed to be '**Not Significant**'. However, concerns were raised by consultees with regard the deployment of geobags (now rock bags) placed on top of the existing beach crest and the potential for increased wave reflection and exposure of the underlying concrete mattress. This concern is addressed here. A key consideration in the use of rock bags was to prevent overwashing and loss of sediment from the beach as has previously occurred during storm events. Following the storms of 2014 considerable quantities of coarse gravels and cobbles were washed from the rear of the beach, over the crest to the low-lying land behind. The loss of this material from the beach reduces the dissipative function that they provide and leaves the rear of the beach, and beach crest, at an increased risk of future erosion. By increasing the crest height using the rock bags, there will be a reduction in wave overtopping which will minimise, perhaps even eliminate the loss of coarse sediment from the beach. Retaining this material at the rear of the beach, in front of the rock bags, would be expected to reduce the likelihood of scour and future exposure of the underlying concrete mattress. The cumulative mass of coarse sediment and the protective function that they provide would likely help maintain the structural integrity of the underlying concrete mattress and extend the design life. The operational impacts on coastal processes are deemed to be of negligible magnitude and at this site scale be of a low sensitivity. It is considered that the proposed defences will have an effect that is deemed to be '**Not Significant**'.
- 4.7.36 Although the proposed design is considered as an effective measure for reducing wave overtopping and coastal flooding the structure will be expected to have a potentially negative impact on intertidal habitats by contributing to coastal squeeze. The proposed defence structure will create a barrier that will prevent the natural landward transgression of intertidal habitats in response to increasing sea levels. However, the design drawings indicate that the defence structure is located above the current MHWS mark with the toe of the defence being approximately 15 m from the current MHWS mark at the southwestern end of the defence and 20 m to the northeast. The distance of the structure from the MHWS mark will provide reasonable capacity for the landward migration of intertidal habitats as they respond to changes in sea level. In the future as the tidal frame shifts spatially up the beach, there will be a need to review the existing defence and management

policy. However, given that recent research suggests the Isles of Scilly is currently subject to sea level rise of less than 1 mm per year (Barnett et al., 2020) this would be expected to be beyond the design life of the proposed structure. The scale at which coastal squeeze is likely to be affected is of low sensitivity. Given the issue of coastal squeeze is anticipated to become an issue beyond the design life of the structure, the magnitude of change associated with coastal squeeze at Porth Coose is therefore considered to be negligible and the effect '**Not Significant**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

Porth Killier (St Agnes)

Construction impacts

4.7.37 The construction impacts associated with the proposed works at Porth Killier remain as reported in the Environmental Statement. This includes the measures to place rock armour at the foot of the seawall and a rock revetment at the eastern end of the embayment. Based on the low sensitivity of the scale at which coastal processes are likely to be affected, and the negligible magnitude of disturbance, the effects are deemed to be '**Not Significant**'.

Operational impacts

4.7.38 Operational impacts relating to the sea wall protection and the rock revetment remain as detailed in the Environmental Statement. The operational impacts on coastal processes are deemed to be of low sensitivity and negligible magnitude. It is therefore considered that the proposed defences will have an effect that is deemed to be '**Not Significant**'. However, additional consideration has been applied to the impacts of the proposed works with respect to coastal squeeze.

4.7.39 The sea wall defence will extend seaward and the design drawings indicate that the placement of cobbles at the front of the sea wall will encroach into the tidal frame, below MHWS. In addition, the footprint of the rock armour will cover existing sub-tidal rocky habitat and substrate as well as future intertidal habitat that could be colonised by a range of intertidal species as they respond to increasing sea levels. Whilst the existing sea wall will act to prevent any landward migration regardless of the proposed rock armourstone, the advancement of the defence may place additional pressure on existing intertidal habitats. The construction of the rock revetment to reduce the ram erosion may also have potential to contribute towards coastal squeeze. The design drawings indicate that the rock armour will encroach up to 4 m beyond the MHWS tidal level. This will provide limited capacity for intertidal habitat to adapt to rising sea levels. Furthermore, the placement of rock armour up to the crest of the ram outcrop will cover an extensive area of intertidal habitat formed upon the exposed bedrock. This loss of habitat will exacerbate coastal squeeze encroaching into an area that could otherwise provide compensation against rising sea levels. The magnitude of change associated with coastal squeeze at Porth Killier is considered to be moderate, the sensitivity at the site scale to changes in coastal processes, is deemed to be low. Therefore, the significance of the effects of coastal squeeze are considered as being '**Moderate adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

4.8 Cumulative Effects

4.8.1 In terms of the construction and operational impacts there are no updates to the assessment of cumulative effects further to those already presented in the

submitted Environmental Statement. The works are all considered to be of a small-scale, localised and are not expected to cause major obstruction to longshore sediment supply. Therefore, at each site no impacts are anticipated outside of the nearshore zone.

- 4.8.2 However, the inclusion of an assessment of coastal squeeze has highlighted that the proposed designs are expected to impact on the ability for intertidal habitats to transgress landward in response to rising sea levels. This impact is greater at those locations where the proposed defence structures encroach upon and below MHWS, thus providing limited space for landward migration. This is reflected at Great Porth (Bryher) and Porth Killier (St Agnes) where the impact is considered to be **'Moderate adverse'**.
- 4.8.3 Collectively, island-wide the placement of artificial defence structures limits the ability of coastal habitats, both terrestrial and marine, to respond naturally to changing climate conditions. The construction of such structures on beaches reduces the intertidal area and restricts coastal marine habitats, and species from transgressing landwards. This is considered to lead to a **'Moderate adverse'** cumulative effect. Should sea levels continue to rise, it is anticipated that the impacts of coastal squeeze will continue to be felt across the archipelago.
- 4.8.4 There are no known planned coastal developments that could interact with the impacts on coastal processes.

4.9 Additional Mitigation Measures

- 4.9.1 All mitigation measures as previously described in the submitted Environmental Statement remain applicable. Additional mitigation is required to limit the impacts relating to the revised design at Great Porth (Great Par) North of Great Carn, although this is expected to be limited to increased awareness of tidal conditions to facilitate working in the dry.

4.10 Summary of Updated Residual Effects

- 4.10.1 All residual effects as previously described in the original Environmental Statement remain applicable. However, additional residual effects are anticipated at Great Porth (Great Par) North of Great Carn, where the proposed revised design of the defence structure is expected to have a **'Slight adverse'** effect on coastal processes that may result in changes to beach morphology and the potential disruption to sedimentary processes.
- 4.10.2 Further to the residual effects listed in the submitted Environmental Statement, there are additional residual effects resulting from coastal squeeze at all sites although the extent of this impact is relative to the available area between the existing MHWS line and the toe of the defence structure and/or rear of the beach. The greater the available space for intertidal habitats to migrate landward in response to sea level rise the lesser the impact. The greatest magnitude of change is expected at Great Porth (Great Par) North of Great Carn (Bryher) and Porth Killier (St Agnes) where intertidal area is limited due to encroachment into the intertidal zone by the proposed defence structures. The potential impact at these two locations is considered to be **'Moderate adverse'**. A further six sites including Great Popplestone (Bryher), Stinking Porth (Bryher), Green Bay (Bryher), Kitchen Porth (Bryher), Periglis (St Agnes) and Lower Town (St Martin's) are considered to have a **'Slight adverse'** impact in terms of coastal squeeze. However, as sea levels rise over time the magnitude of impacts relating to coastal squeeze across each of

the sites may be expected to increase.

5 ES Addendum: Biodiversity and Nature Conservation

5.1 Introduction

5.1.1 This chapter provides an addendum to the biodiversity and nature conservation assessment within the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 5: Biodiversity and Nature Conservation of the submitted ES Volume I
- Updated Appendices 5.1a – 5.1i of ES Addendum Volume II (Habitats Regulations Assessment reports)

5.1.2 Additional documents have been prepared to support this ES Addendum. These are outlined below and contained within ES Addendum Volume II:

- Appendices 5.2a and 5.2b (Marine Conservation Zone Assessment Screening reports)
- Appendices 5.3a, 5.3b and 5.3c (Water Framework Directive Assessments)
- Appendix 5.4a (Biodiversity Net Gain Addendum)

5.1.3 This assessment considers the biodiversity and nature conservation effects arising from the relevant Proposed Development design changes. It also provides additional information in response to comments made by consultees.

5.1.4 This addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed then the conditions are the same as those prepared in the submitted ES.

