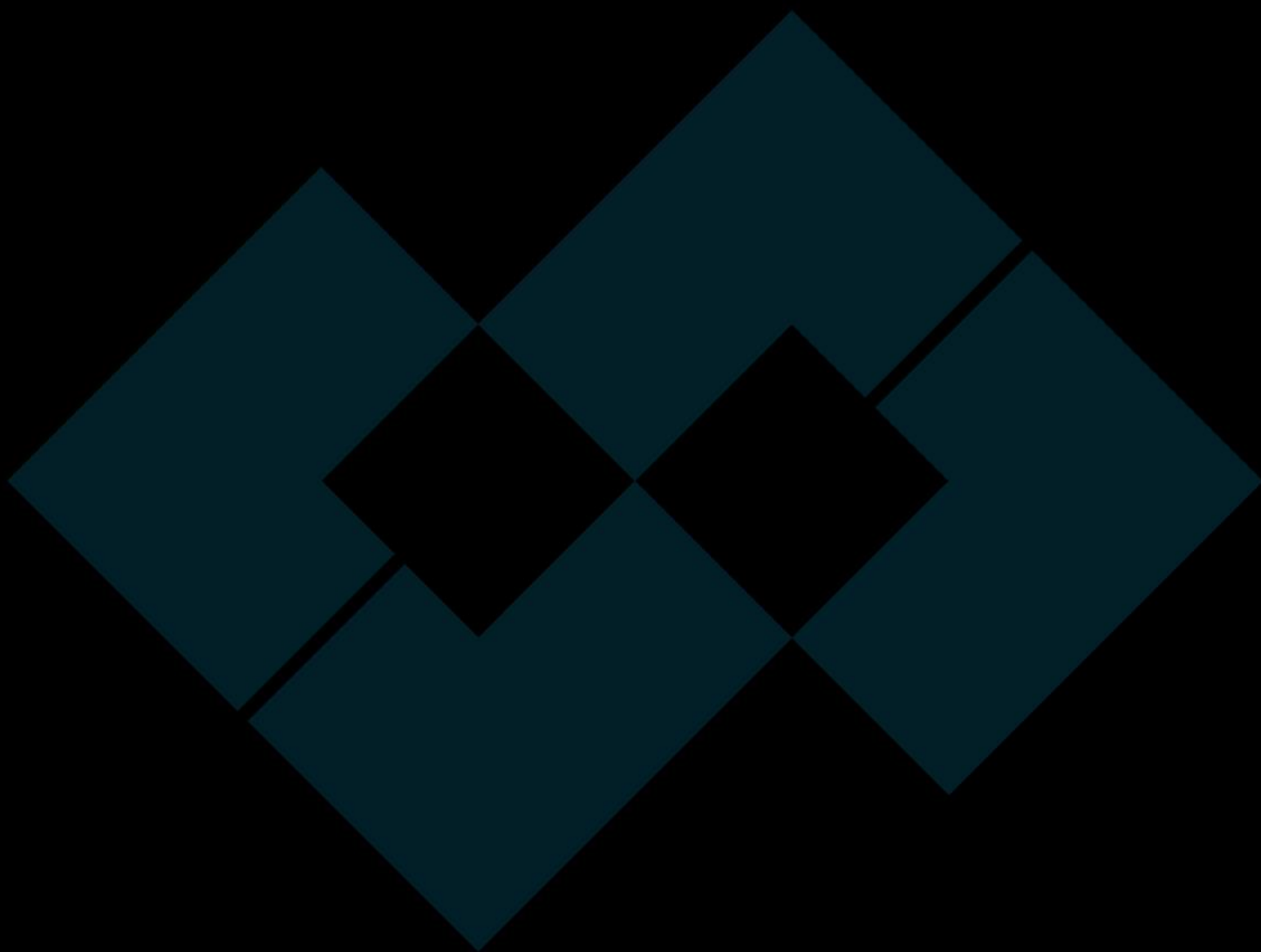




## **Appendix B - Langstone Environmental Scoping Report – November 2020**

**Appendices available separately due to size**



Langstone FCERM Scheme  
Environmental Scoping Report

November 2020

**Document Control:**

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## Acronyms

|       |                                                      |
|-------|------------------------------------------------------|
| AA    | Appropriate Assessment                               |
| AL1   | Action Level 1                                       |
| AMS   | Archaeological Mitigation Strategy                   |
| AONB  | Area of Outstanding Natural Beauty                   |
| AQMA  | Air Quality Management Area                          |
| CBA   | Cost Benefit Analysis                                |
| CCP   | Communications and Collaboration Plan                |
| CEMP  | Construction Environmental Management Plan           |
| CHC   | Chichester Harbour Conservancy                       |
| CIA   | Cumulative Impacts Assessment                        |
| CIfA  | Chartered Institute for Archaeologists               |
| CTMP  | Construction Traffic Management Plan                 |
| DBA   | Desk Based Assessment                                |
| DCMS  | Department of Culture, Media and Sport               |
| DEFRA | Department of Environment, Farming and Rural Affairs |
| EC    | European Community                                   |
| EEZ   | Exclusive Economic Zone                              |
| EIA   | Environmental Impact Assessment                      |
| EQOs  | Environmental Quality Objectives                     |
| EQS   | Environmental Quality Standards                      |
| ESR   | Environmental Screening and Scoping Report           |
| ES    | Environmental Statement                              |
| EUNIS | European Nature Information System                   |
| FCERM | Flood and Coastal Erosion Risk Management            |
| FRAP  | Flood Risk Activity Permit                           |
| GCS   | Good Chemical Status                                 |
| GES   | Good Ecological Status                               |
| GHG   | Green House Gases                                    |
| GS    | Good Status                                          |
| HBC   | Havant Borough Council                               |
| HCC   | Hampshire County Council                             |
| HRA   | Habitats Regulations Assessment                      |
| HSI   | Habitat Suitability Index                            |
| IEMA  | Institute of Environmental Management and Assessment |

|        |                                                               |
|--------|---------------------------------------------------------------|
| IFCA   | Inshore Fisheries and Conservation Authority                  |
| INNS   | Invasive Non-Native Species                                   |
| ISQG   | Interim Sediment Quality Guidelines                           |
| LPA    | Local Planning Authority                                      |
| LVIA   | Landscape and Visual Impact Assessment                        |
| MCZ    | Marine Conservation Zone                                      |
| MHWS   | Mean High Water Springs                                       |
| MLW    | Mean Low Water                                                |
| MMO    | Marine Management Organisation                                |
| MPA    | Marine Protected Areas                                        |
| MSFD   | Marine Strategy Framework Directive                           |
| MWL    | Mean Water Level                                              |
| NERC   | Natural Environment and Rural Communities                     |
| NPPF   | National Planning Policy Framework                            |
| ODUs   | Option Development Units                                      |
| PAH    | Polycyclic Aromatic Hydrocarbon                               |
| PEA    | Preliminary Ecological Appraisal                              |
| PEL    | Probable Effect Level                                         |
| PRoW   | Public Right of Way                                           |
| PfSH   | Partnership for South Hampshire                               |
| SAC    | Special Areas of Conservation                                 |
| SCOPAC | Standing Conference On Problems Associated with the Coastline |
| SINCs  | Sites of Importance for Nature Conservation                   |
| SMP    | Shoreline Management Plan                                     |
| SOM    | Soil Organic Matter                                           |
| SPA    | Special Protection Areas                                      |
| SSSI   | Site of Special Scientific Interest                           |
| SWBGS  | Solent Waders and Brent Goose Strategy                        |
| TEL    | Threshold Effects Level                                       |
| TPO    | Tree Preservation Order                                       |
| UKCP   | United Kingdom Climate Projections                            |
| WeBS   | Wetland Bird Survey                                           |
| WFD    | Water Framework Directive                                     |

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Appendix B: WFD Scoping Tables

Appendix C: Consultation

Appendix D: Outline Design and Decision Criteria Report

Appendix E: PEA

Appendix F: Concept Ground Model

Appendix G: Coastal Processes Study

Appendix H: Archaeological DBA

Appendix I: Economic Appraisal

Appendix J: Wider Benefits Assessment

# 1. Introduction

This Environmental Screening and Scoping Report (ESR) is in relation to the Langstone Flood and Coastal Erosion Risk Management (FCERM) Scheme (hereafter referred to as 'the Scheme'). The Scheme is required to protect a significant number of people, property, businesses and other key assets from coastal flooding and erosion. A key asset considered for this scheme is the protection of critical infrastructure, specifically the A3023, the only road connecting Hayling Island with the mainland. This is considered critical to the delivery of the Local Plan (see **Section 3.15.2**). This ESR has been prepared to ascertain the scope of work for the consents and licences required for the Scheme.

The purpose of this ESR is to:

- I. provide consultees with a description of the proposed Scheme and an overview of the need for the Scheme;
- II. provide an overview of the existing natural, human and built environment that has the potential to be impacted by the Scheme during its construction and operational phases;
- III. identify any potentially significant impacts of the proposed Scheme on the existing environment;
- IV. set out the scope of further studies and (if necessary) data collection (e.g. survey work) required to describe the characteristics of the existing environment in sufficient detail to inform the assessment of potential impacts; and
- V. describe the work that is proposed to be undertaken during any Environmental Impact Assessment (EIA) process required in order to fully assess the significance of potential impacts.

The majority of the Scheme will be undertaken onshore and therefore planning permission will be required from Havant Borough Council (HBC) as the Local Planning Authority (LPA). However, a proportion of the works will take place below mean high water springs (MHWS), potentially including access to the foreshore to complete the works. Consequently, a marine licence will also be required from the Marine Management Organisation (MMO).

Under Environmental Impact Assessment (EIA) Regulations, all 'coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works' are considered to be 'Schedule 2' development that are likely to have significant effects. In addition, the proposed Scheme is located within an environmentally sensitive area and therefore an Environmental Statement (ES) may be needed under the Town and Country Planning EIA Regulations 2017 and the Marine Works (EIA) (Amendment) Regulations 2017. The requirement for an EIA will be confirmed by seeking a screening and scoping opinion from the HBC and MMO respectively via the Coastal Concordat (see **Section 3.14**). The Coastal Concordat is anticipated to be led by HBC. If it is deemed that the Scheme is not an EIA development, it is proposed the planning application and marine licence will still be supported by a non-statutory environmental appraisal so as to inform and manage environmental impacts. The scope of the environmental appraisal will build on the potential impact pathways and further works proposed within this report.

## 1.1 Scheme Location

Langstone is situated on the south coast of England, within the borough of Havant in the county of Hampshire. Langstone lies just north of Hayling Island. The borough lies between

Portsmouth in the west and Chichester in the east and is serviced by the A27 from the east and west, the B2149 from the north and the A3023 from the south. The Scheme frontage is adjacent to Langstone Harbour to the west and Chichester Harbour in the east. The location of the Scheme is shown in **Figure 1**.

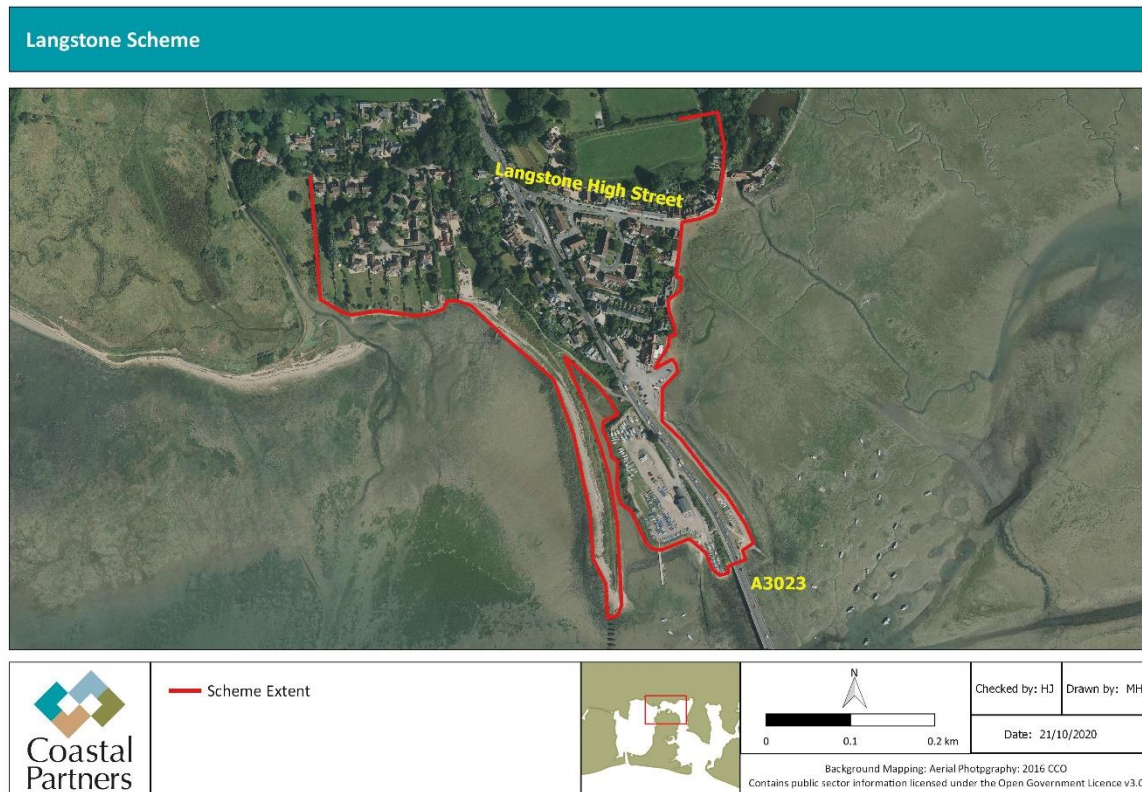


Figure 1. | Scheme location and extent

## 1.2 Scheme Rationale

The North Solent Shoreline Management Plan (SMP) (New Forest District Council, 2010) is a high-level policy document that sets out a framework for future management of the coastline over the next 100 years. It was adopted by HBC in 2010 and recommends a 'Hold the line' policy to maintain or upgrade the level of protection provided by the coastal defences in Langstone.

The Portchester to Emsworth Coastal Flood and Erosion Risk Management Strategy (Environment Agency, 2012) covers a 27 km stretch of coastline that marks the northern boundaries of Portsmouth, Langstone and Chichester Harbours. The Strategy looked at how the SMP policy can be implemented at a more local level and identified areas where work may be required over the next 100 years. The Strategy recommendations were adopted by HBC in 2013 for improvement of the defences at Langstone through a phased approach.

The existing defences consist of a mixture of concrete walls, concrete block revetments and masonry quay walls which are in a poor and degraded condition. Currently maintained by HBC, Hampshire County Council (HCC) and other private owners, the majority of present defences have residual lives of less than five years (without any maintenance) and therefore,

without a Scheme at Langstone, the existing community will continue to be at significant flood and erosion risk.

Coastal Partners, formerly Eastern Solent Coastal Partnership, on behalf of HBC, have secured Department of Environment, Farming and Rural Affairs (DEFRA) Grant in Aid and HBC Community Infrastructure Levy funding to develop designs for a new coastal defence scheme to protect homes from flooding and erosion in Langstone.

The coastal defence scheme will aim to reduce flood and coastal erosion risk over the next 50 years for over 100 properties, heritage assets and critical infrastructure including the A3023; the only road crossing to Hayling Island. For the present day there are 73 residential properties at risk of flooding from a 1 in 200 year (0.5% Annual Exceedance Probability (AEP)) tidal flood event. There are also four non-residential properties at risk of flooding from the same return period event. Due to sea level rise, in 100 years' time 123 residential properties and nine non-residential properties are expected to be at risk from a 1 in 200 year (0.5% AEP) event. Annual Exceedance Probability refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which may be calculated to have a 1% chance to occur in any one year, is described as 1% AEP.

The project team has undertaken a robust option appraisal study supported by extensive stakeholder engagement (see **Section 2**). This has culminated in the development of an outline design for a coastal defence scheme at Langstone to manage and reduce the flood and erosion risk to the frontage. The leading option is to construct a variety of defences along the frontage to provide a scheme with a 50-year life. The Scheme will provide a standard of protection (SoP) of 0.5% AEP (1 in 200 year) present day, which will reduce to 1 in 75 years SoP over the 50-year life. The SoP provided by a defence is the severity of flood event that it should protect against.

The scheme being promoted is an “adaptive” approach to reduce the risk for 50 years at which time a further phase will need to be developed that takes account of the understanding of the risk, economics and environmental factors nearer that time.

### 1.3 Structure of this report

The structure of this report is as follows:

- **Section 1: Introduction.** Brief project background including an overview of the scheme location and rationale.
- **Section 2: Project Development.** Background on the alternative options that have been considered and the preferred design options being taken forward.
- **Section 3: Legislative and Consenting Framework.** Sets out the principal consents/approvals and studies that are likely to be required.
- **Section 4: Environmental Receptors.** Reviews the key environmental issues and potential impacts from the proposed Scheme, including potential cumulative effects.
- **Section 5: Proposed Assessment Methods.** Summarises the assessment approach to future work.
- **Section 6: Further Environmental Assessment work.** Provides a summary of the topics, receptors and impact pathways that require further assessment work.

In addition, a Habitats Regulations Assessment (HRA) screening assessment is provided in **Appendix** Error! Reference source not found., while Water Framework Directive (WFD) scoping tables are presented in **Appendix** Error! Reference source not found..

## 2 Project Development

### 2.1 Option Appraisal

In order to identify the most appropriate, cost effective, environmentally acceptable/beneficial option, an Options Appraisal process was developed during the outline design stage of the Scheme (AECOM, 2019). This process comprises three key stages;

1. Identification of 'Long List' (all potential options that could be taken forward to meet the project objectives).
2. Identification of 'Short List'. Rationalised of the 'Long List' to take into account factors such as cost, technical viability and environmental constraints (beneficial or adverse).
3. Selection of Preferred Option. Through a multi-criteria analysis, a preferred option is selected.

The frontage has been broken down into four Option Development Units (ODUs) to facilitate the development and appraisal of options at this stage<sup>1</sup>. These are presented in **Figure 2** and are as follows:

- **ODU 1:** Langstone West, between the east bank of the Langbrook Stream to the edge of the formal defences at the northern end of Langstone Spit;
- **ODU 2:** Sailing club and Langstone Spit, including the spit, sailing club and A3023 revetment;
- **ODU 3:** Langstone east, between the Ship Inn car park and the Old Mill slipway; and
- **ODU 4:** Old Mill and Mill pond, between the Old Mill slipway and the slipway to the north east of the Mill pond.

The ODUs have been divided further to assess options on a local level. Full details of these sub-units can be found within the Preferred Option Report (available on the project webpage here: <https://coastalpartners.org.uk/project/how-we-ve-developed-options>), together with details on the shortlist and long list options (AECOM, 2019).

The long list measures for each ODU sub-unit were appraised against 14 categories, including environmental impacts. For each category in the multivariate appraisal the measure was scored as red (score of 0), amber (score of 1) or green (score of 2). For each measure the total score across all the categories was then calculated. Based on the total score the measures were then ranked (with 1 being the highest ranking). The top-ranking measures were then taken forward to the short list (AECOM, 2019).

In order to identify a preferred option, each different defence measure on the short list in each ODU sub-unit was assigned a score for each of the following categories:

- Environmental impacts (Ecology, Landscape and Heritage)
- Social impacts
- Technical feasibility
- Cost/economic comparison

The scoring for the environmental category was based on the results of the multivariate assessment undertaken by AECOM's environmental specialists. In each ODU sub-unit, the multivariate environmental scoring for the short list options has been compared to a Do

---

<sup>1</sup> Please note reference to ODUs refers to descriptions used within the outline design stages. As the design develops some detail may be refined as part of work to deliver a holistic Scheme during detailed design.

Nothing scoring. This has enabled the environmental impact of the short list options, relative to the Do Nothing scenario to be assessed (AECOM, 2019).

## 2.2 Consultation overview

At the inception of the project, a stakeholder mapping workshop was undertaken in order to identify all stakeholders and interested parties. Further to this, a Communications and Collaboration Plan (CCP) was prepared as a guide for communications and collaboration throughout the life of the proposed Scheme. It is split into two phases; outline design and detailed design and has been updated as the project develops to provide a live log of communication and collaboration.

The objectives of the outline design CCP include:

- To outline the necessity of stakeholder engagement;
- To identify all stakeholders, including statutory consultees, for the scheme;
- To pre-empt and aid the management of concerns from different stakeholder groups;
- To outline the communication methods to be employed throughout the development of the scheme;
- To explore the opportunities for working in partnership to deliver broader outcomes and benefits.

Coastal Partners has a dedicated website that has been used to provide updates on the Scheme so far (<https://coastalpartners.org.uk/project/langstone-coastal-defence-study/>).

Advice from Regulators and Statutory Consultees was sought regularly throughout the outline design stage. **Appendix C** includes the feedback received from:

- Historic England
- Natural England

In addition to engagement with Regulators and Statutory Consultees a Steering Group and the Langstone Stakeholder Working Group were formed.

The Steering Group invited representatives from:

- |                            |                                  |
|----------------------------|----------------------------------|
| - Havant Borough Council   | - Environment Agency             |
| - Natural England          | - Chichester Harbour Conservancy |
| - Hampshire County Council | - Langstone Harbour Board        |

The Langstone Stakeholder Working Group invited representatives from:

- Langstone Residents Association
- Langstone Village Association
- Havant Civic Society
- Solent Protection Society
- Langstone Sailing Club
- Langstone Conservation Group
- The Ship Inn and Royal Oak Public Houses
- Langstone Rowing Club
- Havant Borough Council

Towards the end of Outline Design, a Collaborative Workshop was also hosted to discuss the emerging leading options, widening the Stakeholder Working group to residents and other interested parties. The following section sets out the consultation milestones for these groups.

**Table 2.1** provides a summary of key consultation milestones that have taken place throughout the project so far.

**Table 2.1: Consultation milestones completed during outline design phase**

| Date                                  | Milestone                                                                                                                                                                                        |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Start Up</b>               |                                                                                                                                                                                                  |
| May 2018                              | Press Release<br>Engagement with the local community<br>Letters and questionnaires issued to residents                                                                                           |
| August 2018                           | Informal stakeholder meetings<br>Site walkover (Natural England, Historic England, Environment Agency)<br>Steering Group Meeting #1                                                              |
| September 2018                        | Langstone Stakeholder Working Group #1                                                                                                                                                           |
| <b>Long List to Shortlist Options</b> |                                                                                                                                                                                                  |
| November 2018                         | Steering Group Meeting #2<br>Langstone Stakeholder Working Group #2<br>Meetings (Historic England, Natural England)<br>Public Event x2- Shortlist Options (Langstone Sailing Club, The Ship Inn) |
| January 2019                          | Meetings (HBC Conservation Officer)                                                                                                                                                              |
| <b>Shortlist to Leading Options</b>   |                                                                                                                                                                                                  |
| May 2019                              | Meetings (Natural England, Historic England)                                                                                                                                                     |
| June 2019                             | Meetings (Residents, Hampshire County Council, Langstone Sailing Club, Royal Oak Pub, The Ship Inn)<br>Langstone Stakeholder Working Group #3                                                    |
| July 2019                             | Meetings (Residents, Chichester Harbour Conservancy)                                                                                                                                             |
| October 2019                          | Meetings (Utilities)                                                                                                                                                                             |
| January 2020                          | Public Event x2- Leading Option (Langstone Sailing Club, The Ship Inn)<br>Letter, Leaflet and questionnaires issued to residents<br>Meeting with Langstone SOS Group                             |
| March 2020                            | Collaborative Workshop (Residents and Community Stakeholders)<br>Summary Report- January 2020 public events<br>Summary Report- Collaborative Workshop March 2020                                 |
| April 2020                            | Meeting (HBC Planning Officer, Conservation Officer, Natural England)                                                                                                                            |
| May 2020                              | Public Consultation on Royal Oak Leading Option alignment                                                                                                                                        |
| August 2020                           | Summary Report- Royal Oak Engagement<br>Website Updates                                                                                                                                          |

**Table 2.2** provides a summary of the consultation milestones that are scheduled and remain to be undertaken on publishing of this scoping report.

**Table 2.2: Outstanding Consultation in connection with detailed design and construction phases**

| Phase           | Milestone                                                                                                                                                                                                                                                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Detailed Design | Newsletter and website updates with progress of detailed design, licencing and consents, planning and programme<br>Key Stakeholder Collaborative Workshops and Updates<br>1-2-1 Meetings with Frontline Residents<br>Steering Group Briefings<br>Councillor Briefing Notes<br>Leaflet deliveries and social media<br>Local Community Presentations |
| Construction    | Pre-construction Public Event<br>Press Release<br>Leaflet deliveries and social media<br>Local Community Presentations                                                                                                                                                                                                                             |

### 2.2.1 The Preferred Option

Two alignments were selected to progress to the outline design stage following the economic option appraisal, due to differences in affordability (AECOM, 2019). The most likely alignment to be delivered is known as the 'Core Scheme', the extension to this scheme is known as the 'Additional Scheme'. Both parts of the Scheme have been broken down into ODUs that each represent an area of similar coastal characteristics, where a single type of structure can be provided to guard against flooding.

In the option selection stage, the ODUs were broken down into sub-units and in these sub-units preferred options have been determined. The process of determining the preferred alignments and sub-unit options is described in the Preferred Option Report (AECOM, 2019). Subsequently some of the preferred defence measures were revised, as described in the Outline Design and Decision Criteria Report (**Appendix D**). **Table 2.3** summarises the preferred options for the sub-units.

Note that there is some overlap between the two schemes meaning that if the Additional Scheme was delivered in combination with the Core Scheme the defence structure in sub-unit 2b would be shortened where the flood defences tie in.

**Table 2.3: Summary of preferred defence measure for each ODU sub-unit based on the Preferred Options Report (AECOM, 2019) and Outline Design Criteria Report (Appendix D)**

| ODU sub-unit                    | Preferred defence measure                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Core Scheme</i></b>       |                                                                                                                                                             |
| <b>2b</b>                       | Raising of the footpath (north section) and earth embankment (south section)                                                                                |
| <b>3b</b>                       | Active flood barrier across car park and setback floodwall (south section), extension of western end of flood defence to the south, parallel with the road. |
| <b>3d to 3e</b>                 | Floodwall with glass top                                                                                                                                    |
| <b>3f to 3h</b>                 | Floodwall with accessible path <sup>2</sup>                                                                                                                 |
| <b>3i</b>                       | Flood proof residential building, accessible path (potential for 3i to be combined with 3h if building flood proofing not adequate).                        |
| <b>3j</b>                       | Flood gate                                                                                                                                                  |
| <b>3k</b>                       | New parapet wall on alignment of existing wall (if possible due to integrity of the current wall).                                                          |
| <b>3l</b>                       | Setback floodwall (footpath section) and earth embankment (field area)                                                                                      |
| <b><i>Additional Scheme</i></b> |                                                                                                                                                             |
| <b>1a</b>                       | Earth embankment                                                                                                                                            |
| <b>1b</b>                       | Capital refurbishment                                                                                                                                       |
| <b>2a</b>                       | Rock armour                                                                                                                                                 |

**Figure 2** shows the ODU sub-units and preferred defence measures.

<sup>2</sup> Please note that a boardwalk was referenced within the outline design criteria report, however following subsequent consultation, accessible paths are now being considered further.

## Option Development Unit Boundaries

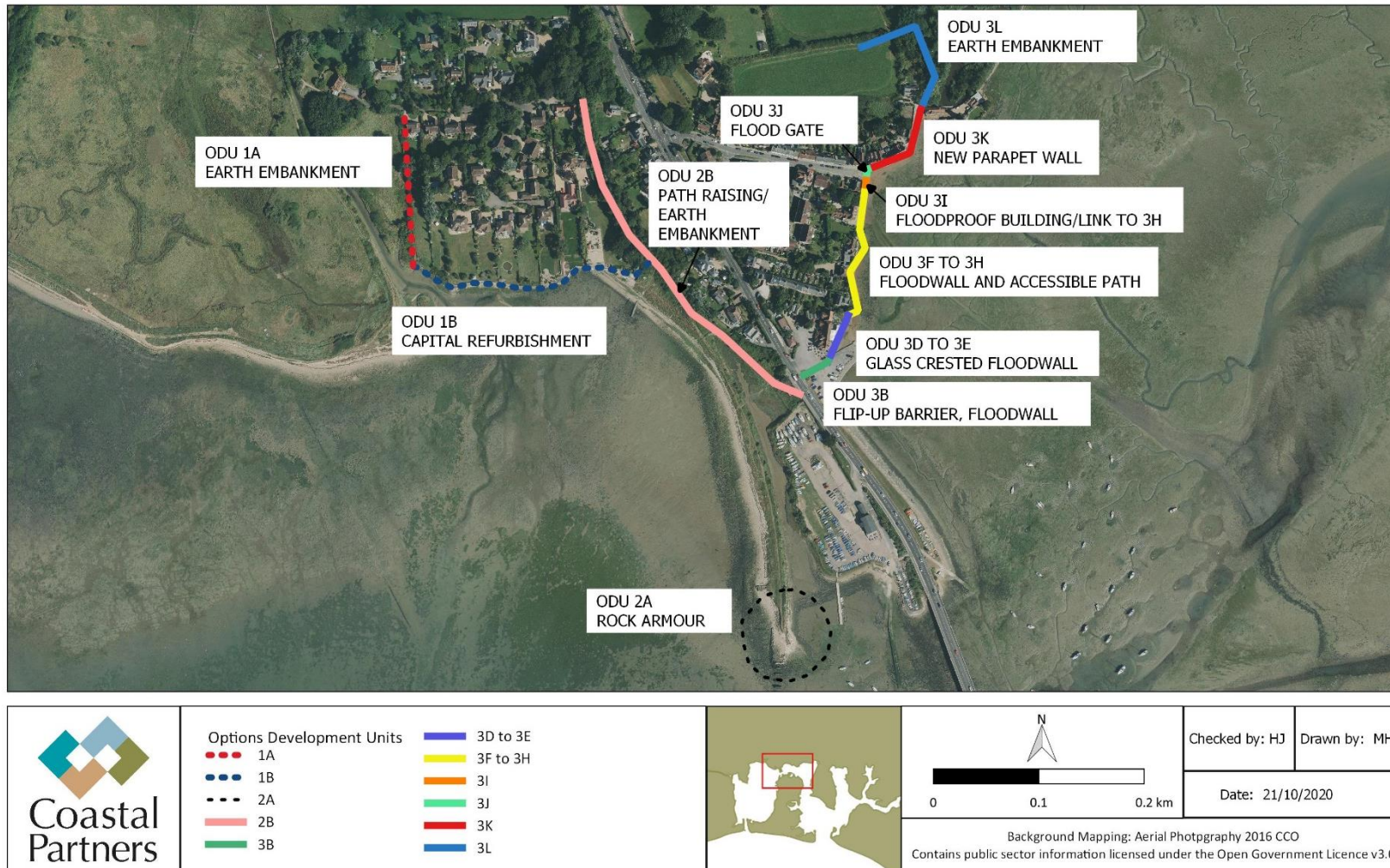


Figure 2. | Option Development Unit Boundaries.

