



Intertidal Walkover Survey at Highfield, Lower Swanwick

A Retrospective Preliminary Environmental Assessment

21 JULY 2021

HIGHFIELD INTERTIDAL PEA

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1. Company Background

Fathom Ecology Limited www.fathom-ecology.com is a small consultancy advising on fit for purpose environmental data for marine and freshwater infrastructure projects. The company provides advice on the assessment of the effects of disturbance on the aquatic environment and on mitigation and compensation measures required in the reduction of risk to both the developer and the environment.

2. Introduction

Fathom Ecology Limited were commissioned to undertake a Preliminary Ecological Appraisal of the intertidal area of land at Highfield, Green Lane, Lower Swanick, Southampton, Hampshire SO31 7DF, Grid reference SU494097. A Preliminary Environmental Report (PEA) is a short form of an Environmental Impact Assessment (EIA), meant for assessing projects with lesser environmental impacts. This PEA was undertaken retrospectively to identify the impacts associated with the jetty development and the means of mitigation. PEA is an important tool for sound decision making and for achieving sustainable development.

The owner of the site is seeking retrospective planning permission for the construction of a small jetty that provides access to the River Hamble from the property. The jetty has been constructed from timber railway sleepers and runs from an area of amenity grassland through saltmarsh and on to intertidal mudflats.

2.1. Scope

The objective of the survey was to assess the impact of the jetty structure on the species and habitats present at the site and to identify opportunities to compensate for any level of impact observed. The survey was undertaken on the 25th of June 2021 by an experienced aquatic ecologist from Fathom Ecology.

- Determine the nature conservation value of the study area.
- To confirm the potential presence/absence of protected and/or notable species of flora and fauna within the study area.
- To identify any other ecological constraints or requirements associated with the development.
- To make recommendations regarding nature conservation enhancements.
- To identify any further survey requirements.

The survey methodology is detailed in Section 3. The survey results are presented in Section 4 and on Phase 1 Habitat Maps in Appendix A, with site photographs provided in Appendix B. Nature conservation value, constraints and enhancement are discussed in Section 5.

2.2. Limitations

The survey was conducted after the installation of the jetty at the site, therefore the assessment of the habitat under the jetty has had to be made using satellite imagery and assumptions based on adjacent habitats observed during the field survey.

3. Methodology

3.1. Background Data Search

A thorough background data search was undertaken to identify any nature conservation sites and /or any relevant protected or notable species within 1 km of the site.

The following sources of information were utilised:

- NBN Gateway (<https://data.nbn.org.uk/>)
- Magic (<https://magic.defra.gov.uk/>)

3.2. Site Appreciation

The site is located on the east bank of the River Hamble approximately 500 m southwest of the M27 and adjacent to the Hamble River Boat Yard, Bridge Road in the Southampton borough of Fareham. The intertidal area of the site lies within the Solent Marine Site (SEMS), one of several European marine sites in the UK which are designated as internationally important sites for their habitats and species.

The site comprises primarily an area of amenity grassland leading down to reed-swamp, saltmarsh and intertidal mudflats of the River Hamble. This report focuses upon the intertidal species and habitats found below the mean high-water mark.

3.3. Ecological Context

The intertidal area of the site lies partially within the internationally protected Solent and Dorset Coast Special Protection Area (SPA) and 100 m from the Solent Maritime Special Area of Conservation (SAC) and 500 m from the Solent and Southampton water SPA and Ramsar site. The site is also within close proximity to the nationally protected Lincegrove and Hacketts Marshes Site of Special Scientific Interest (SSSI) which is approximately 2 km downstream of the Site, Upper Hamble Estuary and Woods SSSI 1 km to the north-east, and a number of Local Nature Reserves (LNR) including Hackett's Marshes LNR 2 km to the south-west, and Swanick Lakes LNR lies approximately 1 km to the north-east.

3.4. Field Survey

An extended Phase 1 Habitat Survey was undertaken focusing on the habitats and species encountered within the intertidal area. The intertidal area is defined here as that below mean high water springs (MHWS). MHWS is the averaged highest level that spring tides reach.

The ecological appraisal follows Phase 1 habitat survey methodology, which uses a habitat classification system developed by the Nature Conservation Council, now Joint Nature Conservation Committee (JNCC, 2003) to map habitats and land-use categories to a 'consistent level and accuracy'. Habitats are mapped using standard colour codes allowing rapid visual assessment of the extent and distribution of different habitat types. Where appropriate, Target Notes were used to highlight potential features of interest.