5.2 Changes in Legislation, Planning Policy and Guidance

5.2.1 There have not been any changes in legislation, planning policy or guidance since the preparation of the submitted ES.

5.3 Proposed development changes

5.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

5.3.2 The following Proposed Development changes have been considered within the revised assessment for biodiversity and nature conservation:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn
- Proposed development change number 2: revised design for Periglis

5.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of biodiversity and nature conservation and have not been considered further.

5.4 Relevant Additional Information

5.4.1 Since the submission of the application, additional assessment has been

undertaken to provide further information, including assessment of coastal squeeze, Marine Conservation Zone screening, a Water Framework Directive Assessment and consideration of opportunities for net gain following comments from consultees. This is discussed further below.

5.5 Updated Baseline Conditions

5.5.1 The section below presents an updated overview of baseline conditions, where applicable. This includes provision of additional information in response to requests from consultees.

5.5.2 The submitted ES presents a description of statutory designated sites located within close proximity to the proposed works site. One of these sites is the Isles of Scilly Special Protection Area (SPA). It was not previously acknowledged in the submitted ES that the Isles of Scilly SPA was renotified in 2020. An updated overview of the qualifying features and conservation objectives for the SPA is outlined below. There are no other updates to the baseline conditions detailed within the Environmental Statement submitted in November 2022.

Isles of Scilly SPA qualifying features

5.5.3 The site qualifies under Article 4.1 of the Birds Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- European storm-petrel *Hydrobates pelagicus* (breeding)

5.5.4 The site qualifies under Article 4.2 of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

- Lesser black-backed gull *Larus fuscus graellsii* (breeding)
- European shag *Phalacrocorax aristotelis aristotelis* (breeding)
- Great black-backed gull *Larus marinus* (breeding)

5.5.5 The site qualifies under SPA selection stage 1.3 as it is used regularly by over 20,000 seabirds in any season. In the breeding season, the site regularly supports at least 26,478 (1999) individual seabirds. The main components of the assemblage include all of the qualifying features listed above.

Isles of Scilly SPA conservation objectives

5.5.6 The site's conservation objectives apply to the site and the individual species and/or assemblage of species for which the site has been classified (the "Qualifying features" listed above).

5.5.7 The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features
- the structure and function of the habitats of the qualifying features
- the supporting processes on which the habitats of the qualifying features rely
- the populations of each of the qualifying features

- the distribution of qualifying features within the site

5.6 Assessment methodology and assessment criteria

5.6.1 The assessment methodology and assessment criteria used remain the same as in the Environmental Statement submitted in November 2022.

5.7 Potential Impacts and Significant Effects

5.7.1 An updated assessment of the potential impacts and significant effects on biodiversity and nature conservation has been undertaken to reflect the proposed design changes and objections raised by consultees. The findings of this updated assessment are summarised below. The assessment findings for all sites where design changes are not proposed remain the same as detailed in the Environmental Statement submitted in November 2022.

Bryher

Designated Sites

Isles of Scilly SPA and Ramsar

Construction impacts

5.7.2 It is considered that in addition to the likely impacts on the Isles of Scilly SPA and Ramsar site reported in the submitted ES, during the construction phase there could be potential disturbance to seabird assemblages resting or foraging at sea within the Isles of Scilly SPA and Ramsar.

5.7.3 This is without prejudice to the assessment of impacts on the SPA / SAC as set out in the HRA. The HRA concluded that given the short duration of the proposed works and their relative small-scale in relation to the size of the SPA and abundance of other available habitat it is considered that any potential disturbance due to construction works will be short term and local and will not cause a significant impact to seabird assemblages within the SPA.

Operational impacts

5.7.4 It is not considered that the works will have an impact upon the SPA or Ramsar during its operational lifetime.

Isles of Scilly SAC

Construction impacts

5.7.5 The assessment of likely impacts on the Isles of Scilly SAC reported in the submitted ES remain unchanged (there will be a **temporary negative impact** upon intertidal habitats at landing sites and where haul routes are established).

5.7.6 This is without prejudice to the assessment of impacts on the SAC as set out in the HRA. The HRA concluded that given the relatively small scale of the works and the nature of the littoral habitats in this area that the works are unlikely to cause a significant impact to the habitat features of the SAC.

Operational impacts

- 5.7.7 The assessment has been updated to consider the potential impacts on habitats as a result of coastal squeeze since the SAC extends over the lower shore of the sites on Bryher.
- 5.7.8 The revised design at Great Porth (Great Par) North of Great Carn would result in the seaward advancement of the rock armour structure by 4.1 m, relative to the original design. The impact of this is the encroachment below the MHWS level. The toe of the proposed rock armour would therefore fall within the SAC boundary. The beach in this area meets the SAC Annex I criteria as 'mudflats and sandflats not covered by seawater at low tide'. This would therefore lead to a small-scale loss of this Annex I habitat. The habitat in this area is Littoral Barren Sand as detailed below.

Pool of Bryher and Popplestone Bank (Bryher) SSSI

Construction impacts

- 5.7.9 Further consideration has been given to the potential impacts of the proposed removal of the existing rock revetment at Great Popplestone. The existing rock revetment located in the north of the bay is an unnatural feature within the SSSI.
- 5.7.10 A natural coarse sediment beach ridge is present within the vicinity of the rock armour and it will therefore be ensured that only the imported boulders are removed and all natural beach material is reinstated in the appropriate location. Beach material will be reinstated through sand re-distribution from an area of scrub that received sand excavated from the beach when the rock armour was placed in 1994.
- 5.7.11 The proposed scrub clearance of this area will provide an opportunity to meet Natural England's View about Management (VAM) goal for the SSSI of "dune management should aim to allow for all stages of the succession to be present on the site" by providing an area suitable for the early successional stages of back dune habitat, which is very limited in extent in the SSSI at present.
- 5.7.12 The works will include the small scale clearance of scrub from an area of sand dune where sand has previously been removed. Sand dune is a priority habitat under Section 41 of the Natural Environment and Rural Communities (NERC) Act meaning that the protection of the habitat is a principal planning consideration.
- 5.7.13 Following discussions with the Isles of Scilly Wildlife Trust, it has been advised that the scrub removal/sand winning would result in a long-term increase in diversity and make the area more wildlife-rich than at present through promoting colonisation of species for which the SSSI is designated. However, this removal will have a **temporary negative impact upon the site.**

Operational impacts

- 5.7.14 As outlined above, the scrub removal/sand winning would result in a long-term increase in diversity which have a **permanent positive impact** upon the site.

Rushy Bay and Heathy Hill SSSI

- 5.7.15 The assessment of potential impacts of the proposed works on Rushy Bay and

Heathy Hill SSSI detailed in the submitted ES remains valid. Given the scale of the works and the distance from this site impacts are considered to be **negligible**.

Habitats and species

Operational impacts

- 5.7.16 The advancement of the flood defence structure at Great Porth (Great Par) North of Great Carn will impact further upon the coastal habitats described in the submitted ES. The works will result in the direct loss of barren littoral coarse sand and an area of littoral cobbles in front of the existing flood defence. This habitat for the most part lacks a macrofaunal community due to the continual mobility of the substrate. Therefore impacts upon this habitat are considered to be **permanent minor negative**. Although, as assessed in the HRA, it is not considered that the small scale loss of this habitat will have a significant impact upon the SAC designation.

Coastal Squeeze

- 5.7.17 Section 4 of this ES Addendum (Coastal Processes, Geomorphology, Flood Risk and Erosion) has considered and recorded a level of significance for coastal squeeze at each site. The below section details the habitats likely to be impacted in each case.

Great Popplestone

- 5.7.18 The effects of coastal squeeze are deemed to be '**Slight adverse**'. The bay consists of sandy sediments with an area of coarse to medium sandy beach above the high tide mark. This area will be lost first, becoming inundated and forming part of the littoral sand habitat. The rest of the bay consists of coarse to medium littoral sand and over a longer period there is the potential for this habitat to be impacted as well. It is not considered that the flood defence works will contribute to coastal squeeze impacts of the rocky shore habitats described in the submitted ES that are located to the south west. Given the scale of coastal squeeze and the value of the habitats at Great Popplestone, it is considered that the effect will be '**Slight adverse**'.

Great Porth (Great Par) North of Great Carn

- 5.7.19 The significance of the effects of coastal squeeze are considered to be '**Moderate adverse**'. The bay consists predominantly of coarse to medium littoral sand with finer sands towards the low tide mark and is intertidal up to the existing rock revetment. The upper shore consists of coarse sand which has little value for benthic invertebrates, this is likely to be exacerbated by increased wave energy at high tide. Given the scale of coastal squeeze and the value of the habitats at Great Porth (Great Par) North of Great Carn, it is considered that the effect will be '**Slight adverse**'.