At the time of publishing this ESR, the scheme is in the concluding stages of outline design, whereby the leading options for each sub-frontage are identified and have been recommended to be taken forward to the detailed design stage. During detailed design, the preferred option design will be refined, to produce design drawings for consenting and construction. Further work required includes further details on the Scheme such as:

- Construction programme and phasing
- Methods and materials to be used
- Any requirement for excavation, bulk fill, material disposal, foreshore working, piling and concrete pour
- Details on storage and compound areas

## 2.3 Proposed works

This ESR considers both the Core Scheme and Additional Scheme. As discussed in **Section 2.2.1** the Detailed Design stage will include both schemes, and in refining the design and costs a decision will be made whether to proceed with the Additional Scheme to construction. Consequently if ODUs within the Additional Scheme are not taken forward to construction they will not be included within the ES.

Construction of the Core and the Additional Scheme if progressed is currently anticipated to take place in two phases during Summer 2023 and Summer 2024, to avoid works during the overwintering bird season. The Scheme will have a design life of 50 years with minimal maintenance such as visual inspections only anticipated over this period.

Within the Core Scheme the main works below MHWS are anticipated to involve a floodwall with accessible path potentially resulting in a marginal extension of the existing footprint to maintain accessibility within ODU 3f to 3i and 3k. Similarly, the footprint of the Additional Scheme may also increase slightly within ODU 1b for the capital refurbishment of the defences as well as ODU 2b where rock armour protection is proposed. Additionally, due to the limited space onshore, both Schemes may require foreshore working within 10-20 metres of the existing structures during the construction phase.

An overview of the preferred defence measures for each ODU sub-unit (**Figure 2**) is provided below based on the outline design (AECOM, 2019). These options may need to be validated or refined through Detailed Design.

### 2.3.1 Core Scheme ODU 2b - Footpath raising and earth embankment

ODU 2b is approximately 350 metres long and located along the old Hayling Island 'Billy' railway line incorporating National Cycle Route 2 and a permissive path. The proposed works involve raising the level of the footpath in the northern section and construction of an earth embankment in the southern section. This is anticipated to increase the height by up to approximately 0.6 metres above existing ground level using a low permeability material such as compacted clay. The raised footpath will follow the alignment of the existing footpath which will also help minimise the vegetation clearance required. The toe of the embankment will be above MHWS and will therefore only be exposed to high tidal water levels in extreme events. Scour protection is not considered as a requirement, but this will be confirmed at the detailed design stage.

### **2.3.2 Core Scheme ODU 3b - Flip-up flood barrier floodwall set back and extension**

ODU 3b is located within the car park of the Ship Inn and covers an area approximately 100 metres long. The car park is fronted by a footpath with benches looking towards Hayling Island. The proposed works involve a flood wall and potentially a flip-up flood barrier maintaining access to the car park. It is also proposed to extend the western end of the flood defence to the south, parallel with the road. This is to prevent flood water flowing over the southwest edge of the car park and reaching Langstone Road.

### **2.3.3 Core Scheme ODU 3d to 3e - Floodwall with glass top**

ODU 3d and 3e is along the Ship Inn frontage. ODU 3d involves constructing a wall approximately 40 metres long behind the existing wall to provide a flood defence and support a proposed glass barrier. The new flood wall (without the glass barrier) is to be no higher than the existing flood wall to maintain the view from the pub seating area. The level of the existing wall means the glass barrier will be approximately 0.4 metres high. ODU 3e is a shorter length (12 metres) of frontage immediately to the north of ODU 3d along the edge of the private property garden. A reinforced concrete flood wall is also proposed.

### **2.3.4 Core Scheme ODU 3f to 3h - Floodwall with accessible path**

ODU 3f to ODU 3h is a linear frontage approximately 150 metres long situated along the footpath between the Ship Inn and Winkle Market. This footpath is 1-2 metres wide and sits on top of a vertical brick wall. At the back of the footpath there are garden walls which act as informal defacto secondary defences. The preferred option is to build a new flood wall in front of the existing garden walls and then provide improved access with an accessible path. It is proposed to install trench sheets in front of the existing brick seawall to ensure the future stability of the wall and protect against reductions in foreshore level and undermining of the seawall and footpath by wave action. A new brick wall will be required above the trench sheets to match existing levels. Behind the trench sheets a new reinforced concrete flood defence will be constructed in front of the existing garden walls. Any accessible path will be designed to have a width of 1500 mm to give sufficient space for a wheelchair user and pedestrian to pass each other. The accessible path will be constructed from high quality natural materials to protect the character of the Conservation Area. Two options are being considered:

- Option 1: Install a new flood wall on the level of the existing footpath, potentially on top. The advantage of this option is that it avoids the requirement to excavate in front of the existing garden walls. The wall height will also be less. The installation of the wall units will therefore be quicker and lower cost. The disadvantage is that the accessible path could end up at a raised level compared to the existing footpath, preliminarily estimated at a 0.40 metre increase in level.
- Option 2: Install a new flood wall and accessible path so that the level matches the level of the existing footpath. This option will require excavating in front of the existing walls, construction will be slower and more expensive because of having to work in small sections, potentially with additional temporary works to stabilise the walls. The advantage of this option is that there will be no change in the level of the footpath.
- Option 3: Is to incorporate the existing garden walls into the defences, this is only possible where they are found to provide structural integrity for flood defence purposes over the full life of the Scheme. The advantage to this option is that it reduces the width of footpath that is used to provide a new all. Detailed Design will include the structural investigations required to evaluate this option.

The crest height of the primary line of defence is intended to be 3.8m AOD.

### **2.3.5 Core Scheme ODU 3i - Flood proof residential building and accessible path**

ODU 3i is approximately 10 metres long. The existing defence is a continuation of the vertical masonry with a footpath as per ODU 3h. At the back of the footpath is a residential building wall forming a secondary informal flood defence and is an existing defence. The preferred option is to use the current property wall as a flood defence however further investigation of the existing building is required to confirm that the property is appropriate to be used as a flood defence as part of the Scheme. Along the front of the property, where the current footpath is located, the accessible path would be continued along this sub-unit. Depending on the outcomes of the further investigation work, additional flood proofing could be added to the wall to increase the robustness of the defence, for example, a waterproof membrane could be added to the outer wall. Alternatively, if it is assessed that the building cannot be used as a flood defence then the option of sub-unit 3f to 3h could be extended to 3i.

### **2.3.6 Core Scheme ODU 3j - Floodgate**

ODU 3j is approximately 10 metres in length and spans the highway in front of the slipway at the end of Langstone High Street. Works are anticipated to include two flood gates: a pedestrian gate adjacent the flood-proofed property (sub-unit 3i) and a double leaf gate across the width of the road with a demountable central post. It is proposed to position the gates approximately 3 metres in from the end of the road to minimise the built-up of marine debris interfering with the operation of the gates. In order to achieve this the flood wall from sub-unit 3k would be extended on the north side. On the south side either the side of the property in sub-unit 3i could be relied on as a flood defence or a short section of flood wall constructed.

### **2.3.7 Core Scheme ODU 3k - New parapet wall on alignment of existing wall**

ODU 3k is approximately 100metres long and encompasses the frontage of the Royal Oak public house and adjacent buildings and garden walls. There is a 2-3 metre wide footpath in front of the Royal Oak, which is fronted by a vertical stone faced masonry quay wall. The footpath is wider than the footpath between ODU 3f and 3i and has sufficient space to accommodate a new flood defence. The preferred option would involve construction of a new parapet wall on the alignment of the existing seawall. However further structural assessment of the existing wall is required to confirm it can take the additional load of the parapet. Alternatively, a wall could be placed in front of the existing structure. Because there is some uncertainty about the structural condition of the existing wall, the original option of a wall in front of or on the footprint of the existing seawall is provided as alternative option.

### **2.3.8 Core Scheme ODU 3l - Setback floodwall and earth embankment**

ODU 3l extends a total of 100 metres from ODU 3k into fields to the north and is necessary to tie-in to high ground and prevent outflanking of the scheme alignment. The preferred option is a flood wall along the west side of the footpath in the southern section, transitioning into an earth embankment in the field in the northern section. The structure will replace the existing wall towards the southern end of the sub-unit, either side of the property access, and the fence further north along the property boundary next to the footpath. Therefore, on top of the wall a fence will be installed to the same crest level as the existing, so the appearance remains unchanged. The flood wall has been designed to run along the private property boundary (on the inside), replacing the existing walls and fence. The preliminary design has assumed the walls either side of the property vehicle access are to be replaced. At the southern end of the

sub-unit the wall will connect to a flood gate positioned perpendicular. At the north end of the sub-unit the earth embankment will continue until an existing ground level of 3.5 m Above Ordnance Datum (AOD) is reached. A flood gate will also be required across the private property vehicle entrance. As an alternative to flood gates, stoplogs are also being considered.

### **2.3.9 Additional Scheme ODU 1a - Earth embankment**

ODU 1a comprises the east bank of the Langbrook stream and the field to the east of this. The preferred option is an earth flood embankment. The alignment of the defence is set-back along the eastern edge of the field. It will be less prone to erosion here compared to placing it along the riverward face due to exposure to larger waves and higher velocity river flows along the riverbank. This alignment will also avoid working in tidal conditions.

### **2.3.10 Additional Scheme ODU 1b - Capital refurbishment**

ODU 1b spans the private defences that protect the properties (and gardens) of Mill Lane. This sub-unit frontage has two typical defence structure types. The first structure to the west (Structure 1) is approximately 30 metres long and is a revetment formed of stone pitching and concrete blocks bound with mass concrete. The second structure (Structure 2) is a concrete wall with a concrete apron extending approximately 150 metres along the frontage. The height of the existing defences will not change. At Structure 1 it is proposed to remove and replace the revetment. This would involve steel sheet piling and then constructing a new 500 mm thick concrete revetment, with dowels to connect it to the existing wall. The apron at Structure 2 will also be removed and replaced. This is likely to involve new steel sheet piling. The new sheet piling would be driven seaward of the existing sheet piles. An offset allowance will have to be provided from the existing sheet piles as these might have not been installed completely vertical. Therefore, the proposed structure will end up having a larger footprint along the lengths with existing sheet piling. Potentially in the location of Structure 1 (west) the width of the revetment could be narrowed as the existing apron is being removed and replaced, however at this stage the existing profile has been maintained. The MHWS level is above the apron level, however, the Mean Water Level (MWL) is below the apron toe. Access to most areas of the seawall will be possible working either side of low water. However, tidal working hours are yet to be determined. It is envisaged that the steel sheet piles will need to be installed from the foreshore.

### **2.3.11 Additional Scheme ODU 2a Rock armour**

ODU 2a encompasses Langstone Spit which is a man-made sand / shingle spit that has remained a feature of the coastline since the Hayling Island railway came out of service. Parts of the spit are showing signs of erosion, which is particularly noticeable at the southern tip. The main risk to this ODU is from erosion rather than flooding. The preferred option is to install rock armour protection at the south end of the spit, (approximately 50 metres in length). The layer of primary armour will have a thickness of at least two rocks and therefore will be approximately 5-7 metres wide. This will provide increased wave dissipation and will provide better protection to the spit from erosion than one layer. The footprint of the rock has been limited to the area undergoing down wear and erosion (the narrowest part of the spit) to enable ongoing protection of the adjacent sailing club.

## **2.4 Mitigation measures**

A number of mitigation measures have already been considered and incorporated into the outline design to minimise and mitigate adverse effects of the Scheme on the environment:

- Careful development of the outline design to minimise both the direct effects on intertidal habitats and the indirect effects from changes in coastal processes
- Measures to minimised effects on terrestrial habitats including limiting vegetation clearance
- Development of the construction programme to avoid impacts to overwintering birds specifically
- Adoption of appropriate on-site construction measures through an appropriate Construction Environmental Management Plan (CEMP) including minimising the risk of accidents and spillages into the watercourse through the use of bunding and/or storage facilities to contain and prevent the release into the marine environment of fuels, oils etc

## **3 Legislative Framework**

### **3.1 Planning Permission**

Planning permission may be required from the LPA for any 'development' carried out down to the Mean Low Water (MLW) mark, in accordance with the Town and Country Planning Act 1990.

Any planning consent will take account of the National Planning Policy Framework (NPPF) 2012 (as amended), which sets out the UK Government's planning policies for England, and the Havant Borough Local Plan (Core Strategy and Allocations Plan) (Havant Borough Council, 2011 and 2014).

### **3.2 Environment Agency Consents**

The roles and responsibilities of different flood risk management authorities are set out in the Flood and Water Management Act, 2010. Coastal Partners is a Risk Management Authority as set out in section 6 (13) of the Flood and Water Management Act 2010<sup>3</sup>. However, separate permissions may also be required from the Environment Agency such as a Flood Risk Activity Permit (FRAP) under the Environmental Permitting (England and Wales) Regulations 2016. This legislation includes requirements for environmental permits for works in, over, under or near a main river or flood defence, or within a flood plain. This is to ensure activities do not cause a risk of flooding, make existing flood risk worse or interfere with flood risk management assets.

Under the terms of the Land Drainage Act 1991, Water Resources Act 1991, Environmental Permitting (England and Wales) Regulations 2016 and associated byelaws, prior written consent from the Environment Agency is required for any works in, under, over or near (within 16 m) the bank of a tidal main river.

At the time of writing, the detailed design and associated construction methods are still to be developed. Any permitting requirements will be discussed with the Environment Agency and incorporated within further work where necessary.

### **3.3 Land and seabed ownership**

The Scheme will require consent from a range of land and seabed owners. This is anticipated to include private individuals, HCC, Chichester Harbour Conservatory, The Crown Estate and HBC. In addition, Langstone Harbour Board and Chichester Harbour Conservancy will be consulted where necessary due to the proximity of their Statutory Harbour Authority boundary to the Scheme.

### **3.4 The Requirement for an Environmental Impact Assessment (EIA)**

The need for, and scope of, a statutory EIA under the EIA Directive (85/337/EEC) is transposed under the Marine Works (EIA) (Amendment) Regulations 2017 and/or the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

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<sup>3</sup> <https://www.legislation.gov.uk/ukpga/2010/29/section/6> (Last Accessed August 2020)

These regulations implement the European Community (EC) Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), as amended by EC Directive 97/11/EC.

The requirement for an EIA will be confirmed by seeking a screening/scoping opinion under these regulations from the MMO and HBC respectively via the Coastal Concordat (see **Section 3.14**).

### **3.5 Town and Country Planning (Environmental Impact Assessment) Regulations 2017**

Any works carried out down to Mean Low Water (MLW) may be subject to an EIA under the Town and Country Planning (EIA) Regulations 2017 (Statutory Instrument 2011 No. 1824).

### **3.6 The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017**

The Marine Works (EIA) (Amendment) Regulations 2017 transpose the EIA Directive into English and Welsh Law in relation to the following activities:

- Harbour works which require approval or consent pursuant to a local Act or an order made under Section 14 or 16 of the Harbours Act 1964; and
- Activities which are regulated under the Marine and Coastal Access Act 2009 (i.e. those activities which require a 'Marine Licence').

The regulations apply to marine licences issued by the MMO and implement a legal requirement on the MMO that an EIA be undertaken for certain types of development before consent is granted. The requirements for an ES will be confirmed by the MMO and HBC in their screening and scoping opinion.

### **3.7 Marine and Coastal Access Act 2009**

The Marine and Coastal Access Act 2009 came into force on 6 April 2011 and covers the area from MHWS out to 12 nautical miles. This legislation requires anybody wishing to undertake works below MHWS to obtain a marine licence from the MMO. The proposed Scheme will therefore require a marine licence including for the demolition of structures below MHWS and construction or refurbishment below MHWS.

The UK Marine Policy Statement (HM Government, 2011) contributes to the achievement of sustainable development in the UK marine area. Prepared under Section 44 of the Marine and Coastal Access Act 2009, it provides the framework for the preparation of Marine Plans and informing decisions affecting the marine environment. It ensures that marine resources are used in a sustainable way in line with marine objectives thereby:

1. Promoting sustainable economic development;
2. Enabling the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects;
3. Ensuring a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets; and
4. Contributing to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.

The proposed Scheme is within the area covered by the South Inshore Marine Plan, published in July 2018 by the Department for Environment, Food and Rural Affairs (Defra, 2018). Policies are presented within an economic, social and environmental framework, helping to support the high-level objectives set out in the UK Marine Policy Statement, as well as sustainable development of the marine area. In taking a proportionate approach to applying policies, it is highlighted that consideration should be given to the scale, complexity and impact of a Scheme. Further consideration of the policies in the South Marine Plan in relation to the proposed Scheme will be provided within the ES where necessary.

The Marine and Coastal Access Act 2009 facilitates the establishment of an ecologically coherent network of Marine Protected Areas (MPAs). The Act established a new type of MPA called a Marine Conservation Zone (MCZ) to protect nationally important marine wildlife, habitats, geology and geomorphology. The nearest MCZs to the Scheme are the Selsey Bill and the Hounds MCZ and Bembridge MCZ over 14 km south east and south west respectively. Considering this distance MCZs have not been considered further.

### **3.8 Marine Strategy Framework Directive**

The Marine Strategy Framework Directive (MSFD) (2008/56/EC) aims to protect the marine environment across Europe. It aims to achieve good environmental status of marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The MSFD constitutes the vital environmental component of future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. It establishes European Marine Regions on the basis of geographical and environmental criteria. Each Member State is required to develop strategies for its marine waters.

The MSFD applies to the landward boundary of coastal waters as defined under the WFD (i.e. from MHWS) to the outer limit of the UK Exclusive Economic Zone (EEZ), as well as the area of UK continental shelf beyond the EEZ. Reporting against the MSFD is a cyclical process, and updated assessments and Marine Strategy documents are anticipated in due course. The anticipated pressures exerted on the marine environment by the Scheme are considered to be of such a small magnitude in the context of UK Marine Regions that they are unlikely to be a significant issue in relation to the MSFD. The MSFD is therefore not considered further.

### **3.9 The Conservation of Habitats and Species Regulations 2017 and The Convention on Wetlands of International Importance especially as Waterfowl Habitat (The Ramsar Convention 1971)**

Chichester and Langstone Harbours as well as the Solent are protected by a number of national and international nature conservation designations, including Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites. Consequently, the Scheme will be subject to the provisions of EC Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive), implemented in the UK through The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations)<sup>4</sup>.

In accordance with Regulation 63 of the Habitats Regulations, a Habitats Regulations Assessment (HRA) is required for any plan or project not connected with the management of

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<sup>4</sup> Modified by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 on 31 January 2020

a European site, which is likely to have a significant effect on the site either alone or in combination with other plans and projects. European sites comprise SPAs, as designated under EC Directive 79/409/EEC (the Birds Directive), or SACs as designated under the Habitats Directive. In addition to sites designated under European nature conservation legislation, UK Government policy (ODPM Circular 06/2005) states that internationally important wetlands designated under the Ramsar Convention 1971 (Ramsar sites) are afforded the same protection as SPAs and SACs for the purpose of considering development proposals that may affect them. Where required, the HRA should be undertaken by the 'competent authority' (either the MMO or HBC for the proposed Scheme, see Coastal Concordat **Section 3.1.4**), with advice from Natural England. An HRA screening report is provided in **Appendix A**.

### **3.10 Water Framework Directive**

The Water Framework Directive (WFD) (2000/60/EC)<sup>5</sup> establishes a legal framework to protect and restore clean water across Europe to ensure its long-term, sustainable use. It applies to waters out to one nautical mile from the baseline from which territorial waters are drawn. One of the aims of the WFD is to ensure that all European water bodies are of Good Ecological Status or Potential by 2015 by the setting of Environmental Quality Objectives (EQOs) for water chemistry, ecological and hydromorphological quality parameters.

For this Scheme, permission must be sought from the Environment Agency to ensure that the development complies with the WFD. The Scheme is unlikely to result in non-temporary (i.e. permanent) effects on WFD parameters and deterioration to the current status of the adjacent water bodies is not predicted, nor are the proposed works expected to prevent these water bodies from achieving their long-term future WFD status objectives. This is detailed further in **Section 4.3 Water and Sediment Quality**. WFD scoping tables are provided in **Appendix B**.

### **3.11 Waste Framework Directive 2008**

The Waste Framework Directive (2008/98/EC) provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste. The directive requires all Member States to take the necessary measures to ensure waste is recovered or disposed of without endangering human health or causing harm to the environment and includes permitting, registration and inspection requirements. The directive also requires Member States to take appropriate measures to encourage, firstly, the prevention or reduction of waste production and its harmfulness and, secondly, the recovery of waste by means of recycling, re-use or reclamation or any other process with a view to extracting secondary raw materials, or the use of waste as a source of energy. The directive's overarching requirements are supplemented by other directives for specific waste streams.

The classification of excavation material and other waste produced during the construction phase will be sought in line with the Waste Framework Directive.

### **3.12 Wildlife and Countryside Act 1981 (as amended)**

Under the terms of Section 28(4)b of the Wildlife and Countryside Act 1981 as amended by Schedule 9 to the Countryside and Rights Of Way Act (CROW) 2000, any operations within, or adjacent to, a Site of Special Scientific Interest (SSSI) require consent from Natural England.

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<sup>5</sup> Modified by the Floods and Water (Amendment etc) (EU Exit) Regulations 2019 on 31 January 2020

Approval under the Section 28 of the Wildlife and Countryside Act 1981 (as amended by the CROW Act 2000) would be included in Natural England's overall advice under the Habitats Regulations and also Natural England's response to the marine licence application and planning application.

### **3.13 Natural Environment and Rural Communities (NERC) Act 2006**

The Natural Environment and Rural Communities (NERC) Act 2006 states that 'every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'.

It is deemed that by complying with the NPPF, EIA Regulations and other legislation set out above this project will address the requirements of the NERC Act 2006.

### **3.14 Coastal Concordat**

In November 2013, the government introduced the Coastal Concordat, which was revised in December 2019. The government's 25 Year Environment Plan aims for all Local Authorities with a coastal interest to adopt the concordat by 2021.

The concordat provides a framework within which the separate processes for the consenting of coastal developments in England can be better coordinated. As highlighted in the above sections, there are numerous legislations and regulations that apply to this overall project with a number of authorities who are required to provide consents / licences.

The aim of the concordat is to provide applicants / developers with a single point of contact for schemes which require multiple consents, such as a marine licence, planning permission and FRAP and for statutory / regulatory bodies to coordinate their responses back to applicants / developers (so for example developers are not producing multiple reports for different organisations) and where legally possible dispense with and / or defer regulatory responsibilities.

HBC as the local planning authority are anticipated to undertake the role of the 'single point of entry' for Coastal Partners and initiate the concordat implementation process. Through the concordat process the various authorities will confirm what consents / licences will be required (including the requirements for EIA, HRA and WFD).

### **3.15 Planning policy context**

The following plans are considered to be of relevance to the project.

#### **3.15.1 National Planning Policy Framework**

The NPPF<sup>6</sup> and planning practice guidance aims to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

#### **3.15.2 Local Planning**

HBC has adopted a local plan made up of the Core strategy (2011) and the Site allocations plan (2014) (HBC, 2011 and 2014). At the time of writing, the Havant Borough Local Plan 2036 is at pre-submission stage (HBC, 2020). This includes 44 separate local policies covering the environment, infrastructure, housing and commercial development. 24 policies relate to

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<sup>6</sup> First published in 2012 and last updated 2019 <https://www.gov.uk/guidance/national-planning-policy-framework> (Last accessed September 2020)

the environment. This includes E4: Development on the coast, which identifies that new or replacement coastal defence schemes will be permitted where the works are consistent with the management approach for the frontage presented in the North Solent SMP and it has been demonstrated that there will be no material adverse impacts on the environment or that these impacts can be mitigated. In addition, the Scheme supports the following Pre-submission Local Plan Policies:

- C2 Tourism
- DR2 Regeneration
- E13 Historic Environment and Heritage Asset
- E14 The Local Ecological Network
- E15 Protected Species
- E16 Solent Special Protection Area
- E17 Solent Wader and Brent Goose feeding and roosting sites
- E2 Health and Wellbeing
- E4 Development on the Coast
- E5 Chichester Harbour Area of Outstanding Natural Beauty
- IN1 Effective Provision of Infrastructure

The ES will consider the current adopted and new pre-submission version of the Local Plan where necessary, together with supplementary planning documents and other plans and strategies as required including:

- Hampshire Minerals and Waste Plan (HCC *et al.* 2013);
- Chichester Harbour Area of Outstanding Natural Beauty Joint Supplementary Planning Document (Chichester District Council and HBC, 2017);
- Hampshire Biodiversity Action Plans<sup>7</sup>;
- North Solent SMP2 (December 2010) - Selsey Bill to Hurst Spit (New Forest District Council, 2010);
- Solent Coastal Habitat Management Plan (Bray and Cottle, 2003);
- Solent European Marine Site Management Plan<sup>8</sup>;
- Solent Waders and Brent Goose Strategy (Whitfield, 2019);
- The Solent Recreation Mitigation Partnership (Bird Aware Solent)<sup>9</sup>; and
- The Partnership for South Hampshire (PfSH) policies and strategies<sup>10</sup>

### **3.16 Archaeology and historic environment**

#### **3.16.1 Planning (Listed Buildings and Conservation Areas) Act (1990)**

The Planning (Listed Buildings and Conservation Areas) Act 1990 covers the registration of Listed Buildings (buildings that are seen to be of special architectural or historic interest) and designation of Conservation Areas (areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance).

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<sup>7</sup> <https://www.hants.gov.uk/landplanningandenvironment/environment/biodiversity/conserving> (Last Accessed August 2020)

<sup>8</sup> <http://www.solentems.org.uk/> (Last Accessed August 2020)

<sup>9</sup> <https://solent.birdaware.org/about-us> (Last Accessed August 2020)

<sup>10</sup> <https://www.push.gov.uk/> (Last Accessed August 2020)

A Listed Building may not be demolished, altered or extended in any manner which would affect its character as a building of special architectural or historic interest without Listed Building Consent being granted. There are three grades of listing (in descending order):

- Grade I: buildings of exceptional interest;
- Grade II\*: particularly important buildings of more than special interest; and
- Grade II: buildings of special interest, warranting every effort to preserve them.

Section 66 1) of the Planning (Listed Building and Conservation Areas) Act 1990 provides that when considering whether to grant permission for development which affects a Listed Building or its setting, the local planning authority shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. As a consequence, the desirability of preservation must be given considerable importance and weight in the decision making process. Section 72 of the Act states that with respect to buildings or land within a Conservation Area, special attention should be paid to the desirability of preserving or enhancing the character or appearance of that area.

### **3.16.2 Ancient Monuments and Archaeological Areas Act 1979 (as amended)**

Under the terms of the Act an archaeological site or historic building of national importance can be designated as a Scheduled Monument and is registered with the Department of Culture, Media and Sport (DCMS). Any development that might affect either the Scheduled Monument or its setting is subject to the granting of Scheduled Monument Consent. Historic England advises the government on individual cases for consent and offers advice on the management of Scheduled Monuments. It is an offence to disturb a Scheduled Monument by carrying out works without consent, cause reckless or deliberate damage to a monument, use a metal detector or remove an object found at a Scheduled site without a licence from Historic England. There are no Scheduled Monuments within the Scheme area, so this Act is not considered further.

### **3.16.3 Register of Parks and Gardens in England**

The Register of Parks and Gardens of Special Historic Interest in England is maintained by Historic England and divides the sites into three grade bands similar to those used for Listed Buildings. There are no Registered Parks or Gardens within the Scheme area, so this is not considered further.

## 4 Environmental Receptors

This ESR includes consideration of impacts associated with the construction (including surveys) and operation (including maintenance) associated with the Scheme.

This section identifies the key environmental issues that are scoped in for further assessment work and those that have been scoped out. This process has been informed by a review of existing and readily available sources of information, including previous study reports, site surveys and web-based information.

