

THE YORK POTASH HARBOUR FACILITIES ORDER 201X

Mitigation and Monitoring Strategy



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Royal HaskoningDHV

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York Potash Harbour Facilities: Bran Sands Lagoon Mitigation and Monitoring Strategy

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Drawing PB1586-SK467 - Bran Sands Lagoon Proposed Habitat Enhancement

Drawing PB1586-SK466 - Bran Sands Lagoon Proposed Habitat Enhancement Delivery Methodology



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1 Introduction

1.1 Bran Sands Lagoon Mitigation and Monitoring Strategy

This Bran Sands Lagoon Mitigation and Monitoring Strategy (MMS) has been prepared in response to consultation undertaken following provision (in December 2014) of the York Potash Harbour facilities Habitats Regulations Assessment (HRA) (Royal HaskoningDHV, 2014a) to Natural England (and the Environment Agency) for review. The consultation related, in particular, to the habitat enhancement and mitigation proposals for Bran Sands lagoon outlined within the HRA. The MMS should be read in conjunction with the Harbour facilities HRA and has been prepared in support of it.

The consultation comprised a telephone meeting on 15 January 2015 (meeting notes are included as **Appendix A**) and a subsequent advice letter from Natural England (dated 21 January 2015) that set out Natural England's expectations of the MMS (also **Appendix A**). On the basis of this consultation, a first draft of the MMS was produced. Subsequently, a site visit to Bran Sands lagoon and meeting was held on 5 February 2015 with Natural England, the Environment Agency, the Marine Management Organisation (MMO), Cefas and York Potash Limited to discuss the first draft of the MMS and the deliverability of the habitat enhancement proposals for Bran Sands lagoon. Comments made at the meeting (and subsequently in a letter from Natural England dated 9 February 2015 (see **Appendix A**)), and in Natural England's relevant representation, have been incorporated into this version of the MMS (Revision 4).

1.2 Objectives

The key objectives of the MMS are to:

1. Further describe the aims of the habitat enhancement measures¹ proposed in the Harbour facilities HRA (and Environmental Statement (ES)).
2. Confirm the interest features of the Teesmouth and Cleveland Coast Special Protection Area (SPA) that are use Bran Sands lagoon and how the proposed habitat creation measures would affect the interest features.
3. Define how the habitat enhancement proposals can be delivered (practically) and the timing of delivery.

Natural England's letter dated 21 January 2015 set out a series of requirements and, in meeting the above three objectives, the MMS responds to these items.

¹ The draft Development Consent Order (DCO) proposes and, through the HRA, includes assessment of habitat enhancement measures in Bran Sands lagoon as part of the proposed Harbour facilities scheme. The HRA concluded that the habitat enhancement proposals would deliver an overall net benefit when considered in light of the adverse effects of the proposed scheme. The distinction between the use of the terms 'mitigation' and 'habitat enhancement' has been discussed with Natural England (and Natural England commented on this point in the letter of 21 January 2015); and this is further explained in this document (see **Section 3**).



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2 SPA Interest Features and Potential Impacts

2.1 Introduction

Section 7.5 of the HRA (Royal HaskoningDHV, 2014a) presented waterbird data to demonstrate the usage of Bran Sands lagoon (Dabholm Gut and the intertidal area at the location of the proposed port terminal). Reference should be made to the HRA for the full data set; however, **Sections 2.1** and **2.2** below summarise the interest features of the Teesmouth and Cleveland Coast SPA and the waterbird data for Bran Sands lagoon.

2.2 Interest features of the Teesmouth and Cleveland Coast SPA

The Teesmouth and Cleveland Coast SPA is of European importance because it is used regularly by at least 1% of the Great Britain population of the following species listed on Annex I of the Birds Directive (79/409/EC), as illustrated in **Table 2.1**.

Table 2.1 Annex I species of the Teesmouth and Cleveland Coast SPA

Annex I species	5 year peak mean	% of GB population
Little tern <i>Sterna albifrons</i>	40 pairs (1995-1998)	1.7
Sandwich tern <i>Sterna sandvicensis</i>	1,900 birds (1988-1992)	6.8

In addition, the SPA is used regularly by 1% or more of the biogeographical population of the migratory species (other than those listed in Annex I) in any season, as presented in **Table 2.2**.

Table 2.2 Non-Annex I migratory species

Non-Annex I migratory species	5 year peak mean	% of population
Knot <i>Calidris canutus</i>	5,509 (1991/92-1995/96)	1.6 (NE Canada/Greenland/Iceland/UK)
Redshank <i>Tringa totanus</i>	1,648 (1987-1991)	1.1 (Eastern Atlantic wintering)

The SPA also qualifies as it is used regularly by over 20,000 waterbirds or 20,000 seabirds in any season; the SPA supported a peak mean of 21,312 individuals over the period 1991/92 to 1995/96.