Green Bay

- 5.7.20 The significance of the effects are considered to be '**Slight adverse**'. The bay consists predominantly of medium to fine sand has the potential to support a range of macroinvertebrates. It is this habitat that will be impacted by coastal squeeze but it is not considered that the small scale loss predicted will be significant in relation to the overall habitat and an effect of '**Slight adverse**' is recorded.

Stinking Porth

5.7.21 The effects of coastal squeeze are considered to be '**Slight adverse**'. The bay consists predominantly of coarse to medium sand and it is considered that the beach is largely unsuitable for benthic species. To the north and south corners of the bay is a mixed substratum of boulders on pebbles and sand. Impacts arising from coastal squeeze from the works will be limited to the sediment habitats described above and it is considered that the effect will be '**Slight adverse**'.

Kitchen Porth

5.7.22 The significance of the coastal squeeze effects are considered as being '**Slight adverse**'. The bay consists predominantly of coarse clean sand and as such opportunities for benthic invertebrate species is limited. Towards the low tide mark the sand is finer and has the potential to support a range of macroinvertebrates. Given the scale of coastal squeeze and the value of the habitats at Kitchen Porth it is considered that the effect will '**Slight adverse**'.

St Agnes

Designated Sites

5.7.23 Potential impacts on designated sites across St Agnes largely remain as reported in the submitted ES. Updates to the assessment of potential impacts on these sites is summarised below.

Isles of Scilly SPA and Ramsar

Construction impacts

5.7.24 It is considered that in addition to the likely impacts on the Isles of Scilly SPA and Ramsar site reported in the submitted ES, during the construction phase there could be potential disturbance to seabird assemblages resting or foraging at sea within the Isles of Scilly SPA and Ramsar (**temporary negative impacts**).

5.7.25 This is without prejudice to the assessment of impacts on the SPA / SAC as set out in the HRA. The HRA concluded that given the short duration of the proposed works and their relative small-scale in relation to the size of the SPA and abundance of other available habitat it is considered that any potential disturbance due to construction works will be short term and local and will not cause a significant impact to seabird assemblages within the SPA.

Operational impacts

5.7.26 It is not considered that the works will have an impact upon the SPA or Ramsar during its operational lifetime.

Isles of Scilly SAC

Construction impacts

5.7.27 The assessment of likely impacts on the Isles of Scilly SAC reported in the submitted ES remain unchanged (there will be a **temporary negative impacts** upon intertidal habitats at landing sites and where haul routes are established).

Operational impacts

- 5.7.28 The assessment of impacts has been updated to consider the potential impacts on habitats as a result of coastal squeeze since the SAC extends over the lower shore of the sites on St Agnes.
- 5.7.29 SAC Annex I features at Periglis and Porth Coose consist of intertidal and subtidal sandflats. The distance between the SAC Annex I features and the works at Porth Coose and Periglis provides adequate space for the migration of the Annex I feature as sea level rises. Without the works, coastal squeeze following sea level rise would occur to the same degree as with the works. Therefore, impacts to SAC Annex I features as a result of the proposed works via coastal squeeze at each site is considered low risk.
- 5.7.30 This is without prejudice to the assessment of impacts on the SAC as set out in the HRA. The HRA concluded that given the relative small scale of the works and the nature of the littoral habitats present within close proximity of the works that the works are unlikely to cause a significant impact to the habitat features of the SAC.
- 5.7.31 At Porth Killier, the sea wall defence will extend seaward and the design drawings indicate that the placement of stone at the front of the sea wall will encroach into the tidal frame, below MHWS. The construction of the rock revetment will encroach into an area of intertidal rocky habitat and also contribute towards coastal squeeze. The design drawings indicate that the rock armour will encroach up to 4 metres beyond the MHWS tidal level. The rocky shore habitat in this area consists of large boulders and areas of exposed bedrock. It is at the limit of the tidal zone and there is a sparse covering of Channel Wrack present in the area below MHWS. Above MHWS the boulders are covered with lichens commonly found in the supralittoral zone. The wider bay consists of diverse range of rocky shore biotopes as described in the submitted ES with fucoids dominating in the sheltered bay. Given the value of the habitats at Porth Killier, the effect is considered to be **'Moderate adverse'**.

Big Pool and Browarth Point SSSI

Construction impacts

- 5.7.32 The assessment of potential impacts of the proposed works on Big Pool and Browarth Point SSSI detailed in the submitted ES remains unchanged.
- 5.7.33 Further consideration has been given to the strandline vegetation at the back of Porth Killier, Porth Coose and Periglis which qualifies as a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act. The strandline vegetation is particularly notable for the population of Sea Radish *Raphanus maritimus* and Sea Kale *Crambe maritima* with Frosted Orache *Atriplex laciniata* and Babington's Orache *A. glabriuscula* also present. This habitat exists in areas where the existing sand bank is eroding onto the beach. The works will directly impact the strandline vegetation that is present and will lead to the temporary localised loss of this habitat. An ECoW will survey the areas to be impacted immediately prior to the works taking place. Material excavated will be stored in situ and reinstated upon completion of the works. Where possible whole plants will be stored, however, as a minimum it is considered that suitable storage of the material will preserve the seedbank. Therefore, it is expected that this habitat will re-establish following the completion of the works.
- 5.7.34 The proposed access tracks and site compound have the potential to have a

temporary adverse impact upon the SSSI plant assemblages. The red line boundary has been placed in an area where it will avoid the freshwater and brackish habitats close to the pool itself. It will also avoid the adjacent short wet grassland for which the SSSI is designated, however, it is still possible that individual rare plants will be present within the redline boundary including the nationally rare early meadow grass *Poa infirma* which has been recorded in the drier areas of the existing access track. Any impact in this area will be temporary, however, if especially rare plants are impacted there is the potential that they will be unable to recolonise following the completion of the works. In this case the impact would be **permanent adverse**.

Operational impacts

5.7.35 It is not considered that the works will have an impact upon the Big Pool and Browarth Point SSSI during its operational lifetime.

Isles of Scilly MCZ Complex

5.7.36 Potential impacts on the Isles of Scilly MCZ complex were not explicitly considered in the submitted ES.

5.7.37 The works on St Agnes will take place approximately 400m from the Isles of Scilly: Smith Sound Tide Swept Channel Marine Conservation Zone. A Marine Conservation Zone Assessment has been completed (included as Appendix 5.2b) and concluded that provided pollution prevention measures are put in place during operational phase of the project there is no significant risk to the MCZ as a result of the proposed works.

Habitats and species

5.7.38 Potential impacts on habitats and species across St Agnes remain as reported in the submitted ES.

5.7.39 It is noted that Brown rats pose a threat to nesting birds within the Isles of Scilly. Materials will be delivered by barge which could potentially provide a pathway for rats to be brought on to the island which has been rodent-free following the Isles of Scilly Seabird Recovery Project. It is considered that these measures will minimise potential impacts to negligible (**'Not Significant'**).

Operational impacts - Coastal Squeeze

Periglis

5.7.40 The significance of the effects of coastal squeeze are considered as **'Slight adverse'**. The bay consists of sandy sediments with an area of coarse to medium sandy beach above the high tide mark. This area will be lost first becoming inundated and forming part of the littoral sand habitat. The rest of the bay consists of coarse to medium littoral sand and over a longer period there is the potential for this habitat to be impacted as well. It is not considered that the flood defence works will contribute to coastal squeeze impacts of the rocky shore habitats described in the submitted ES that are located to the west. Given the scale of coastal squeeze and the value of the habitats at Periglis, it is considered that the effect will be **'Slight adverse'**.

Porth Coose

5.7.41 The significance of the effects of coastal squeeze are considered as '**Slight adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase. The bay consists predominantly of fine to medium sand and conditions were considered suitable for a range of benthic species. It is this habitat that will be impacted by coastal squeeze at the site. Given the scale of coastal squeeze and the value of the habitats at Porth Coose it is considered that the effect will be '**Slight adverse**'.

Porth Killier

5.7.42 The magnitude of change associated with coastal squeeze at Porth Killier is considered to be moderate, the sensitivity at the site scale to changes in coastal processes, is deemed to be low. Therefore, the significance of the impacts of coastal squeeze are considered as being '**Moderate adverse**'. However, as sea levels rise over time the magnitude of impact is likely to increase.