In summary, the following issues (or receptors/topics) are considered to be potentially relevant and have been reviewed further in the subsequent sections:

- Environmental Designations;
- Land Quality and Hydrology;
- Water and Sediment Quality;
- Coastal Processes;
- Ornithology;
- Terrestrial Ecology;
- Marine Ecology;
- Archaeology and Historic Environment;
- Landscape and Visual;
- Commercial Fisheries and Navigation;
- Socio Economic, Amenity and Recreation;
- Traffic and Access;
- Noise and Vibration;
- Air quality; and
- Cumulative Effects.

**Table 4.1** summarises the environmental receptors which were excluded from further consideration in this ESR, including a justification.

**Table 4.1: Environmental Receptors excluded from further consideration**

| Receptor                     | Justification                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coastal and Flood protection | As detailed in <b>Section 1.2 Scheme Rationale</b> , the majority of current defences have residual lives of less than 5 years and therefore, without the Scheme, the existing community will continue to be at significant flood risk. The Scheme is therefore considered to have a beneficial effect on coastal and flood protection and scoped out of further consideration.                                                      |
| Climate change               | The Scheme has a design life of 50 years including for future sea level rise predictions due to climate change (see <b>Section 1.2</b> ). Changes in relation to the future baseline including climate change will be considered within individual receptor topics where necessary. Overall, the Scheme is considered to have a beneficial effect for climate change adaption and is not considered further for separate assessment. |

Potential environmental effects associated with human health are considered to be already encompassed within wider topics, namely Landscape and visual (**Section 4.9**), Socio Economic, Amenity and Recreation (**Section 4.11**), Noise and Vibration (**Section 4.13**) and Air Quality (**Section 4.14**). Consequently, human health is not considered separately.

The following sections provide a brief overview of the baseline environment for each of the topics considered. This is followed by a review of the possible mechanisms by which the Scheme may cause a potential (direct or indirect) impact to a receptor or whether significant effects are not expected, and the topic is therefore scoped out of further assessment and will not be included in the ES. The specific studies and/or further assessment work that will be undertaken (for topics scoped in for further assessment) has also been provided.

## 4.1 Environmental Designations

The Scheme is located adjacent and within both Chichester and Langstone Harbours, where Hayling Island joins the mainland. Langstone and Chichester Harbours and their surroundings support a host of habitats and species of significant ecological and nature conservation importance. This is reflected in the number of sites that have gained international and national designation status both within and adjacent to the harbours. For designations relating to archaeology and historic environment see **Section 4.8**.

### 4.1.1 Baseline Conditions

**Table 4.2** provides a summary of the international and national designated sites within and surrounding the Scheme. **Figures 3 and 4** show the location of these designated sites. A Preliminary Ecological Assessment (PEA) has been undertaken and appended to this report (**Appendix E**). This Section includes a summary of its findings and recommendations.

#### Habitats and site designations

The proposed scheme is within and adjacent to the Solent Maritime SAC, Chichester and Langstone Harbours SPA/Ramsar, Chichester Harbour SSSI and Langstone Harbour SSSI. There are an additional two SPAs and one Ramsar site within 7 km of the Scheme and one additional SSSI within 2 km of the Scheme.

**Table 4.2: Statutory environmental designation within 7km of the site (SSSI within 2 km of site)**

| Statutory Nature Conservations    | Designation                               | Distance and direction |
|-----------------------------------|-------------------------------------------|------------------------|
| Solent Maritime                   | SAC                                       | Adjacent/overlaps      |
| Chichester and Langstone Harbours | SPA                                       | Adjacent/overlaps      |
| Chichester and Langstone Harbours | Ramsar                                    | Adjacent/overlaps      |
| Chichester Harbour                | Area of Outstanding Natural Beauty (AONB) | Adjacent/overlaps      |
| Chichester Harbour                | SSSI                                      | Adjacent/overlaps      |
| Langstone Harbour                 | SSSI                                      | Adjacent/overlaps      |
| Warblington Meadow                | SSSI                                      | 1.1 km (north east)    |
| South Downs                       | National Park                             | 5 km (north east)      |
| Solent and Dorset Coast           | SPA                                       | 6 km (south)           |
| Portsmouth Harbour                | SPA                                       | 6.6 km (west)          |
| Portsmouth Harbour                | Ramsar                                    | 6.6 km (west)          |

## International Environmental Designations



Figure 3. | International and National designations (SPA, SAC, Ramsar)- note that all SPA, Ramsar and SAC is also SSSI.

## National Environmental Designations

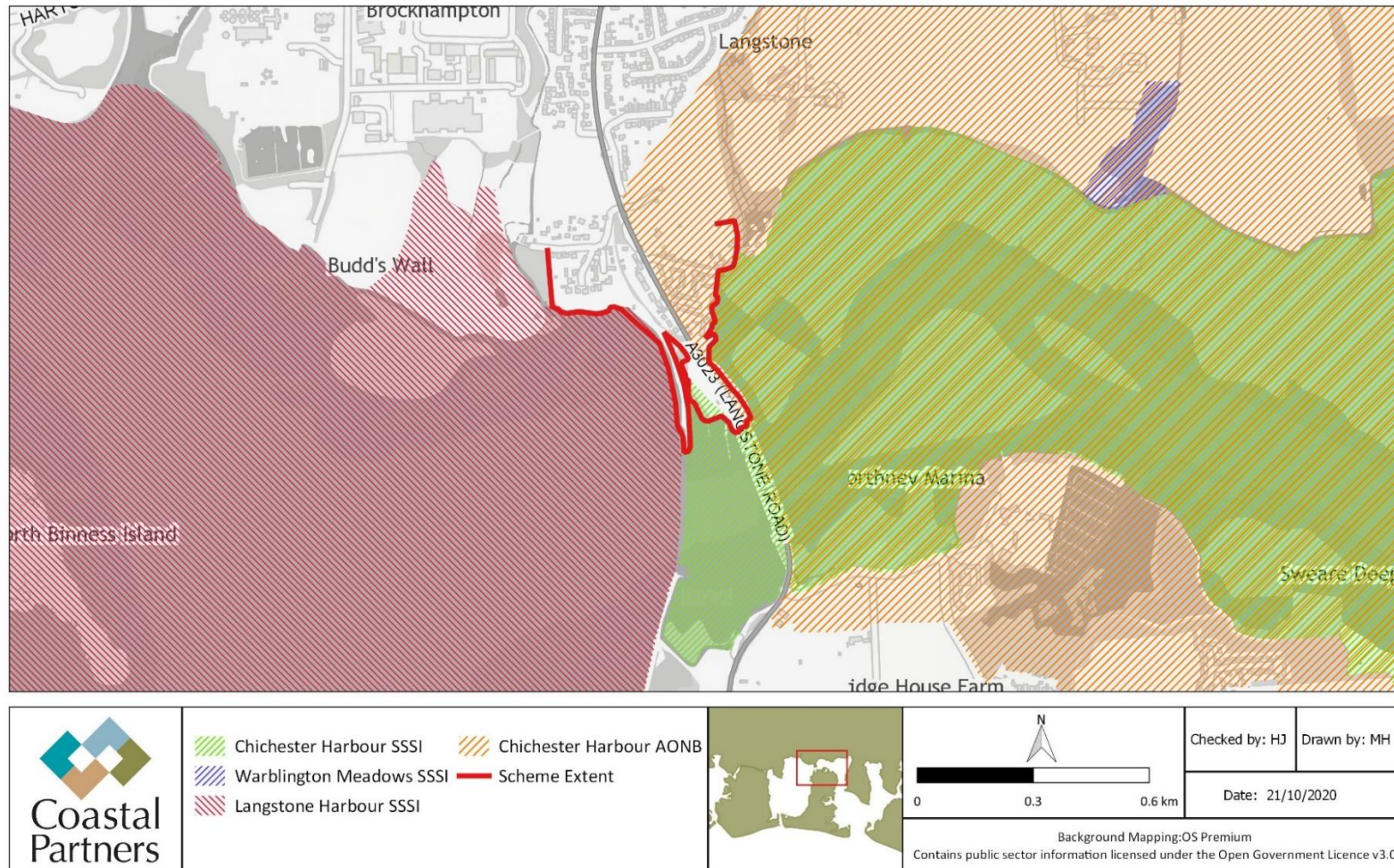


Figure 4. | National designations (AONB, SSSI)

There are 24 Sites of Importance for Nature Conservation (SINCs) within 2 km of the Scheme including the Langstone Mill Pond SINC. The nearest within approximately 1 km are shown in **Figure 5**.

#### **4.1.2 Potential Impacts**

An HRA screening report has been provided in **Appendix A**. The following sections review the potential impacts of the proposed works on ecology receptors including relevant protected habitats/species and interest features of nature conservation sites both indirectly (see **Section 4.2 Land Quality and Hydrology**, **Section 4.3 Water and Sediment Quality** and **Section 4.4 Coastal Processes**) and directly (see **Section 4.5 Ornithology**, **Section 4.6 Terrestrial Ecology** and **Section 4.7 Marine Ecology**). Consequently, no specific potential impacts have been identified in this section.

#### **4.1.3 Recommendations for further work**

The following investigations are proposed to be undertaken:

- HRA – see **Appendix A** for more information.
- A suite of investigations (noted in the relevant sections below) are required to assess the potential for harm to nature conservation interests.

## Local Environmental Designations

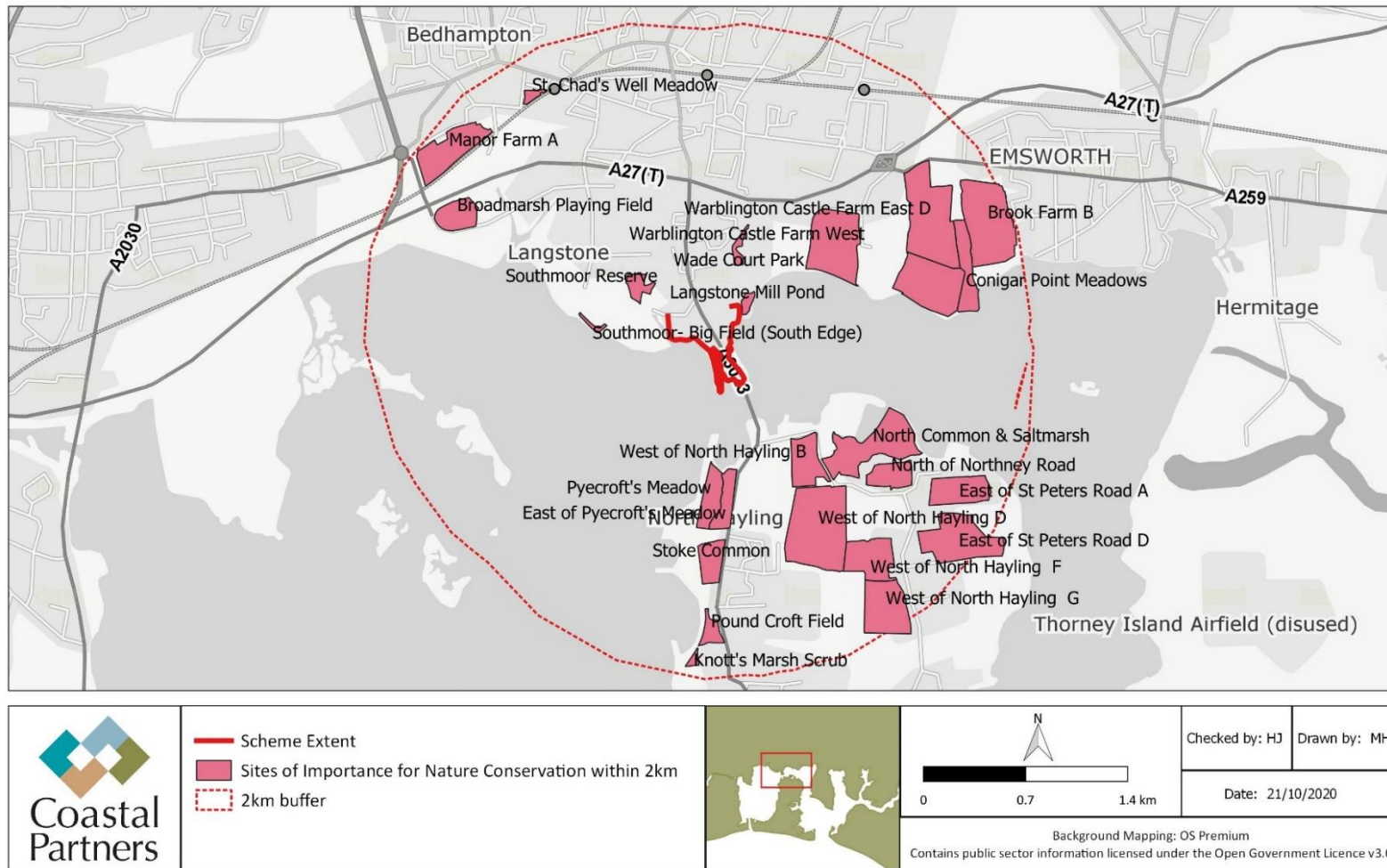


Figure 5. | SINCs in the Scheme area

## 4.2 Land Quality and Hydrology

This section of the report considers the potential impacts from the proposed Scheme on land quality and hydrogeology, including aspects of human health.

### 4.2.1 Baseline Conditions

Preliminary investigations have been undertaken specifically ground investigations (**Available on request due to length**) and summarised within the concept ground models (**Appendix F**). This work included a review of land use and geo-environmental information, to assess the likely ground conditions and identify potential sources of contamination.

#### Ground conditions

In September 2018, ground investigations were carried out at Langstone by WYG which included boreholes, trial pits, ground water monitoring, exploratory concrete core samples from the existing sea defence walls; in-situ testing in boreholes; chemical and geotechnical sampling in exploratory holes; and laboratory geotechnical and geo-environmental testing of soils and rock (summarised in **Appendix F**).

In summary the studies identified the Scheme is underlain by river terrace deposits (clays, silts, sands and gravels) which in turn is underlain by chalk strata. The west of the frontage is bounded by the Langbrook Stream, and the Lymbourne Stream is present to the east (both main rivers). The site is underlain by secondary aquifers, lies within a nitrate vulnerable zone and soils that have a high leaching potential.

Langstone was established as a coastal village on the earliest historical map (1866). A railway, sidings and coal wharf were present until 1977 when the railway was shown as dismantled. Alongside residential dwellings, boathouses, sailing clubs, slipways, quays and a coastguard station have been present within the study area. Organic and inorganic contaminants (including organo-tin compounds and asbestos) may be present in the vicinity of boat yards, quays and slipways, sourced from boat maintenance activities. Inorganic and organic contaminants, in particular sulphates and poly-cyclic aromatic hydrocarbons may be present in the location of the former coal wharf (now Langstone Sailing Club's boat yard). Based upon historical maps it also appears that this area is reclaimed and therefore it is considered that this locality is likely to pose the greatest risk of ground contamination.

#### Contamination

The contamination results from the geo-environmental sampling undertaken as part of the ground investigations are shown in **Table 4.3** and compared with the land soil quality human health threshold criteria (Public Open Spaces (Parks) Generic Assessment Criteria). Sample locations are shown in **Figure 6**. Only one sample (WS03, behind Langstone Sailing Club and adjacent to the footpath) exceeded the lowest threshold criteria for the Polycyclic Aromatic Hydrocarbon (PAH) Dibenzo(a,h)anthracene. This compound is primarily associated with petrol emissions, cigarettes, coal tar, soot and certain food products, especially smoked and barbecued foods.

**Table 4.3: Langstone Ground Investigation contamination results interpreted from WYG 2018, against land soil quality human health threshold criteria – Public Open Spaces (Parks) Generic Assessment Criteria**

| Analyte                 | Unit  | LoD   | Threshold criteria: Soil Organic Matter (SOM) |        |        | Sample number and depth (m) |              |              |              |              |              |
|-------------------------|-------|-------|-----------------------------------------------|--------|--------|-----------------------------|--------------|--------------|--------------|--------------|--------------|
|                         |       |       | 1                                             | 2.5    | 6      | BH03<br>0.30                | WS03<br>0.50 | WS03<br>2.20 | WS05<br>0.30 | WS02<br>1.00 | WS02<br>3.30 |
| <b>Metals</b>           |       |       |                                               |        |        |                             |              |              |              |              |              |
| Arsenic (As)            | mg/kg | 0.6   | -                                             | -      | 168    | 4.43                        | 6.92         | 5.46         | 9.68         | 10.7         | 9.55         |
| Cadmium (Cd)            | mg/kg | 0.02  | -                                             | -      | 880    | 0.237                       | 0.657        | 0.302        | 0.374        | <0.02        | 0.0201       |
| Chromium (Cr)           | mg/kg | 0.9   | -                                             | -      | 250    | 10.8                        | 6.73         | 5.92         | 4.16         | 4.04         | 3.46         |
| Copper (Cu)             | mg/kg | 1.4   | -                                             | -      | 44000  | 8.33                        | 21.8         | 3.94         | 21.7         | 51.9         | 16.3         |
| Lead (Pb)               | mg/kg | 0.7   | -                                             | -      | 1300   | 59.7                        | 38.4         | 3.57         | 29.3         | 11.4         | 8.31         |
| Mercury (Hg)            | mg/kg | 0.14* | -                                             | -      | 30     | <0.14                       | <0.14        | <0.14        | <0.14        | <0.14        | <0.14        |
| Nickel (Ni)             | mg/kg | 0.2   | -                                             | -      | 3400   | 12.4                        | 14.7         | 8.71         | 14.7         | 5.67         | 5.17         |
| Zinc (Zn)               | mg/kg | 1.9   | -                                             | -      | 170000 | 40.6                        | 57.2         | 29.2         | 59.9         | 27.5         | 26.3         |
| <b>PAHs</b>             |       |       |                                               |        |        |                             |              |              |              |              |              |
| Naphthalene             | mg/kg | 0.009 | 1200                                          | 1900   | 3000   | <0.009                      | 0.18         | <0.009       | 0.0165       | <0.009       | <0.009       |
| Acenaphthylene          | mg/kg | 0.012 | 29000                                         | 30000  | 30000  | <0.012                      | 0.982        | <0.012       | 0.051        | <0.012       | <0.012       |
| Acenaphthene            | mg/kg | 0.008 | 29000                                         | 30000  | 30000  | <0.008                      | 0.43         | <0.008       | <0.008       | 0.0862       | <0.008       |
| Fluorene                | mg/kg | 0.01  | 20000                                         | 20000  | 20000  | <0.01                       | 0.55         | <0.01        | <0.01        | 0.0703       | <0.01        |
| Phenanthrene            | mg/kg | 0.015 | 6200                                          | 6200   | 6300   | <0.015                      | 7.34         | <0.015       | 0.107        | 1.05         | 0.0467       |
| Anthracene              | mg/kg | 0.016 | 150000                                        | 150000 | 150000 | <0.016                      | 2.1          | <0.016       | 0.0599       | 0.292        | <0.016       |
| Fluoranthene            | mg/kg | 0.017 | 6300                                          | 6300   | 6400   | 0.0358                      | 14           | <0.017       | 0.460        | 1.46         | 0.101        |
| Pyrene                  | mg/kg | 0.015 | 15000                                         | 15000  | 15000  | 0.0342                      | 12           | <0.015       | 0.434        | 1.13         | 0.079        |
| Benzo[a]anthracene      | mg/kg | 0.014 | 49                                            | 56     | 62     | 0.024                       | 6.58         | <0.014       | 0.224        | 0.703        | 0.0458       |
| Chrysene                | mg/kg | 0.010 | 93                                            | 110    | 120    | 0.0236                      | 5.44         | <0.010       | 0.212        | 0.566        | 0.0396       |
| Benzo[b]-fluoranthene   | mg/kg | 0.015 | 13                                            | 15     | 16     | 0.0332                      | 9.96         | <0.015       | 0.389        | 0.701        | 0.058        |
| Benzo[k]fluoranthene    | mg/kg | 0.014 | 370                                           | 410    | 440    | <0.014                      | 2.82         | <0.014       | 0.172        | 0.209        | 0.0183       |
| Benzo[a]pyrene          | mg/kg | 0.015 | 11                                            | 12     | 21     | 0.0238                      | 7.19         | <0.015       | 0.249        | 0.544        | 0.0358       |
| Indeno[123,cd]-pyrene   | mg/kg | 0.018 | 150                                           | 170    | 180    | <0.018                      | 5.7          | <0.018       | 0.190        | 0.274        | 0.0221       |
| Dibenzo[a,h]-anthracene | mg/kg | 0.023 | 1.1                                           | 1.3    | 1.4    | <0.023                      | 1.22         | <0.023       | 0.0486       | 0.0709       | <0.023       |
| Benzo[ghi]perylene      | mg/kg | 0.024 | 1400                                          | 1500   | 1600   | <0.024                      | 5.26         | <0.024       | 0.179        | 0.326        | 0.0254       |
| Asbestos                | -     | -     | -                                             | -      | -      | Not detected                |              |              |              |              |              |

Guideline used (mg/kg):

Defra 2014: Category 4 Screening Level (C4SL) (Contaminated Land: Application in Real Environment (CL:ARE), 2014)

LQM/CIEH 2015: Suitable 4 Use Level (S4UL)

Langstone 2018 Ground Investigations

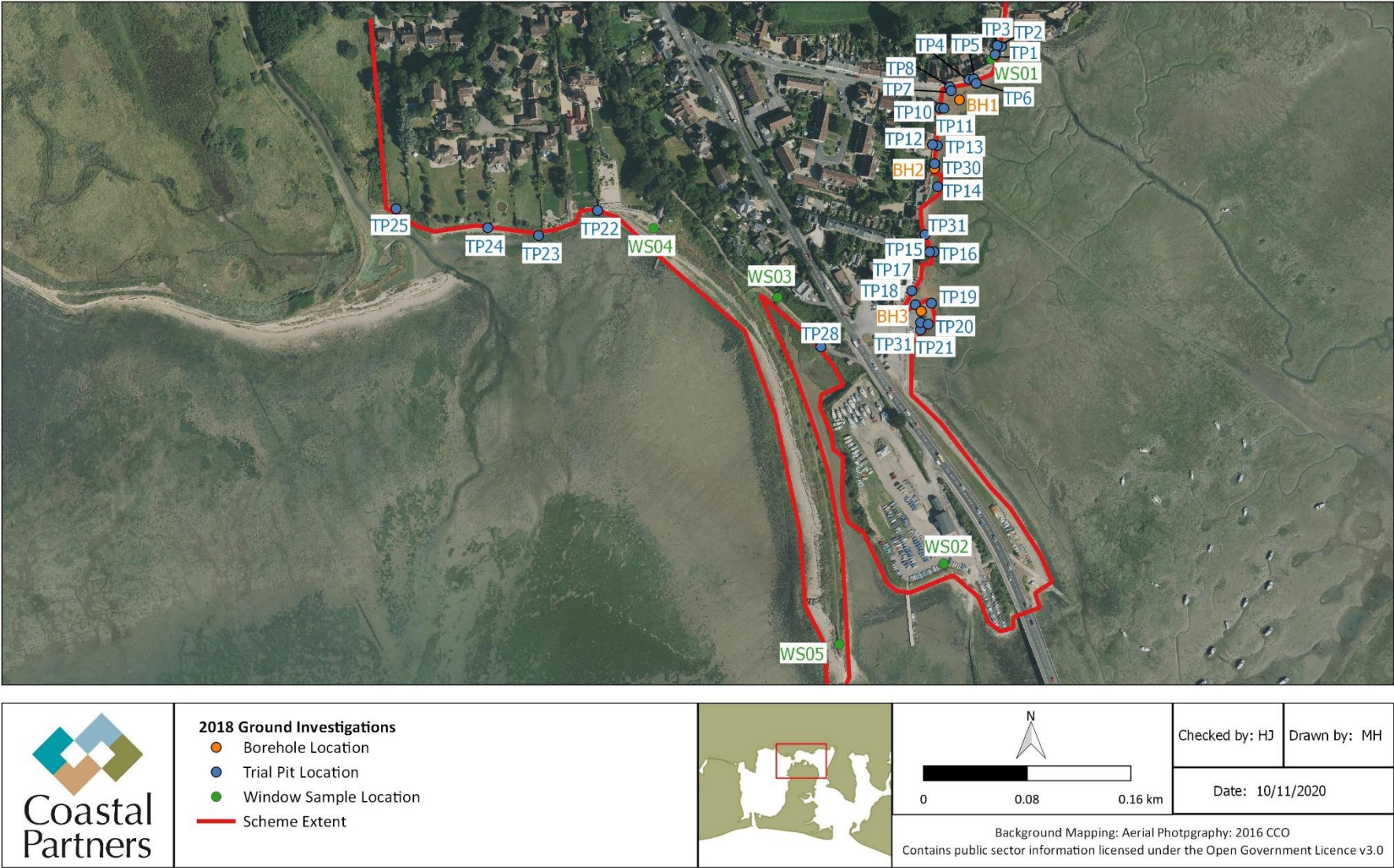


Figure 6. | Location of Ground Investigation Sample Locations

## 4.2.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect land quality and hydrology. **Table 4.4** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.4: Potential Land Quality and Hydrology pathways**

| Impact pathway (s)                                   | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impacts to land quality and hydrology (construction) | Core Scheme – Out<br>Additional Scheme - Out | There is the potential for contaminated land to be disturbed during construction. As shown in <b>Table 4.3</b> a number of geo-environmental samples, including for contamination, have been collated covering the extent of the Scheme. All samples were shown to be below the threshold criteria for 2.5 and 6 Soil Organic Matter (SOM). There was one exceedance of the threshold for SOM1 located behind Langstone Sailing Club and adjacent to the footpath (WS03). This marginal exceedance in one PAH (Dibenzo(a,h)anthracene) at one sample location is considered likely to be associated with an isolated pollution incident. A contaminated land method statement and materials management plan will be produced for approval by HBC prior to the commencement of construction works (see <b>Section 4.2.3 - Recommendations for further work</b> ). Consequently, no significant potential impacts on land quality and hydrology during construction are anticipated and this pathway is therefore scoped out. |
| Impacts to land quality and hydrology (operation)    | Core Scheme – Out<br>Additional Scheme - Out | All new surfaces will use clean materials and will cap any underlying contaminated soils. Consequently, no potential impacts on land quality and hydrology are anticipated and this pathway is therefore scoped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## 4.2.3 Recommendations for further work

All potential impacts on land quality and hydrology have been scoped out. A contaminated land method statement and materials management plan will be produced for approval by HBC prior to the commencement of construction works. These will include details of:

- Where soils will be stored, tested and transferred, and the approach to be used when soils excavated do not meet re-use criteria;
- A strategy for dealing with any unexpected contamination encountered during construction; and
- Construction best practice techniques to reduce the risk of transferring any contaminants.

- Any materials to be re-used within the works will be managed in accordance with the approved materials management plan and contaminated land method statement.
- Any materials to be imported for the works will be tested to ensure they are clean and suitable for the proposed use prior to importation and placement within the works.
- Any materials to be removed from the site will be suitably classified and taken to an appropriate off-site disposal facility or treatment site.
- Should de-watering of excavations be required during construction, the groundwater quality will be assessed to understand discharge options and discussions held with the Environment Agency and the HBC Contamination Team to understand their requirements. Any contaminated groundwater will be discharged of appropriately off site. A licence will be obtained for any dewatering activities where abstraction lasts for more than 6 months or daily abstraction exceeds 100m<sup>3</sup>.

These management controls will be included in the CEMP for the Scheme.

### **4.3 Water and Sediment Quality (Marine)**

This section of the report considers the potential impacts of the Scheme on marine water and sediment quality. The study area for these parameters is considered to be the intertidal and nearshore areas in the vicinity of the Scheme. WFD scoping tables are provided separately in **Appendix B**.

