Opportunity Mapping in Southampton Water - Final Report

A collaborative partnership project with the Solent Forum, commissioned by the Environment Agency

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1. Executive Summary

We recognise that the concept of ecological enhancement and net gain in the marine environment is still in its infancy. Enhancement work is being considered and adopted at a small scale in the Solent. It is important to learn from this work, to help support the Government's 25 year Environment Plan, which aims to improve the environment within a generation and embed an 'environmental net gain' principle for development, including housing and infrastructure.

To move us closer to achieving this goal, we have worked with Solent partners to map and assess the opportunities to enhance the ecology of Southampton Water's (including Itchen and Hamble estuaries) shoreline infrastructure. This was achieved through a consultative exercise to understand more about the coastal structures; their use, value, ownership, and potential opportunities for ecological (mitigation, enhancement, restoration, and creation) enhancement. The information gathered will make it easier to understand 'what and where' the opportunities are, when considering future development proposals and 'net gain'. However, in many cases there is a lack of knowledge, evidence and practical help to make this happen. Partners would like to develop the necessary tools and guidance to facilitate it to happen. The findings from this work should help in that process.

The Solent Forum is working with its members to build a Building Biodiversity Solent (BBS) hub of information on net environmental gain and ecological enhancement, this work will be progressed during 2019, see:
http://www.solentforum.org/services/Member_Services/Building_Bioversity_hub/.

There is a will amongst the people of the Solent to improve the ecological value of the area in which they work and live, this work has helped move us much closer to realising this.

1.1 Key Findings and Recommendations

1. There were general structures identified where enhancements are considered possible, particularly sea walls and outfalls. Generally, wrecks need individual consideration to assess their historical value.

   *Recommendation: We need to continue to encourage pilot enhancement and mitigation on different types of substrates and under different coastal conditions. Results from these pilots should be collated and added to the BBS hub (*http://www.solentforum.org/services/Member_Services/Building_Bioversity_hub/ *) and publicised by the Solent Forum's news service.*

2. A baseline assessment is needed of the current ecological value provided by the structures in Southampton Water. We need to know the current position to assess if mitigation measures are adding value in the future; Southampton Water could be of higher value than we think even though it's a highly modified water body. We also need to account for ecological seasonality when undertaking assessments.

   *Recommendations: The Secrets of the Solent project (*https://www.hiwwt.org.uk/SecretsoftheSolent*) undertakes citizen science work and we should look to use this network and other similar networks to gather data on the ecological value of coastal infrastructure and ground truth some of the structure options identified in the opportunity mapping. It would be useful to evaluate the ecological value of structures when undertaking maintenance work and also identify maintenance techniques or adaptations that could potentially help increase value.*

3. There is currently no comprehensive record of who owns or maintains coastal infrastructure, where there are records it can be difficult to obtain information as it is often a chargeable cost, there are limits due to GDPR and datasets are incomplete. Improving these records and access to them would help to facilitate a 'pick list' for those who need to undertake mitigation.

   Recommendation: SCOPAC is seeking funding to build up a database on ownership of coastal defences and this would be very helpful for this work. As development or maintenance takes place it would be helpful if information on ownership and management could be collated. It would be useful to liaise with The Crown Estate to understand their role, records held and jurisdiction.

4. There are good archaeological records and local knowledge on wrecks for the New Forest side of Southampton Water. It would be helpful if there was greater communication between archaeologists and ecologists to see how they could work together for mutual benefit. Historic England are undertaking research on the historic environment and natural capital and are the statutory advisors**.**

   Recommendation: It would be useful to look at the possibility of coordinating and sharing information and resources when survey work is undertaken. For example, ecologists could work with the archaeologists to help them identify the ecological value of historic structures on dives.