5.7.43 Placing the new rock armour will reduce the capacity for intertidal habitats to adapt to rising sea levels. Whilst the existing sea wall will act to prevent migration regardless of the rock armourstone, the advancement of the defence may place additional pressure on existing intertidal habitats. It is likely that as sea level rises, upper shore biotopes will be lost in this area with mid shore and lower shore persisting in areas that will be inundated for a longer period. This is likely to result in a '**Slight adverse**' permanent effect.

5.7.44 Higher up the shore and up to the existing sea defences the biotope consists of exposed to moderately exposed upper eulittoral bedrock characterised by a band of the spiral wrack *Fucus spiralis*. Underneath the fronds of *Fucus spiralis* there is a community consisting of the limpet *Patella vulgata*, the winkles *Littorina saxatilis* and *Littorina littorea*, and the barnacle *Semibalanus balanoides*. Given the value of the habitats at Porth Killier the effect is considered to be '**Moderate adverse**'.

St Martin's

Designated Sites

5.7.45 Potential impacts on designated sites across St Martin's largely remain as reported in the submitted ES. Updates to the assessment of potential impacts on these sites is summarised below.

Isles of Scilly SPA and Ramsar

Construction impacts

5.7.46 It is considered that in addition to the likely impacts on the Isles of Scilly SPA and Ramsar site reported in the submitted ES, during the construction phase there could be potential disturbance to seabird assemblages resting or foraging at sea within the Isles of Scilly SPA and Ramsar (**temporary negative impacts**) .

5.7.47 Given the short duration of the proposed works and its relative small-scale in relation to the size of the SPA and abundance of other available habitat it is

considered that any potential disturbance due to construction works will be short term and local and will not cause a significant impact to seabird assemblages within the SPA.

Operational impacts

5.7.48 It is not considered that the works will have an impact upon the Isles of Scilly SPA and Ramsar during its operational lifetime.

Isles of Scilly MCZ Complex

5.7.49 Potential impacts on the Isles of Scilly MCZ complex were not explicitly considered in the submitted ES.

5.7.50 The works on St Martin’s will take place within the Isles of Scilly: Tean Marine Conservation Zone. A Marine Conservation Zone Assessment has been completed (included as Appendix 5.2a) and concluded that provided pollution prevention measures are put in place during operational phase of the project there is no significant risk to the MCZ as a result of the proposed works.

St Martin’s Sedimentary Shore SSSI

5.7.51 St Martin’s flats form the largest area of sand exposed at mean low water within the Isles comprising a 2km section of shoreline on the island’s west coast. It is influenced by complex local tidal and current patterns, leading to a diverse mixture of habitat types and associated communities. Given the scale of the works on St Martin’s impacts to this site will be limited to potential impacts arising from pollution incidents due poor construction practices. Mitigation to avoid this has been included below and in the submitted ES. Impacts to the SSSI are therefore considered to be negligible (**‘Not Significant’**).

Habitats and Species

5.7.52 Potential impacts on habitats and species across St Martin’s remain as reported in the submitted ES.

5.7.53 It is noted that Brown rats pose a threat to nesting birds within the Isles of Scilly. Materials will be delivered by barge which could potentially provide a pathway for rats to be brought on to the island which has been rodent-free following the Isles of Scilly Seabird Recovery Project. It is considered that these measures will minimise potential impacts to negligible (**‘Not Significant’**).

Operational impacts - Coastal Squeeze

5.7.54 The coastal processes assessment assessed the significance of coastal squeeze at St Martin’s to be ‘Slight adverse’. By protecting the sand dunes from erosion there is the potential for habitats below to be lost through coastal squeeze. In this area habitats consisted of coarse sand above the high tide mark and littoral coarse sand grading to finer sands towards the low tide mark. The works in this area are small and it is considered that the potential small scale loss of sediments in this area will have a maximum **‘Slight adverse’** impact.

5.8 Mitigation measures

- 5.8.1 Mitigation measures for all construction work to avoid or reduce impacts upon the ecological features identified will be as detailed in the submitted ES. Further detail on these measures, and some additional mitigation measures, are outlined below.
- 5.8.2 Across all sites, biosecurity measures will be put in place to ensure the proposed works do not result in the introduction of Brown rats. Measures include checking of material, plant and vessels for signs and presence of rats before transportation and on arrival at site, the use of rope guards on the vessel transporting construction material and ensuring food and waste onboard are all contained in rodent proof containers. Good waste management will be implemented throughout the works and a toolbox talk highlighting vigilance for rats and the importance of reporting rat activity will be given to all site personnel before works begin. The biosecurity measures outlined above to ensure that the works do not result in the introduction of Brown rats will be adhered to and documented in a biosecurity risk assessment and mitigation strategy.
- 5.8.3 The proposed scheme is not located near any known seal breeding colonies and the works areas are not known hauling out spot for seals, although it is possible they are occasionally used as such by some individuals. There is ample alternative habitat available, and therefore any potential impact on Grey Seal habitat would be negligible. Haul out areas should be confirmed by local wildlife groups before works begin. Prior to works commencing each day, the works area and immediate vicinity will be checked for hauled out seals. If any seals are present within 200m of the works, site staff will keep their distance and no works will take place until the seal has moved off of its own accord.
- 5.8.4 To reduce impacts that working on multiple sites could have on seabird assemblages foraging or resting at sea, and wading bird assemblages, where parallel working is preferred to meet project delivery schedules it will be organised so that works do not take place on adjacent beaches.
- 5.8.5 After the completion of works at Periglis and Porth Coose, replanting of native dune species on the constructed dunes should be undertaken to compensate any loss of vegetation.
- 5.8.6 At Porth Killier, the footprint of the rock armour will cover existing sub-tidal rocky habitat and substrate resulting in the direct loss of this habitat as well as contributing to coastal squeeze in this area of rocky shore. It is recommended that enhancement measures be built into the scheme in order to compensate for the loss of intertidal habitat including placing large, textured rocks and boulders at the toe of the rock armour in the intertidal zone, creating indentations and artificial rock pools that create niches and ecological opportunities for colonisation by intertidal species.
- 5.8.7 Site limits have been developed with the help of The Isles of Scilly Wildlife Trust to best avoid important features of the SSSIs, however, to avoid impacts upon rare plant assemblages a survey of all haul routes, lay down areas and site compounds will be carried out immediately prior to the works taking place. Site limits will be marked out at this point to avoid impacts upon any plants identified.

5.9 Cumulative Effects

- 5.9.1 There will be cumulative effects arising from coastal squeeze at each site. As

discussed, the placement of artificial defence structures will limit the ability of coastal habitats to respond naturally to changing climate conditions. There will be a cumulative impact upon littoral sediment habitats on Bryher and St Agnes. This is considered to cumulatively lead to a '**slight adverse**' effect over the lifetime of the flood defences.

- 5.9.2 In order to meet project delivery schedules, parallel working between sites may occur. In order to minimise in-combination effects as a result of parallel working it will be organised so that works do not take place on adjacent beaches.
- 5.9.3 Other plans and projects with potential in-combination impacts were reviewed. No plans were identified that could potentially act in-combination with the proposed works. All of the planning applications within 1km of each of the sites are all small-scale works that have no direct connection to the site. There are no Nationally Significant Infrastructure projects within 1km of the site.

5.10 Summary of Updated Residual Effects

- 5.10.1 The residual impact will be small scale loss of littoral sediments through direct loss where rock armour has been placed and through coastal squeeze. This impact is considered to be **slight adverse** at all locations.
- 5.10.2 There will be a direct loss of natural rocky shore habitat at Porth Killier. This will be replaced by the rock armour, which will be enhanced to allow colonisation by littoral algae and invertebrate species, however, it is unlikely that this habitat will replicate the natural rocky shore there at present. This loss is considered **moderate adverse**.

6 ES Addendum: Landscape and Visual

6.1 Introduction

6.1.1 This chapter provides an addendum to the landscape and visual assessment submitted with the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 6: Landscape and Visual chapter of ES Volume I
- Appendix 6.1A: Figures of ES Volume II
- Appendix 6.1B: Photographs illustrating landscape context of ES Volume II
- Appendix 6.1C: Assessment tables of ES Volume II
- Appendix 6.2: Existing landscape character assessment of ES Volume II
- Appendix 6.3: Topography of ES Volume II
- Appendix 6.4: Viewpoints of ES Volume II

6.1.2 This assessment considers the landscape and visual effects arising from the relevant Proposed Development design changes.