#### **4.3.1 Baseline**

##### **Water Quality**

To determine which water bodies would potentially be affected by the Scheme, all surface and groundwater water bodies located within 2 km of the Scheme have been considered (see **Figure 7**):

- Langstone Harbour transitional water body (GB580705130000) – overlapping / adjacent to the Scheme
- Chichester Harbour transitional water body (GB580705210000) – overlapping / adjacent to the Scheme
- Langstone Oysterbeds transitional water body (GB510070073000) – Approximately 500 metres south of the Scheme on the west coast of Hayling Island
- East Hants Chalk Groundwater Body (GB40701G502700) – overlapping/adjacent to the Scheme

## Water Bodies in the vicinity of Langstone FCERM scheme

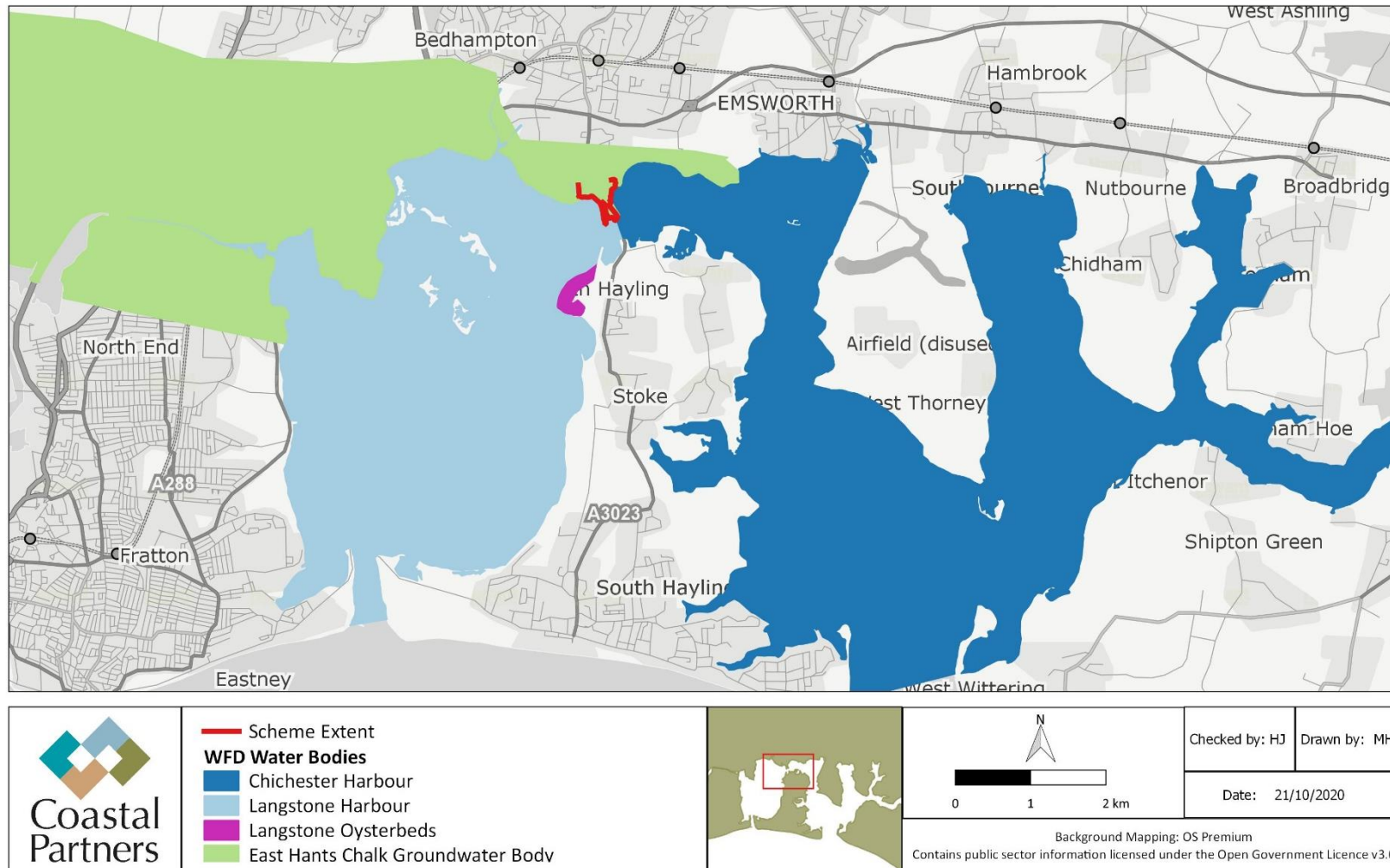


Figure 7. | Location of WFD water bodies

Based on the location and scale of the activities it is considered unlikely that the Scheme will cause a significant permanent effect on the Langstone Oysterbeds transitional water body, or cause deterioration in status at the water body level. Similarly there is no impact pathway associated with the Scheme that could affect the East Hants Chalk Groundwater Body. Therefore, these water bodies have been screened out of the EIA and WFD assessment. However potential effects on this groundwater body will be reviewed again based on the detailed design.

Scoping tables for the Langstone Harbour and Chichester Harbour transitional water bodies are provided in **Appendix B**. The overall objective of the WFD is to achieve good status (GS) in all inland, transitional, coastal and ground waters by 2015, unless alternative objectives are set and there are appropriate reasons for time limited derogation. For a surface water body to be at overall GS, the water body must be achieving good ecological status (GES) and good chemical status (GCS). Ecological status is measured on a scale of high, good, moderate, poor or bad, while chemical status is measured as good or fail (i.e. failing to achieve good). The ecological status of surface waters is classified using information on the biological (e.g. fish, benthic invertebrates, phytoplankton, angiosperms and macroalgae), physico-chemical (e.g. dissolved oxygen and salinity) and hydromorphological (e.g. hydrological regime) quality of the body of water, as well as several specific pollutants (e.g. copper and zinc). The latest (2019) classification for the Langstone Harbour and Chichester Harbour is moderate overall status, based on moderate ecological potential and fail chemical status.

The Scheme is located within the Langstone Harbour and Chichester Harbour (Emsworth Channel) Shellfish Waters and eutrophic coastal sensitive areas. The nearest designated Bathing Waters are Beachlands West, Beachlands Central and East Stoke off Hayling Island, over 6 km south (**Figure 8**). The current classification for these Bathing Waters are all excellent<sup>11</sup>.

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<sup>11</sup> <https://environment.data.gov.uk/bwg/profiles/> (last accessed September 2020)

## Bathing Waters and Shellfish Waters

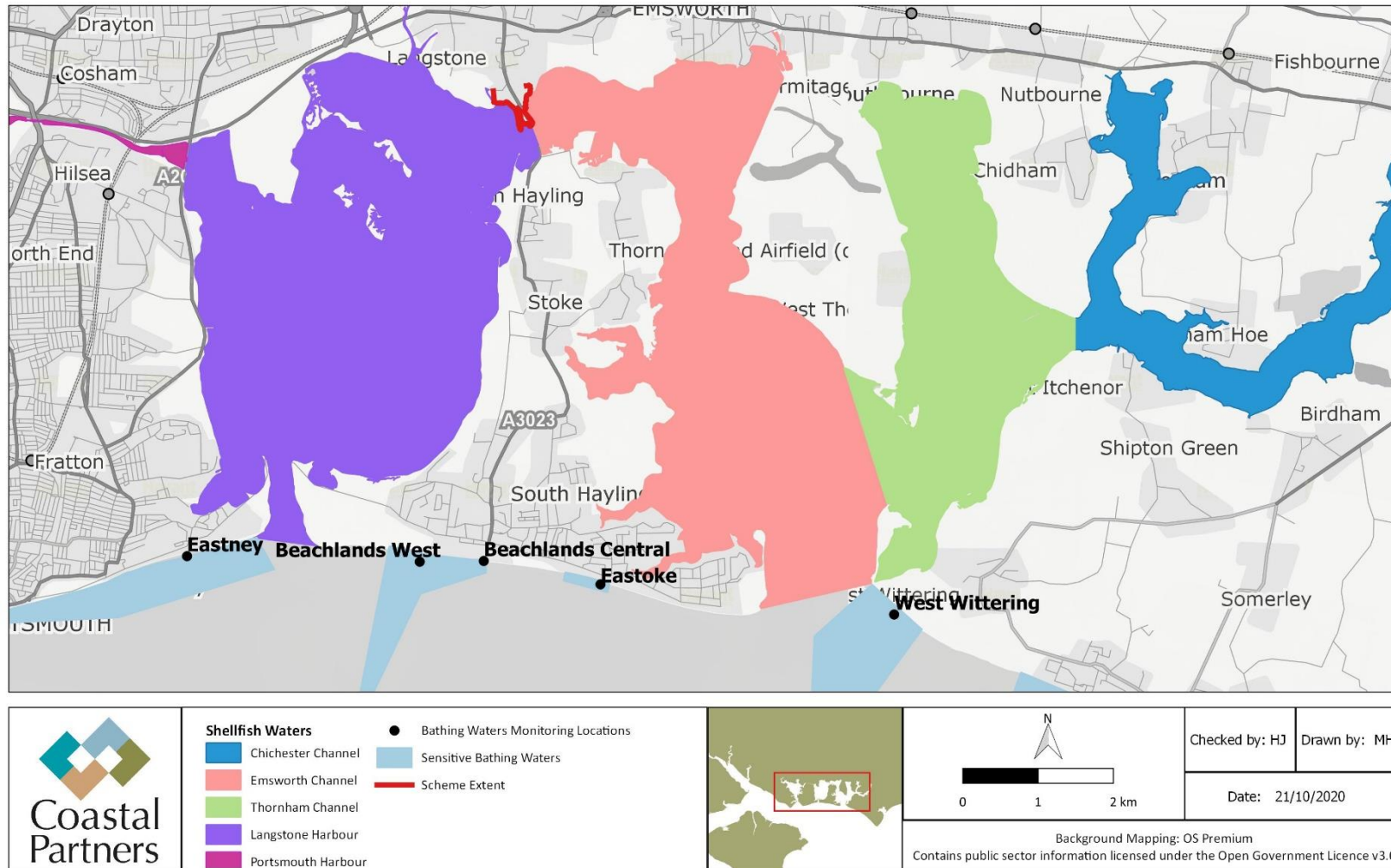


Figure 8. | Location of Shellfish Waters and Bathing Waters

## Sediment Quality

In the absence of any UK quantified Environmental Quality Standards (EQS) for in situ sediment quality, any data assessed for EIA purposes tends to be compared to two sets of guidelines:

- Cefas guideline Action Levels for the disposal of dredged material; and
- The Canadian Interim Sediment Quality Guidelines (ISQG) for the protection of aquatic life.

Cefas' guideline Action Levels are not statutory contaminant concentrations but are used as part of a weight of evidence approach to decision making on the disposal of dredged material to sea. If concentrations are below Action Level 1 (AL1), then refusal of disposal at sea on grounds of contamination is unlikely. If concentrations fall above AL1 but below Action Level 2 (AL2), then further assessment may be required. If concentrations exceed AL2 then dredged material may not be deemed acceptable for disposal at sea.

The Canadian ISQG provide scientific benchmarks, or reference points, for evaluating the potential for observing adverse biological effects in aquatic systems. The guidelines have been derived from available toxicological information, reflecting the relationships between sediment concentrations of chemicals and any adverse biological effects resulting from exposure to these chemicals. In the absence of UK sediment quality guidelines, the Canadian guidelines provide one of the most comprehensive sets of sediment quality data available.

The guidelines comprise two assessment levels. The lower level is referred to as the threshold effects level (TEL) and represents a concentration below which adverse biological effects are expected to occur rarely. The higher level, known as the probable effect level (PEL), defines a concentration above which adverse effects are expected to occur more frequently.

## Contamination

In September 2018, ground investigations were carried out at Langstone by WYG which included boreholes, trial pits, ground water monitoring, exploratory concrete core samples from the existing sea defence walls; in-situ testing in boreholes; chemical and geotechnical sampling in exploratory holes; and laboratory geotechnical testing of soils and rock (see **Appendix F** for details and **Figure 6 in Land Quality and Hydrology** for the map of sample locations).

The contamination results for intertidal samples are shown in **Table 4.5** and compared against marine sediment quality threshold criteria (Canadian ISQG TEL/PEL and Cefas Action Levels). Nine samples had a low level of PAH contamination (above Cefas AL1 but below ISQG PEL and below AL2). The highest level (TP8) was for PAH Dibenzo(a,h)anthracene located at the end of the High Street adjacent to the Royal Oak frontage (ODU 3k). This compound is primarily associated with petrol emissions, cigarettes, coal tar, soot and certain food products, especially smoked and barbecued foods. This sample (TP8) also had slightly elevated levels of lead (above Cefas AL1 but below ISQG PEL and below AL2).

Table 4.5: Langstone GI contamination results from marine samples interpreted from WYG 2018, against marine sediment quality threshold criteria – Canadian ISQG TEL/PEL and Cefas Action Levels

| Analyte                | Unit  | LoD   | Threshold criteria |             |     |     | Sample number and depth (m) |              |                    |              |              |              |                    |             |              |              |              |              |
|------------------------|-------|-------|--------------------|-------------|-----|-----|-----------------------------|--------------|--------------------|--------------|--------------|--------------|--------------------|-------------|--------------|--------------|--------------|--------------|
|                        |       |       | ISQG<br>TEL        | ISQG<br>PEL | AL1 | AL2 | BH02<br>0.30                | BH02<br>1.00 | TP8<br>0.10        | TP11<br>0.10 | TP14<br>0.20 | TP16<br>0.15 | TP17<br>0.10       | BH1<br>0.30 | TP18<br>0.60 | TP19<br>0.20 | TP21<br>0.50 | TP24<br>0.40 |
| <b>Metals</b>          |       |       |                    |             |     |     |                             |              |                    |              |              |              |                    |             |              |              |              |              |
| Arsenic (As)           | mg/kg | 0.6   | 7.2                | 42          | 20  | 100 | 8.35                        | 8.21         | 6.74               | 6.91         | 7.32         | 4.45         | 4.49               | 6.06        | 6.37         | 14.4         | 3.86         | 10.8         |
| Cadmium (Cd)           | mg/kg | 0.02  | 0.7                | 4.2         | 0.4 | 5   | 0.084                       | 0.0368       | 0.0436             | 0.0741       | <0.02        | 0.0435       | 0.0877             | 0.0453      | 0.156        | <0.02        | 0.082        | <0.02        |
| Chromium (Cr)          | mg/kg | 0.9   | 52                 | 160         | 40  | 400 | 15.2                        | 15.2         | 5.69               | 6.92         | 3.55         | 2.04         | 12.6               | 5.6         | 7.68         | 12.4         | 4.01         | 10.7         |
| Copper (Cu)            | mg/kg | 1.4   | 19                 | 108         | 40  | 400 | 8.3                         | 8.03         | 17.3               | 17.3         | 33.8         | 5.25         | 12.5               | 7.64        | 9.5          | 13.7         | 6.43         | 8.93         |
| Lead (Pb)              | mg/kg | 0.7   | 30                 | 112         | 50  | 500 | 7.41                        | 7.34         | 95.9               | 40.6         | 39.4         | 19.9         | 43.9               | 31.1        | 23           | 29           | 9.24         | 21.7         |
| Mercury (Hg)           | mg/kg | 0.14* | 0.1                | 0.7         | 0.3 | 3   | <0.14                       | <0.14        | <0.14              | <0.14        | <0.14        | <0.14        | <0.14              | <0.14       | <0.14        | <0.14        | <0.14        | <0.14        |
| Nickel (Ni)            | mg/kg | 0.2   | -                  | -           | 20  | 200 | 17.8                        | 16.3         | 6.85               | 7.87         | 5.41         | 3.63         | 9.21               | 6.64        | 9.85         | 14.8         | 6.17         | 12           |
| Zinc (Zn)              | mg/kg | 1.9   | 124                | 271         | 130 | 800 | 37.1                        | 36.7         | 40.4               | 38.8         | 22.6         | 14.6         | 51.4               | 27.1        | 71.9         | 71.8         | 32.4         | 41.1         |
| <b>PAH</b>             |       |       |                    |             |     |     |                             |              |                    |              |              |              |                    |             |              |              |              |              |
| Naphthalene            | µg/kg | 9     | 35                 | 391         | 100 | N/A | <9                          | <9           | <90                | <9           | <9           | 20.7         | <45                | <9          | <9           | <9           | <9           | <9           |
| Acenaphthylene         | µg/kg | 12*   | 5.9                | 128         | 100 | N/A | <12                         | <12          | <120               | <12          | 38.5         | <12          | <60                | 17.1        | 22.8         | 18.3         | <12          | <12          |
| Acenaphthene           | µg/kg | 8*    | 6.7                | 89          | 100 | N/A | <8                          | <8           | <80                | <8           | <8           | <8           | <40                | <8          | <8           | <8           | <8           | <8           |
| Fluorene               | µg/kg | 10    | 21                 | 144         | 100 | N/A | <10                         | <10          | <100               | <10          | 20           | 24.1         | <50                | <10         | <10          | 16.9         | <10          | <10          |
| Phenanthrene           | µg/kg | 15    | 87                 | 544         | 100 | N/A | <15                         | <15          | 178                | 94.5         | 224          | 155          | <75                | 134         | 68.6         | 279          | <15          | <15          |
| Anthracene             | µg/kg | 16    | 47                 | 245         | 100 | N/A | <16                         | <16          | <160               | 27.9         | 97.8         | 34.4         | <80                | 58.6        | <16          | 63.2         | <16          | <16          |
| Fluoranthene           | µg/kg | 17    | 113                | 1494        | 100 | N/A | <17                         | <17          | 576                | 287          | 908          | 285          | 103                | 645         | 273          | 546          | 72.6         | <17          |
| Pyrene                 | µg/kg | 15    | 153                | 1398        | 100 | N/A | <15                         | <15          | 524                | 254          | 698          | 267          | 96.9               | 567         | 242          | 433          | 70.7         | <15          |
| Benzo[a]anthracene     | µg/kg | 14    | 89                 | 763         | 100 | N/A | <14                         | <14          | 259                | 157          | 466          | 150          | <70                | 343         | 167          | 217          | 65.8         | <14          |
| Chrysene               | µg/kg | 10    | 108                | 846         | 100 | N/A | <10                         | <10          | 227                | 134          | 428          | 136          | <50                | 304         | 154          | 206          | 59.5         | <10          |
| Benzo[b]fluoranthene   | µg/kg | 15    | -                  | -           | 100 | N/A | <15                         | <15          | 336                | 129          | 637          | 148          | <75                | 434         | 174          | 248          | 57.2         | <15          |
| Benzo[k]fluoranthene   | µg/kg | 14    | -                  | -           | 100 | N/A | <14                         | <14          | <140               | 53.9         | 242          | 55.3         | <70                | 187         | 76.4         | 75.6         | 30.2         | <14          |
| Benzo[a]pyrene         | µg/kg | 15    | 89                 | 763         | 100 | N/A | <15                         | <15          | 330                | 162          | 423          | 141          | <75                | 414         | 176          | 223          | 73.6         | <15          |
| Indeno[123,cd]pyrene   | µg/kg | 18    | -                  | -           | 100 | N/A | <18                         | <18          | 196                | 95.6         | 276          | 68.6         | <90                | 238         | 101          | 128          | 48.7         | <18          |
| Dibenzo[a,h]anthracene | µg/kg | 23*   | 6.2                | 135         | 100 | N/A | <23                         | <23          | <230 <sup>12</sup> | <23          | 69.5         | <23          | <115 <sup>13</sup> | 59.6        | <23          | 31.9         | <23          | <23          |
| Benzo[ghi]perylene     | µg/kg | 24    | -                  | -           | 100 | N/A | <24                         | <24          | <240               | 116          | 282          | 90.4         | <120               | 286         | 115          | 138          | 53.9         | <24          |
| Asbestos               | -     | -     | -                  | -           | -   | -   | Not detected                |              |                    |              |              |              |                    |             |              |              |              |              |

\* Limit of Detection (LoD) is above the Threshold Effect Level (TEL) – limitation of analysis

<sup>12</sup> This is a less than result so the concentration of the analyte could be below the Probable Effects Level (PEL), but the accuracy of the lab analysis means it is not possible to determine this.

<sup>13</sup> This is a less than result so the concentration of the analyte could be below Action Level 1 (AL1), but the accuracy of the lab analysis means it is not possible to determine this.

### 4.3.2 Potential Impacts

The potential implications to other receptors, namely ornithology and marine ecology are considered in **Section 4.5** and **Section 4.7** respectively. Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect water and sediment quality. **Table 4.6** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.6: Potential Water and Sediment Quality pathways**

| Impact pathway(s)                                                                                        | Scoped in/out?                                   | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes to levels of contaminants in water, including accidental spillages, (construction and operation) | Core Scheme – Out<br><br>Additional Scheme - Out | As detailed in <b>Section 2.3 Proposed Works</b> , the majority of the works will be undertaken from land. Any vessels or landside machinery used during construction will be required to adhere to standard best practice measures including pollution control strategies and spillage response. In terms of construction, the proposed works will not directly introduce contaminants to the marine environment. All materials used in the Scheme will be suitable for use in the marine environment. Any new outfalls required in the detailed design will be draining the same surface water catchment area as the existing situation. Consequently, the proposed works will not result in any new sources or pathways for the introduction of contaminants, and this impact pathway associated with both the Core and Additional Scheme is scoped out for construction and operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Redistribution of sediment-bound chemical contaminants (construction)                                    | Core Scheme – Out<br><br>Additional Scheme - Out | The Scheme could lead to the resuspension of contaminated sediments during excavation activities on the foreshore. Once in suspension, sediment-bound contaminants could be released into the water column and redistributed in the surrounding area. However, as shown in <b>Table 4.5</b> , a number of geo-environmental samples, including for contamination, have been collected and analysed covering the extent of the Scheme. Nine samples had a low level of PAH contamination. The highest level recorded (at TP8) was located at the end of the High Street. However, this is a less than result so the concentration of the analyte could be below the PEL, but the accuracy of the lab analysis means it is not possible to determine this. In addition, adjacent samples to TP8 do not replicate this exceedance. This sample location (TP8) also had slightly elevated levels of lead (above Cefas AL1 but below ISQG PEL and below AL2). Works on the foreshore will be undertaken over the low tide period to minimise resuspension of contaminants into the water column. A silt curtain will be in place during construction works on the foreshore, which will contain any suspended sediments within the works area and prevent any significant impacts on water quality in the harbours. Consequently, this pathway is scoped out. |
| Potential changes to suspended sediment concentrations and dissolved oxygen                              | Core Scheme – Out<br><br>Additional Scheme - Out | The Scheme does not involve any changes to outfalls/discharges, or any dredging or beach recharge works. The construction of the Scheme has the potential to increase suspended sediment concentrations and change dissolved oxygen levels                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Impact pathway(s)            | Scoped in/out? | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (construction and operation) |                | specifically where any excavation is required on the foreshore during construction. In addition, this may also occur during maintenance. However, considering the anticipated small size, any changes that will occur will be very small and localised, limited to the immediate vicinity of any new structure or repair works. In addition, a silt curtain will be in place during construction works on the foreshore, which will contain any suspended sediments within the works area. The potential for changes to suspended sediment concentrations and dissolved oxygen is therefore scoped out. |

### 4.3.3 Recommendations for further work

All potential pathways in relation to water and sediment quality have been scoped out. A WFD compliance assessment will be undertaken based on the final design and included as an Appendix to the ES. As detailed in **Appendix B** the following waterbodies are scoped in:

- Langstone Harbour (GB580705130000); and
- Chichester Harbour (GB580705210000).

These use of a silt curtain for foreshore works will be included in the CEMP for the Scheme.

It is considered unlikely that the Scheme would cause a significant effect or cause deterioration in status at the East Hants Chalk Groundwater Body. However potential effects on this groundwater body will be reviewed based on the detailed design.

## 4.4 Coastal Processes

This section considers the coastal processes (including hydrodynamics and sediment transport) in the vicinity of the Scheme including around Langstone Harbour, Chichester Harbour and the wider Solent Region.

At a regional scale the system comprises Chichester Harbour and Langstone Harbour and their entrances. Whereas at a local scale the system comprises of the northern most reach of Chichester and Langstone Harbours known as Sweare Deep and Bridge Lake respectively.

### 4.4.1 Baseline Conditions

This section provides a high-level description of the baseline physical and sedimentary processes of the harbours as detailed further within **Appendix G**.

#### The Solent

The Solent is a tidal channel approximately 40 km long between the Isle of Wight and the mainland of southern England. The Solent represents the drowned remnants of an ancient Pleistocene (pre-10,000 years ago) river. The wider geomorphological unit of the eastern Solent encompasses Portsea and Hayling Islands and the three harbours of Portsmouth, Langstone and Chichester.

The coast in proximity to Langstone can be broadly characterised as a wide range of coastal landforms, including tidal flats of mud and sand, saltmarshes, beaches, barriers and spits of

sand and gravel, and ebb and flood tidal deltas. These landforms are generally organised into distinct systems comprising mutually dependent sediment sources, transport pathways and sediment sinks.

### **Langstone Harbour**

Langstone Harbour is an almost completely land locked tidal inlet with a narrow mouth constrained by two recurved shingle spits. On the eastern side of Langstone Harbour entrance is an extensive ebb tidal delta, known as the East Winner. The substantial West Winner bar, also part of the ebb delta system, was located on the west side of the harbour entrance but gradually has moved onshore to form the substantial beach at Eastney and by the millennium was no longer in existence (SCOPAC Sediment Transport Study, 2012). In terms of sediment transport, Langstone Harbour is considered to be a weak sink for both fine and coarse sediment.

### **Chichester Harbour**

Similarly to Langstone Harbour, Chichester Harbour consists of mudflat and saltmarsh habitats. To the south west of the entrance to Chichester Harbour is a shallow offshore feature known as the Chichester Bar. To the east side of the harbour entrance is East Head, a large sand dune spit connected to land by a narrow area known as The Hinge. Chichester Harbour has three main channels, the Emsworth Channel, the Thorney Channel and the Chichester Channel.

### **Geomorphological Setting**

The ~1 km long Langstone frontage is located on the mainland, immediately north of Hayling Island. The internationally environmentally designated Langstone and Chichester Harbours merge at the point where the A3023, the only road crossing to Hayling Island, intersects the frontage. Due to its sheltered nature, a low energy wave climate exists at the site.

The Additional Scheme includes works on Langstone Spit. As detailed in **Appendix G** this spit is not indicated to be a natural feature, but a relict spit influenced by construction and decommissioning of the Hayling railway line which lies to the west of Langstone Road (**Figure 1**). The Lavant Spit is also located adjacent to the Additional Scheme at the mouth of the Lavant Stream.

### **Tidal Currents**

Tidal current and water level data is shown in more detail within the Langstone Coastal Processes Study, (**Appendix G**).

The tidal currents around the Solent are complex. The area experiences a double high tide where the tide rises following low water but the tidal stream slackens two hours before high water leading to a stand (known as the Young Flood Stand) before rising to high water which can take a further three hours (Pugh, 1987). The effect is most pronounced at Southampton but is evident throughout the Solent. The ebb tide is very short and therefore associated with strong currents. The tidal range across the East Solent is approximately 4 metres on average (New Forest District Council, 2010).

Currents at Langstone, where it is shallow, are generally weak and the strongest currents are at the harbour entrances. The foreshore around the Scheme is variable but is typically between approximately 0-1mOD in elevation, indicating that it is submerged between 4-6 hours over a spring tidal cycle. The North Solent SMP (New Forest District Council, 2010) states that nearshore currents are typically less than 0.5m/s.

## Wind and Waves

Wave generation within the Solent is controlled by a combination of local fetches and waves which enter its eastern and western entrances (New Forest District Council, 2010). The processes of wave generation and transformation from offshore to inshore are particularly complex in the eastern Solent. Storm waves which reach the coast can be generated locally under winds from the south-west through to the east, or in the English Channel. Swell waves generated further afield also penetrate the area, though their heights are modest.

The worst-case waves for the Langstone frontage are under a southerly wind direction and are shown below (**Figure 9**). The maximum significant wave heights at the Scheme are in the range of 0.5-0.75 metres high. However, it should be noted that wave heights have been modelled within the north of the harbour reaching up to 0.9 metres in height.

It can be assumed that wave heights and energy are low due to the extremely sheltered nature: the narrow harbour entrances restrict waves and the fetch is limited. A shallow harbour means that waves are depth limited near the shore. The main threat of flooding in this area is from still water level overtopping rather than wave overtopping.

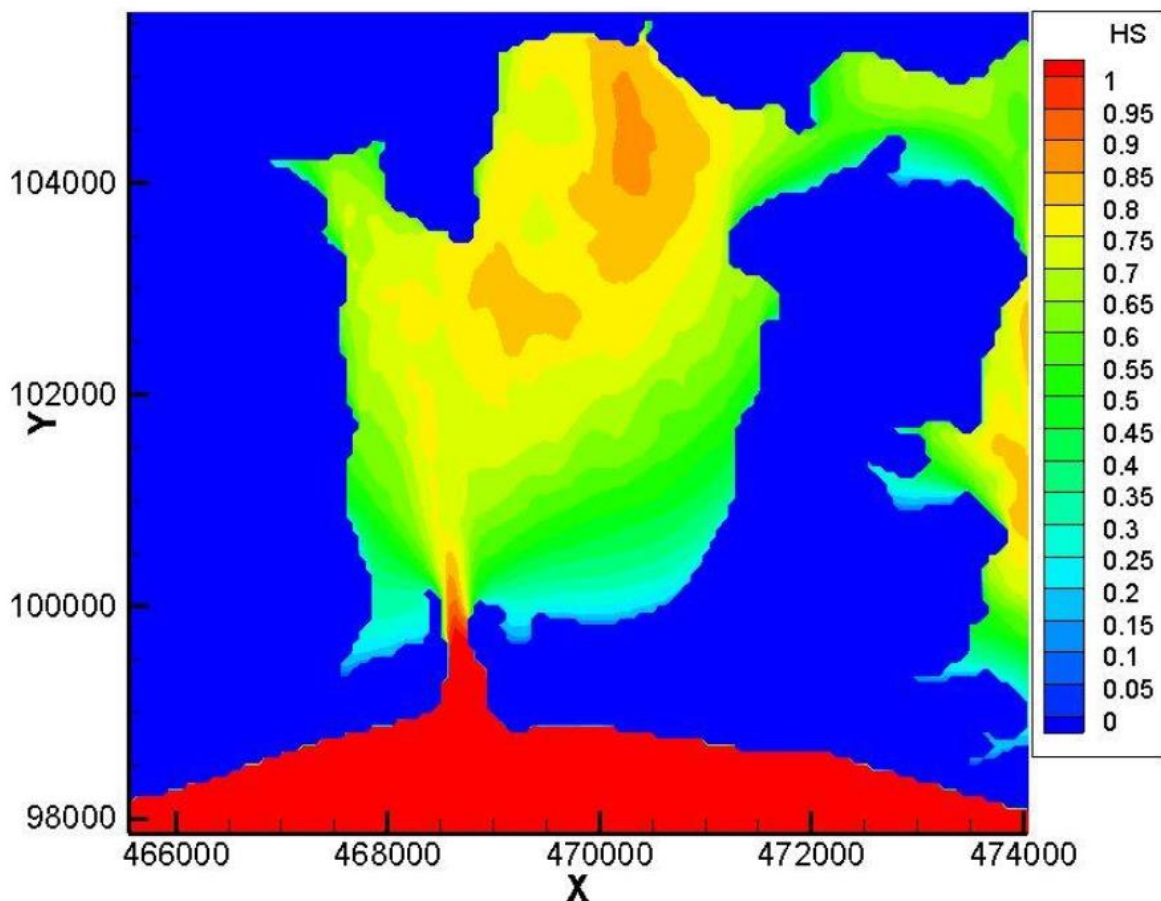


Figure 9. | Significant wave height under a 1 in 200 year southerly wind condition (19.43m/s at 180°)  
(RHDHV, 2014)

## Climate Change Allowances

The primary way in which climate change is considered within the Scheme is through changes in storminess/storm surges, wave heights, and sea levels, posing an increased risk of coastal damage and flooding. The UK Climate Projections 2009 (UKCP09) User Interface provides projections for climate variables at specific locations. The Environment Agency Flood Risk

Assessments: Climate Change Allowances (2016) gave percentage change allowances for extreme wave heights for two different epochs. Wave heights may change due to changes in water depths that result from sea level rise (SLR) and the frequency, duration and severity of storms and winds is also expected to change (Environment Agency, 2016). **Table 4.7** shows the allowances that were used for waves over the next 100 years due to climate change in the outline design stage of the Scheme.