5. We need to recognise that mitigation and enhancement options can be different depending on the local coastal conditions, both manmade and natural, i.e. mitigation in a sheltered estuary would be different to that on the open coast. Sites that have had past heavy historic use may have levels of contaminants that mean that structure removal would cause more damage than benefit. A 'catalogue' of mitigation measures that shows the most appropriate method to use based on the structure type, its historic use, current ecological value, whether it lies in a designated site and the local coastal environment would be helpful to developers.

   Recommendation: The BBS Solent hub can look to find, collate and record published material on mitigation options in different coastal environments, e.g. high energy and low energy. This can start to form the basis of a 'mitigation catalogue'.

6. We need to ensure that sites for mitigation are available at the appropriate time, for cost and disturbance reasons, e.g. we need to consider timings of natural events such as avoiding bird breeding seasons that may reduce ecological value in the short term.

   Recommendation: Preparation (or publicising, collating) of information that sets out key environmental principles and natural timing cycles in the Solent would be helpful for developers. This could be located on the BBS hub.

7. Stakeholders noted that undertaking work in the coastal zone is already highly regulated and there is currently no additional funding for mitigation when undertaking maintenance. Organisations asked for greater certainty that if they enhance infrastructure it will not create higher future maintenance costs and require extra environmental assessments.

   Recommendation: It would be helpful to obtain and collate position statements from key regulators on their policy regarding mitigation options and enhancement. The concept of financing of natural capital work is being piloted in North Devon via the company Environmental Finance. This is working with WWF (funded through a partnership with Sky Ocean Rescue) to help support the protection and sustainable management of North Devon's seas and coasts.

8. The skills base needs developing to help increase the human resources available to enable ecological enhancement to become mainstream.

   Recommendation: Work package 5 of the MARINEFF project (http://marineff-project.eu/en/marineff-2/) aims to address the skills base by creating a professional stakeholder network. The Solent Forum is on the distribution list for this project and can use the BBS hub to facilitate the sharing of knowledge.

2. Opportunity Mapping Exercise

The Environment Agency undertook a mapping exercise in 2016/17 to identify hard structures (see 5.1 for structure types) along the shoreline of Southampton Water using aerial imagery. The information was stored in excel spreadsheets for each river catchment. This formed the basic information for the consultation. In 2017, the River Hamble was used as a pilot to test what people thought about mitigation options for the identified infrastructure; the findings of this pilot can be viewed in appendix one.

Solent Forum mapped the structures in GIS and produced two maps of Southampton Water (north and south) that show their distribution. The structures and maps can be viewed at: http://www.solentforum.org/services/Current_Projects/oppmap/Consultation/. The structures were split into their constituent catchments, New Forest (NF), East Hampshire (EH) and Test and Itchen (TI) for the consultation exercise.

Solent Forum checked the individual structures using CCO aerial photography. Incorrect grid references and duplications were amended, those that could not be viewed accurately, or were hidden due to shading or could not observed, such as rope lines and boat scrapes, were removed from the consultation list. Location descriptions were also added to each structure to facilitate the consultation.

Fish passes were removed with the consent of the Environment Agency as they have responsibility for them, as were habitat compensation sites. The Regional Habitat Compensation programme (https://www.escp.org.uk/regional-habitat-compensation-programme) has already assessed in detail potential sites throughout the Solent including Southampton Water. The one site identified in Southampton Water is at Hook Lake on the River Hamble.

An image was prepared of each structure and an arrow added to highlight it. A short table was included under each image to capture consultee comments, and the completed files were uploaded to the consultation page on the Forum's website at http://www.solentforum.org/services/Current_Projects/oppmap/Consultation/.

- East Hampshire - 15 sites
- New Forest - 57 sites
- Test and Itchen - 185 sites

3. Three Phase Consultation

The consultation was undertaken in three phases. It was designed to capture broad principles for mitigation options, key ecological and archaeological factors to consider and to try and determine site specific information.