6.1.3 This addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed then the conditions are the same as those prepared in the submitted ES.

6.2 Changes in Legislation, Planning Policy and Guidance

6.2.1 There have not been any changes in legislation, planning policy or guidance since the preparation of the submitted ES.

6.3 Proposed development changes

6.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

6.3.2 The following Proposed Development changes have been considered within the revised assessment:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn
- Proposed development change number 2: revised design for Perigris

6.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of landscape and visual impacts and have not been considered further.

6.4 Relevant Additional Information

6.4.1 There is not any relevant additional information relating to this chapter.

6.5 Updated Baseline Conditions

6.5.1 The landscape baseline conditions described within the Environmental Statement submitted in November 2022 have not changed and remain the same.

6.6 Assessment methodology and assessment criteria

6.6.1 The assessment methodology and assessment criteria used remain the same as the Environmental Statement submitted in November 2022.

6.7 Potential Impacts and Significant Effects

6.7.1 An updated assessment of the potential impacts and significant effects on landscape and visual amenity has been undertaken to reflect the proposed design changes. The findings of this updated assessment are summarised below. The assessment findings for all of the sites where design changes are not proposed remain the same as detailed in the Environmental Statement submitted in November 2022.

6.8 Landscape Effects

Bryher, Great Porth (Great Par) North of Great Carn

Construction impacts

6.8.1 At Great Porth (Great Par) North of Great Carn the revised design comprises the movement of proposed rock structure seawards by 4.1m to reduce overlap with the Scheduled Monument. The revised design would reduce the need to remove existing vegetation during construction; however, the amount is negligible. There is no other change to the construction works that results in a change to the significance of landscape effect; therefore, the significance of landscape effect remains as '**Slight adverse**'.

Operational impacts

6.8.2 The original design defined the significance of landscape effect as neutral on completion and slight beneficial at 15 years. The revised design has an increased height (above current proposals) of 0.5m. It has a greater overall volume compared with current design and a greater footprint on the beach resulting from the encroachment seaward onto the beach of 4.1m. This results in a change in the significance of landscape effect from neutral to negligible on completion. The significance of landscape effect at 15 years will remain as '**Slight beneficial**' per the original design due to the establishment of naturally occurring groundcover vegetation.

St Agnes, Periglis

Construction impacts

6.8.3 The changes present a negligible change and overall the magnitude of impact of the revised design remains small adverse, the significance of effect remaining '**Slight adverse**'.

Operational impacts

6.8.4 The original design defined the significance of landscape effect as neutral ('**Not Significant**') on completion and '**Slight beneficial**' at 15 years. The changes present a negligible change and the significance of effect remains unchanged.

6.9 Visual Effects

Bryher, Great Porth (Great Par) North of Great Carn

Construction impacts

- 6.9.1 The original design defined the magnitude of impact as small adverse, resulting in a significance of effect that is '**Slight adverse**'. The revised design visual effects remain unchanged.

Operational impacts

- 6.9.2 On completion, for people using footpaths, pedestrians on roads and occupants of dwellings, the magnitude of impact remains negligible, resulting in a significance of effect that is also negligible ('**Not Significant**'). For beach users the significance remains '**Slight adverse**' on completion and negligible ('**Not Significant**') at 15 years.

St Agnes, Periglis

Construction impacts

- 6.9.3 The magnitude of impact remains medium adverse due to the temporary storage of bulk materials, resulting in a significance of effect that is '**Moderate adverse**'.

Operational impacts

- 6.9.4 The magnitude of impact remains small beneficial, due to the removal of degraded erosion control fabrics currently visible at the dune surface, and the significance of effect remains '**Moderate beneficial**'.

6.10 Additional Mitigation Measures

- 6.10.1 No additional mitigation measures are required and those of the original design remain valid.

6.11 Summary of Updated Residual Effects

- 6.11.1 The significance of residual effects remains unchanged from the original ES submission.

7 ES Addendum: Historic Environment

7.1 Introduction

7.1.1 This chapter provides an addendum to the historic environment assessment submitted with the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 7: Historic Environment of submitted ES Volume I
- Appendix 7.1: Historic Environment Figures in the ES Addendum Volume II
- Appendix 7.2: Cultural Heritage Gazetteers of submitted ES Volume II
- Appendix 7.3: Site Visit Photographs of submitted ES Volume II

7.1.2 This assessment considers the effects on the historic environment arising from the relevant Proposed Development design changes.

7.1.3 This addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed then the conditions are the same as those prepared in the submitted ES.

7.2 Changes in Legislation, Planning Policy and Guidance

7.2.1 There have not been any changes in legislation, planning policy or guidance since the preparation of the submitted ES.

7.3 Proposed development changes

7.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

7.3.2 The following Proposed Development changes have been considered within the revised assessment:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn
- Proposed development change number 2: revised design for Periglis
- Proposed development change number 3: realignment of access track at Green Bay
- Proposed development change number 4: St Martin's red line boundary alteration

7.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of impacts on the historic environment and have not been considered further.

7.4 Relevant Additional Information

7.4.1 There is not any relevant additional information relating to this chapter.

7.5 Updated Baseline Conditions

7.5.1 The historic environment baseline conditions described within the Environmental Statement submitted in November 2022 have not changed and remains the same.

7.6 Assessment methodology and assessment criteria

7.6.1 The assessment methodology and assessment criteria used remain the same as the Environmental Statement submitted in November 2022.

7.7 Potential Impacts and Significant Effects

7.7.1 An updated assessment of the potential impacts and significant effects on the historic environment has been undertaken to reflect the proposed changes. The findings of this updated assessment are summarised below. A more detailed Heritage Statement for the works at Great Porth (Great Par) North of Great Carn has also been prepared and is submitted with the planning application and Scheduled Monument Consent application.

7.7.2 The overall impact of the works on the Isles of Scilly Conservation Area is considered to remain the same, as the scale of the changes are not considered large enough to result in a change to the conclusions of the previous assessment.

Bryher

Construction Impacts

7.7.3 The access route between Church Quay and Green Bay no longer crosses the scheduled area of the prehistoric field system and Romano-British cist monument (1014989). As a Scheduled Monument, the prehistoric field system and Romano-British cist is considered to be of high importance. The monument contains evidential value from surviving below ground remains which can inform on prehistoric agricultural activity and past funerary practices.

7.7.4 As the access route has been moved from within the boundary of the monument there are no longer any direct physical impacts on this designated asset, resulting in a neutral significance of effect (**'Not Significant'**).

7.7.5 As the monument survives primarily below ground, its setting makes less of a contribution to its significance. As such the impact on the setting of this monument is considered to be negligible negative, resulting in a **'Slight adverse'** significance of effect.

7.7.6 There may be impacts on previously unknown buried archaeological remains relating to the Scheduled Monument as a result of vehicle movement through the access route. The magnitude of impact could vary depending upon the nature, extent and survival of any remains.

7.7.7 At Great Porth (Great Par) North of Great Carn the designs have been altered to reduce the impact on the scheduled post-medieval gig shed (1016173). The Scheduled Monument currently survives in a poor condition, quite different to the Historic England listing description. A revised design has been proposed which includes the seaward advancement of the structure by 4.1m to reduce overlap with the Scheduled Monument. Installation of rock armour will serve to protect the monument from wave overtopping, resulting in a 'minor positive' impact in relation

to its long term stability.

- 7.7.8 The revised design of the rock armour extends into the footprint of the gig shed within the scheduled area. This will result in direct physical impacts and the removal of historic structural material both surviving above ground and buried. Works also have the potential to impact on previously unknown buried archaeological remains related to the monument. The magnitude of impact is considered to be at the upper end of moderate negative, resulting in a **'Large adverse'** significance of effect.
- 7.7.9 The above impact assessment is based only on impacts occurring within the footprint of the proposed rock armour, with the construction methodology being developed to avoid further impacts on the remainder of the Scheduled Monument. There is potential to preserve some elements of the gig shed in situ beneath the rock armour and this is being investigated through more detailed survey and design work, but the above assessment is based on the assumption that those elements would be removed.
- 7.7.10 The installation of rock armour would also impact on the setting of the scheduled gig shed. The proposed works would introduce a large man-made structure onto the foreshore, and during construction impacts on the setting of the monument will arise from plant activity and vehicle movement. As the gig shed currently survives in poor condition and much of the above ground elements have been removed the setting is considered to be less integral to the significance of the monument. As a result the impacts on the setting of the monument are considered to be minor negative, resulting in a **'Slight adverse'** significance of effect.
- 7.7.11 All other construction impact assessment findings for Bryher outlined within the Environmental Statement submitted in November 2022 remain the same.