**Table 4.7: Wave height allowances due to climate change (EA, 2016)**

| Applies around all the English coast | 1990 to 2055 | 2056 to 2115 |
|--------------------------------------|--------------|--------------|
| Offshore wind speed allowance        | +5%          | +10%         |
| Offshore wind speed sensitivity test | +10%         | +10%         |
| Extreme wave height allowance        | +5%          | +10%         |
| Extreme wave height sensitivity test | +10%         | +10%         |

Allowances for SLR are covered in detailed within the Langstone Coastal Processes Study, **Appendix G**. More recently the UK Climate Projections 2018 (UKCP18) has introduced new projections which build on UKCP09. The design has been sensitivity tested against the new projections and this indicates continued suitability of the design heights.

### Sedimentary Processes

The Standing Conference On Problems Associated with the Coastline (SCOPAC) Sediment Transport Study (2012) is a comprehensive literature review of the existing published information detailing sediment movement along the south coast. It also incorporates analysis of Regional Monitoring Programme data between 2003-2012.

The study records that the foreshore around the Scheme is generally stable. It does find that that the area around the slipway from Langstone High Street is slowly accreting. This is verified by the aerial photography which shows a greater extent of shingle-type material in more recent years. In addition, two areas of particular geomorphological interest are the Langstone and Lavant Spits. A closer look at their morphology has been discussed within the Langstone Coastal Processes Study (**Appendix G**). This report includes details on the construction and decommissioning of the Hayling Billy Railway Line on Langstone Spit. This man-made spit offers some sheltering to the adjacent sailing club but is thought to be eroding (most significantly at the distal end) particularly over the last 50 years since the railway structures were demolished.

Other than the areas noted above, there are no significant areas of erosion or accretion and the Scheme area is relatively stable.

#### 4.4.2 Potential Impacts

The potential implications of coastal processes on other receptors namely marine ecology are considered in **Sections 4.7**. **Table 4.8** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.8: Potential Coastal Processes impact pathways**

| Impact pathway(s)                                                                            | Scoped in/out?                                   | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes to coastal processes including alteration to seabed form and features (construction) | Core Scheme – Out<br><br>Additional Scheme - Out | During construction best practice measures in relation to coastal process will be followed. This is anticipated to include a construction environmental management plan and method statement to be developed with the contractor to ensure changes to the seabed and topography of the intertidal area are minimised as far as possible during the works. This will strictly control construction activities including any effects associated with coastal processes during the construction phase. As a competent authority Coastal Partners, alongside our advisors, will monitor for any effects during construction and consequently changes in physical processes during construction have been scoped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Changes to coastal processes including alteration to seabed form and features (operation)    | Core Scheme – Out                                | No new cross-shore structures are proposed as part of the Scheme. The new defences will follow the existing alignment, albeit slightly seawards where encasement or sheet piles are required to ensure the stability of existing/new structures as part of the design. Throughout the design process changes to the footprint of the existing structures and consequently effects associated with coastal processes are being minimised. The Core Scheme is primarily the same footprint as the existing defence structures, generally only increasing the height of existing structures. The exception is ODU 3d to 3e and potentially 3k, specifically any additional footprint associated with the accessible path along approximately 150 metres of the Scheme. However, considering the anticipated small size, any changes that will occur will be very small and localised, limited to the immediate vicinity of any new structure. Consequently, the Core Scheme will not result in any discernible changes to coastal processes. Changes in physical processes as a result on the Core Scheme have therefore been scoped out.                                                                                                                                         |
|                                                                                              | Additional Scheme - Out                          | The Additional Scheme is anticipated to involve approximately 50 metres of rock armour being added to the eroding low elevation cliffs to reduce erosion of the distal end of Langstone Spit (ODU2a). As detailed in <b>Appendix G</b> , the composition of the spit is indicated to be associated with the old Hayling railway line and erosion of the distal end area appears to have increased since the removal of associated structures. The rock armour proposed is being placed within the footprint of the spit as it was when it was used as an embankment base for construction of the Billy Line railway. The rock protection is anticipated to be placed from MHWS landward to the crest of the spit and will avoid extending the footprint of the spit and therefore minimise effects on the intertidal area. In addition, a slight encroachment from the new pile line may occur in ODU1b. However, considering the anticipated small size, any changes that will occur will be very small and localised, limited to the immediate vicinity of any new structure. Overall, changes to physical process as a result of the proposed work are anticipated to be negligible in the context of background conditions and have been scoped out of further assessment. |

#### 4.4.3 Recommendations for further work

All potential pathways in relation to coastal processes have been scoped out. No further work is therefore recommended.

### 4.5 Ornithology

This section summarises the potential impacts on birds by the proposed Scheme. The Scheme surroundings support a host of habitats and species of significant ecological and nature conservation importance. This is reflected in the number of sites that have gained international and national designation status.

#### 4.5.1 Baseline Conditions

The coastal environment in Chichester and Langstone Harbour provides supporting habitat for a number of important species of bird. Habitats include extensive mudflats, sandflats and associated saltmarshes, eelgrass beds, coastal grazing marsh and shingle ridges and islands. These habitats support internationally and nationally important numbers of overwintering and breeding bird species.

The eelgrass beds (consisting of both *Zostera noltii* and *Zostera marina*) cover more than 300 ha of the Chichester and Langstone Harbours SPA and Ramsar site. These eelgrass beds are an important food source for dark-bellied Brent geese (*Branta bernicla bernicla*), (Marsden and Chesworth, 2014).

A Preliminary Ecological Appraisal was undertaken in 2018 (**Appendix E**) for the Scheme. This included a review of Hampshire Biodiversity Information Centre (HBIC) records within 2 km. This identified 50 red list (Birds of Conservation Concern 4), 23 s41 species and a number of species provided with special protection under Schedule 1 of the Wildlife and Countryside Act. These include Cetti's warbler (*Cettia cetti*). These birds were also noted during the field visit, two singing male Cetti's warblers and a number of little egrets were observed at Langstone Mill Pond. Langstone Mill Pond is an established site for breeding little egret and is believed to be the only location in the UK where egrets breed outside of an existing heronry.

The SPA and Ramsar site adjacent to the Scheme is important for over-wintering wildfowl and waders and Wetland Bird Survey (WeBS) data indicates that the mudflats are well used by species including dark-bellied brent goose, bar-tailed godwit, black-tailed godwit, redshank and wigeon. The SPA is also designated for three species of breeding tern, the nearest colony is the Oyster Beds on Hayling Island, which is situated around 500 metres to the south of the Scheme (see **Appendix E**).

In addition, there are 31 Solent Waders and Brent Goose Strategy (SWBGS) (Whitfield, 2019) sites within 1 km of the scheme, including 9 sites of primary importance (see **Figure 10**). The SWBGS identifies sites outside of the SPA that are of importance (functionally linked land) to the over-wintering wader and brent goose populations.

## Solent Wader and Brent Geese Strategy 2018 sites

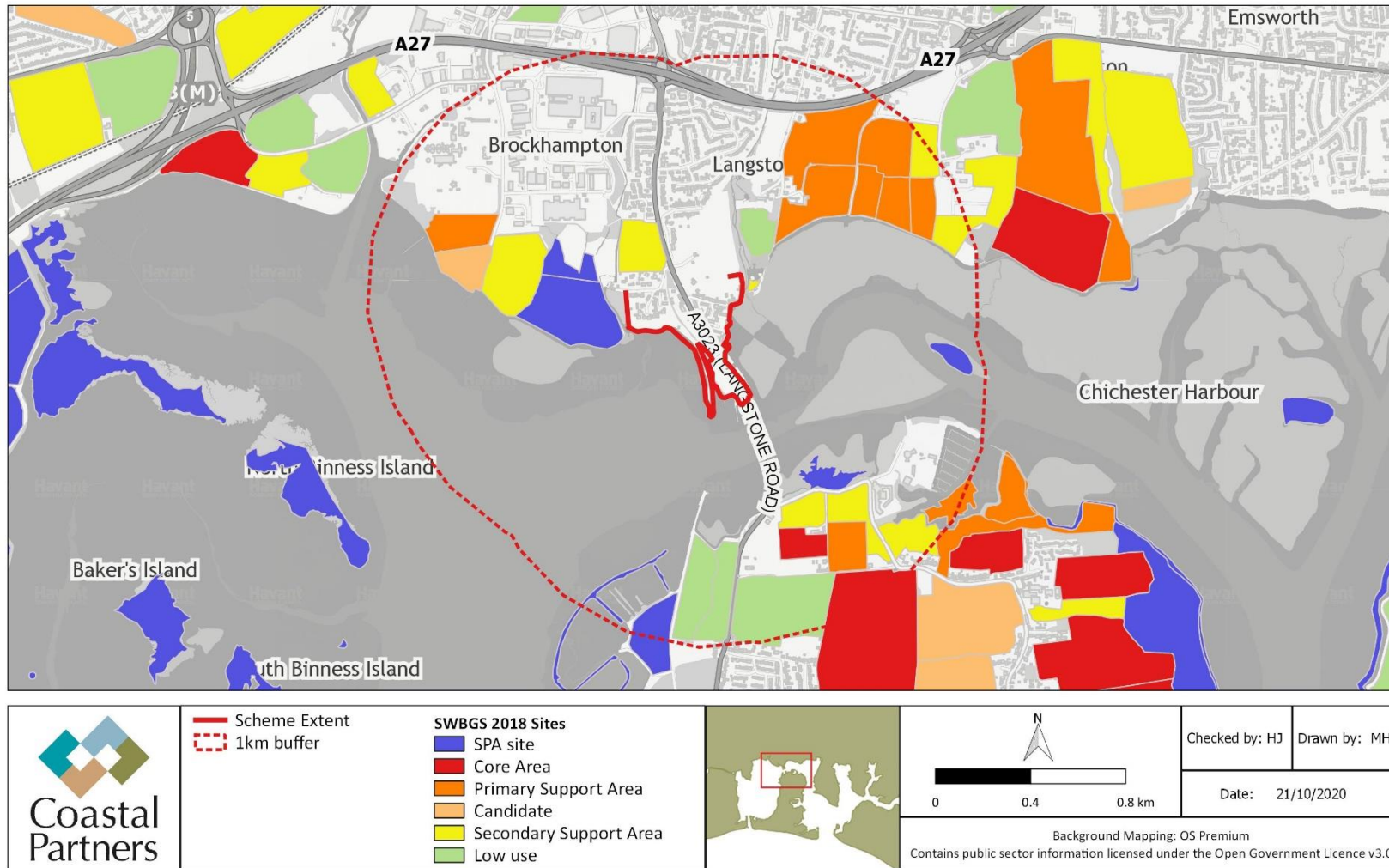


Figure 10. | Solent Waders and Brent Goose Strategy sites 2018

## 4.5.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect ornithology. **Table 4.9** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.9: Potential Ornithology pathways**

| Impact pathway(s)                                                                                                                     | Scoped in/out?                             | Justification                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise from construction works on site displacing birds in the local area (construction)                                               | Core Scheme – In<br>Additional Scheme - In | Disturbance from construction works including truck movements, piling, earthworks and re-pointing has the potential to displace birds that may be feeding, roosting or breeding in the area.                                                                                                                                                                                                      |
| Visual disturbance from construction works on site displacing birds in the local area (construction)                                  | Core Scheme – In<br>Additional Scheme - In | Birds can be affected by the visual presence of people and vehicles in an area which can lead to displacement from feeding and roosting areas.                                                                                                                                                                                                                                                    |
| Physical disturbance of upper intertidal habitats during construction leading to a reduction in feeding area for birds (construction) | Core Scheme – In<br>Additional Scheme - In | Most of the works will be undertaken behind the existing sea defence however where works require access from the foreshore, they may be a temporary reduction in available feeding area for birds due to temporary disturbance of the foreshore for birds feeding at low tide and/or increased turbidity of the water column for birds feeding at high tide.                                      |
| Disturbance to nesting birds (construction)                                                                                           | Core Scheme – In<br>Additional Scheme - In | Vegetation clearance has the potential to disturb breeding birds and has therefore been scoped in for further assessment.                                                                                                                                                                                                                                                                         |
| Loss of feeding areas for birds through permanent loss of intertidal habitat from scheme footprint and coastal squeeze (operation)    | Core Scheme – In<br>Additional Scheme - In | The design limits any encroachment into the existing intertidal area and is unlikely to lead to a significant loss of feeding habitat. However, where shading of the intertidal area and any footings will occur from introduction of an accessible path or similar structure at ODU3f-h or rock armour for the Additional Scheme, it could result in a loss of feeding habitat for some species. |
| Disturbance/displacement of birds during any maintenance and repair work required during the lifetime of the sea defence (operation)  | Core Scheme – In<br>Additional Scheme - In | Ongoing maintenance of the sea defence could lead to disturbance of birds using this area.                                                                                                                                                                                                                                                                                                        |

### 4.5.3 Recommendations for further work

The following investigations are proposed to be undertaken:

- Undertake a breeding bird survey with a particular focus on the Schedule 1 and rare breeding species.
- Analyse existing data for breeding terns and undertake airborne noise modelling to understand the effect of the Scheme on the tern breeding colony.
- Analyse existing WeBS data and if required undertake further over-wintering bird surveys to understand the effect of the Scheme on over-wintering populations.
- Additional bird surveys, two surveys per month from September to March, to better understand spatial use by bird species.
- Further consultation with key bodies such as the British Trust for Ornithology, Natural England, Langstone Harbour Board, Chichester Harbour Conservancy and Royal Society Protection Birds will be undertaken to gather additional information on bird use in the area of works.
- Once details of the construction activity have been confirmed, the EIA will be able to assess the potential for the Scheme to disturb sensitive bird areas by comparing machinery noise levels with bird count data and considering key times of the use of the area by birds.
- Through liaison with our stakeholders and advisors, timings of works within the EIA to minimise disturbance will be agreed.
- Any loss of bird feeding habitat will be identified within the EIA, and mitigation opportunities identified, where these losses are significant, in order to deliver the level of coastal defence required. No key bird feeding habitat is expected to be lost.

## 4.6 Terrestrial Ecology

This section of the Scoping Report considers the potential impacts of the proposed works on terrestrial ecology. This section does not cover ornithology as this has been considered in **Section 4.5**. There are a number of international and national statutory and non-statutory nature conservation designations in the vicinity of the works. These have been described in **Section 4.1**.

Terrestrial habitats within a 2 km radius from the Scheme have been considered for this study. This was considered an appropriate corridor given the anticipated effects and scheme alignment.

### 4.6.1 Baseline Conditions

#### Overview of terrestrial habitat within study area

The Scheme comprises predominantly of built-up areas (i.e. areas of hard standing and residential properties). There are also areas of improved grassland, woodland and scrub.

Full details of the terrestrial habitat and likely ecology present in the vicinity of the scheme is presented in the Preliminary Ecological Assessment (PEA) (**Appendix E**). A habitat map produced as part of the PEA has been included here in **Figure 11**. Coastal habitats are discussed in **Section 4.7 Marine Ecology**.

## Habitat Map for Langstone FCERM Scheme

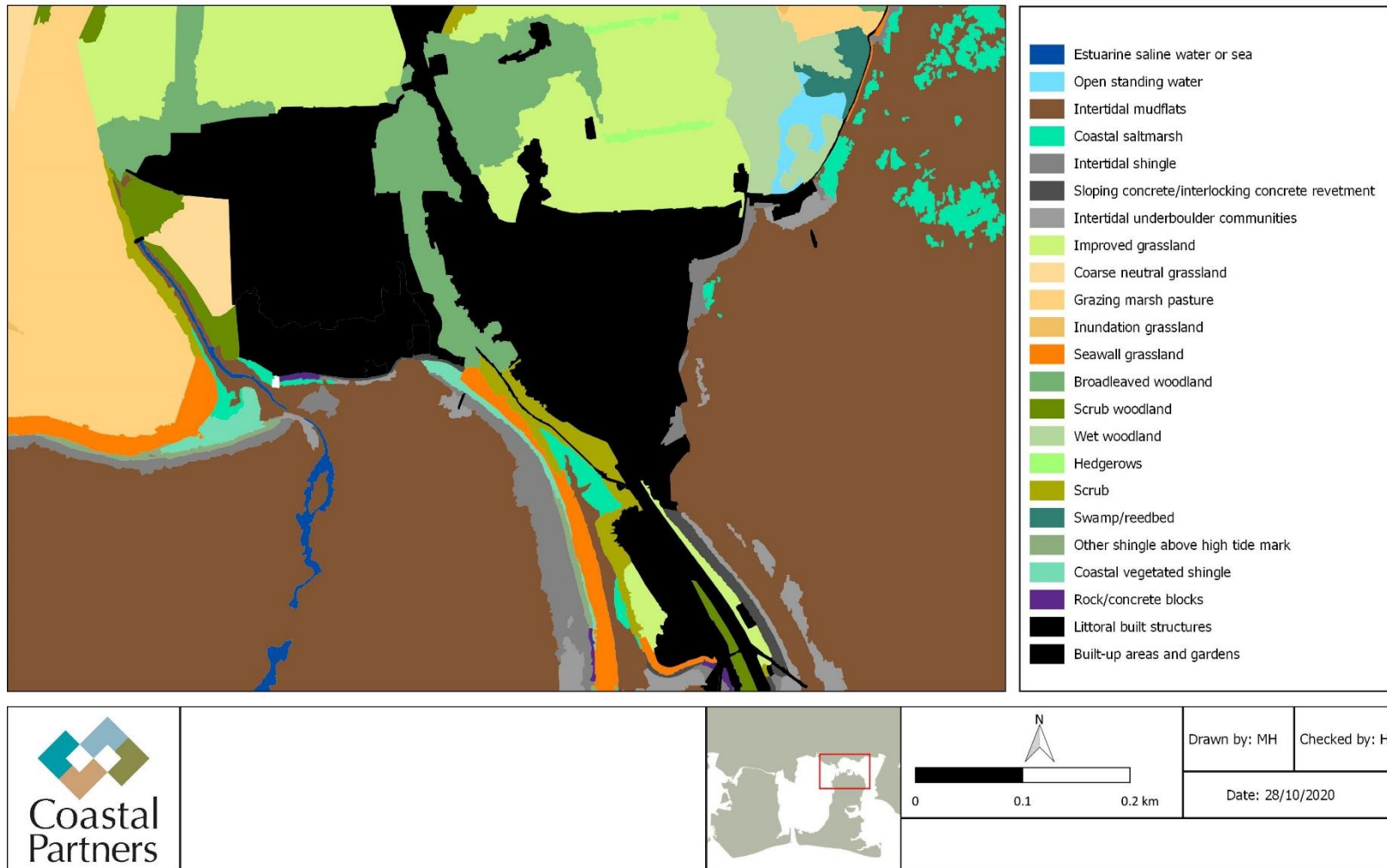


Figure 11. | Habitat Map for Langstone Scheme

Several trees, which are subject to a Tree Preservation Order (TPO), are located within the study area. None of the individual trees subject to a TPO are likely to be impacted by the Scheme, however the Core Scheme alignment (ODU 3L) runs through an area of TPO woodland<sup>14</sup>.

### Terrestrial habitats and species present in the study area

The PEA (**Appendix E**) has identified the following protected species present in the study area:

- **Bats**  
HBIC records indicate 10 species of bats have been recorded within 2 km of the proposed scheme. The hinterland of the Scheme includes areas that would be considered high quality bat foraging habitat. No systematic inspection has been undertaken of trees or structures, however, no obvious potential roosts were identified during the PEA walkover, although many of the structures on the frontage are of an older construction and may contain features that are suitable access points for bat species.
- **Reptiles**  
HBIC records note 4 species of reptile (common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*) have been recorded within 2 km of the scheme boundary. Surveys on Southmoor (adjacent to the western extent of the site) discovered a strong population of common lizard and slow worm in 2017. Field survey identified significant areas of potential reptile habitat, principally to the west of the Langstone bridge, with only small pockets of suitable habitat on the eastern part of the frontage.
- **Water Voles**  
HBIC holds records for water vole within 2 km of the Scheme and suitable habitat exists within the Mill Pond and Langbrook Stream, although the Scheme is unlikely to have any direct effects on these areas.

The PEA also identified the potential for the following species, considering the presence of suitable habitats within the study area:

- **Badgers** - Although there are no HBIC records for badger within 2 km of the proposal, and field survey also did not identify any evidence of badger activity, it does represent suitable foraging habitat.
- **Great Crested Newt** - There are no records of great crested newt within 2 km of the Scheme however potential waterbodies are identified in the vicinity.

The PEA was able to identify the likely absence of the following protected species based on lack of suitable habitat present and lack of records:

- **Hazel Dormouse** - There are no records of hazel dormouse within 2 km of the proposal and the habitat is considered sub-optimal for this species. **No further assessment required.**
- **Otter** - There are no otter records held by HBIC within 2 km of the proposal and a wider search reveals few records in the area, the area is not currently of any significance for otter. **No further investigation required.**

The PEA has also identified **Terrestrial Invertebrates** within the vicinity of the Scheme. This includes 24 national notable species and 38 s41 species of principle concern, which includes

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<sup>14</sup> <http://maps.havant.gov.uk/havant.aspx> (Last accessed August 2020)

species such as stag beetle (*Lucanus cervus*), grayling (*Hipparchia semele*) and wall butterflies (*Lasiommata megera*).

#### 4.6.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect terrestrial ecology. The key issues arising that may impact upon the ecological receptors are likely to involve the potential for possible destruction and disturbance of habitat immediately adjacent to the scheme, and noise and light pollution associated with the construction activity, much of which can be controlled to minimise these impacts. **Table 4.10** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.10: Potential Terrestrial Ecology pathways**

| Impact pathway(s)                                              | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Damage to TPO woodland via construction of set-back floodwall. | Core Scheme – In<br>Additional Scheme - In   | It is not clear at this stage of scheme development what activities will be required for construction, but there is potential that lopping of trees will be necessary and that excavation activities will cause damage to roots.                                                                        |
| Disturbance to bat species roosting and feeding in the area    | Core Scheme – In<br>Additional Scheme - In   | The impact is likely to be minimal, with limited impact on foraging habitat, although very site-specific issues have the potential for harm if not adequately assessed. For example, some buildings will be directly impacted by the scheme (i.e. within ODU 3I) by incorporation into the sea defence. |
| Disturbance to reptile species and loss of reptile habitat     | Core Scheme – In<br>Additional Scheme - In   | Construction activities including vegetation removal have the potential to cause disturbance to reptile species.                                                                                                                                                                                        |
| Disturbance to badgers                                         | Core Scheme – In<br>Additional Scheme - In   | It appears unlikely that badger setts are present within the construction envelope of the Scheme. However, the site is likely to be within foraging range of badgers and a badger walkover survey will be undertaken to confirm absence during detailed design.                                         |
| Great Crested Newts                                            | Core Scheme – In<br>Additional Scheme - In   | There are no records of great crested newt within 2 km of the Scheme however potential waterbodies are identified in the vicinity which will be investigated further where necessary.                                                                                                                   |
| Harm to terrestrial invertebrates                              | Core Scheme – Out<br>Additional Scheme - Out | The Scheme is unlikely to affect invertebrates however a detailed analysis of invertebrate records will be undertaken to confirm any species of concern.                                                                                                                                                |
| Disturbance to water vole and loss of habitat for water vole   | Core Scheme – Out<br>Additional Scheme - Out | No water voles have been identified within the vicinity of the Scheme and the Scheme will not affect suitable habitat. Consequently, water voles have been scoped out.                                                                                                                                  |

| Impact pathway(s)                                                                   | Scoped in/out?                             | Justification                                                                                       |
|-------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Potential beneficial impacts through planting, habitat enhancements and landscaping | Core Scheme – In<br>Additional Scheme - In | The Scheme has the potential for beneficial impacts and will be considered in relation to net gain. |

### 4.6.3 Recommendations for further work

A number of potential impacts to terrestrial ecology have been identified and therefore further investigations and assessments will be carried out as the Scheme develops. The following investigations are proposed for further work:

- Detailed botanical survey to National Vegetation Council/Integrated Habitat System level will be undertaken in areas of valued habitat, that are to be affected by the Scheme.
- Consultation with the Tree Protection Officer at the Local Planning Authority will be undertaken in regard to any potential impacts on to the TPO woodland within the Scheme footprint and identify the requirement for an Arboricultural Impact Assessment.
- The following investigations and activities are proposed in relation to bats:
  - Ground level bat roost surveys undertaken for all trees and structures that require removal or modification or could be subject to levels of noise and vibrational disturbance.
  - If the unlikely occurrence potential for bats are identified bat activity surveys will be undertaken.
  - Bat sensitive working practices to be adopted.
- The following investigations and activities are proposed in relation to reptiles:
  - Reptile survey in accordance with best practice will be undertaken in all suitable habitat.
  - Following the reptile survey, a reptile avoidance and mitigation strategy will be established if necessary.
  - Mitigation will be established where necessary such as ecological supervision undertaken on all site investigation and vegetation clearance activity.
- Clear guidelines for the removal of any vegetation will be established, avoiding key times for nesting birds. Where vegetation removal is required, this will be supervised by an Ecologist.
- The following activities are proposed in relation to badgers:
  - Site walkover during active badger season to ratify assumptions that there are no badger setts impacted by the proposal.
  - Badger sensitive working practices to be adopted.
- The following investigations and activities are proposed in relation to invertebrates:
  - Undertake a detailed analysis of invertebrate records to confirm any species of concern. If required, undertake surveys appropriate to that species group.
- For any freshwater habitats within 500m of the Scheme, Habitat Suitability Index (HSI) assessments will be undertaken for Great Crested Newts. If necessary eDNA sampling will also be undertaken.
- Consultation with relevant stakeholders with regards to ecological enhancement opportunities and explore potential beneficial impacts through planting, habitat enhancements and landscaping.

## 4.7 Marine Ecology

This section considers marine ecology, including benthic ecology, fish and shellfish, marine mammals and invasive species. Reference should be made to **Section 4.3** for effects relating to water and sediment quality.

### 4.7.1 Baseline Conditions

#### Benthic Ecology

The Scheme is located within a complex site encompassing a major estuarine system with functionally linked estuaries and dynamic marine and estuarine habitats. This includes extensive areas of intertidal mudflats and sandflats, often supporting eelgrass (*Zostera* species), subtidal sandbanks, saltmarsh and natural shoreline transitions such as drift line vegetation. The Solent Maritime SAC is the only site to support all four species of cordgrass (*Spartina*) found in the UK, including the rare native small cordgrass (*Spartina maritima*) (Natural England, 2020).

The data collated during the desk-based study for this ESR on the intertidal habitats present along the Scheme frontage are shown in **Figure 12** and described below.

There is limited intertidal sediment survey data available for the eastern side of the Scheme in Chichester Harbour, but MAGIC map indicates the frontage in the Core Scheme area is predominantly intertidal sand (habitat type A2.2) and intertidal mixed sediments (habitat type A2.4) (Defra, 2020). An intertidal vegetation survey of Chichester Harbour was undertaken for Chichester Harbour Conservancy (CHC) in 2005 by the University of Portsmouth (University of Portsmouth, 2005). This indicates that the intertidal habitats adjacent to the Core Scheme area are covered with extensive green algal mats (*Ulva* species), with small areas of fucoids adjacent to the existing defences, likely to be strandline vegetation.

A condition assessment survey of Langstone Harbour was carried out for Natural England in 2015 (Thomas et al., 2016). The foreshore in the vicinity of the western side of the Scheme frontage is indicated to consist primarily of intertidal mixed sediment (European Nature Information System (EUNIS) biotope A2.421 'Cirratulids and *Cerastoderma edule* in littoral mixed sediment') and intertidal mud (EUNIS biotope A2.312 '*Hediste diversicolor* and *Limecola balthica* in littoral sandy mud'). The core sample taken within this SSSI unit (6), overlapping with the Additional Scheme area, provided the highest diversity and abundance of individuals within the SSSI (35 taxa and 99,610 individuals per m<sup>2</sup>) and possessed some of the coarsest sediments recorded in the harbour (Thomas et al., 2016).