1. Consultation on individual structures and potential for mitigation
2. Consultation on archaeological value of structure types
3. Consultation on ecological value of structure types

4. Organisations Consulted

The following organisations were asked for their opinions:

- Coastal local authorities
- Environment Agency
- Ports and Harbours
- MMO
- Archaeological Bodies

- Universities
- Eastern Solent Coastal Partnership
- RYA/BMF/MDL
- Natural England and the Wildlife Trust
- Coastal Partnership Network
- Marine Protected Areas Network
- Wider Solent Forum membership
- Southern Water

5. Consultation on Structures

5.1 Structure Types

The following structure types were included in the opportunity mapping work:

- Seawalls
- Tyres
- Jetties
- Concrete blocks/pipes/outfalls
- Wooden posts/structures
- Wrecks – metal, plastic and wooden
- Concrete slipways
- Revetments
- Rip rap walls
- Moorings and pontoons
- Quay walls

5.2 Structure Ownership/Maintenance

Finding out who owns coastal structures and who is responsible for their maintenance can be complex. Consultees did not have this knowledge to hand and needed to go to their assets and estates departments to find the information and the records are often incomplete. Given the large number of structures to review, consultees were only able to give general comments, due to time constraints and the need to apply charges for a more in-depth service. HM Land Registry has details of land and property ownership, but charge fees. It should also be noted, that under data protection, GDPR organisations cannot release third party ownership details. It was therefore agreed, that it was more appropriate for developers to seek this information for the specific structures they may consider enhancing when planning development.

The Environment Agency's Asset Performance Team holds a database of coastal assets. Some entries are third party assets which means that they are managed, operated and owned by a local authority or private individuals. The Agency have limited or no information on such assets, unless they use permissive powers to maintain or inspect.

Coastal engineers reported that there are sometimes local agreements in place for maintaining structures, especially those under private ownership, and they often require researching on an individual basis.

SCOPAC and the Southern Coastal Group have identified the lack of knowledge on who owns or is responsible for coastal defence assets as a priority area for work. They are currently trying to obtain funding to undertake this task.

For coastal infrastructure under the responsibility of the Crown Estate, clarification about enhancements is required. The Crown Estate provides an estuary and foreshore map that shows its ownership - https://crownestate.maps.arcgis.com/apps/Viewer/index.html?appid=0aac22685d2f4d78a2a3b0a5aa1660db.

The Environment Agency may like to consider the feasibility of a rapid assessment of the ecological value of coastal infrastructure, in the forthcoming Shoreline Management Plans (SMP) refresh, as was done for archaeological assets when the last round of SMPs were delivered.

5.3 Development Sites

A number of the structures, particularly in the Test and Itchen catchment, lie within sites earmarked for development. This provides opportunities for future mitigation when development takes place, and developers should be encouraged to look to undertake this in their design stage. Published proposed sites for development are currently Royal Pier, Itchen Riverside and Fawley Waterside.

5.4 Structure Maintenance

Respondents thought that, where possible, mitigation work to existing structures that need to be retained, e.g. seawalls should take place at the time of scheduled maintenance. Currently, there is no extra funding to achieve this, but people are open to the possibility of undertaking measures if it could be made available, for example via a developer contribution fund. By undertaking all the work at the same time disruption can be minimised to both people and wildlife and be less costly.

5.5 Marine Licensing

The MMO responded that: “any changes to structures, even to enhance the function for WFD, may require a licence, this will be dependent on what is being done and how it is undertaken. Generally, if works are small scale and done by hand there is no licence requirement or the activity may be exempt, if the activities are minor they may be done under a self-service licence depending on the activities. If there are a number of projects going ahead within a single area they may be able to assess this as one application for multiple sites.”

6. Consultation on Archaeological Value

6.1 Heritage Assets Mapping

Archaeological respondents noted that the most accurate source of information on historic wrecks is the 'rapid archaeological coastal zone assessment' that was undertaken for the last round of Shoreline Management Plans. Local authority archaeologists have continued to add data to this from various datasets that they have accumulated working along the coast. This includes Hampshire Historic Environment Record, Lidar, National Mapping Programme, historic aerials and personal knowledge.