Operational Impacts

- 7.7.12 The access route between Church Quay and Green Bay would only be in use during the construction phase of the scheme, and as such there would be no impacts on the scheduled prehistoric field system and Romano-British cist during operation of the scheme.
- 7.7.13 During operation of the scheme there will be impacts on the setting of the scheduled gig shed as a result of the installed rock armour, which introduces a large man-made structure to the foreshore area. The monument survives in poor condition and will be much reduced in its surviving elements as a result of construction of the scheme, meaning the setting of the monument will contribute much less towards its significance. The magnitude of impact on the setting of the gig shed during the operation of the scheme is considered to be negligible negative, resulting in a **'Slight adverse'** significance of effect.

St Agnes

- 7.7.14 At Periglis the placement of geobags within the dune are now located 3m further landward, though the footprint remains the same.
- 7.7.15 There are no anticipated changes to the impact assessment at construction or operation as a result of these design changes.
- 7.7.16 All other assessment findings for St Agnes remain the same.

St Martin's

Construction Impacts

7.7.17 At St Martin's, the proposed storage area at the Seven Stones Inn has been removed from the scheme, as has the connecting access route. The access route previously ran adjacent to the Grade II Listed Ashvale Farmhouse (1141203). There was a temporary slight adverse significance of effect on the setting of this asset during the construction phase. As a result of the removal of this access route from the scheme, there are no longer considered to be impacts on the setting of this asset during the construction phase of the scheme. The effect on the listed building is therefore neutral (**'Not Significant'**).

7.7.18 All other assessment findings at St Martin's remain the same.

7.8 Cumulative Effects

7.8.1 There are no changes to the cumulative effects as assessed within the Environmental Statement submitted in November 2022.

7.9 Additional Mitigation Measures

7.9.1 The scheduled prehistoric field system and Romano-British monument (1014989) at Green Bay should be demarcated to avoid accidental damage from vehicle movements straying from the access route. To prevent damage to potential buried archaeological remains associated with the Scheduled Monument within the access route from wheel rutting, track matting or similar should be deployed along the beach close to the Scheduled Monument.

7.9.2 At Great Porth (Great Par) North of Great Carn, consultation with Historic England is ongoing. It is currently proposed to remove vegetation from atop the monument so that the extent of surviving elements of the gig shed can be assessed and the detailed design of the rock armour and construction methodology can be refined.

7.9.3 In addition to any proposed mitigation against the direct impacts to the Scheduled Monument, such as archaeological monitoring and evaluation, Historic England have also stated that the scheme should also demonstrate added benefit. The consultation with Historic England has determined that the added benefit could take various forms such as research into other gig sheds on the Isles of Scilly.

7.9.4 Any works comprising groundbreaking or that are likely to damage elements of the Scheduled Monument will require Scheduled Monument consent. Any such works would also need to be subject to full site excavation and archaeological monitoring and recording undertaken by a professional archaeologist in line with an approved Written Scheme of Investigation (WSI).

7.9.5 All other mitigation measures proposed within the submitted Environmental Statement remain valid.

7.10 Summary of Updated Residual Effects

7.10.1 As a result of the repositioning of the access road between Church Quay and Green Bay from within the boundary of the scheduled monument, there are no residual

effects on the prehistoric field system and Romano-British monument (1014989) Scheduled Monument or its setting.

7.10.2 The revised design at Great Porth (Great Par) North of Great Carn will result in permanent physical impacts to the scheduled post-medieval gig shed (1016173). Mitigation measures including archaeological recording and compensatory research are proposed. These mitigation measures will not reduce the impact on the scheduled monument itself. The residual significance of effect will therefore remain **'Large adverse'**.

7.10.3 All other residual effects remain the same as assessed within the submitted Environmental Statement.

8 ES Addendum: Land Use, Tourism and Recreation

8.1 Introduction

8.1.1 This chapter provides an addendum to the land use, tourism and recreation assessment submitted with the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 8: Land Use, Tourism and Recreation of submitted ES Volume I

8.1.2 This assessment considers the effects on land use, tourism and recreation arising from the relevant Proposed Development design changes.

8.1.3 This addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed then the conditions are the same as those included in the Environmental Statement submitted in November 2022.

8.2 Changes in Legislation, Planning Policy and Guidance

8.2.1 There have been no changes in legislation, planning policy or guidance since the submission of the Environmental Statement in November 2022.

8.3 Proposed development changes

8.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

8.3.2 The following Proposed Development changes have been considered within the revised assessment:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn.
- Proposed development change number 2: revised design for Periglis.

8.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of land use, tourism and recreation and have not been considered further.

8.4 Relevant Additional Information

8.4.1 There is not any relevant additional information relating to this chapter.

8.5 Updated Baseline Conditions

8.5.1 There are no updates to the baseline conditions presented within the Environmental Statement submitted in November 2022.

8.5.2 There have been minor updates made to the red line boundaries for the islands of Bryher and St Martin's, as described in Section 2 of this ES Addendum. Figures 8-1 and 8-3 presented in the submitted ES show the permissive footpaths and tracks across the islands. These figures have not been updated to reflect the red line boundary changes as the baseline information about footpaths and tracks presented remains valid.

8.6 Assessment methodology and assessment criteria

8.6.1 The assessment methodology and assessment criteria used remain the same as the Environmental Statement submitted in November 2022.

8.7 Potential Impacts and Significant Effects

8.7.1 An updated assessment of the potential impacts and significant effects on land use, tourism and recreation has been undertaken to reflect the proposed design changes. The findings of this assessment are summarised below. The assessment findings for all sites where design changes are not proposed remain as detailed in the Environmental Statement submitted in November 2022.

8.7.2 Therefore, the section below presents an update on the assessment of effects of the proposed developments at Great Porth North and Periglis on land use, tourism and recreation.

Land Use

8.7.3 As outlined in the Environmental Statement submitted in November 2022, the proposed works entail the replacement and augmentation of existing defences and therefore the construction and operation of the proposed schemes would not affect existing land uses.

8.7.4 The land use is considered to be of high sensitivity since it is used for a unique purpose, important to the local context and cannot be relocated elsewhere. The impact on land use assessed to result from the proposed developments at Great Porth North and Periglis remain neutral (**'Not Significant'**) since there will be only minor change to the use of the land.

Access and Recreation

Great Porth (Great Par) North of Great Carn

Construction impacts

8.7.5 As outlined in the submitted ES, based on anecdotal evidence, Great Porth (Great Par) North of Great Carn is a popular beach used for recreational purposes including sitting, walking and observing. Great Porth (Great Par) North of Great Carn is therefore considered to be of medium sensitivity since the beach is a commonly used and valued recreational resource within the area and would have some tolerance to accommodate slight change.

8.7.6 The revised design of the proposed scheme at this site would likely further reduce access to areas of the beach than the previous design. It is considered that the revised scheme design would further reduce access since movement seaward would mean they would extend over a greater area of the beach.

8.7.7 It is anticipated that the construction of the proposed scheme will be undertaken over approximately 66 working days between December and February, requiring short term closure of a small area of the beach. The assessment of impact of construction of the proposed scheme on access and recreation is considered to be of minor magnitude and therefore remains **'temporary Slight adverse'**.

8.7.8 Despite changes to the proposed scheme design, the impacts of material delivery

on access and recreation for the revised design remain as detailed in the Environmental Statement submitted in November 2022. These were deemed to be **'temporary Slight adverse'** since material delivery will be short term and deliveries will be staggered.

Operational impacts

- 8.7.9 The revised design would move the structure seawards by 4.1m, encroaching on areas of the beach used for recreation, and limiting access to them. Relocation of the access ramp westwards will still maintain accessibility.
- 8.7.10 The revised design results in the structure moving approximately 4.1m seawards. Impacts on access and recreation would be **'Slight adverse'** since there would still be large areas of beach accessible for recreation purposes. However, these areas would be smaller than the original proposed design.

Periglis

Construction impacts

- 8.7.11 As outlined in the submitted ES, Periglis is the most popular beach on the island of St Agnes due to its accessibility from New Lane/Old Lane and existing access tracks/ Periglis is therefore considered to be of medium sensitivity since it is a commonly used and valued recreational resource within the area and would have some tolerance to accommodate slight change.
- 8.7.12 Despite the changes to the proposed scheme design at Periglis, the impacts of construction of the proposed scheme on access and recreation remain as detailed in the Environmental Statement submitted in November 2022 since works will be undertaken over approximately 62 days between November and January, restricting access to area of the beach. These were deemed to be **'temporary Slight adverse'**.
- 8.7.13 The impacts of material delivery remain as reported in the Environmental Statement submitted in November 2022 which were **'temporary Slight adverse'** since material delivery will be short term and deliveries will be staggered.