## Intertidal habitats present along the Scheme frontage

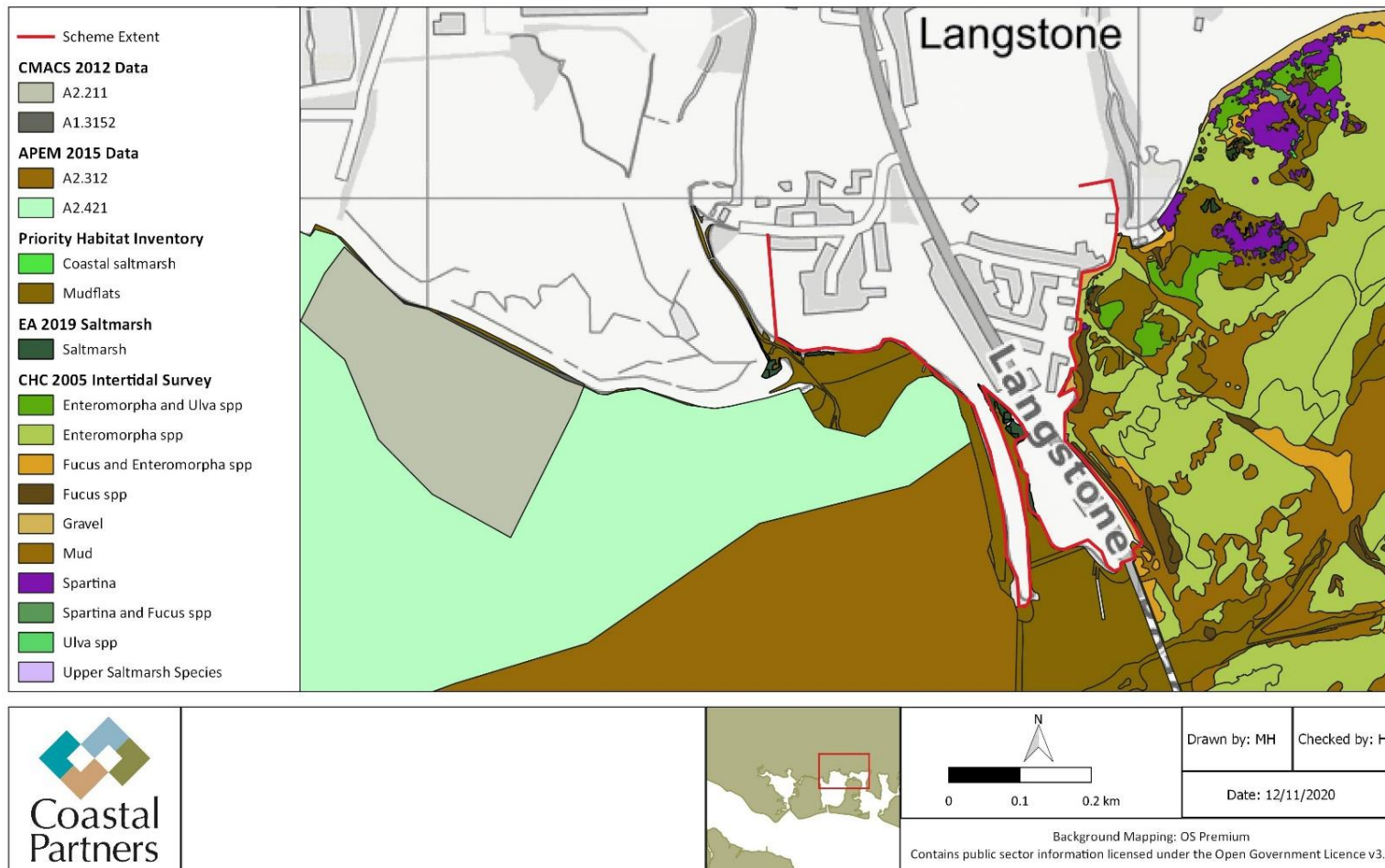


Figure 12. | Intertidal Habitats along the Scheme Frontage

A SAC condition assessment undertaken for Natural England by CMACS in 2011 included a transect adjacent to the west of the Scheme in front of the Southmoor nature reserve (CMACS, 2012). This survey identified that the upper shore consisted of coarse material with a strandline of furoid detritus which contained numerous talitrid amphipods, corresponding to the EUNIS biotope A2.211 'Talitrids on the upper shore and strand-line'. On the mid and lower shore, the habitat consisted of coarse material, mainly sandy or muddy gravel with some pebbles and cobbles. This substrate supported dense growths of algae, mainly *Fucus serratus* and *Fucus vesiculosus* but with some *Chondrus crispus* and *Ulva* species, representing the EUNIS biotope A1.3152 '*Fucus serratus* on full salinity sheltered lower eulittoral rock'. This transect had a very rich molluscan fauna compared to other transects surveyed in Langstone Harbour, with the following species recorded: *Cerastoderma edule*, *Crepidula fornicata*, *Gibbula umbilicalis*, *Littorina littorea*, *L. mariaae*, *L. obtusata*, *L. saxatilis* and *Patella vulgata*. Larger particles were encrusted with barnacles including *Balanus balanus* and *Semibalanus balanoides* and porifera (sponges) were also present. The breadcrumb sponge *Halichondria panicea* was recorded in the wetter parts of the shore. The gammarid amphipod *Chaetogammarus* sp. and shore crab *Carcinus maenas* were also recorded (CMACS, 2012).

As shown in **Figure 13**, the CHC intertidal vegetation survey and the Environment Agency saltmarsh extent and zonation layer indicate that there is sparse saltmarsh vegetation along the Scheme frontage (University of Portsmouth, 2005; Environment Agency, 2020). Along the Core Scheme area to the east of the A3023, there are occasional patches of *Spartina* vegetation (University of Portsmouth, 2005). Between the sailing club and the Langstone Spit is an area of *Spartina* with some upper saltmarsh species present (Environment Agency, 2020). In front of the Mill Lane defences in the Additional Scheme area, there is some low-mid marsh and upper marsh saltmarsh habitat at the base of the existing revetment (Environment Agency, 2020).

## Saltmarsh extent and zonation along the Scheme frontage

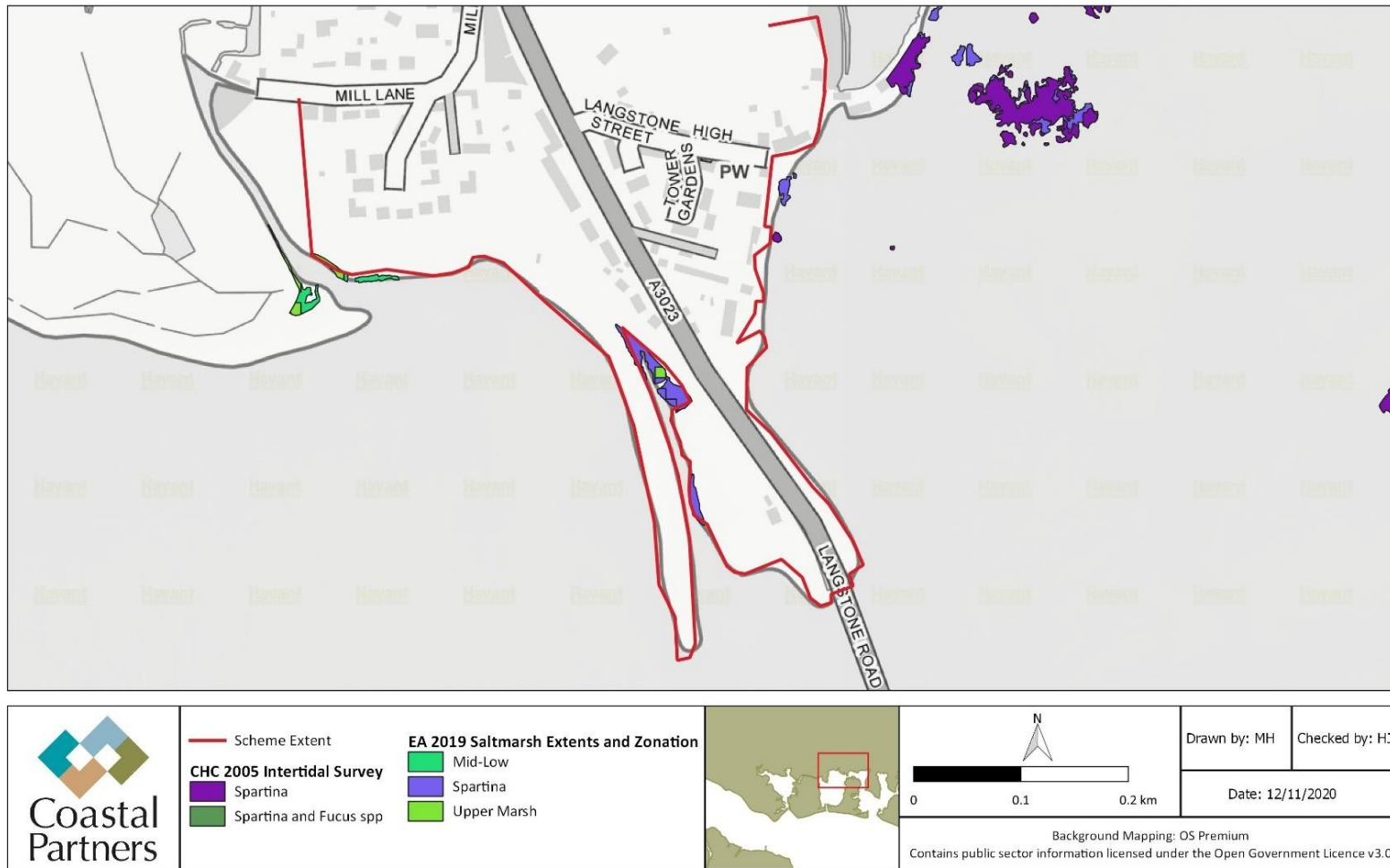


Figure 13. | Saltmarsh extent and zonation along the Scheme frontage

Furthermore, the HBIC data reviewed in the PEA (**Appendix E**) identifies a number of notable plant species within the study area that are typical of saltmarsh habitat and sea walls including four species of glasswort (*Salicornia* spp.), nationally scarce Slender Hares-ear (*Bupleurum tenuissimum*), Golden Samphire (*Inula crithmoides*) and Divided Sedge (*Carex divisa*).

There are no seagrass (*Zostera*) beds adjacent to the Scheme frontage. The nearest seagrass beds are located over 3 km away from the Core Scheme in Chichester Harbour at Gutner Point on Hayling Island, and over 2 km away from the Additional Scheme in Langstone Harbour at Sinah Lake to the south of Stoke on Hayling Island.

Intertidal mudflats, saltmarsh and seagrass beds are all Habitats of Principal Importance under Section 41 of the NERC Act 2006 and are therefore considered to be of national importance in their own right. Furthermore, these habitats are also features and supporting habitats of the SAC, SPA and Ramsar site and as such are of international importance as an area of estuarine habitats.

### Coastal invertebrates

The HBIC data reviewed in the PEA (**Appendix E**) identified a number of coastal habitat specialist invertebrate species in the study area (e.g. glasswort moth *Coleophora salicorniae*, sea purslane moth *C. salinella*, the saltmarsh moth *C. atriplicis*, saltmarsh bell moth *Eucosma tripoliana* and coast neb moth *Monochroa moyses*).

### Fish and shellfish

Evidence based maps for spawning and nursery grounds for selected fish species in the UK have been produced by Coull *et al* (1998) and later revised by Ellis *et al* (2012) and show that there are spawning and nursery grounds for several species of fish within Portsmouth Harbour, Langstone Harbour, Chichester Harbour and the wider Solent. The inshore waters of the Solent are important nursery areas for juvenile species of fish. There are also known spawning grounds for bass. Langstone and Chichester (and Portsmouth) Harbours are designated Bass nurseries under the Bass Order 1999 and as such fishing for bass, or any other fish using Sand Eels as bait by any fishing boat in any part of the harbour, is prohibited between 30th April and 1st November (SIFCAc, 2020).

In addition to Bass, the general area supports spawning and nursery grounds (Ellis *et al.*, 2012) for species listed in **Table 4.11**.

**Table 4.11: Species that use the study area for spawning and nursery grounds**

| Species                                  | Nursery | Spawning |
|------------------------------------------|---------|----------|
| Bass ( <i>Dicentrarchus labrax</i> )     | ✓       | ✓        |
| Tope Shark ( <i>Galeorhinus galeus</i> ) | ✓       |          |
| Plaice ( <i>Pleuronectes platessa</i> )  | ✓       | ✓        |
| Sole ( <i>Solea solea</i> )              | ✓       | ✓        |
| Thornback Ray ( <i>Raja clavata</i> )    | ✓       |          |
| Undulate Ray ( <i>Raja undulata</i> )    | ✓       |          |
| Lemon Sole ( <i>Microstomus kitt</i> )   | ✓       | ✓        |
| Cod ( <i>Gadus morhua</i> )              |         | ✓        |
| Sandeel ( <i>Ammodytes tobianus</i> )    |         | ✓        |
| Sprat ( <i>Sprattus sprattus</i> )       |         | ✓        |

The boundaries for spawning and nursery areas associated with **Table 4.11** should be seen as indicative only since species move around their preferred areas. However, some species are known to use the vicinity of the Scheme for nursery grounds including plaice, sole, tope, thornback ray, undulate ray and lemon sole. Bass, lemon sole, sandeel, plaice, cod and sprat are all known to have spawning grounds within the area. **Table 4.12** gives an indication of the peak spawning periods for the main species.

**Table 4.12: Main spawning periods for fish species in the study area (after Coull et al, 1998, and Ellis et al., 2012).**

| Species                        | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Sole                           |     |     |     | *   |     |     |     |     |     |     |     |     |
| Lemon Sole                     |     |     |     |     |     |     |     |     |     |     |     |     |
| Sandeel                        |     |     |     |     |     |     |     |     |     |     |     |     |
| Plaice                         | *   | *   |     |     |     |     |     |     |     |     |     |     |
| Cod                            |     | *   | *   |     |     |     |     |     |     |     |     |     |
| Sprat                          |     |     |     |     | *   | *   |     |     |     |     |     |     |
| Bass                           |     |     |     |     |     |     |     |     |     |     |     |     |
| * denotes peak spawning period |     |     |     |     |     |     |     |     |     |     |     |     |

There is potential for migratory fish, many of which are of conservation concern e.g. European eel (*Anguilla anguilla*) and sea trout (*Salmo trutta morpha trutta*), to pass through the harbours and the Langdale Brook (and potentially Lymbrook Stream) may form a migration route for these species (refer to the PEA in **Appendix E**). Sea trout are protected under the Salmon and Freshwater Fisheries Act 1975 and are also Species of Principal Importance under Section 41 of the NERC Act 2006 and, as such, are considered to be of national importance. European eels are a Species of Principal Importance under Section 41 of the NERC Act 2006. They are also listed as critically endangered on the IUCN red list and are included on the OSPAR Commission list of threatened and/or declining species. As such, they are considered to be of international importance.

The Solent was historically the largest native oyster fishery in Europe, supporting up to 450 vessels and 15 million oysters were caught in one year alone in 1978 (Blue Marine Foundation, 2019). However, the population of oysters has declined in recent years for a variety of reasons including recruitment failures, poor water quality, over-fishing, the spread of the disease *Bonamia ostrea*, competition from the slipper limpet (*Crepidula fornicata*) and increases in the predatory winkle (*Ocenebra erinacea*). In 2013, the Solent oyster fishery collapsed and since then oyster populations across the Solent have continued to remain very low (SIFCA, 2018 and SIFCA *pers. comms*). Native oyster is a Species of Principal Importance under Section 41 of the NERC Act 2006 and is also on the OSPAR list of threatened and declining species and habitats and can be considered to be of national importance. The native oyster beds in the Solent are also partially within the Solent European Marine Site network of protected areas.

The intertidal mudflats within the vicinity of the Scheme support a large diversity of bivalves including clams and mussels together with whelk as well as many other invertebrates which provide a food source for birds and some fish species. There is a small fleet of commercial fishing vessels which target clams and whelks as well as oyster within Langstone Harbour

(Langstone Harbour, 2020a). The commercial shellfish industry is further described in **Section 4.10**.

### Marine mammals

Marine mammals occurring in UK waters comprise cetaceans (whales, dolphins and porpoises) and pinnipeds (true seals and eared seals). All cetacean species are European Protected Species listed in Annex IV of the European Habitats Directive 2010. Additionally, the harbour porpoise and the bottlenose dolphin are protected under Annex II of the Habitats Directive. Grey seal and harbour seal are listed on Annex V of the Habitats Directive.

Due to the mobile and transitory nature of marine mammals, it is necessary to examine species occurrence in and around the Scheme and in the Solent area. The distribution of marine mammals throughout the Eastern Solent, including Langstone and Chichester Harbours, identifies six marine mammal species that potentially occur within the vicinity of the Scheme (**Appendix E**). These include:

- Odontocetes (toothed whales): Harbour porpoise (*Phocoena phocoena*); bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*) and long finned pilot whale (*Globicephala melas*); and
- Pinnipeds: Grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*).

Within the wider area of the Solent and the English Channel, other occasional visitors may include Killer whale (*Orcinus orca*), Fin whale (*Balaenoptera physalus*), Sei whale (*Balaenoptera borealis*) and Humpback whale (*Magaptera novaeanglia*).

There is a small but growing population of harbour seal and occasional Grey Seals resident in Chichester and Langstone Harbours. Current (2020) seal populations are estimated at 65+ for harbour seal and 15+ for grey seal, compared to populations of 23 – 25 harbour seals and two grey seals in 2010 (Pete Hughes, *pers. comms.*; Chesworth *et al.*, 2010). The seals predominately forage in the Eastern Solent, between Southampton and Selsey Bill. Regular foraging is observed in Portsmouth, Langstone, Chichester and Bembridge Harbours (Chesworth *et al.*, 2010; John Arnott, *pers. comms.*). The two main haul-out sites in the Solent are over 4 km from the scheme boundary at Mallard Sands in Langstone Harbour and Oar Rithe in Chichester Harbour, however the 2010 Solent Seal Tagging Project recorded seals using all of the harbour area for foraging (Chesworth *et al* 2010).

### Invasive species

A number of marine invasive, non-native species (INNS) are likely to be present within the vicinity of the Scheme. During the field survey of Langstone Harbour SSSI the presence of *Austrominius modestus* (Australasian barnacle) was noted and the American slipper limpet (*Crepidula fornicata*) was recorded nearby (Thomas *et al.*, 2016).

#### 4.7.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect marine ecology. **Table 4.13** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.13: Potential Marine Ecology pathways**

| Receptor           | Impact pathway(s)                                                                                                                                                                                                                                                                    | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All marine ecology | Effects from contaminants (construction)                                                                                                                                                                                                                                             | Core Scheme – Out<br>Additional Scheme - Out | As in <b>Section 4.3 Water and Sediment Quality</b> , the potential for contamination during construction has been scoped out. Consequently, indirect effects on marine ecology receptors are also scoped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| All marine ecology | Indirect changes in benthic habitat extent and quality due to changes in coastal processes (operation).                                                                                                                                                                              | Core Scheme – Out<br>Additional Scheme - Out | As in <b>Section 4.4 Coastal Processes</b> , no changes in coastal processes are anticipated and indirect effects are therefore also scoped out.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| All marine ecology | Changes to suspended sediment concentrations and dissolved oxygen levels                                                                                                                                                                                                             | Core Scheme – Out<br>Additional Scheme - Out | As in <b>Section 4.3 Water and Sediment Quality</b> , the potential to increase suspended sediment concentrations and dissolved oxygen levels has been scoped out as a silt curtain will be used during construction works on the foreshore. Consequently, indirect effects on marine ecology receptors are also scoped out.                                                                                                                                                                                                                                                                                                                                                                      |
| Benthic ecology    | Temporary loss and/or disturbance of intertidal sediment habitats and saltmarsh vegetation from machine access to foreshore and potential excavation and/or removal of existing defence structures, which contain saltmarsh plant species (construction and operation - maintenance) | Core Scheme – In<br>Additional Scheme - In   | For some parts of the frontage, temporary excavation work within the intertidal area is expected to be required during construction and potentially operation (for maintenance activities). If access to the site is required from the marine side, increased footfall over intertidal areas at low tide, and associated movement and/or operation of equipment may damage intertidal habitats.                                                                                                                                                                                                                                                                                                   |
| Benthic ecology    | Permanent loss of intertidal habitat under the footprint of new defence structures and due to coastal squeeze (operation)                                                                                                                                                            | Core Scheme – In<br>Additional Scheme - In   | <p>The new sea wall and accessible path in ODUs 3f to 3i and 3k (Core Scheme) and 1b (Additional Scheme) will result in the permanent loss of a narrow ribbon of intertidal sediment and saltmarsh habitat under the footprint of the new structures. Furthermore, the rock armour protection proposed on the spit in ODU 2a (Additional Scheme) may result in the loss of intertidal sediment, saltmarsh and vegetated shingle habitat depending on the extent of its footprint (to be confirmed in detailed design).</p> <p>Loss of intertidal habitats will also occur due to coastal squeeze over the lifetime of the Scheme from the implementation of the 'Hold the Line' policy at the</p> |

| Receptor                | Impact pathway(s)                             | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                                               |                                              | Langstone frontage. This loss has been assessed at both the SMP and Strategy level and compensation via the Solent and South Downs Regional Habitat Compensation Programme has been approved by the Secretary of State but is included here for completeness.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Benthic ecology         | Underwater noise during construction          | Core Scheme – Out<br>Additional Scheme - Out | Piling during construction has the potential to produce noise above background conditions. The understanding of elevated underwater levels on invertebrates is relatively underdeveloped (Hawkins et al., 2015). However, there is some evidence that some benthic species respond to sediment vibration. For example, at high levels hermit crabs ( <i>Pagurus bernhardus</i> ) can leave their shell and then return (Roberts et al, 2016). Other behavioural effects have been recorded in decapod crustaceans including changes in foraging habitat (Tidau and Briffa, 2016). However, changes in population and mortality is considered unlikely. Consequently, this impact pathway is scoped out. |
| Marine mammals and fish | Underwater noise and vibration (construction) | Core Scheme – In<br>Additional Scheme - In   | There is the potential for noise disturbance to marine mammals and fish particularly as a result of any piling. Further assessment is required once the type and extent of any piling is confirmed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Marine mammals          | Visual disturbance                            | Core Scheme – Out<br>Additional Scheme - Out | The vast majority of works being undertaken will be conducted onshore and construction within the intertidal zone is only likely to be undertaken at low water. In addition, marine mammal populations are indicated to be low (especially for cetaceans) with the proposed works covering a small proportion of any potential foraging area. The works are over 4 km from the haul out sites used by seals and are therefore unlikely to be affected. Visual effects are therefore scoped out.                                                                                                                                                                                                         |
| Marine mammals and fish | Indirect effects of habitat loss              | Core Scheme – Out<br>Additional Scheme - Out | The majority of works will be undertaken onshore. The footprint of the Scheme on the intertidal area only covers a highly localised area that constitutes a very small fraction of the known ranges of local fish and marine mammals. Indirect effects of habitat loss are therefore scoped out of further assessment.                                                                                                                                                                                                                                                                                                                                                                                  |

| Receptor         | Impact pathway(s)                                                                      | Scoped in/out?                               | Justification                                                                                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Invasive species | Introduction and/or spread of non-native invasive species (construction and operation) | Core Scheme – Out<br>Additional Scheme - Out | The final design will consider measures to enhance biodiversity where possible such as using mixture of material types. A biosecurity plan will be prepared within the CEMP. No further assessment work is proposed for this pathway. |

### 4.7.3 Recommendations for further work

The following investigations are proposed for further work:

- Undertake a Phase II intertidal habitat survey to determine the biotopes present along the frontage including the access route across the intertidal area to Mill House.
- Quantification of the extent and type of biotopes to be temporarily affected and permanently lost including from any shading by the new defences.
- Information on the proposed extent and nature of the sheet piling will be used to assess potential impacts in relation to noise.
- Due to known population of seals and fish, investigate potential for generating significant underwater noise levels and if appropriate adopt safe working practices.
- The detailed design will continue to seek to reduce encroachment onto the foreshore as far as technically and economically possible whilst still delivering the objectives of the scheme.

## 4.8 Archaeology and Historic Environment

This section presents an overview of the known (recorded) heritage assets within the vicinity of the Scheme and provides an initial assessment of the potential impacts upon these assets and their settings as a result of the promoted scheme being developed for Langstone. Reference should be made to **Section 4.9** in relation to landscape and visual effects.

### 4.8.1 Baseline Conditions

A Cultural Heritage Desk-based Assessment (DBA) was completed by AECOM in November 2018 on behalf of Coastal Partners (**see Appendix H**). The baseline conditions were assessed following the guidelines outlined by the Chartered Institute for Archaeologists (CIfA), the Standard and Guidance for Historic Environment Desk-based Assessment (CIfA 2017) and the Code of Conduct (CIfA 2019). A 500 metre radius from the Scheme was used to identify designated and non-designated heritage assets (**Figure 14**).

### Recorded Heritage and Archaeological Assets

The following heritage and archaeological assets are located within the 500 metre study area, there are:

- Eight grade II listed buildings
- Four Conservation Areas
- 31 non-designated assets

The eight grade II listed buildings are all located within the settlement of Langstone and include The Ship Inn and The Royal Oak Public House, Green Cottage, 16, 17 and 18 High Street and the Old Mill. Most of the historic buildings in the area are located along the coastal frontage and the part of Langstone High Street to the north. These include a group of listed buildings, on the High Street that is located to the east side of the Langstone High Street. They form an irregular terrace of two storey dwellings, dating from the 18th century. It is believed that they were originally built as fisherman's cottages. Although they are set back from the coastal frontage, they are closely associated with the waterside and the commercial history of Langstone. Details of these heritage and archaeological assets are provided in **Appendix H**. A summary of the Conservation Areas is provided below.

### **Langstone Conservation Area**

Langstone Conservation Area encapsulates the historic hamlet of Langstone that evolved around Langstone Harbour and includes seven listed buildings. The coastal setting of the conservation area with the wetlands and harbour extending to the east and south, combined with the flat green fields to the north and west, create a unique setting where the historic hamlet of Langstone unfolds. The waterfront development is positioned on raised stone quays acknowledging the close proximity of the area to the water and the interchangeable low and high tides. This has been a historic characteristic of the conservation area that at times can be threatening to the asset, but also contributes to its individual character. The whole of the foreshore of the village is open to public access with a footpath running along the coastal frontage. The footpath offers some picturesque and panoramic views in and out across the harbour, which is an integral and important part of the character of Langstone.

### **Mill Lane Conservation Area**

Mill Lane Conservation Area is located to the west of Langstone with the southern part of the conservation area defined by the coastal frontage and the Lavant Stream and Southmoor to the west. The relationship of the surrounding waterside adds to the special interest of the conservation area. The foreshore is defined by gardens and open fields that contribute to the openness of the area creating interesting views when seen from Langstone Harbour.

### **Wade Court Conservation Area**

Wade Court Conservation Area encompasses the remains of an estate landscaped during the late 19th and early 20th centuries, with the designed landscape making a significant contribution to the surrounding rural landscape. The Wade Court Conservation Area can be divided into two character areas consisting of the water garden and open parkland. A distinctive feature of the conservation area is the numerous trees which complement views from and towards the conservation area. The tower of Wade Court House is also a prominent feature within the conservation area, but also can be seen from outside the area, particularly in views from Hayling Island and Langstone.

### **Warblington Conservation Area**

The Warblington Conservation Area is set around the Grade I Church of St Thomas-a-Becket dating from the 12th century with meadows that slope gently down to the water with no sea wall, hedgerow or woodland fringe separating the meadows from the foreshore. This open boundary is highly visible when viewed from Hayling Island and the harbour. Hedgerow trees and groups of trees further north in the conservation area provide a backdrop in views creating the impression of woodland. Consequently, there are significant views from the conservation area across Chichester Harbour.

There are no World Heritage Sites, scheduled monuments, registered parks and gardens, or registered battlefields within the study area.

The 31 non-designated assets date from the prehistoric to the modern period. The nearest to the Scheme is a sailing barge (**Appendix H** asset number 27) constructed in 1900 and wrecked, approximately 80 metres east of the Scheme (Hampshire HER ref. 57339). Nine previous archaeological investigations (events) are also recorded within the study area. More information on this can be found within the Desk Based Assessment (**Appendix H**).

### **Potential Heritage and Archaeological Assets**

The DBA identified a low archaeological potential for the early medieval and modern periods, and a moderate potential for the prehistoric, Roman, medieval and post-medieval periods. This is due to previous prehistoric records, and Roman and medieval estates identified within the study area. Any related remains encountered would be of local significance and potentially region significance depending on their nature.

### **Architecture**

The terrace of houses on Langstone High Street date back to the 18<sup>th</sup> century. There are a number of thatched cottages. Many properties feature in postcards of the local area.

Many of the buildings on Langstone High Street have adapted doorways to enable installation of wooden barriers and sandbags during flood events, and this is limited to the older properties.