Hampshire's Historic Environment records that include land, sea and intertidal is available at: https://maps.hants.gov.uk/historicenvironment/. Southampton City Council and Portsmouth City Council maintain their own Historic Environment Records (HER) and enquiries for these areas must be addressed direct to them.

Historic England, rather than LPAs, have the legal remit for matters offshore. The land archaeologists work within a local authority framework and this is commonly defined to the mean high-water mark. The English Heritage publication '*Shoreline Management Plan Review and the Historic Environment: English Heritage Guidance'* provides further guidance on coastal heritage assets, see: https://historicengland.org.uk/images-books/publications/shoreline-management-plan-review-and-historic-environment/shoreline-management-plan-review/.

6.2 Guiding Principles for Archaeological/Historical Value of Structures

The Forum designed a basic table (table 1) of the structures identified in the original mapping and circulated it to the archaeologists, the information returned is set out in the table below. It is traffic light colour coded to show what structures are deemed not to be of value (green), should not be touched (red) and need site specific investigation (amber). Special thanks goes to the Marine Archaeology Trust for their input.

Table 1.	**Guiding Principles for Archaeological/Historical Value of Structures**
***Structure Type**	
Seawalls	Can have historic value, it depends on the age and construction materials, also can contribute to understanding coastal change through dating - decisions on mitigation will have to be on a case by case basis.
Pontoons	As long as they are clearly modern pontoons that are floating and not older types they shouldn't have heritage value.
Tyres	Unlikely to have any heritage value.
Jetty	Lots of examples of historic jetties around Solent shores – will have to be reviewed on a case by case basis for mitigation measures unless precise date of construction is known and there isn't any reuse from earlier structures.
Concrete blocks/pipes/outfalls	Concrete cannot be dismissed as modern. There are a lot of remains from the Second World War around the shores that are of significant heritage value. Would need to confirm that the concrete is definitely related to modern outfalls.
Wooden posts/structures	Lots of examples of wooden posts/ structures around the Solent that can date from the bronze age onwards. Very important that these are fully assessed by

	archaeologists on the ground. May need to incorporate scientific dating programme if age unknown. Definitely need to be assessed on individual case by case basis. May even be best not to include this type of site for any mitigation measures.
Metal wrecks	Can have high heritage significance. Must be reviewed on case by case basis. If someone wanted to remove a structure then an assessment by maritime archaeologists would be required (at a cost) to determine heritage value.
Plastic wrecks	Unlikely to be of heritage value unless example of a particularly rare ship type/ design.
Wooden wrecks	Suggest that wooden wrecks should be removed from any further consideration as part of this programme as they are highly likely to be of heritage significance.
Concrete slipways	As with above comment on concrete these can relate to the various war activities and historic industries/ activities. Need case by case assessment.
Revetments	Can have historic value – depends on age and construction materials, also can contribute to understanding coastal change through dating - decisions on mitigation will have to be on a case by case basis.
Rip Rap Wall	Unlikely to be of heritage value.
Moorings	Can have historic value – depends on age and construction materials. Some moorings can be of considerable age. Decisions on mitigation will have to be on a case by case basis.
Quay walls	Can have historic value – depends on age and construction materials, also can contribute to understanding coastal change through dating - decisions on mitigation will have to be on a case by case basis.

*Structure type – as recorded by the Environment Agency for the purpose of this project using aerial photography

Key:

Green: Structures unlikely to be of heritage value and may be suitable for mitigation

Amber - Structures that will all need to be looked at individually by archaeologists to determine their heritage significance

Red - Structures are highly likely to be of heritage significance unsuitable for any mitigation

6.2.1 Cultural Value

Archaeological consultees noted the importance of recognising the cultural importance and social value of structures. Often no formal records are held but they recommend checking for any local interest groups 'e.g. friends of..' to see if structures have local cultural value. This is especially the case with military defence assets, i.e. second world war concrete structures.