Operational impacts

- 8.7.14 It is not considered that the landward movement of the geobags would lead to significant impacts on access and recreation during the operation of the proposed scheme. There will be no perceptible change to the operational use of the beach for and adjacent footpath for access and recreation. Operational impacts of the scheme are therefore considered to be neutral (**'Not Significant'**).

Tourism

Great Porth (Great Par) North of Great Carn

Construction impacts

- 8.7.15 As outlined in the submitted ES, Great Porth (Great Par) North of Great Carn is a popular beach for tourists to visit with local businesses nearby, including the Richard Pearce Art Studio within 100m. Great Porth (Great Par) North of Great Carn is therefore considered to be of medium sensitivity since local businesses have

limited tolerance to change in the tourist economy.

8.7.16 The impacts of construction on tourism remain as reported in the Environmental Statement submitted in November 2022 which were neutral (**'Not Significant'**) since there would likely be a very small impact on tourist numbers over a short term period. It is also anticipated that works will be undertaken between December to February, outside of key tourist periods.

8.7.17 The impacts of material delivery on tourism remain as reported in the Environmental Statement submitted in November 2022 which were neutral (**'Not Significant'**) since material deliveries will be staggered and only over a short term period.

8.7.18 The impacts of construction works on local businesses remain as reported in the Environmental Statement submitted in November 2022 which were neutral (**'Not Significant'**) since construction will be short term and will likely only be undertaken outside of the key tourist periods.

Operational impacts

8.7.19 The impacts of the operation of the proposed scheme on tourism would be neutral (**'Not Significant'**) since there will be very small changes in tourist numbers as a result of the operational scheme.

Periglis

Construction impacts

8.7.20 As outlined in the submitted ES, Periglis is a popular beach for tourists to visit with local businesses nearby, including St Agnes watersports within 100m of the proposed scheme. The southern end of the beach experiences greater tourist interest than other areas in the vicinity. It is therefore considered to be of medium sensitivity. Despite the change in design, the impacts of construction on tourism remain as reported in the Environmental Statement submitted in November 2022 which were **'temporary slight adverse'** due to likely restricted access to large areas of the beach and audible construction noise. However, it is considered that works will likely be undertaken between November and January, outside of key tourist seasons.

8.7.21 Despite the change in design, the impacts of material delivery on tourism remain as reported in the Environmental Statement submitted in November 2022 which were neutral (**'Not Significant'**) since material delivery will be over a short term period and will be staggered. It is also considered that works will likely only be undertaken outside of key tourist seasons.

8.7.22 Impacts of construction works on local businesses remain as reported in the Environmental Statement submitted in November 2022 which were **'temporary slight adverse'** since construction works could deter visitors from visiting the area and local businesses. However, works will be undertaken outside of key tourist seasons.

Operational impacts

8.7.23 The impacts of the operation of the proposed scheme would not lead to changes in

tourist numbers ('**Not Significant**').

Geodiversity

8.7.24 The impacts of the proposed works on geodiversity across the islands remain as reported in the Environmental Statement submitted in November 2022 which were neutral ('**Not Significant**').

8.8 Cumulative Effects

8.8.1 There remains the potential for residents and visitors to the island to experience minor adverse impacts on access and recreation as a result of the construction of the proposed works should construction be undertaken at multiple sites simultaneously. However, where parallel working is preferred to meet project delivery schedules, it will be organised so that works do not take place on adjacent beaches. It is also intended that all construction works will be undertaken outside of key tourist periods.

8.9 Additional Mitigation Measures

8.9.1 No additional mitigation measures are proposed other than those reported in the Environmental Statement submitted in November 2022.

8.10 Summary of Updated Residual Effects

8.10.1 Residual effects remain as reported in the Environmental Statement submitted in November 2022.

9 ES Addendum: Climate change

9.1 Introduction

9.1.1 This chapter has been scoped out of the need for any updates to reflect design changes. All of the baseline and conclusions outlined in the Environmental Statement submitted in November 2022 remain valid.

10 ES Addendum: Other Construction Related Effects

10.1 Introduction

10.1.1 This chapter provides an addendum to the other construction related effects assessment submitted with the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 10: Other Construction Related Effects of submitted ES Volume I

10.1.2 This assessment considers the other construction related effects arising from the relevant Proposed Development design changes.

10.1.3 This addendum only considers changes in legislation, baseline conditions or potential effects since the submitted ES was prepared. If no change is listed then the conditions are the same as those prepared in the submitted ES.

10.2 Changes in Legislation, Planning Policy and Guidance

10.2.1 There have been no changes in legislation, planning policy and guidance since the submission of the Environmental Statement in November 2022.

10.3 Proposed development changes

10.3.1 Section 2 of this ES Addendum provides an overview of the Proposed Development changes.

10.3.2 The following Proposed Development changes have been considered within the revised assessment:

- Proposed development change number 1: revised design for Great Porth (Great Par) North of Great Carn
- Proposed development change number 2: revised design for Periglis
- Proposed development change number 3: realignment of access track at Green Bay
- Proposed development change number 4: removal of rock recovery area from St Martin's red line boundary.

10.3.3 Other Proposed Development changes described in Section 2 would not alter the assessment of other construction related effects and have not been considered further.

10.4 Relevant Additional Information

10.4.1 There is not any relevant additional information relating to this chapter.

10.5 Updated Baseline Conditions

10.5.1 The baseline conditions remain as detailed in the Environmental Statement submitted in November 2022.

10.5.2 Section 10.4.2 of the submitted ES details the construction logistics for the proposed works. Details of the updated approximate duration are contained within Table 3-4 of this ES Addendum.

- 10.5.3 It was previously anticipated that it would take a total of 48 working days to complete the construction of the five schemes across the island of Bryher. It is now considered that this will take a total of approximately 167 days.
- 10.5.4 It was previously anticipated that it would take a total of 53 working days to complete the construction of the three schemes across the island of St Agnes, it is now considered that this would take approximately 126 days.
- 10.5.5 It was previously anticipated that it would take five working days to complete the construction of the works on St Martin's. This is now considered to take approximately seven working days.
- 10.5.6 Where parallel working is preferred to meet project delivery schedules, it will be organised so that works do not take place on adjacent beaches.
- 10.5.7 Assumptions were made regarding the types of plant that are likely to be used during the construction work. It was assumed in the submitted ES that a 20-tonne 360° excavator would be used to move material around the site. It is now understood that a 30-tonne excavator would be used for moving material around the sites since it is more effective for 1-3 tonne rocks.
- 10.5.8 At Great Porth (Great Par) North of Great Carn, there may be a greater number of vehicle journeys required to deliver materials than outlined in the submitted ES, if materials are delivered by road. The revised design entails a revetment with a greater overall length and greater overall volume compared to the existing design. An updated bill of quantities is not currently available for the revised design and therefore an updated number of vehicle journeys is not available. Details relating to the construction methodology at Great Porth (Great Par) North of Great Carn will be subject to the outcome of Historic England's review of the Scheduled Monument Consent application and any mitigation measures required.
- 10.5.9 The construction logistics for all of the other sites will remain as detailed in the Submitted ES.

10.6 Assessment methodology and assessment criteria

- 10.6.1 The assessment methodology and assessment criteria used remain the same as the Environmental Statement submitted in November 2022.

10.7 Potential Impacts and Significant Effects

- 10.7.1 The assessment of impacts from construction traffic, changes in air quality and noise remain as reported in the Environmental Statement submitted in November 2022.

10.8 Cumulative Effects

- 10.8.1 There remains the potential for residential receptors to experience minor adverse cumulative effects as a result of noise and dust emissions, should construction be undertaken at multiple sites simultaneously. However, where parallel working is preferred to meet project delivery schedules, it will be organised so that works do not take place on adjacent beaches.

10.9 Additional Mitigation Measures

10.9.1 The mitigation measures outlined in the Environmental Statement submitted in November 2022 remain valid, no further mitigation measures have been identified. The assessment was used to inform the development of an outline CEMP, provided in Appendix 2.2 This Outline CEMP has been updated to reflect any updates to mitigation measures detailed in this ES Addendum. A Framework Site Waste Management Plan has also been developed and incorporated into the Outline CEMP (Appendix 2.2).