Furthermore, the SPA supports nationally important populations of cormorant *Phalacrocorax carbo*, shelduck *Tadorna tadorna*, teal *Anas crecca*, shoveler *Anas clypeata*, ringed plover *Charadrius hiaticula* and sanderling *Calidris alba*.

In addition to the SPA features cited above, (non-breeding) ringed plover were identified in the 2001 SPA Review as being present in numbers which would qualify them for further consideration as a new and additional feature of the SPA. An extension to encompass little tern and, potentially, common tern foraging is also being considered. Natural England has advised that through this review process, the SPA boundaries may also be proposed for extension to encompass the wintering waterbird assemblage that uses habitats within and adjacent to the DCO application site. The entire lagoon at Bran Sands and the adjacent

Dabholm Gut are being considered in the proposed SPA Review in the context of supporting habitat for the SPA wintering waterbird assemblage.

2.3 Waterbird usage of Bran Sands Lagoon

Table 2.3 presents the annual peak counts for waterbirds within Bran Sands lagoon from 2009 to 2013. These data have been used to calculate a five year average of usage for these areas, which has been compared to the WeBS five year average data for the Tees WeBS site. This data is reproduced from the HRA; however, amendments have been made to the table to identify species that can be classified as dabbling and diving species, in response to a query from Natural England regarding the potential effect of the habitat enhancement proposals on these species (addressed herein).

Table 2.3 Peak counts and five year averages from 2009 to 2013 within Bran Sands lagoon, compared against five year average data for the Tees WeBS site

Species	Peak Counts					5-year average	WeBS 5-year average 2009 -13	% WeBS 5-year average
	2009	2010	2011	2012	2013			
Mute Swan	13	7	12	4	2	8	85	9%
Canada Goose	24	-	-	-	-	5	823	< 1%
Shelduck	189	104	106	68	73	108	451	24%
Gadwall	9	21	2	13	3	10	407	2%
Teal	97	176	185	32	194	137	1661	8%
Mallard	28	37	72	13	16	33	304	11%
Pochard	-	33	8	17	-	12	94	13%
Tufted Duck	-	2	1	-	-	1	266	< 1%
Scaup	-	3	-	-	-	1	2	50%
Long-tailed Duck	-	-	-	-	2	< 1	2	< 1%
Goldeneye	22	31	80	63	24	44	84	52%
Red-breasted Merganser	9	16	70	25	43	33	64	52%
Little Grebe	3	6	19	14	15	11	65	17%
Great Crested Grebe	-	2	3	-	-	1	42	2%
Cormorant	-	-	-	-	17	3	298	1%
Grey Heron	-	-	-	1	4	1	44	2%
Little Egret	-	-	-	-	11	2	30	7%

Species	Peak Counts					5-year average	WeBS 5-year average 2009 -13	% WeBS 5-year average
	2009	2010	2011	2012	2013			
Oystercatcher	-	-	1	-	-	< 1	1262	< 1%
Lapwing	24	37	6	-	30	19	4218	< 1%
Dunlin	-	-	4	-	-	1	767	< 1%
Curlew	2	5	4	8	3	4	1195	< 1%
Redshank	82	86	30	13	99	60	1235	5%
Turnstone	13	-	7	1	7	6	233	3%
Common Tern	-	34	-	-	19	11	509	2%
Sandwich Tern	-	-	-	-	18	4	177	2%

Key:

Dabbling species

Diving species

It is clear from **Table 2.3** that Bran Sands lagoon constitutes an important habitat for waterbirds and represents a supporting habitat to the SPA. These points were acknowledged in the HRA and the assessment of potential effects of the proposed scheme was undertaken bearing in mind this context.

Natural England's letter dated 21 January 2015 (**Appendix A**) notes that the lagoon is of particular significance for redshank, shelduck, mallard, pochard, goldeneye, red-breasted merganser and little grebe; and this is agreed.



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3 Objectives and Effects of the Proposals

3.1 Effects of habitat enhancement in relation to SPA interest features

The habitat enhancement proposals comprise the placement of capital and maintenance dredged arisings within Bran Sands lagoon, and form part of the Harbour facilities DCO proposals. As set out in the HRA, it is considered that the net effect of the proposals (i.e. the overall effect of the proposed Harbour facilities, taking into account detrimental and positive impacts) would be beneficial in terms of waterbird habitat. This conclusion is further explored in this section through the examination of the aims of the habitat enhancement proposals.

In terms of direct effects (i.e. effects other than construction disturbance), the construction of the Harbour facilities would impact on habitats used by waterbirds. In particular, the intertidal area within the footprint of the proposed port terminal would be lost and there would be a (very minor) direct impact in Dabholm Gut or in Bran Sands lagoon due to the construction of the overland conveyor (the location that would be impacted is dependent on whether the conveyor is constructed along the southern or northern corridor). The implications of these direct effects on the interest features of the SPA are summarised in **Table 3.1**, and the objective of mitigation proposed is set out.