## Listed Buildings and Conservation Areas within 500m of the Langstone FCERM Scheme

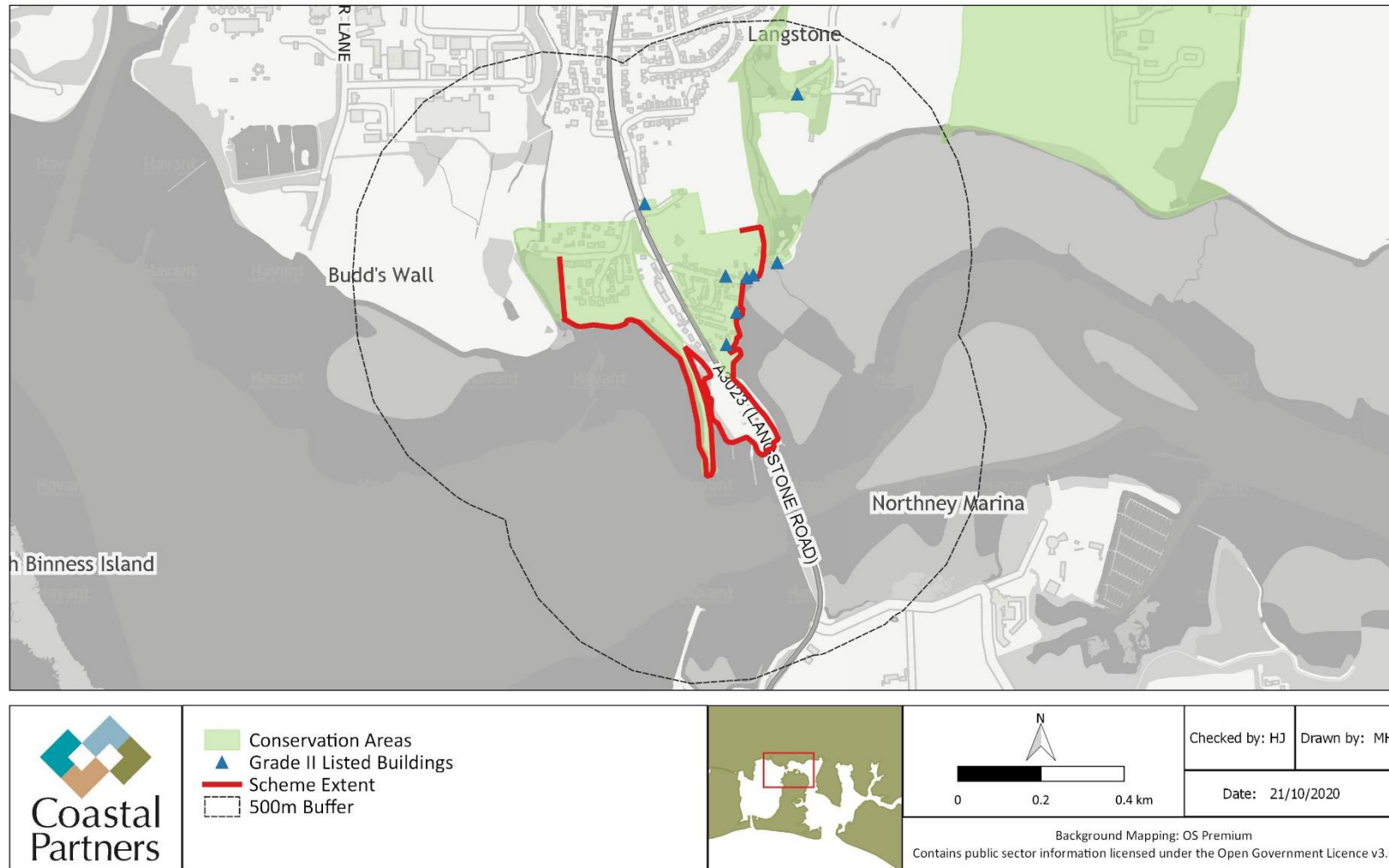


Figure 14 | Cultural Heritage Desk-based Assessment search radius and location of built heritage assets

## 4.8.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect Archaeology and the Historic Environment. **Table 4.14** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.14: Potential Archaeology and Historic Environment pathways**

| Impact pathway(s)                                                  | Scoped in/out?                             | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disturbance to archaeology and historic environment (construction) | Core Scheme – In<br>Additional Scheme - In | Any intrusive groundwork for piling, footings, or drainage associated with the flood defence works could impact on the survival of unknown archaeological remains preserved below ground. Sensitive locations are to be further investigated through consultation with regulators. Requirement for further site investigation is to be confirmed where the likelihood of disturbance is considered high with establishment of a 'watching brief' if necessary. Further assessment is therefore required.                                                  |
| Disturbance to archaeology and historic environment (operation)    | Core Scheme – In<br>Additional Scheme - In | The improved coastal defences are likely to provide a beneficial impact through reducing the risk of flooding to known and unknown heritage assets. However, there is the potential that insensitive design and use of inappropriate materials will impact upon the setting of heritage assets. These include Langstone, Mill Lane, Wade Court and Warblington Conservation Areas, and the Ship Inn, the Green Cottage, 16,17 and 18 High Street, The Royal Oak Public House and the Old Mill Listed Buildings. Further assessment is therefore required. |

## 4.8.3 Recommendations for further work

Coastal Partners is proposing to procure specialist professional heritage and archaeology consultants to support the development of detailed design and the EIA. Further work will be carried out in accordance with available standards and guidance including, but not limited to:

- I. Chartered Institute for Archaeologists' Standard and Guidance for Historic Environment Desk- Based Assessments (2017) and Code of Conduct (2019);
- II. Historic England (2015) The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3; and
- III. Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008).

The following investigations are recommended as part of the EIA:

- Archaeological watching brief for Ground Investigation/Site Investigation.
- Heritage Statement.
- Archaeological Mitigation Strategy (AMS) – if confirmed as required by Heritage Statement findings and planning / marine licence conditions. For discharge of conditions stage.
- Written Scheme of Investigation and watching brief for construction phase - if confirmed as required by Heritage Statement findings and planning / marine licence conditions (could be included as part of AMS). For discharge of conditions stage.
- Engagement with Historic England, the County Archaeologist and HBC Conservation Officer.

- Focused stakeholder workshops including on landscape and heritage are to be undertaken as part of the stakeholder engagement plan.

## 4.9 Landscape and Visual

This section considers the landscape/seascape and visual impacts associated with the proposed Scheme. Reference should be made to **Section 4.1** in relation to designated sites including the Chichester Harbour AONB. **Section 4.8 Archaeology and Historic Environment** provides for further details on the Conservation Areas.

### 4.9.1 Baseline Conditions

Positioned on the mainland opposite Hayling Island, the coastal frontage at Langstone faces Chichester Harbour to the east and Langstone Harbour to the west. The Core Scheme overlaps with Langstone village including a historic quay with two public houses along with mixed residential property and adjacent footpaths. This includes the Mill Lane Conservation Area, designated to protect the open, historic landscape adjacent to the Langstone and Chichester Harbours. The Core Scheme also overlaps with the Langstone Conservation Area that encapsulates what was the historical hamlet of Langstone that evolved around the harbour (see **Section 4.8 Archaeology and Historic Environment**). Both the Core and Additional Scheme are adjacent to Public Rights of Way (PRoW) including the Solent and Wayfarers walk (see **Section 4.12**). These PRoW provide scenic views across to Hayling Island, Thorney Island and Portsea Island including the adjacent Chichester Harbour AONB<sup>15</sup>.

### Visual Receptors

The following categories of visual receptor can be found within the study area:

- Residential properties
- Recreational areas (see **Section 4.11** for further details) including:
  - Footpaths/bridleway
  - Recreational open space and ecologically & historically/culturally designated sites;
  - Boats on the harbours
  - Business users; and
  - Road users

### 4.9.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect landscape and visual receptors. **Table 4.15** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

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<sup>15</sup> <https://landscapesforlife.org.uk/about-aonbs/aonbs/chichester-harbour> (Last accessed August 2020)

**Table 4.15: Potential Landscape and Visual pathways**

| Impact pathway(s)                                                       | Scoped in/out?                             | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temporary effects on landscape character during construction activities | Core Scheme – In<br>Additional Scheme – In | Construction activities have the potential to affect the landscape including the Chichester Harbour AONB and heritage assets such as Conservation Areas and Listed Buildings. Temporary effects on landscape character is therefore scoped in for further assessment.                                                                                                                                                                                                   |
| Permanent effects on landscape character                                | Core Scheme – In<br>Additional Scheme – In | The Scheme is located within an AONB, Conservation Areas, and in close proximity to listed buildings. The Scheme includes the construction of seawalls and addition of floodgates and flip up barriers that have the potential for permanent effects on landscape character. Consequently, further assessment is required.                                                                                                                                              |
| Temporary effects on views as a result of construction activities       | Core Scheme – In<br>Additional Scheme – In | The construction works will require the clearance of vegetation and raising or rebuilding of footpaths/cycle routes along new embankments. This may result in an increased sense of exposure and openness along the coastline. Consequently, further assessment is required when details on construction activities are available.                                                                                                                                      |
| Permanent effects on views                                              | Core Scheme – In<br>Additional Scheme – In | The scheme has the potential to cause permanent effects on panoramic views to and from Langstone. This includes from adjacent properties, PRow's and businesses, including the public houses within the picturesque hamlet. Mitigation by design is likely to be required to minimise adverse impacts as far as possible during detailed design. Consequently, further assessment is required and permanent effects on views has been scoped in for further assessment. |

### 4.9.3 Recommendations for further work

The following investigations are proposed for further work:

- A landscape architect will be appointed for the detailed design phase who will work with the designers, heritage consultants, the community and statutory stakeholders to ensure a sensitive landscape design including material types, structures in the landscape, addition of furniture, signage, lighting, planting and reinstatement of local landscape assets in this sensitive setting.
- Based on the potential impacts detailed above, a Landscape and Visual Impact Assessment (LVIA) will be undertaken for the Scheme. This assessment will consider the potential landscape and visual impacts arising from the Scheme and suggest mitigation options that can be incorporated into the detailed design. Where possible the design will seek to incorporate options that minimise visual impacts and promote access to the view.
- Illustrations and visualisations will be produced to support the interpretation of the detailed design in a landscaping context.
- Focused stakeholder workshops including on landscape and heritage to be undertaken as part of the stakeholder engagement plan.

## 4.10 Commercial Fisheries and Navigation

The main study area considered for navigation and commercial fisheries is considered to be the foreshore and immediate nearshore coastal waters, this includes Langstone and Chichester Harbours. The indirect effects to commercial fisheries relating to the disturbance of fish are presented separately in **Section 4.7 Marine Ecology**.

### 4.10.1 Baseline Conditions

#### Commercial Fisheries

A small fleet of fishermen operate from Langstone and Chichester Harbours, often fishing in the wider Solent. Fishing activities in the vicinity of the Scheme are regulated by the Southern Inshore Fisheries and Conservation Authorities (IFCA) and the Sussex IFCA.

Approximately 20 boats fish from Langstone Harbour the main effort being during the oyster season (Walmsley and Pawson, 2007). However severe depletion of the native oyster beds has resulted in the Temporary Closure of them in the Solent in recent years, including in Langstone Harbour for the 2020/2021 season (between the 1st November 2020 and the 28th February 2021) (SIFCA, 2020a) and in Chichester Harbour (SxIFCA, 2020). Other byelaws include regulation of the use of Skate or Stop nets in Langstone Harbour (SIFCA, 2020b) and byelaws prohibiting the use of towed fishing gears and digging, collection and hand gathering of marine fisheries resources in specified areas of Langstone Harbour and Chichester Harbour to protect eelgrass (*Zostera* spp.) and therefore prevent damage or deterioration to the Solent European Marine Site<sup>16</sup>.

The harbours are also busy during the summer where boats run to fish for bass, mullet, sole, plaice, lobster. Many boats offer charter angling trips and set the occasional net or pot. There is a rod and line fishery for bass within Langstone Harbour and around its entrance, which has been designated a bass nursery area. Several boats set nets and trawl for a variety of demersal fish in season, and pots are set for both lobsters and crabs during the warmer months (Walmsley and Pawson, 2007). The goods are landed at two wharves, namely Hayling and Eastney pontoons (Langstone Harbour Board, 2020a). The main mooring area for Chichester Harbour is at Itchenor, over 10 km east from the Scheme, however some boats are still likely to fish within Langstone Harbour (Walmsley and Pawson, 2007).

#### Navigation

The Core Scheme is located within the Statutory Harbour Authority boundary of Chichester Harbour Conservancy. The Additional Scheme is located within the Statutory Harbour Authority boundary of Langstone Harbour Board. As detailed in **Section 4.11 Socio Economic, Amenity and Recreation** these harbour areas are used for recreation, both on and off the water. The main activities at sea include sailing, cruising, fishing, kayaking, paddle boarding, jet skiing, water skiing and diving. There are 20 sailing, cruising, rowing and fishing clubs between the harbours. The most commonly used are small recreational craft, normally less than 12 metres. The clubs and marinas welcome visitors throughout the year for sailing and cruising activities (Langstone Harbour Board, 2020b).

The immediate nearshore waters adjacent to the frontage are not used for commercial or military navigation. However, Langstone Harbour does support a range of commercial activities that shape the character of the Harbour and contribute to the local economy,

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<sup>16</sup> <https://secure.toolkitfiles.co.uk/clients/34087/sitedata/files/Prohibition-Fishing-Method-byelaw.pdf>

including marine aggregates and ferry activities. The harbour supports a busy trade in sea-dredged aggregates through the Aggregates Industries (formerly Kendall's) Wharf on the western side of the harbour and Bedhampton Wharf in the north of the harbour. Vessels of up to 80 metres overall length can be accommodated and cargoes other than marine aggregate may be accepted by arrangement with berth operators (Langstone Harbour Board, 2020c).

#### 4.10.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect commercial fisheries and navigation. **Table 4.16** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.16: Potential Commercial Fisheries and Navigation pathways**

| Impact pathway(s)                                            | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes in navigation (construction)                         | Core Scheme – Out                            | The Core Scheme would not involve the mobilisation of any vessels and is consequently scoped out of further assessment.                                                                                                                                                                                                                                                |
|                                                              | Additional Scheme – In                       | The Additional Scheme could involve delivery and deployment of rock armour to the Langstone Spit using vessels. This process could have navigational impacts on other commercial and/or recreational vessels using the harbour and is scoped in for further assessment.                                                                                                |
| Changes in navigation (operation)                            | Core Scheme – Out<br>Additional Scheme – Out | Both the Core and Additional Scheme will not involve the mobilisation of any vessels once operational. In addition, the small scale works will not result in and changes in coastal processes including changes in bathymetry and associated risks to navigation. Effects on navigation once the scheme is operational are therefore scoped out of further assessment. |
| Disturbance to fishing activity (construction and operation) | Core Scheme – Out<br>Additional Scheme – Out | Low commercial fishing activity is indicated to occur within the vicinity of the Scheme with limited potential for effects. No further assessment in relation to commercial fishing activity is therefore proposed.                                                                                                                                                    |

#### 4.10.3 Recommendations for further work

Should the Additional Scheme be brought forward, which would include construction of rock armour at the spit (ODU2a), impacts relating to navigation will be scoped in for further assessment. This will include detailed liaison with the Statutory Harbour Authority. For the Core Scheme, commercial fisheries and navigational impacts have been scoped out.

### 4.11 Socio Economic, Amenity and Recreation

This section considers the socio-economic context and recreational value of the Scheme area and any potential impacts.

#### 4.11.1 Baseline Conditions

Langstone is located within the Havant Borough. According to the Havant Borough Profile (Havant Borough Council, 2018), in 2011, 30% of the population were in the 45-64 age

category, with a fifth over 65 years of age. The dependency ratio is predicted to rise to 66% by 2021 as the over 65 age group is predicted to rise by 23%. In 2011, 77% of homes in Havant and Bedhampton were owner occupied.

The wider area of Havant and Bedhampton's present day economy is centred on Havant Town Centre, Langstone Technology Park, Broadmarsh Industrial Area and New Lane Industrial and Business Areas (Havant Borough Council, 2018). According to the Chichester Harbour Conservancy, the harbour supports a large number of marine-related businesses, providing jobs and a valuable contribution to the local economy.

In the vicinity of Langstone Village, there are a number of businesses including a Premier Inn hotel and Langbrook Farm Carvery. More locally, there are two public houses at the Ship Inn and Royal Oak and small private businesses.

There is no village shop within Langstone, with the nearest convenience stores located on Hayling Island or north of the A27 in Havant. Hayling Island, to the south of Langstone has approximately 17,500 residents and over 1000 Small Medium Enterprise businesses (B2B marketing dataset). Visitors are attracted to the island's beaches and holiday camps and the A3023 forms the only road linking the island with the mainland via a bridge, where all major utilities and services are situated.

In fulfilment of the options appraisal work package, AECOM have undertaken an Economic Appraisal (**Appendix I**) to support determination of the preferred management option. In support of this, a Wider Benefits Assessment (**Appendix J**) has also been undertaken.

The Economic appraisal determines the 'Do Nothing' damages, and the benefits of each defence option as presented in line with the HM Treasury and Environment Agency FCERM Appraisal Guidance (FCERM-AG, 2010). After establishing the Do Nothing economic damages, the short list option costs and benefits were established. The costs and benefits were compared in order to determine the benefit cost ratios (BCRs). Costs associated with the options include design, construction, and maintenance of the option over its design life. Benefits are based on the direct damages avoided (reduced flooding to property, people, assets and infrastructure) and a number of indirect damages avoided (e.g. health and wellbeing impacts of flooding). This economic comparison is known as cost benefit analysis (CBA) and provides a rational and systematic framework for assessing the advantages and disadvantages of the preferred option.

The Wider Benefits Assessment compares the impact of a Do Nothing scenario against the scheme options to identify the wider benefits that could be provided by the Scheme that present economic, social and environmental benefits to the community.

The Wider Benefits Assessment (**Appendix J**) identifies an estimated average 43,147 visitors to Langstone each year for outdoor recreation, worth a welfare value of £178,147.

Within the vicinity of the Scheme there are several key points of recreational interest:

- Langstone Sailing Club and Havant Youth Sail Training Scheme are situated within the scheme area, operating in Chichester Harbour.
- Recreational activities such as angling, yachting, stand up paddle boarding, dinghy sailing, motor cruising, windsurfing, water skiing (under license), jet skiing (with a permit) and canoeing are all well-established within Langstone and Chichester Harbours.
- Shoreline access.
- PRowS, cycleways and bridleways (see **Section 4.12 Traffic and Access**).

The scheme intersects with The Hayling Billy Line. This is a linear path that takes the route of the old railway line between Hayling Island and Havant, starting at Havant train station. The track is used by walkers, cyclists and horse riders. Local amenities are limited to public toilets.

Local community groups include:

- Langstone Residents Association
- Langstone Village Neighbourhood Watch
- Langstone Conservation Group
- Langstone Village Association
- Langstone Sailing Club
- Friends of Chichester Harbour
- Friends of Langstone Harbour
- Havant Civic Society

#### 4.11.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect socio-economic, amenity and recreation. **Table 4.17** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.17: Potential Socio-economic, amenity and recreation pathways**

| Impact pathway(s)                                                          | Scoped in/out?                             | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temporary effects on socio-economic, amenity and recreation (construction) | Core Scheme – In<br>Additional Scheme – In | The Scheme has the potential to disrupt local businesses particularly associated with the Ship Inn and Royal Oak public houses, both of which are in the immediate vicinity of construction works. In addition, a number of recreational interests could be affected by the scheme during construction. Further assessment is therefore required.                                                                                                                                                                                                                                                                                                                                                                        |
| Permanent effects on socio-economic, amenity and recreation (operation)    | Core Scheme – In<br>Additional Scheme – In | Reduced flood risk to properties and businesses should have a positive economic impact. Avoided flooding of the A3023 will benefit residents and local businesses, enabling continued access in accordance with the emerging Local Plan ( <b>Section 3.15</b> ) and Regeneration Strategy designed to enable HBC to address a number of key economic challenges and opportunities. There may also be improved amenity such as through resurfaced footpaths and widened in places. There is also an opportunity to resurface parking areas and reduce flood risk to vehicles, however there may be changes to parking spaces and layout through installation of flood defences. Further assessment is therefore required. |

### 4.11.3 Recommendations for further work

The following investigations are proposed for further work:

- Detailed assessment on the magnitude and duration of disruption to local businesses associated with the construction footprint where this information is available.
- Detailed consideration of the effects of the Scheme including to the local community and businesses in terms of reduced flood risk, improved access and amenity.
- Collaboration with Hampshire County Council, Havant Borough Council, Natural England, local community and other consultees (see **Section 6 Consultation**) on broader outcomes on the Scheme, such as planting and landscape, open space improvements, amenity, signage and interpretation boards, ecological enhancement, waymarkers and footpath resurfacing.

## 4.12 Traffic and Access

This section considers the potential traffic and access impact arising from the scheme proposals.

### 4.12.1 Baseline Conditions

#### Traffic

The Scheme is in the vicinity of narrow roads including the High Street at Langstone with restricted turning or passing places. Particularly in the summer months it is a popular visitor's location, with increased pressure on road space.

The A3023, Langstone Road (see **Figure 1**) is a major 'A' road that bisects the Scheme, linking the A27 to Hayling Island. According to the Department for Transport, the annual average daily flow is approximately 24,400 motor vehicles (2018) travelling on to and from Hayling Island (and thus passing through the Scheme (Department of Transport, 2020). The A3023 is the only highway access to Hayling Island. Over 70% of those of working age commute off and onto the island using a car and 84% of those living on the island use a car as their main form of transport (2011 CENUS Data). The speed limit through the scheme site is 40mph. The A3023 lies off the A27 that provides quick links to Portsmouth, Southampton and Brighton, and also London via the A3(M) (HCC, 2014).

#### Access

There are several PRow or permissive paths within the vicinity of the Scheme<sup>17</sup> as indicated on **Figure 15**. These include:

- Langstone Harbour Waterside Walk.
- Hayling Billy Coastal Path/Shipwrights.
- 129 (along the frontage between the Ship Inn and the Royal Oak public houses).
- 54b linking the Hayling Billy Trail to the Royal Oak public house.
- 45 (to the west of the site).

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<sup>17</sup> <https://www.hants.gov.uk/landplanningandenvironment/rightsofway/definitivemap> (Last accessed August 2020)

- 131 (to the north of the High Street and site).
- 56 (to the east of the site).
- Bridleway 132 links Langstone with Hayling Island across the intertidal foreshore.

The following long distance routes also pass through Langstone:

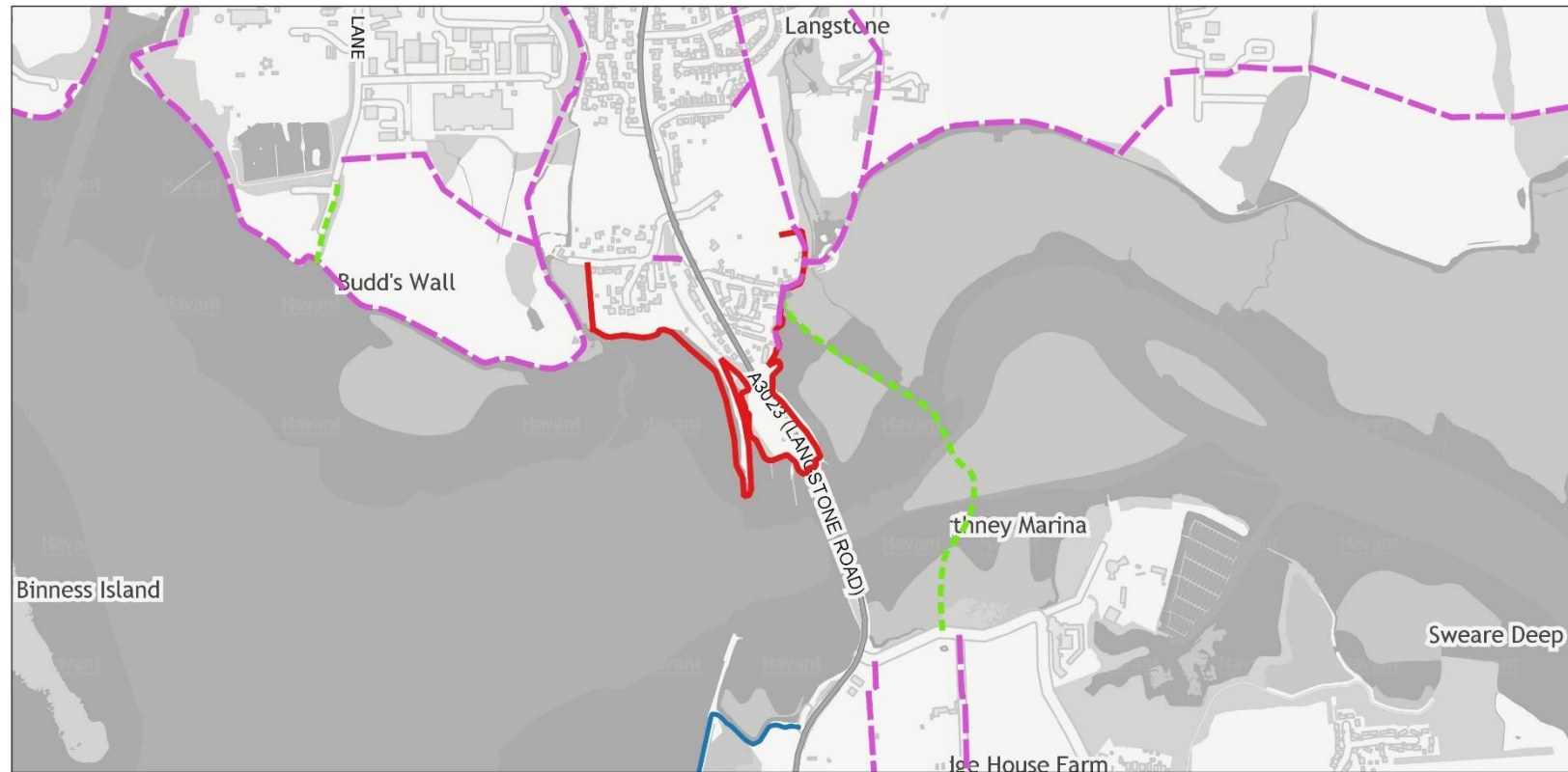
- The Solent Way and the Wayfarers Walk – via Mill Lane and the High Street; and
- The Shipwrights Way – via the footpath in ODU2b and over the Langstone Bridge (A3023).

It is possible to reach the Langstone High Street, The Ship Inn and Mill Lane via bus, with stopping points located adjacent on the A3023. The nearest train stations are Havant, Bedhampton and Warblington within approximately 3 miles.

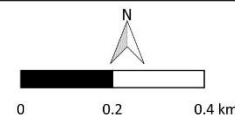
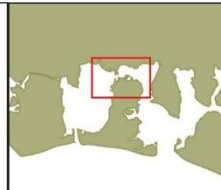
Parking is limited at Langstone. There are free parking spaces for cars along the northern side of the High Street (approx. 25 vehicles). It is not permitted to park on the foreshore. There is also limited parking adjacent to the Ship Inn (approx. 75 vehicles).

There are a number of properties in the vicinity of the Scheme that are reliant on use of the foreshore as access. This includes using informal slipways at the High Street and the car park adjacent to the Ship Inn. This access is through permission from the Langstone Harbour Board or Chichester Harbour Conservancy and for emergency and resident use only. This access is tidally restricted to periods where water levels are low enough. The route is frequently inundated with water at high tide and during extreme water levels.

## Public Rights of Way



— Scheme Extent  
**Hampshire Rights of Way**  
- - - Bridleway  
- - - Footpath  
— Offroad Cycle Routes



Checked by: HJ Drawn by: MH

Date: 21/10/2020

Background Mapping: OS Premium  
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Figure 15 | Public Rights of Way in the vicinity of the Scheme

## 4.12.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect traffic and access. **Table 4.18** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.18: Potential Traffic and Access pathways**

| Impact pathway(s)                                                                 | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes in the route, volume, composition or speed of traffic during construction | Core Scheme - In<br>Additional Scheme - In   | Whilst the final detail is yet to be established there is likely to be increased traffic demand during the construction phase. Based on other similar construction projects, it is expected that the construction works will attract the need for Heavy Goods Vehicles, low-loader, articulated dump trucks, concrete wagons and excavators to attend site, in addition to construction staff vehicles. This has the potential to increase driver and pedestrian delay and is therefore scoped in for further assessment.                                                                                                                                                                                        |
| Changes in the route, volume, composition or speed of traffic during operation    | Core Scheme - Out<br>Additional Scheme - Out | Whilst the final detail is yet to be established there is likely to be a very slight increase in traffic demand during the operational phase to enable maintenance, and potentially operation of flood gates / flip up barriers), however this is expected to be negligible against background levels and is therefore scoped out for further assessment.                                                                                                                                                                                                                                                                                                                                                        |
| Changes in road safety (construction)                                             | Core Scheme - In<br>Additional Scheme - In   | Appropriate management measures will be employed to limit impacts on road safety as a result of the construction vehicles, which may access the construction site / compound. This will include construction traffic routing, speed limits, signage and traffic marshals, where appropriate. These management measures will be detailed in a Construction Traffic Management Plan (CTMP). The details of required transport and access routes during construction, however, have not been confirmed and therefore this impact pathway will require further consideration in the ES.                                                                                                                              |
| Reduced accessibility (construction)                                              | Core Scheme - In<br>Additional Scheme - In   | Due to the nature of the construction works within a restricted area, and requirement to maintain health and safety standards, it is likely that there will be temporary closure of PRoW during construction, most notably to footpath 129 and 54b. The Hayling Billy Trail, Solent Way and Wayfarers Walk are also likely to be temporarily disrupted. There is also potential for permanent diversion of restricted sections of public footpath. In addition, there will also be a potential impact on parking availability as a result on vehicles from construction workers and potentially associated with the compound location (areas are yet to be confirmed). Further assessment is therefore required. |
| Damage to the local road network (construction)                                   | Core Scheme - Out<br>Additional Scheme - Out | Appropriate management measures will be employed to repair any damage to the local road network as a result of the construction vehicles. These management measures will be detailed in a CTMP and are anticipated to include a pre-works inspection and reinstatement of the road following completion of the construction works. No significant impacts are anticipated with these appropriate mitigation measures in                                                                                                                                                                                                                                                                                          |

| Impact pathway(s)                    | Scoped in/out?                             | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      |                                            | place and damage to the local road network is therefore scoped out for further assessment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Changes in accessibility (operation) | Core Scheme - In<br>Additional Scheme - In | The Scheme has the potential to reduce traffic disruption and maintain safe access to residents as well as potentially increase access to some users. However, it is important to maintain access to the proposed scheme in order to ensure maintenance of the flood defence and access assets throughout their operational phase. This may lead to intermittent disruption to access whilst maintenance works are undertaken. In addition, the operation of floodgates and/or flip up barriers may affect access, particularly to PRoW and parking availability. Further assessment is therefore required. |

### 4.12.3 Recommendations for further work

The following investigations are proposed for further work:

- Assessment of the detailed design alignment and construction methods on transport and accessibility.
- Incorporation of mitigation methods, where necessary, to reduce the impact of construction on traffic and accessibility.
- Further consultation with the highways and countryside access teams will be necessary in order to identify any further studies and appropriate impact methodologies.