An extended Phase 1 habitat survey also records provisional signs of protected or notable species and assesses the suitability of the habitats on-site and within the accessible surroundings of the site to support such species.

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Every effort was also made to identify invasive non-native species (INNS) though this assessment does not constitute a full Schedule 9 (as listed under the Wildlife & Countryside Act) species survey. The potential for any Schedule 9 species was assessed and any clearly visible species that were encountered were mapped and noted.



Figure 1. Highfield Survey Site (red) in context with the wider area

4. Results

The intertidal habitat at the site comprised of saltmarsh and mudflats. More detail of these interconnected habitats is given below.

4.1. Intertidal Mudflats

The estuarine intertidal mudflat associated with the site of poor quality with much anthropogenic debris (Appendix B), a low species count and abundance (Table 2) and the presence of a non-native algae smothering much of the area (Appendix B).

Despite this, intertidal mudflats are habitats of high ecological value and of principal importance for the conservation of biodiversity in England. Mudflats typically exhibit high productivity for communities and species and provide a link between marine and intertidal habitat for prey species, nutrients and nutrient cycling (e.g. see Blanchard et al., 2001). Accordingly, these habitats have previously been identified under the UK Biodiversity Action Plan as under threat from sea level rise, human disturbance, industrial and domestic housing development and pollution, amongst other factors. Notably, estuarine mudflats are listed as Priority Habitat under UKBAP conservation goals.

The intertidal area at the site consisted of estuarine fine sediments; mud and muddy sand derived from the river Hamble and typical of the most sheltered areas of the coast. The mudflats showed evidence of

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bioturbation by oligochaete worms, occasional bivalves (*Tapes* sp), gammarid amphipods and the polychaete worm *Arenicola marina*. Mobile epifauna included *Littorina littorea* and juvenile shore crabs.

The macroalgae *Fucus vesiculosus* and *Ascophyllum nodosum* predominated on rubble, wood and debris on the mudflats and inlet where solid structures were present for their holdfasts to attach. The non-native invasive red algae *Agarphyton (Gracilaria) vermiculophylla* colonised much of the mudflat south of the jetty. This species is known to be highly invasive and a habitat modifier and thus raises ecological and environmental concerns (Gurgel et al 2018). It is thought to have been introduced to Europe on numerous occasions by shipping and the import of Japanese oysters (Kim et al 2012). Studies in the U.S. have shown that saltmarsh habitats where *A.vermiculophylla* is present have significantly different biota with lower species richness and biomass (Zi-Min & Lopez Bautista 2014). This species has been recorded elsewhere in the Solent on saltmarsh and intertidal mudflats including at Gosport Cruising Club (Aqass 2020) and lower down the Hamble estuary (Fathom 2021).

The fauna and flora observed during the course of the survey were considered common for UK coastal waters, and no species of conservation importance were recorded. Nonetheless the common species observed provide a potential food source to transitory species visiting the site including fishes, wildfowl and waders.

4.2. Saltmarsh

The saltmarsh present on site was in fair to moderate condition with a good variety of plant species being recorded. Three distinct vegetative zones were characterised from the strand line to the very low shore.

4.2.1 Pioneer/Low Marsh

The very-low marsh was species poor and dominated by *Salicornia* and *Spartina* which form an equal component of the community. These pioneering saltmarsh species colonise sheltered low energy habitats where sediment has built up above the mean high-water level of neap tides. The plants stabilise sediments, slow water movement and further increase the accretion of sediments until the height of the marsh is only covered by high tides. They form an integral part of the transition from the intertidal mudflats through to the upper salt-meadows. Although the saltmarsh on site is eroding, these secondary pioneer communities appear as a precursor to erosion on the seaward edge of degraded mid-marsh communities. Occasional sea lavender *Limonium vulgare* occurred in the upper low marsh amongst the *Spartina* and *Salicornia*.

4.2.2 Middle Marsh

The mid-marsh community was dominated by sea purslane *A. portulacoides* and Creeping Bent *Agrostis stolonifera*. This was the most diverse of the salt marsh communities on site with common saltmarsh grass *Puccinellia maritima*, sea lavender *Limonium vulgare*, Scurvy grass *Cochlearia spp*, Greater sea spurrey *Spergularia media*, Sea aster *Aster tripolium* and red fescue *Festuca rubra* all occurring within the transition to high marsh. The Mid marsh was eroding and this is evident looking at the google earth pictures of the site over the past decade (Appendix C). The disturbed ground was colonised by the pioneer species discussed above.