Table 3.1 Predicted direct effects of the Harbour facilities on SPA interest features and mitigation objective

Identified direct effect (port terminal and conveyor construction)	Relevant interest features of the SPA	Objective of the habitat enhancement proposals	Supporting evidence
Loss of intertidal foreshore (up to 3.6ha ²) of low quality in terms of waterbird habitat and exposed for a cumulative average of 20% of the time.	The intertidal area is used by the following interest features of the SPA, but in low numbers: <ul style="list-style-type: none"> Redshank Waterbird assemblage. 	To provide improved feeding, roosting and loafing habitat, thereby mitigating the direct impact of the port terminal.	HRA (see Table 7.5); ES (Sections 8.4 and 9.4)
Loss of habitat in Dabholm Gut or Bran Sands lagoon due to conveyor supports (approximately 3m ² and 1m ² respectively).	This impact is predicted to be insignificant in terms of implications for SPA interest features due to the very small and localised nature of the effect.	Not directly relevant in this case, however, the above objective applies.	HRA
Overshadowing and crossing of Bran Sands lagoon due to the (possible) construction of the conveyor in the northern corridor.	The HRA concluded that this impact would be of minor significance. The area of the lagoon that would be crossed is largely used by diving species; however, the following interest features use the wider lagoon: <ul style="list-style-type: none"> Redshank Common tern 	Not directly relevant in this case, however, the above objective applies.	HRA

² Calculated based on the final dimensions of the quay as set out in the application ES.

Identified direct effect (port terminal and conveyor construction)	Relevant interest features of the SPA	Objective of the habitat enhancement proposals	Supporting evidence
	<ul style="list-style-type: none"> Sandwich tern Waterbird assemblage (waders and wildfowl). 		

In addition to providing a function as mitigation for elements of the Harbour facilities proposals, the placement of dredged material in Bran Sands lagoon would provide habitat enhancement. The proposals would have direct beneficial effects on interest features of the SPA, as presented in **Table 3.2**. However, Natural England has requested that the potential negative impacts of the habitat enhancement proposals on SPA interest features are also identified, in acknowledgement of the fact that there is an existing waterbird interest at Bran Sands lagoon that contributes to the status of the SPA. These considerations are also included in **Table 3.2** and diving species are specifically considered below.

3.2 Diving species

The waterbird assemblage at Bran Sands lagoon includes a number of species that are categorised as diving ducks (based on their predominant feeding behaviour). These species are identified in **Table 2.3**, and are as follows:

- Goldeneye;
- Red-breasted Merganser; and,
- Little Grebe.

The following diving species are also recorded, but in very low numbers:

- Great Crested Grebe;
- Pochard;
- Tufted Duck;
- Scaup; and,
- Long-tailed Duck.

The Harbour facilities ES contains a series of distribution plots for several species of waterbird (key species, present in significant numbers) (presented in Appendix 9.1 of the ES). Distribution plots for all the diving species listed above are presented in **Appendix B** to this document (the data shown are composite data for 2013/2014).

Typically, diving species are concentrated in areas of the lagoon that are of sufficient depth for them to feed most successfully. The distribution plots enable the preferred locations of these species to be readily identified and, consequently, a conclusion to be drawn regarding the likely effect of the habitat enhancement proposals on this existing waterbird interest.

The following summarises the distribution of diving species in Bran Sands lagoon (refer to **Appendix B**):

- Goldeneye – widespread across the lagoon but with an apparent concentration in the northern half of the lagoon.

- Red-breasted Merganser – concentrated in the north-western quadrant of the lagoon, with some presence in the south-eastern quadrant.
- Little Grebe – concentrated in the north-western quadrant of the lagoon, outside of the footprint of the habitat enhancement proposals.
- Pochard – recorded in the location of the habitat enhancement proposals.
- Tufted Duck – not recorded in the lagoon for the period of surveys represented in the distribution plots.
- Scaup, Long-tailed Duck and Great Crested Grebe – located in the northern section of the lagoon, outside of the footprint of the habitat enhancement proposals.

On the basis of this analysis, it is concluded that diving species tend to concentrate in areas of the lagoon outside of the area proposed for the creation of new shallows. The distribution data does show that some diving species use the area in the footprint of the location identified for creation of new shallows, but no one species is concentrated in this area to the exclusion of the remainder of the lagoon. Therefore, the proposals are not expected to have an adverse effect on the existing populations of diving species that use Bran Sands lagoon, but would result in the redistribution of part of the population of those species that have been demonstrated to use the area proposed for the creation of new shallows.