6.2.2 Plastic Pollution and Wrecks

Divers from the Marine Archaeology Sea Trust found a "surprisingly large quantity" of rubbish on HMS Invincible's wreck site in Portsmouth Harbour during a survey. The Trust said such wrecks, proud of the seabed, act as "accumulation points" for rubbish and could potentially affect the aquatic wildlife colonising wrecks.

This finding could have implications for the modification of other coastal infrastructure. Providing larger surfaces that are of beneficial use for colonisation could inadvertently become litter traps and reduce ecological value; this topic could provide an interesting further study.

6.2.3 Marine Planning Policies

Consideration needs to be made by developers for the policies in the adopted marine plan which covers Southampton Water. Policy S-HER-1 in the South Marine Plan, states that 'Proposals that may compromise or harm elements contributing to the significance of heritage assets should

demonstrate, that they will, in order or preference:

a) Avoid
b) Minimise
c) Mitigate compromise or harm. If it is not possible to mitigate, the public benefits for proceeding with the proposal must outweigh the compromise or harm to the heritage asset.'

7. Consultation on Ecological Value

7.1 Inherent Ecological Value

Structures can have inherent ecological value and it is important to establish this before looking to enhance, for example old pontoon structures can provide high tide roosts; removing them will mean it is necessary to recreate this asset elsewhere to maintain value. There appears to be limited knowledge of what this inherent value is for Southampton Water, it would be helpful to try to get a baseline ecological value for different types of coastal infrastructure. There are numerous academic papers and studies on this topic from other locations. An example is set out below.

'Coastal structures provide habitat for many species but generally support lower biodiversity than natural habitats. This is primarily due to the absence of environmental heterogeneity and water-retaining features on artificial structures.'
Source: Journal of Conservation Biogeography, Diversity and Distributions, (Diversity Distrib.)(2013) 1–9

Bournemouth University have undertaken studies on how, with increasing coastal Infrastructure and use of novel materials, there is a need to investigate the colonisation of assemblages associated with new structures, how these differ to natural and other artificial habitats and their potential impact on regional biodiversity.

7.2 Existing Statutory Duties

Consultees raised the issue that they already have duties to ensure that they don't damage the environment when undertaking work on coastal infrastructure. This investment and work should be recognised, i.e. they are already contributing to keeping the current ecological value of Southampton Water and in some cases may already be increasing it. It would be useful to evaluate the ecological value of existing maintenance work being undertaken to evaluate whether it is leading to net loss, maintaining the balance or achieving net gain.

7.3 Natural England Response

For the project, Natural England put together a list of general principles that should be considered in terms of whether structures are removed, or enhancement methods are used.

- Small structures serving no function (e.g. tyres) and placed over designated habitats the preferred option would be removal leading to more saltmarsh and intertidal habitat.
- Small structures serving no function (e.g. tyres) and not placed over designated habitats the preferred option will depend on what they are lying on (i.e. will removal lead to a potential to increase biodiversity); are they potentially causing pollution or small enough that they could move onto another area of potential good biodiversity. So, there may possibly be some cases where enhancement rather than removal is the preferred option.

- Large structures serving no function (derelict jetties) and placed over designated habitats the preferred option would likely be removal, unless that removal might mean an indirect consequence in terms of more rapid erosion of saltmarsh.
- Large structures serving no function (derelict jetties) and placed over designated habitats, again removal of larger structures preferred option but where this is unfeasible use enhancing methods such as methods used by Artecology to increase marine life colonisation.
- Exception to this would be where the removal of the structure could potentially lead to a worse impact on the environment through its removal e.g. contamination or more rapid erosion of saltmarsh. An environmental impacts assessment/appropriate assessment of the impact of the removal would be expected.