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4.2.3 High Marsh

A narrow stand of high marsh (<5 m wide) occurred on site on wet level ground seaward of the amenity grassland which marked the boundary between the terrestrial/aquatic zones. The plant community comprised stands of sea club rush *Scirpus maritimus*, the mud rush *Juncus jerardi*, creeping bent *Agrostis stolonifera* and a few specimens of orache *Atriplex hastata*. The sea club rush and mud rush dominated the community, with creeping bent occurring landward of the rushes.

4.2.4 SACFOR

A standardised MNCR SACFOR abundance scale (Table 1) was used to analyse the surface community.

Table 1. SACFOR abundance scale used for littoral taxa (NB: table adapted from the 1990 Marine Nature Conservation Recording (MNCR) SACFOR abundance scale referenced within JNCC, 2017).

Abundance		Encrusting & turf species e.g. sponges, barnacles, mussels, seaweeds etc.	Small plant & animals (1-5cm) e.g. worms, anemones, limpets, dogwhelks etc.	Large plants & animals (>5cm) e.g. crabs, starfish, fish etc.
Abbreviation	Definition			
S	Superabundant	80 – 100% cover	>750 per m ²	>100 per m ²
A	Abundant	40 – 80% cover	500 per m ²	75 per m ²
C	Common	20 – 40% cover	100 per m ²	50 per m ²
F	Frequent	10 – 20% cover	50 per m ²	10 per m ²
O	Occasional	5 – 10% cover	10 per m ²	5 per m ²
R	Rare	<5% cover	<5 per m ²	1 per m ²

Table 2. Site description, species list and SACFOR

Waypoint no.	Position WGS84 DD° mm.mmm'		Description of site	Species name	SACFOR
	Longitude	Latitude			
01	50° 53.122'N	001° 17.952'W	Intertidal Mudflat	<i>Arenicola marina</i> <i>Agarophyton vermiculophylla</i> <i>Ascophylum nodosum</i> <i>Blindingia minima</i> <i>Carcinus maenus</i> <i>Fucus vesiculosus</i> <i>Littorina littorea</i> <i>Peringia ulvae</i> <i>Gammarus</i> species	R A C F R C O O R

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Waypoint no.	Position WGS84 DD° mm.mmm'		Description of site	Species name	SACFOR
	Longitude	Latitude			
02	50° 53.126'N	001° 17.943'W	Pioneer/Low saltmarsh	<i>Limonium vulgare</i> <i>Salicornia europaea agg</i> <i>Spartina anglica</i>	O A A
03	50° 53.118'N	001° 17.926'W	Mid Saltmarsh	<i>Aster tripolim</i> <i>Atriplex portulacoides</i> <i>Cochlearia spp.</i> <i>Limonium vulgare</i> <i>Puccinellia maritima</i> <i>Spergularia media</i> <i>Triglochim maritima</i>	R A R O A R O
04	50° 53.116'N	001° 17.914'W	High Saltmarsh	<i>Agrostis stolonifera</i> <i>Atriplex hastata</i> <i>Juncus jerardi</i> <i>Scripus maritimus</i>	C R A S

The mudflat at the site was in poor condition, with much riprap and debris including old tyres, anodes, corrugated roofing panels, pipe work, timbers, concrete slabs, old carpet, cardboard and litter (Appendix B). Biodiversity at the site was low and consisted of a small number of common species at low abundance (Section 4.2.4). The mudflat supports communities that, in terms of species composition, may be considered typical of sheltered harbours and estuaries throughout the Solent. The fucoids *Fucus vesiculosus* and *Ascophyllum nodosum* are typical of sheltered shores and mudflats where debris occur on which their holdfasts can attach. The green algae *Blindingia minima* is typical of nutrient rich waters and is observed over much of the nitrate vulnerable Solent. The invasive non-native seaweed *Agarophyton vermiculophylla* was also abundant at the site. Epifauna included the winkle *Littorina littorea*, shore crab *Carcinus maenus* and *Gammarus species* (likely locusta) and infauna included oligochaete worms and lug worms *Arenicola marina*. These species are widespread in their distribution and are not species of conservation concern.