A CTMP will be produced for approval by HBC prior to the commencement of construction works.

## 4.13 Noise and Vibration

This section examines the potential airborne environmental noise and vibration impact arising from the scheme proposals. It does not examine occupational noise and vibration issues. Effects from airborne noise on sensitive ecological receptors is considered under **Section 4.5 Ornithology** and **Section 4.6 Terrestrial Ecology** and underwater noise is also considered separately within **Section 4.5 Marine Ecology**.

### 4.13.1 Baseline Conditions

The majority of the Scheme is sited within a quiet coastal residential area, with some residential properties in the immediate vicinity. There are also several local businesses in the vicinity of the works, including the Ship Inn and Royal Oak public houses, and Langstone Sailing Club. Other sensitive receptors include visitors to the area and adjacent heritage assets.

### 4.13.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect noise and vibration. **Table 4.19** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.19: Potential Noise and Vibration pathways**

| Impact pathway(s)                          | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                 |
|--------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Traffic noise (Construction)               | Core Scheme - In<br>Additional Scheme - In   | Changes in road traffic noise as a result of the Scheme may result in increases in noise at nearby sensitive receptors. Further assessment is therefore required.                                                                                                             |
| Airborne noise (Construction)              | Core Scheme - In<br>Additional Scheme - In   | The detailed design will confirm the requirements of any piling, which has the potential for significant airborne noise. Due to the proximity of the proposed works to sensitive receptors, airborne noise is scoped in for further assessment.                               |
| Ground borne vibration (construction)      | Core Scheme - In<br>Additional Scheme - In   | The Scheme has the potential to generate high levels of vibration at nearby sensitive receptors including historic and listed buildings (See <b>Section 4.8 Archaeology and Historic Environment</b> ). Ground borne vibration is therefore scoped in for further assessment. |
| Changes in noise and vibration (operation) | Core Scheme - Out<br>Additional Scheme - Out | The operation of the scheme will not result in any changes in noise and vibration levels. Only minimal maintenance such as visual inspections are anticipated. Changes in noise and vibration for the operational phase is therefore scoped out for further assessment.       |

### 4.13.3 Recommendations for further work

This scoping report considers the proposed scheme during outline design and as such the final alignment, design and construction methods have not been finalised. It is therefore difficult to estimate the impact of the scheme on noise and vibration during construction and operation, therefore further analysis will be completed as part of the EIA.

The following investigations are proposed for further work:

- Consultation with Havant Borough Council to obtain any existing noise and vibration data within the Langstone scheme area. In the absence of any data, it is likely that a background noise survey will be required. The scope and methodology of the survey is to be confirmed.
- Plans for consultation with the local community in the lead up to construction to provide notice of any anticipated noise and vibration impacts and proposed mitigation.
- An assessment of any noise and vibration impacts according to relevant best practice guidance, including British Standard BS5228-1 2009 "Code of practice for noise and vibration control on construction and open sites".
- Details of proposals for vibration monitoring of properties directly impacted by the proposed scheme.
- Further detail on the requirement for piling during construction and associated mitigation measures will be included in the CEMP.

## 4.14 Air Quality

This section examines the potential air quality impacts from the proposed Scheme.

### 4.14.1 Baseline Conditions

The Environment Act 1995 Part IV established a national framework for air quality management that requires all local authorities to conduct air quality reviews. If the reviews indicate that an objective for any of the identified pollutants will not be met by the date for compliance, then an Air Quality Management Area (AQMA) should be declared.

HBC completed an Air Quality Annual Status Report in 2019 in fulfilment of its obligations (HBC, 2019). The main pollutants of concern are those relating to fuel combustion, such as Nitrogen Dioxide (NO<sub>2</sub>), Sulphur Dioxide (SO<sub>2</sub>), Carbon Monoxide (CO) and Particulate Matter (PM<sub>10</sub>). The majority of larger particulates and dust in the study area are likely to be formed through mechanical generation, for example from wear of vehicle tyres and brakes, and re-suspension of settled materials due to road transport. In coastal locations a proportion of airborne particles are typically from sea salt.

Nitrogen Dioxide levels are highlighted by Havant Borough Council (2019) as ‘the only pollutant likely to challenge compliance with its respective air quality objective’ within the district. The air quality within the Havant district is regarded as ‘generally very good’. Havant Borough Council’s Air Quality Status Report indicates that ‘the B2149 / A3023 transport link between Havant Town Centre and Hayling Island is considered to remain a location where the annual mean objective for Nitrogen Dioxide risks being breached. This route is currently subject to a high-density monitoring effort to better understand how specific locations are influenced by traffic conditions (HBC, 2019). Other sources of air pollution include marine vessels, given the proximity of the Langstone and Chichester Harbours. However overall air quality within the Havant area is generally very good. This Annual Status Report shows that the air quality objectives are likely to be achieved for all pollutants at relevant locations throughout the Borough and consequently no AQMAs are designated.

### 4.14.2 Potential Impacts

Both the Core and Additional Scheme (See **Section 2.2.1 Preferred Option** for further details) have the potential to affect air quality. **Table 4.20** describes the impact pathways and/or potential effects that are scoped in and out of the ES.

**Table 4.20: Potential Air Quality pathways**

| Impact pathway(s)                                   | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes in air quality (construction and operation) | Core Scheme – Out<br>Additional scheme - Out | It is considered unlikely that there will be impacts in relation to air quality during the works which cannot be controlled by the adoption of established construction mitigation practices. These measures will adhere to best practice guidance and will be included in a CTMP and the CEMP – both of which will be submitted for approval by HBC prior to the commencement of construction works. Furthermore, the proposed Scheme is not within an AQMA. In addition, there are no anticipated air quality impacts associated with operation as there will be no significant changes to road layout or traffic flows. This impact pathway is therefore scoped out. |

| Impact pathway(s)                                        | Scoped in/out?                               | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes in greenhouse gas (GHG) emissions (construction) | Core Scheme – Out<br>Additional Scheme - Out | GHGs will be emitted from plant and machinery used during construction, as well as from the delivery of materials to site. There are also emissions associated with the production of materials to be used for the Scheme. Due to the scale and of the Scheme, GHG emissions will be of a small magnitude. The Environment Agency carbon planning tool 'ERIC' will be used to provide a mechanism for assessing carbon over the whole life of the Scheme. Furthermore, there are few alternatives to construction materials as they are required to have a high durability to withstand conditions in the marine environment, and other buildability restrictions. As such, a GHG emission assessment is not considered to be necessary. Nevertheless, measures to minimise GHG emissions where possible (e.g. switching off idling equipment, sourcing materials locally) will be included in the CEMP. No further assessment is therefore required. |

#### 4.14.3 Recommendations for further work

All issues relating to air quality and greenhouse gas emissions are not considered to require any further specific assessment and this topic has been scoped out of any further work.

### 4.15 Cumulative Impacts

The Cumulative Impacts Assessment (CIA) assesses the potential environmental impacts of the proposed scheme when combined with the effects of other relevant plans and projects in the study area. The Environmental Statement (ES) for the Langstone FCERM scheme will include a CIA and this chapter outlines the proposed scope of the assessment.

#### 4.15.1 Guidance

Schedule 4 of the EIA Regulations states that an ES should include the cumulative impacts of a development. The Institute of Environmental Management and Assessment (IEMA) (IEMA, 2004) define cumulative impacts as:

“Impacts on the environment which result from incremental impacts of the action when added to other past, present or reasonably foreseeable future actions...”

In line with agreed practice, the CIA will be limited to plans and projects where:

- There is sufficient information to allow consideration of the potential for a cumulative or in-combination effect to arise.
- There is a degree of confidence that the development will proceed.
- In the absence of publicly available information (usually in the form of a planning application) or a defined scheme, it is not possible to undertake a proper consideration of cumulative effects.
- They will take place in the reasonably foreseeable future.

#### 4.15.2 Projects Identified

A desk-based study was carried out to identify any plans and projects with the potential to have an environmental impact in-combination or cumulatively with the Langstone FCERM scheme for inclusion in the CIA. Relevant searches included checking for planning applications in close vicinity to the scheme<sup>18</sup> and marine licence applications on the MMO public register<sup>19</sup>.

The plans and projects which have been identified to date as having the potential to have an environmental impact in-combination or cumulatively with the Langstone FCERM scheme are listed in **Table 4.21** below.

**Table 4.21: Plans and Projects to be considered in the CIA**

| <b>Plans and Projects to be considered for cumulative impacts</b>                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The North Solent Shoreline Management Plan                                                                                                                                                          |
| Havant Borough Local Plan 2036                                                                                                                                                                      |
| Havant Borough Regeneration Strategy                                                                                                                                                                |
| Hayling Island Coastal Management Strategy                                                                                                                                                          |
| Portchester to Emsworth FCERM Strategy                                                                                                                                                              |
| South Hayling Beach Management Plan                                                                                                                                                                 |
| North Portsea Island FCERM Scheme                                                                                                                                                                   |
| England Coast Path: Portsmouth to South Hayling Stretch                                                                                                                                             |
| England Coast Path: South Hayling to East Head Stretch                                                                                                                                              |
| Langstone Technology Park, Langstone Road, Havant. Application for part demolition and reconfiguration of building 1000, reconfiguration of car park layout and new industrial units (APP 12/00467) |
| Land Adjacent to Bosmere Medical Centre, Solent Way, Havant. Proposal for new headquarters building for Portsmouth Water and new commercial buildings                                               |
| Land at Kingscroft Farm, Meryrick Road, Havant. Proposed development of land at Kingscroft farm for up to 164 dwellings                                                                             |
| Langstone Bridge Refurbishment (planning application not yet submitted)                                                                                                                             |
| Northney Marina maintenance dredging                                                                                                                                                                |

#### 4.15.3 CIA Investigations

The CIA will use the Natural England (2014) and Marine Management Organisation (MMO) (2014) framework guidance to assess cumulative effects. This will involve the following key steps:

1. Determine the effects of the proposed Scheme that have the potential to affect receptors in-combination with other proposed activities (i.e. the residual effects that are not significant 'alone');
2. Determine the likely spatial and temporal overlaps of the plans and projects scoped into the assessment in order to determine where interactions could arise; and

<sup>18</sup> <https://www.havant.gov.uk/development-consultation-forums> (Last Accessed August 2020)

<sup>19</sup> [https://marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO\\_PUBLIC\\_REGISTER/search?area=3](https://marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_REGISTER/search?area=3) (Last accessed August 2020)

3. Determine the significance of any potential interactions/cumulative effects identified (together with relevant mitigation).

The final conclusion can then be determined as to whether or not there is a significant cumulative effect with other plans or projects.

The scope of the CIA will be discussed and agreed through the consultation to be carried out throughout the EIA process.

## 5 Proposed Assessment Methods

The reporting of the EIA, if confirmed as required, will be in the form of an ES that will be structured in a similar approach to this scoping report. To facilitate the impact assessment process, a standard analysis methodology will be applied.

The proposed impact assessment framework, which is presented in the following sections, is designed to incorporate the key criteria and considerations without being overly prescriptive. For each potential impact of the Scheme that has been scoped in to the ES for further assessment, a textual description of the impact will be provided together with a characterisation of the impact in terms of its nature and magnitude and/or physical extent. The magnitude and physical extent of impacts will be quantified wherever possible. Each potential impact identified will then be assessed for its likely significance. To classify the significance of each impact, and to provide a consistent approach for the consideration and evaluation of impacts on different environmental parameters, the terminology in **Table 5.1** is proposed to be adopted.

**Table 5.1: Terminology for defining and classifying environmental impacts**

| Impact              | Definition                                                                                                       |
|---------------------|------------------------------------------------------------------------------------------------------------------|
| Negligible          | The impact is not of concern                                                                                     |
| Minor adverse       | The impact is undesirable, but of limited concern                                                                |
| Moderate adverse    | The impact gives rise to some concern, but it is likely to be tolerable (depending on the scale and/or duration) |
| Major adverse       | The impact gives rise to serious concern; it should be considered as unacceptable                                |
| Minor beneficial    | The impact is of minor significance but has some environmental benefit                                           |
| Moderate beneficial | The impact provides some gain to the environment                                                                 |
| Major beneficial    | The impact provides a significant positive gain to the environment                                               |

To determine the significance of an impact, the following criteria detailed in **Table 5.2: 5.2** are proposed to be used. These criteria are defined in further detail in **Table 5.3**.

**Table 5.2: Criteria for determination of significance**

| Effect criteria                                                         | Receptor criteria                                                               | Other criteria                                                            |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Spatial extent (local, regional or national; quantified where possible) | Vulnerability                                                                   | Reversibility (permanent or temporary)                                    |
| Magnitude (high, medium or low; quantified where possible)              | Sensitivity / intolerance (high, medium, low)                                   | Probability of occurrence                                                 |
| Duration (short or long term; quantified)                               | Resilience / Recoverability (low, medium, high)                                 | Confidence in prediction                                                  |
| Timing and Frequency (continuous, frequent or infrequent)               | Value / Importance (rarity, conservation value, social value, commercial value) | Margins by which baseline conditions and/or threshold values are exceeded |

**Table 5.3: Definitions of impact significance criteria**

| <b>Sensitivity of the receiving parameter - this is a measure of the tolerance (resistance) and resilience (recoverability) of an environmental parameter to an identified impact.</b>                                                                                                                              |                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High                                                                                                                                                                                                                                                                                                                | The environmental parameter is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.                               |
| Medium                                                                                                                                                                                                                                                                                                              | The parameter has a degree of acceptability and resilience and is likely to cope with the changes cause by an impact, although there may be some residual modification as a result. |
| Low                                                                                                                                                                                                                                                                                                                 | The parameter is adaptable and is resilient to change.                                                                                                                              |
| <b>Magnitude of the impact - this is the scale of change which the impact may cause compared to the baseline and how this change relates to accepted thresholds and standards.</b>                                                                                                                                  |                                                                                                                                                                                     |
| High                                                                                                                                                                                                                                                                                                                | A large change compared to variations in the baseline. Potentially a clear breach of accepted limits.                                                                               |
| Medium                                                                                                                                                                                                                                                                                                              | Change which may be noticeable and may breach accepted limits.                                                                                                                      |
| Low                                                                                                                                                                                                                                                                                                                 | When compared to the baseline, change which may only just be noticeable. Existing thresholds would not be exceeded.                                                                 |
| <b>Frequency of the impact - this is the duration of the impact compared to the activity causing it.</b>                                                                                                                                                                                                            |                                                                                                                                                                                     |
| Continuous                                                                                                                                                                                                                                                                                                          | The impact persists over the life of the activity causing it.                                                                                                                       |
| Frequent                                                                                                                                                                                                                                                                                                            | The impact is likely to occur for a period of greater than 5% of the life of the activity or will be intermittent.                                                                  |
| Infrequent                                                                                                                                                                                                                                                                                                          | The impact is likely to occur for a period of less than 5% of the life of the activity.                                                                                             |
| <b>Extent of the impact -relates to the geographical area that the impact may affect. It is considered that all identified impacts are local in extent unless otherwise specified in the accompanying text, although interest features of potential national and/or international significance may be affected.</b> |                                                                                                                                                                                     |
| Local / immediate                                                                                                                                                                                                                                                                                                   | The impact is likely to affect interests at district level or for a limited area around the scheme.                                                                                 |
| National                                                                                                                                                                                                                                                                                                            | The impact is likely to affect national concerns such as regional and county level interests.                                                                                       |
| International                                                                                                                                                                                                                                                                                                       | The impact is likely to affect an interest of an international concern.                                                                                                             |
| <b>Timescale of the impact - this is the duration of the impact irrespective of the activity causing it.</b>                                                                                                                                                                                                        |                                                                                                                                                                                     |
| Short-term                                                                                                                                                                                                                                                                                                          | The period over which the impact is experienced is temporary and lasts for the period of construction or less.                                                                      |
| Medium-term                                                                                                                                                                                                                                                                                                         | The impact occurs for longer than the full period of construction.                                                                                                                  |
| Long-term                                                                                                                                                                                                                                                                                                           | The impact remains for a substantial time, perhaps permanently after construction.                                                                                                  |

The criteria described above are proposed to be used to score the level of significance of a particular impact, using the formula below:

|                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|
| $\text{Significance of impact} = \text{Magnitude of effect} \times \text{Value and sensitivity of Receptor}$ |
|--------------------------------------------------------------------------------------------------------------|

A typical matrix for the calculation of significance is shown in **Table 5.4**

**Table 5.4:** below.

**Table 5.4: Matrix for calculation of impact significance**

| <b>Magnitude of effect</b> | <b>Value and sensitivity of feature</b> |                |                          |
|----------------------------|-----------------------------------------|----------------|--------------------------|
|                            | <b>High</b>                             | <b>Medium</b>  | <b>Low</b>               |
| <b>High</b>                | Major                                   | Major/Moderate | Moderate                 |
| <b>Medium</b>              | Major/Moderate                          | Moderate       | Minor                    |
| <b>Low</b>                 | Moderate/Minor                          | Minor          | Minor or None/Negligible |

Where adverse impacts are identified, potential mitigation measures will be recommended in order to reduce potential impacts, as far as reasonably practicable, to environmentally acceptable levels.

## **6 Consultation**

Consultation will continue to be a crucial part of the detailed design and environmental assessment process to seek the views of key parties/stakeholders throughout the development of the detailed design in fulfilment of the detailed design stakeholder engagement plan. These consultees are expected to include the following parties:

- Havant Borough Council
- Hampshire County Council
- Historic England
- Natural England
- Environment Agency
- Chichester Harbour Conservancy
- Langstone Harbour Board
- Marine Management Organisation
- British Trust for Ornithology
- Royal Society Protection Birds
- Local residents, businesses and community groups
- Utility Companies
- Private Landowners
- Hampshire and Isle of Wight Wildlife Trust
- Visitors and Tourists, Car Park Users
- Langstone Residents Association
- Langstone Village Association
- Save our Shores
- Havant Civic Society
- Solent Protection Society
- Langstone Sailing Club
- Langstone Conservation Group
- The Ship Inn and Royal Oak Public Houses
- Langstone Rowing Club
- Langstone Flood Watch

Focused stakeholder workshops will be undertaken as part of the stakeholder engagement plan. This is anticipated to include workshops that focus on the broader outcomes of the Scheme as well as landscape and heritage.

## 7 Concluding Statement

The Scheme is required to protect a significant number of people, property, businesses and other key assets, including the A3023 (the only road on to Hayling Island), from coastal flooding and erosion. This ESR has been prepared to ascertain the scope of work for the ES to support the applications for the consents and licences required for the Scheme. The majority of the Scheme will be undertaken onshore and therefore planning permission will be required from HBC as the LPA. However, a proportion of the works will take place below MHWS, potentially including access to the foreshore to complete the works. Consequently, a marine licence will also be required from the MMO.

All 'coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works' are considered to be 'Schedule 2' development that are likely to have significant effects. In addition, the proposed Scheme is located within an environmentally sensitive area and therefore an ES may be needed under the Town and Country Planning (EIA) Regulations 2017 and the Marine Works (EIA) (Amendment) Regulations 2017. The requirement for an EIA will be confirmed by HBC and the MMO in their joint screening and scoping opinion to be issued, via the Coastal Concordat, in response to this ESR.

As Coastal Partners anticipates that the proposed Scheme will require an EIA, **Table 6.1** summarises the topics and pathways proposed for further assessment.

**Table 7.1: Summary of key assessment issues scoped in**

| Receptor                   | Impact pathway(s)                                                                                        | Scoped in/out?                               |
|----------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Land Quality and Hydrology | Impacts to land quality and hydrology (construction)                                                     | Core Scheme – Out<br>Additional Scheme – Out |
|                            | Impacts to land quality and hydrology (operation)                                                        | Core Scheme – Out<br>Additional Scheme - Out |
| Water and Sediment Quality | Changes to levels of contaminants in water, including accidental spillages, (construction and operation) | Core Scheme – Out<br>Additional Scheme - Out |
|                            | Redistribution of sediment-bound chemical contaminants (construction)                                    | Core Scheme – Out<br>Additional Scheme - Out |
|                            | Potential changes to suspended sediment concentrations and dissolved oxygen (construction and operation) | Core Scheme – Out<br>Additional Scheme - Out |
| Coastal Processes          | Changes to coastal processes including alteration to seabed form and features (construction)             | Core Scheme – Out<br>Additional Scheme - Out |
|                            | Changes to coastal processes including alteration to seabed form and features (operation)                | Core Scheme – Out<br>Additional Scheme - Out |
| Ornithology                | Noise from construction works on site displacing birds in the local area (construction)                  | Core Scheme – In<br>Additional Scheme - In   |

| Receptor            | Impact pathway(s)                                                                                                                                                                                                                 | Scoped in/out?                               |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
|                     | Visual disturbance from construction works on site displacing birds in the local area (construction)                                                                                                                              | Core Scheme – In<br>Additional Scheme - In   |
|                     | Physical disturbance of upper intertidal habitats during construction leading to a reduction in feeding area for birds (construction)                                                                                             | Core Scheme – In<br>Additional Scheme - In   |
|                     | Loss of feeding areas for birds through permanent loss of habitat from scheme footprint and coastal squeeze (operation)                                                                                                           | Core Scheme – In<br>Additional Scheme - In   |
|                     | Disturbance/displacement of birds during any maintenance and repair work required during the lifetime of the sea defence (operation)                                                                                              | Core Scheme – In<br>Additional Scheme - In   |
|                     | Disturbance to nesting birds                                                                                                                                                                                                      | Core Scheme – In<br>Additional Scheme - In   |
| Terrestrial Ecology | Damage to TPO woodland via construction of set-back floodwall                                                                                                                                                                     | Core Scheme – In<br>Additional Scheme - In   |
|                     | Disturbance to bat species roosting and feeding in the area                                                                                                                                                                       | Core Scheme – In<br>Additional Scheme - In   |
|                     | Disturbance to reptile species and loss of reptile habitat                                                                                                                                                                        | Core Scheme – In<br>Additional Scheme - In   |
|                     | Disturbance to badgers                                                                                                                                                                                                            | Core Scheme – In<br>Additional Scheme - In   |
|                     | Great Crested Newts                                                                                                                                                                                                               | Core Scheme – In<br>Additional Scheme - In   |
|                     | Harm to terrestrial invertebrates                                                                                                                                                                                                 | Core Scheme – Out<br>Additional Scheme - Out |
|                     | Disturbance to water vole and loss of habitat for water vole                                                                                                                                                                      | Core Scheme – Out<br>Additional Scheme - Out |
|                     | Potential beneficial impacts through planting, habitat enhancements and landscaping                                                                                                                                               | Core Scheme – In<br>Additional Scheme - In   |
| All marine ecology  | Effects from contaminants (construction)                                                                                                                                                                                          | Core Scheme – Out<br>Additional Scheme - Out |
|                     | Indirect changes in benthic habitat extent and quality due to changes in coastal processes (operation).                                                                                                                           | Core Scheme – Out<br>Additional Scheme - Out |
|                     | Changes to suspended sediment concentrations and dissolved oxygen levels                                                                                                                                                          | Core Scheme – Out<br>Additional Scheme - Out |
| Benthic Ecology     | Temporary loss and/or disturbance of intertidal sediment habitats and saltmarsh vegetation from machine access to foreshore and potential excavation and/or removal of existing defence structures, which contain saltmarsh plant | Core Scheme – In<br>Additional Scheme - In   |

| Receptor                             | Impact pathway(s)                                                                                                         | Scoped in/out?                               |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
|                                      | species (construction and operation - maintenance)                                                                        |                                              |
|                                      | Permanent loss of intertidal habitat under the footprint of new defence structures and due to coastal squeeze (operation) | Core Scheme – In<br>Additional Scheme - In   |
|                                      | Underwater noise during construction                                                                                      | Core Scheme – Out<br>Additional Scheme - Out |
| Marine mammals and fish              | Underwater noise and vibration (construction)                                                                             | Core Scheme – In<br>Additional Scheme - In   |
| Marine mammals                       | Visual disturbance                                                                                                        | Core Scheme – Out<br>Additional Scheme - Out |
| Marine mammals and fish              | Indirect effects of habitat loss                                                                                          | Core Scheme – Out<br>Additional Scheme - Out |
| Marine invasive non-native species   | Introduction and/or spread of non-native invasive species (construction and operation)                                    | Core Scheme – Out<br>Additional Scheme - Out |
| Archaeology and Historic Environment | Disturbance to archaeology, heritage assets and historic environment (construction)                                       | Core Scheme – In<br>Additional Scheme - In   |
|                                      | Disturbance to archaeology, heritage assets and historic environment (operation)                                          | Core Scheme – In<br>Additional Scheme - In   |
| Landscape and Visual                 | Temporary effects on landscape character during construction activities                                                   | Core Scheme – In<br>Additional Scheme – In   |
|                                      | Permanent effects on landscape character                                                                                  | Core Scheme – In<br>Additional Scheme – In   |
|                                      | Temporary effects on views as a result of construction activities                                                         | Core Scheme – In<br>Additional Scheme – In   |
|                                      | Permanent effects on views                                                                                                | Core Scheme – In<br>Additional Scheme – In   |
| Commercial Fisheries and Navigation  | Changes in navigation (construction)                                                                                      | Core Scheme – Out<br>Additional Scheme – In  |
|                                      | Changes in navigation (operation)                                                                                         | Core Scheme – Out<br>Additional Scheme – Out |
|                                      | Disturbance to fishing activity (construction and operation)                                                              | Core Scheme – Out<br>Additional Scheme – Out |
| Socio-economic, Amenity, Recreation  | Temporary effects on socio-economic, amenity and recreation (Construction)                                                | Core Scheme – In<br>Additional Scheme – In   |
|                                      | Permanent effects on socio-economic, amenity and recreation (Operation)                                                   | Core Scheme – In<br>Additional Scheme – In   |
| Traffic and Access                   | Changes in the route, volume, composition or speed of traffic during construction                                         | Core Scheme - In<br>Additional Scheme - In   |
|                                      | Changes in the route, volume, composition or speed of traffic during operation                                            | Core Scheme - Out<br>Additional Scheme - Out |

| Receptor            | Impact pathway(s)                                        | Scoped in/out?                               |
|---------------------|----------------------------------------------------------|----------------------------------------------|
|                     | Changes in road safety (construction)                    | Core Scheme - In<br>Additional Scheme - In   |
|                     | Reduced accessibility (construction)                     | Core Scheme - In<br>Additional Scheme – In   |
|                     | Damage to the local road network (construction)          | Core Scheme - Out<br>Additional Scheme – Out |
|                     | Changes in accessibility (operation)                     | Core Scheme - In<br>Additional Scheme – In   |
| Noise and Vibration | Traffic noise (Construction)                             | Core Scheme - In<br>Additional Scheme - In   |
|                     | Airborne noise (Construction)                            | Core Scheme - In<br>Additional Scheme - In   |
|                     | Ground borne vibration (construction)                    | Core Scheme - In<br>Additional Scheme – In   |
|                     | Changes in noise and vibration (operation)               | Core Scheme – Out<br>Additional scheme - Out |
| Air Quality         | Changes in air quality (construction and operation)      | Core Scheme – Out<br>Additional scheme - Out |
|                     | Changes in greenhouse gas (GHG) emissions (construction) | Core Scheme – Out<br>Additional scheme - Out |

In addition, cumulative and in-combination effects will need to be considered within any further assessment. Further assessment work is also anticipated to include a WFD Compliance Assessment and HRA.

## 8 References

- AECOM (2019)** Langstone Flood and Coastal Erosion Risk Management Scheme: Preferred Option Report, April 2019, 122pp. Available online <https://coastalpartners.org.uk/static/media/resources/langstone-preferred-option-report.pdf> (Last accessed August 2020).
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**Appendix A: HRA Screening**

**Appendix B: WFD Scoping Tables**

**Appendix C: Consultation**

**Appendix D: Outline Design and Decision Criteria Report**

**Appendix E: PEA**

**Appendix F: Concept Ground Model**

**Appendix G: Coastal Processes Study**

**Appendix H: Archaeological DBA**

**Appendix I: Economic Appraisal**

**Appendix J: Wider Benefits Assessment**