7.4 Sustainable Development v Protected Development

Concerns were raised by businesses who undertake development and maintenance work on coastal infrastructure that if they build in enhancements, the resulting ecological value could mean that it could prove more difficult and costly to modify or maintain that structure in the future. They would like clarity from regulators about whether additional assessments may be needed if the value was higher. Presently their focus is on trying not to damage the existing habitats and species when maintaining infrastructure, which can already be a complex process.

Experience from pilot projects by Bournemouth University has shown that not all enhancements will affect maintenance, for example rock pools cut in granite boulders. Their opinion is that maintenance work and repairs will have to be conducted so that the same level of enhancement is included post maintenance. An issue could arise where protected species were attracted to the structure and future maintenance could then be covered by the Habitat Regulations. However, they believe that the chances of this are slim, as most protected species do not inhabit the tidal level where enhancement takes place.

7.5 Removal of Structures

Consultees pointed out that when looking to remove coastal structures an assessment needs to be made as to whether any contaminants would be released during the removal process or fragile ecosystems damaged. Care also needs to be taken to check that removal will not take away small scale habitats, like fish refuges in the sheltered lee of concrete structures or cause flood risk or damage to third party property. The issue of plastic wrecks degrading into microplastics was also raised.

The Eastern Solent Coastal Partnership have been looking at retaining the old footprint of seawalls that are moved landward for net gain. They can be used to provide island refuges for birds that are inaccessible for dogs and other predators.

7.6 Local Coastal Environment

Consultees noted that the local environment, where the structures are located, is as important as the type of structure itself. Carrying out mitigation in low energy environments, such as sheltered

estuaries, is very different to that in exposed coastal environments, or where greater activity leads to a higher energy environment such as sites that are exposed to regular vessel wash.

7.7 Non-Native Invasive Species (NNIS)

When looking to enhance structures, care needs to be taken about creating habitat that will facilitate the spread of Non-native Invasive Species (NIS). NNIS have been identified in Natural England's condition assessments as impacting on the Solent's designated sites. A more detailed explanation is given in the extract below. It would be a positive step if the NNIS were removed during works. Evidence has shown that non-natives have greater potential to establish year round on clear surfaces, whereas native species tend to establish in the spring, or dependent on spawning timings. For further research please visit:
http://www.nonnativespecies.org/index.cfm?sectionid=59.

'The proliferation of anthropogenic infrastructure in the marine environment has aided the establishment and spread of invasive species. These structures can create novel habitats in areas normally characterised as void of suitable settlement sites. Recent studies indicate that artificial structures such as piers, pilings, seawalls and other sea defences are particularly vulnerable to invasion by non-native species; however, their contribution as drivers of ecological change has received limited attention. These structures are often located in disturbed habitats, such as ports and estuaries, areas characterised by high shipping traffic and thus an increased abundance of NNIS.' *Source: Cleft, Crevice, or the Inner Thigh: 'Another Place' for the Establishment of the Invasive Barnacle Austrominius modestus (Darwin, 1854). Sally A. Bracewell, Matthew Spencer, Rob H. Marrs, Matthew Iles, Leonie A. Robinson. School of Environmental Sciences, University of Liverpool, Liverpool, Merseyside, United Kingdom.*

7.8 Examples of Ecological Enhancement in the Solent

Solent Oyster Restoration Project – led by Blue Marine
The project's oyster cages can be considered as "artificial reefs," studies on the associated epifauna have shown 95+ species recorded so far. Blue Marine are in discussion with the Eastern Solent Coastal Partnership hoping to incorporate oysters into their planned coastal defence structures, to use increased biodiversity for greater protection and to provide a 'living seawall'. They are also looking into the potential of how oyster structures can be used for saltmarsh restoration and into the water filtration potential of restored beds.

Artecology Vertipools

Vertipools are artificial rock pools, that offer a simple and versatile solution for creating new wildlife habitat and delivering net ecological gains on defended coasts and harbours across the urban marine environment. See: https://www.artecology.space/vertipools.