The saltmarsh at the site was in fair condition but showed signs of erosion of the mid marsh communities. As the mid marsh erodes it reverts to low marsh and pioneer assemblages of *Salicornia* and *Spartina* which colonise the sediments as they are re-deposited. This is characteristic of coastal squeeze where typically the high and mid marsh communities are eventually drowned, and the saltmarsh reverts to mudflat or contains pools of standing water. This process is referred to as habitat 'rollover' (Allen, 2000) and has resulted in the loss of some mid-upper saltmarsh and contributes to the deterioration of the saltmarsh at the site.

4.3. Evaluation

A jetty of 23.1m² was constructed at Highfield, Green Lane, Lower Swanick, Southampton, Hampshire SO31 7DF, Grid reference SU494097. The jetty was installed prior to receiving planning permission and lies partially within the Solent and Dorset Coast SPA and adjacent to the Solent Maritime SAC.

An estimated 6.6 m² of intertidal habitat has been lost as a result of the jetty construction, with an estimated 5.6 m² of this being intertidal mudflat lost and a further 1 m² being the mid-marsh vegetation community dominated by sea purslane *A. portulacoides* and saltmarsh grass *P. maritima*.

The remaining 16.5 m² of the jetty was positioned above the mean high-water mark in the zone dominated by high marsh vegetation. Whilst this vegetation is present on both sides of the jetty currently, it is acknowledged that the jetty was positioned on a path which gave historical access to the river, the path being well trodden and made up of rip rap and other debris. As such it is likely that the actual area of sea club rush *S.maritimus*, creeping bent *A. stolonifera* and mud rush *J. gerardi* that was lost is less than the figure given here.

Thus, whilst it is clear that some small-scale loss of habitat has occurred beneath the jetty, this is considered to be negligible in relation to the area of the intertidal zone of the Hamble estuary. The magnitude of the effect is therefore considered to be low. The species observed are widely dispersed across the Hamble estuary and throughout the Solent. Taking these factors into account, the impact of the small-scale loss from the jetty to the intertidal mudflats and saltmarsh is considered to be minor adverse.

This conclusion is further backed up by Natural England, who had no objection to the jetty, stating it will not have a significant adverse impact upon the designated sites of the Solent and Dorset SPA and the adjacent Solent Maritime SAC. They provided the following justification for this decision:

- *“The Solent and Dorset Coast SPA is designated for the presence of foraging terns and supporting water column habitat. While the development falls partially within the SPA. It is located at the landward edge of a shallow intertidal creek and outside the main water column. The development will lead to a small loss of intertidal mud habitat within the SPA, however this is not a designated SPA supporting habitat. The proposed development will not interact with any of the SPA features and as such no likely significant effect is anticipated.”*
- *“The proposed development is located within 100m of the Solent Maritime SAC however no impact pathway has been identified between the development and the SAC; as such no likely significant effect is anticipated.”*

Despite Natural England’s conclusion, it is acknowledged that significant effects to the European Protected Sites cannot be ruled out. The following section provides advice to mitigate, restore and enhance the intertidal habitat at the site.

4.4. Mitigation

Given that the saltmarsh on site shows signs of erosion, likely the result of coastal squeeze and sea level rise, every effort should be made to further prevent loss of the vulnerable saltmarsh habitat.

To mitigate for any loss or alteration of habitat at the site, it is proposed that:

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- An environmentally sensitive clean up of the intertidal mudflat is carried out to remove debris, litter and rip rap from the site.
- A small-scale saltmarsh restoration scheme is recommended to reduce erosion, encourage sedimentation and improve the chance of colonisation by saltmarsh plants going forward.

It is noted that the jetty is currently used for paddle board and kayaking activities. If in future the jetty is to be used by small motor vessels, then it is recommended that:

- sustainable sediment retention structures are trailed to prevent prop wash and erosion of the intertidal mudflat. These can be sourced from <https://www.bese-products.com/article/saltmarsh-restoration/>

The proposed saltmarsh restoration scheme would entail placing coir roles (Figure 3) and wicker fencing around the edges of the low and mid marsh saltmarsh on site. These structures would prevent further erosion of the existing saltmarsh at the site and enhance sediment accretion encouraging pioneer saltmarsh vegetation and managing algal mats thus providing new habitat above the MHWN's. The active transfer of *Spartina* / *Salicornia* (spp) from within the creek is encouraged (with correct permissions from NE in place) with ongoing ecological monitoring 12 months after establishment.