10.10 Summary of Updated Residual Effects

10.10.1 Residual effects remain as reported in the Environmental Statement submitted in November 2022.

11 ES Addendum: Cumulative and in-combination effects

11.1 Introduction

11.1.1 This chapter provides an addendum to the cumulative and combined effects assessment submitted with the submitted ES and should be read in conjunction with the following submitted documents:

- Chapter 11: Cumulative and in-combination effects of submitted ES Volume I

11.1.2 This chapter presents an updated cumulative effects assessment as a result of a review of any new planning or other development consent applications for relevant proposed projects since submission of the submitted ES. It then presents an update to the cumulative and combined effects assessment as a result of the Proposed Development design changes.

11.2 Changes in Legislation, Planning Policy and Guidance

11.2.1 There have been no changes in legislation, planning policy or guidance since the submission of the Environmental Statement in November 2022.

11.3 Assessment Methodology and Assessment Criteria

11.3.1 The assessment methodology and assessment criteria used remain the same as the Environmental Statement submitted in November 2022.

11.4 Relevant Additional Information

11.4.1 There is not any relevant additional information relating to this chapter.

11.5 Updated Baseline Conditions

11.5.1 A search of the CIoS planning portal and MMO portal has been undertaken to identify any additional developments with the potential to cause cumulative effects, in light of design changes. There were no additional developments identified.

11.6 Potential Impacts and Significant Effects

11.6.1 The conclusions outlined in the Environmental Statement submitted in November 2022 remain valid, there are not likely to be any cumulative effects with other developments.

11.6.2 Section 11.5.2 of the submitted ES outlines the interrelationship effects between topics. The conclusion remains valid that residential properties and local businesses close to the proposed schemes may be subject to synergistic interrelationship effects, including visual impacts and disturbances from noise and dust impacts, during construction.

11.6.3 Potential impacts of coastal squeeze have been considered within Section 4: Coastal Processes, Geomorphology and Flood Risk, and Section 5: Biodiversity and Nature Conservation of this ES Addendum. The proposed schemes are anticipated to impact upon the ability for intertidal habitats to transgress landward in response to rising sea levels, and also lead to changes in coastal processes. The combined effect at most sites is considered to be '**Slight adverse**'. However, at Great Porth (Great

Par) North of Great Carn and Porth Killier, the combined effect of coastal squeeze on geomorphology and intertidal habitats is considered to be **'Moderate adverse'**.

11.7 Additional mitigation measures

11.7.1 The mitigation measures outlined in the Environmental Statement from November 2022 remain valid, no additional mitigation measures have been identified.

11.8 Summary of updated residual effects

11.8.1 Residual effects remain as outlined in the Environmental Statement from November 2022.

12 ES Addendum: Conclusions

12.1 Introduction

12.1.1 This chapter provides an updated to the summary of significant effects, mitigation measures and residual effects identified in each of the chapters of this ES. This chapter draws upon Chapter 3-11 of this ES Addendum which have considered the potential environmental impacts and effects of the Proposed Development design changes.

12.1.2 The likely significant residual environmental effects of the Proposed Development design changes have been identified following implementation of the embedded mitigation or impact avoidance measures for the Proposed Development.

12.1.3 Table 12-1 was included in the submitted ES to present a summary of the likely significant effects, mitigation measures and residual effects. This table has been updated to reflect the findings of this ES Addendum.

Table 12-1: Summary of likely significant effects, mitigation measures and residual effects

Stage	Locations	Potential Likely Significant Effect	Significance Score	Proposed Mitigation	Residual Effect Significance Score
Chapter 4: Coastal Processes, Geomorphology and Flood Risk					
Construction	No significant effects identified				
Operation	Great Porth (Great Par) North of Great Carn	Revised design will increase the footprint of the structure, reducing beach width and contributing to coastal squeeze and loss of intertidal habitat availability. Placement of the structure in front of the dune crest will prevent the process of shoreline retreat.	Moderate adverse	n/a	Moderate adverse
	Porth Killier	The placement of rock armour up to the crest of the ram outcrop would cover an extensive area of intertidal habitat formed upon the exposed bedrock. This loss of habitat will exacerbate	Moderate adverse	n/a	Moderate adverse

Stage	Locations	Potential Likely Significant Effect	Significance Score	Proposed Mitigation	Residual Effect Significance Score
		coastal squeeze, encroaching onto an area that could otherwise provide compensation against rising sea levels.			
	All sites	Collectively, the island wide placement of artificial defence structures will limit the ability of coastal habitats, both terrestrial and marine, to respond naturally to changing climate conditions.	Moderate adverse	n/a	Moderate adverse
Chapter 5: Biodiversity and Nature Conservation					
Construction	Isles of Scilly Complex SAC	Temporary disturbance to intertidal habitats and landing sites, and where haul routes are established.	Temporary adverse	Ecological Clerk of Works (ECoW) to be present when landing site established to ensure any sensitive marine habitats are avoided. Implementation of strict pollution prevention measures.	Small scale temporary adverse effect. No significant adverse effect on the conservation status of the site.
	Big Pool and Browarth Point SSSI (St Agnes)	The proposed access tracks and site compounds have the potential to have a temporary adverse impact on the SSSI plant assemblages. If especially rare plants are impacted, there is the potential that they will be	Permanent adverse	Use of barge or existing roads and tracks to bring materials into the area. Further survey to be carried out immediately prior to works commencing. Laydown area to be marked out.	Temporary adverse effect on conservation status of site.

Stage	Locations	Potential Likely Significant Effect	Significance Score	Proposed Mitigation	Residual Effect Significance Score
		unable to recolonise following completion of the works.			
	Porth Killier	Placing the new rock armour will reduce the capacity for intertidal habitats to adapt to rising sea levels. Given the value of the habitats at Porth Killier, the impact is considered to be significant.	Moderate adverse	Recommended that enhancement measures be built into the scheme to compensate for loss of intertidal habitat.	Moderate adverse
	Pool of Bryher and Popplestone Bank SSSI	Scrub removal/sand winning from SSSI.	Temporary adverse	A full vegetation survey of the dunes to be impacted should be carried out at an appropriate time of year. Any rare plants to be suitably translocated prior to the works taking place.	Temporary adverse impact. No significant adverse impact on conservation status of site.
Operation	Pool of Bryher and Popplestone Bank SSSI	Scrub removal/sand winning would result in a long term increase in diversity and make the area more wildlife rich than at present through promoting colonisation of species for which the SSSI is designated.	Permanent positive.	n/a	Permanent positive
Chapter 6: Landscape and Visual					
Construction	Periglis	Temporary storage of bulk materials.	Moderate adverse	n/a	Moderate adverse
Operation	Periglis	Removal of	Moderate	n/a	Moderate

Stage	Locations	Potential Likely Significant Effect	Significance Score	Proposed Mitigation	Residual Effect Significance Score
		degraded erosion control fabrics currently visible at dune surface.	beneficial		beneficial
Chapter 7: Historic Environment					
Construction	Great Porth (Great Par) North of Great Carn	The revised design of the rock armour will result in removal of historic structural material both surviving above ground and buried. There will be direct physical impacts on surviving elements of the gig shed as a result of installation of the rock armour.	Large adverse	<p>Consultation with Historic England is ongoing and the required mitigation measures will depend upon the results of consultation and their review of the Scheduled Monument Consent application (including potential offset mitigation).</p> <p>Investigation of the extent of the remains will be undertaken. A full site excavation and recording process will be undertaken by a professional archaeologist.</p>	Large adverse
Operation	No significant effects identified				
Chapter 8: Land Use, Tourism and Recreation					
Construction	No significant effects identified				
Operation	No significant effects identified				
Chapter 9: Climate Change					
Construction	No significant effects identified				
Operation	No significant effects identified				
Chapter 10: Other Construction Related Effects					
Construction	No significant effects identified				
Operation	No significant effects identified				
Chapter 11: Cumulative and Combined Effects					
Construction	No significant effects identified				
Operation	Great Porth (Great Par) North of Great Carn	Combined effect of coastal squeeze on	Moderate adverse	n/a	Moderate adverse

Stage	Locations	Potential Likely Significant Effect	Significance Score	Proposed Mitigation	Residual Effect Significance Score
		geomorphology and intertidal habitats			
	Periglis	combined effect of coastal squeeze on geomorphology and intertidal habitats	Moderate adverse	n/a	Moderate adverse

13 References

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