Eco Moorings
The RYA and partners have been undertaking research and organising events on the use of eco moorings. Although still in the early stages, discussions are ongoing with mooring manufacturers about how moorings can both minimise any potential damage and how they could provide localised

habitat. A LIFE Bid is being put forward to progress this work and as part of this process investigations could be undertaken to see how eco moorings could act as mitigation measures and increase ecological potential.

Artecology Ltd have also been trialling mooring sinkers made from bio-receptive materials.

Ecological Value of Wrecks
Bournemouth University are planning to undertake studies on the ecological value of coastal wrecks, including some wrecks in the Solent. Hopefully these studies will start to provide baseline data on the ecological value of these type of coastal structure in addition to their archaeological value.

Experience of the Eastern Solent Coastal Partnership (ESCP)
The ESCP reported the following in relation to their experience. There are a number of considerations that need to be factored into any decision as to remove a structure or leave in situ, these should include:

- Costs of removal (plant mobilisation, access, disposal of structure once removed, some structures (e.g. old pontoons can be very costly to dispose of).
- Who is going to fund this? – Possibly there could be a link to development to create a sustainable funding stream, driven by WFD assessments.
- What is the ecological impact of physical removal on surrounding habitats, access of heavy plant on the foreshore etc.
- Access to and over the foreshore.
- Knock on effects – how is the structure impacting local hydro and sediment dynamics at the present time, what impacts would the removal cause etc.
- Could adaptation of the structure be more beneficial, for example, adding niches to the structure to create habitat. Could a slipway be resurfaced to created additional habitat, so that it holds water to encourage grazers which then feed on the algal growth to stop it getting slippery.
- Although general principles could be useful, the devil is in the detail and it is likely that in the end each structure will need to be looked at on a case by case basis.
- If the structure is owned or maintained by the ESCP we have a lot of detailed information.
- Within the ESCP we do have the in-house skills to undertake a number of different surveys outside our area if that would be helpful to the project.

7.9 Marine Plan Policies

The policies in the South Marine Plan apply to all decisions for consents and authorisations in the marine plan area, which includes licensing decisions. The MMO considers that enhancement is not a substitute for protection, avoidance, minimisation or mitigation measures when undertaking development. Additionally, when proposing enhancement, they note that there should also be consideration of the wider impacts on the environment. The Plan does include policy on ecological enhancement as set out below.

South Marine Plan policy S-BIO-2 states that ‘proposals that incorporate features that enhance or facilitate natural habitat and species adaptation, migration and connectivity will be supported’. In

terms of obtaining licenses for development, building features in to fulfil this policy would hopefully be looked on favourably by consenting authorities.

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8. Appendix 1 – Pilot Lessons from the Hamble

Principles of structure removal and Ecological enhancement of existing structures.
Seaview Hamble Sub-group- 19/10/2017

8.1 Obsolete Structures – Mitigation Considerations

- In terms of heritage value, a lot of work has been done on the river Hamble, it is exceptional in terms of heritage though unfortunately as a consideration heritage is usually on the bottom of the pile.

- It is really hard from an aerial photograph to know what the structure is and what is important about it. Some structures are very obvious, some there are queries outstanding. Some structures the heritage we will not be able to give a definitive yes or no on without further archaeological investigation.

- In terms of process in terms of removal, what impact does that method of removal have, is it a rip-out job in terms of other features or archaeological features potentially risking being impacted if they are close by?

- Sometimes you don't know what is beneath, in terms of removal, are we talking cut down to bed level, or just below.

- Developers are usually instructed to remove a structure to one metre below the muds surface level. This involves a lot of excavation and plant impact; it could make a huge amount of damage trying to do it.

- Opposition from a single party on removal of structures can lead to the loss of this sort of mitigation going ahead completely.

- There is a real common misconception that if wrecks are metal they pose less value, this is not always the case.

- Issue from a commercial side is that we would need to have appropriate levels of archaeological recording before it can be removed.