Lessons could be learned from the successes and failures of the restoration efforts which would be written up and given to the Hamble Harbour Authority so future efforts would improve the chances of saltmarsh restoration success elsewhere in the estuary.



Figure 2. Newly installed coir role to encourage sedimentation and saltmarsh colonisation

If successful, the mitigation will:

- Prevent further erosion of the saltmarsh

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- Encourage inter-tidal and saltmarsh areas to develop (NB: it will not be possible to precisely predict the balance of saltmarsh and mudflat in a dynamic coastal system)
- Enable saltmarsh plants to colonise more stable higher areas of the intertidal
- Promote biodiversity allowing settlement by marine invertebrates which will act as a food source for birds, fish and other taxa.

5. Discussion

The habitats within the intertidal survey area at the proposed development site directly contribute to the value and status of the Solent Maritime SPA and adjacent SAC. The development of the jetty has resulted in some minor adverse effects on the integrity of the intertidal habitats at the site. These can be mitigated and there is the potential to increase the saltmarsh cover and biodiversity at the site if restoration recommendations are followed.

Given the importance of the Hamble Estuary to waterbirds, fish communities, interstitial and epibenthic fauna, protection of the intertidal mudflats and saltmarsh should be built retrospectively into the design of any activities in the intertidal area. This will help safeguard the vegetation, invertebrates, fish, and birdlife that utilise the site.

Conserving, enhancing and managing the intertidal mudflat and saltmarsh habitats at the site would benefit:

- Fish stocks by protecting their nursery habitat;
- Support the SPA and SAC designated features;
- Protect a locally and nationally depleting saltmarsh habitat; and
- Provide wider environmental benefits by maintaining a healthy ecosystem and associated ecosystem services.

Restoration is becoming a vital tool to counteract coastal ecosystem degradation Temmink et al (2020) and would likely mitigate any negative impacts from the construction of the jetty.

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6. Appendix A Phase 1 Habitat Survey



7. Appendix B: Site Photo's



Photo 1

Image File: HamblePhoto_2.jpg [IMG_20160506_124617]

Description: Jetty leading from site to Hamble estuary.

Direction: West from site Photo 1



Photo 1

Image File: HamblePhoto_2.jpg [IMG_20160506_124617]

Description: Intertidal mudflat showing debris, brown algae and saltmarsh either side of the inlet.

Direction: West from site [Photo 2](#)

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Photo 3

Image File: 1462528979348.jpg

Description: Jetty showing access to intertidal.

Direction: East



Photo 4

Image File: 1462529282110.jpg

Description: Eroding mid marsh community and debris on the intertidal

Direction: North



Photo 5

Image File: 1462531997181.jpg

Description: Debris littering mudflats at the site

Direction: East



Photo 6

Image File: 1462529497515.jpg

Description: Debris and saltmarsh showing adjacent boatyard

Direction: south-east



Photo 7

Image File: 1462529733431.jpg

Description: intertidal mudflat with *Fucus vesiculosus* and invasive non native *Agarphyton (Gracilaria) vermiculophylla*.

Direction: North-east



Photo 8

Image File: 1462530141790.jpg

Description: Eroding mid marsh with sea purslane and green algae *Blindingia minima* and historical timber posts on mudflat.

Direction: west



Photo 9

Image File: 1462532909518.jpg

Description: Evidence of gulls/wildfowl on site

Direction: N/A

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Photo 10

Image File: 1462533003061.jpg

Description: Saltmarsh with pioneer/low marsh in foreground, mid marsh in centre and high marsh visible as long grass in line with fence post on right of picture. Posts on left mark boundary of site.

Direction: East



Photo 11

Image File: 1462533068580.jpg

Description: Pioneer/low marsh with *Spartina*, *Salicornia* and some *Limonium vulgare* to left of picture.

Direction: West



Photo 12

Image File: 1462533328194.jpg

Description: Midmarsh community with *Atriplex portulacoides*, *Puccinellia maritima* and sea lavender *L.vulgare*.

Direction: N/A



Photo 13

Image File: IMG_20160506.jpg
Description: Debris on mid marsh
Direction: N/A

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Photo 14

Image File: IMG_20160506.jpg

Description: High marsh with *Scripus maritimus*

Direction: East

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Photo 15

Image File: IMG_20160506.jpg

Description: High marsh community with *Juncus gerardi* in foreground and *Scripus maritimus* behind

Direction: South



Photo 16

Image File: IMG_20160506.jpg

Description: Sunken barge in saltmarsh

Direction: East

HIGHFIELD INTERTIDAL PEA



Photo 17

Image File: IMG_20160506.jpg

Description: Edge of jetty showing railway sleepers, hardstanding beneath and high marsh

Direction: North



Photo 18

Image File: IMG_20160506.jpg

Description: Jetty from garden at site

Direction: East

8. Appendix C: Satellite Imagery of the site



1999: Little or no visible access to the river from the site.



HIGHFIELD INTERTIDAL PEA

2005: A path, pontoon or jetty clearly visible at the site.



2007: Jetty, path or pontoon removed



2015: No obvious access to the river

HIGHFIELD INTERTIDAL PEA



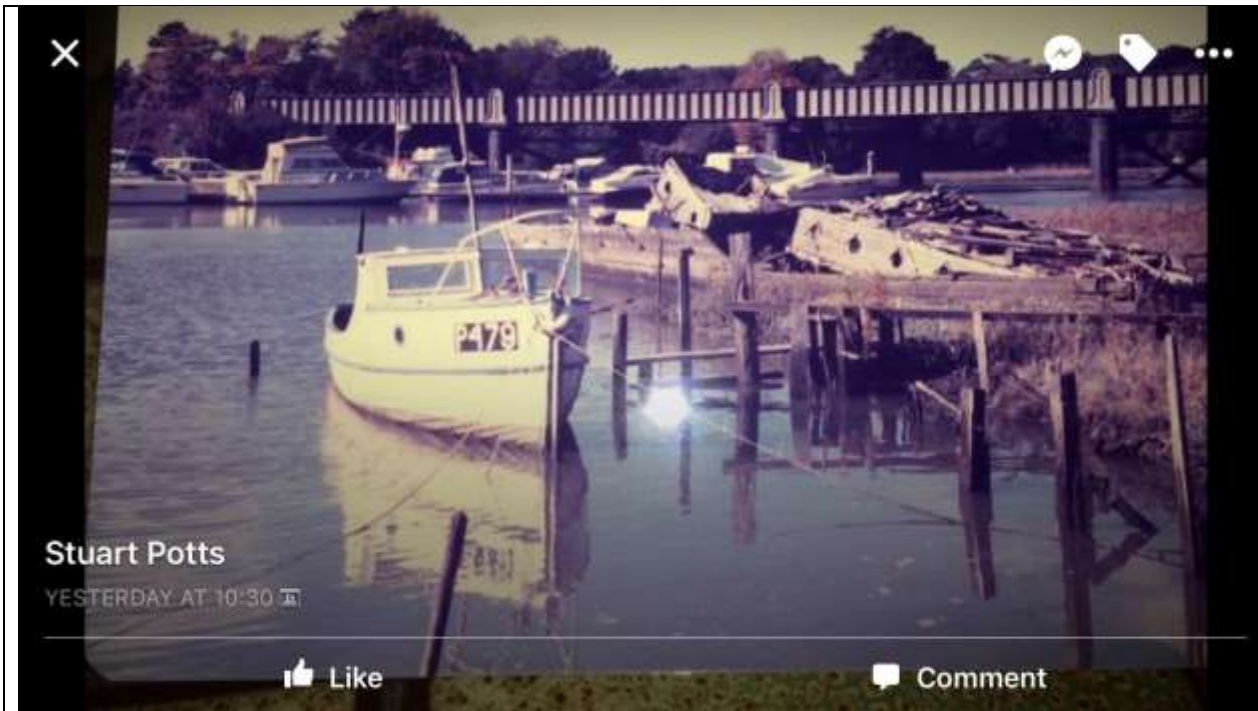
2018: Area of hardstanding visible covering an area of approximately 23 m²

9. Appendix D: Historical Photos



2020 prior to construction of jetty. Hard standing is visible on which jetty was placed

HIGHFIELD INTERTIDAL PEA



Site in late 1970's or early 1980's at high tide. The barge now subsumed by saltmarsh visible on saltmarsh.



Site in late 1970's or early 1980's at low tide