- If a development is large enough to require appropriate planning permission or an EIA then archaeology assessment is embedded within.

- On marine licences, developers often need an archaeologist on board to keep a watching brief.

- It would be fairly typical on the Hamble if a removal of a structure was flagged up through someone wanting to make private improvements, no information would be available if it wasn't in the archaeological remains catalogued in the River Hamble Final Report, June 2008 (not a fully comprehensive document).

- Digging a hole with big plant could cause more damage than leaving structures, issue of access points on the Hamble. Removal is a big expense, and in most places where it is required, other than bit of timber sticking out of it the mud habitats around it could be

functioning fine. For example, for a universal high level jetty, we had to sit the big plant on the mud for months, the clients were dissatisfied with this.

- Question of the value of the alternative habitat provided, although it is not mudflat, it is still providing an artificial reef habitat. In some cases structures can also be serving a hydrodynamic function, leaving it there has formed a status quo, which the river has adapted to such as protecting salt marsh behind the structure from erosion. Trade-off has to be that removal is only right if you thank that is beneficial enough. There is no gain in leaving a structure at mud level being a potential navigational hazard, lose habitat above and then not properly restoring to functioning mudflat leads to disturbance without the benefit.

- Need to be clear on the definition of 'obsolete'- no longer functioning as the structure in its original function.

- Is there a net benefit to the environment, harbour, developer, navigation? Potential positives that changes and removal of structures near others could result in burying silt over an archaeological site which could protect it more.

  Overall considerations;
  - Heritage loss
  - Damage during removal (scale relevant, accessibility)
  - Is there a net benefit (to what is thought to be right for the Hamble)

- In the Hamble in recent years when every private pontoon or jetty has been developed- something has been improved, though in at least a third of cases this has been removal of small scale debris. This is more of the scale of major marine litter or debris that has just ended up there, in affect dealing with marine unintentional/intentional flytipping, such as old pontoons and tyres etc. There is one hulk going to be removed but that is from a modern fibreglass mould. Effectively just putting it back to how it used to be in relatively recent history, a tyre could be there for a few hours or decades as example.

  - Ecological enhancement principles;

  Are we talking ecological enhancement of hard structures, or restoration work that has potential to slow down erosive forces? This could be enhancing otherwise non-ecological functioning structures, or protecting or restoring or enhancing existing habitat.

  - Agreed we could split this into hard and soft structures or natural versus anthropogenic.

Hard structures:
Rip rap boulders - could put holes in it for water retention to increase ecological niches.
Window boxes - within sheet piles that hold water at different levels. As a group we can come up with ideas but we need to give other parties a pick list of what could work on a type of structure.
Piling, typically add wood cladding, and gravel back fill. Installing Vertipools.

- We need to give better advice to applicants in early days discussions.

- If we have had these ideas and advice this could be put in a database that developers or private individuals could access.

- Key question is around the evidence of knowing whether these ecological enhancements work. Could be a justification to add this onto conditions of marine licences when "mitigation" is required. Would it be better to have a condition for monitoring rather than a condition that it must work. For example, monitoring after the works at Burnham pool, the licence goes on for two years beyond the job, MMO condition to submit results three months after the licence expires, install the improvement and try it and release the data.

- Gap between research, academia, developers and government agencies.

Soft ecological enhancements:
A group has got together and fed into the River Hamble soft sediment habitat retention study, some silt trapping flowing of erosion would help to enhance the saltmarsh and its extent. Appetite for how that would be realised. Funding and consents are a separate issue.
Losing mudflat, if lowering, Natural England have had a change of position recently and said at the time can probably agree to that. Solent BUDS project, beneficial reuse which there is one possible site maybe two for possible small-scale options, most of the content of the study is the soft engineering trapping type solution. On those studies normally they measure success when the marsh starts to grow is that the only measure that you should make, cliffing reduction, ecological benefits.

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