Table 3.2 Objectives and predicted effects of the habitat enhancement proposals

Objective of the habitat enhancement proposals	Identified direct effect (placement of dredged material in Bran Sands lagoon)	Relevant interest features of the SPA	Supporting evidence
To provide improved feeding habitat within the lagoon and make a positive contribution to the waterbird populations of the SPA (notably redshank and components of the waterbird assemblage).	Creation of approximately 5.4ha of new shallows in Bran Sands lagoon (based on Option 2, as presented and discussed in Section 4).	The lagoon currently hosts several species of waterbird that form part of the SPA population and the new shallows are expected to provide feeding habitat for waders and dabbling species (the habitat would be too shallow to benefit diving species). Consequently, the new shallows would be of benefit to the following SPA interest features: <ul style="list-style-type: none"> • Redshank • Waterbird assemblage (waders and dabbling species). 	HRA
To provide improved loafing, roosting and nesting opportunities for all components of the waterbird assemblage and make a positive contribution to the waterbird populations of the SPA.	Creation of a series of islands in Bran Sands lagoon	The lagoon currently hosts several species of waterbird that form part of the SPA population and the islands are predicted to provide loafing, roosting and nesting opportunities for all components of the waterbird assemblage. Consequently, the new shallows would be of benefit to the following SPA interest features: <ul style="list-style-type: none"> • Redshank • Common tern • Sandwich tern • Waterbird assemblage (waders and wildfowl). 	HRA
To avoid significant adverse effects on existing interest features that use Bran Sands lagoon	Loss of existing habitat in the lagoon due to habitat enhancement. The concern raised by Natural England is that the lagoon currently represents an important habitat and the effect of the creation of new shallow water areas on habitat used by diving species requires consideration.	The lagoon currently hosts several species of waterbird that form part of the SPA population. The implementation of the habitat enhancement proposals has the potential to adversely affect existing habitats used by: <ul style="list-style-type: none"> • Waterbird assemblage (diving species). 	HRA and Section 3.2 of this MMS



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4 Description of Habitat Enhancement Proposals

4.1 Introduction

This section provides further information to that contained within the ES and HRA with regard to the design and method of implementation of the habitat enhancement measures. This is intended to demonstrate that the proposals are able to be implemented in practice. The information included in this section has been informed by the guidance provided by Natural England (see **Appendix A**).

Three options (Options 1 to 3) for the habitat enhancement measures in Bran Sands lagoon were presented to Natural England, all of which would provide shallow water areas with intertidal fringes and could be designed to enable waterbird feeding across the area throughout the entire tidal cycle. Natural England indicated a preference for Option 2 because this design appears to offer the best opportunity to complement and augment the existing habitat and waterbird interest of the lagoon. An important part of this consideration is that Option 2 would offer the best opportunity to retain existing areas of deeper water, which represent feeding areas for diving waterbird species. Consequently, the MMS has taken this option forward as the preferred option (as shown in **Drawing PB1586-SK467**).

4.2 Description of construction sequencing

Drawing PB1586-SK466 sets out the proposed construction phasing for the habitat enhancement works. Royal HaskoningDHV has discussed and reviewed this sequence of work with one of the UK's leading dredging contractors, who confirmed that the approach illustrated is deliverable.

The following summarises the works that would be involved in each stage shown on **Drawing PB1586-SK466**.

Stage 0

Prior to undertaking the work, further site investigation would be undertaken, comprising:

- Further ground investigation to confirm the nature of the material that would arise from the capital dredging. The ground investigation may need to be extended to cover the lagoon.
- Confirmation of the bathymetry of the lagoon and range of variation in surface water levels.

Using the information above, a detailed engineering drawing would be prepared.

Stage 1

Marl would be excavated from the Tees using a backhoe excavator, placing material in a barge which could then be towed and placed at the Northumbrian Water (NWL) jetty. From this location, the material would be lifted from barge and carried to a stockpile within the lagoon. The exact method of bringing the material ashore would be confirmed by a preferred contractor, but is likely to include use of a conveyor or articulated dump trucks.

The marl is geological (i.e. uncontaminated) material that underlies contaminated sediment. A description of the sediment quality at the site of the proposed port terminal and within the footprint of the capital dredging is provided in Section 7.4 of the ES.

Stage 2

A flow control structure (see Section 4.4) would be constructed to maintain the range of water levels within the lagoon, thereby minimising the potential for impact on the landfill both during the creation of the habitat enhancement areas and on completion of the works. The position of the flow control structure included on **Drawing PB1586-SK466** is indicative only.

Using material from the stockpile, the existing spit/bund would be extended across the lagoon. The height of the spit/bund would be above the water level to provide access for the subsequent stages of construction and to contain the placement of dredged material in subsequent stages of the works. Marl would continue to be deposited in the stockpile.

Stage 3

The base of the islands would be formed along the same alignment as the bund.

Stage 4

The construction of the flow control structure would continue. Marl would continue to be deposited in the stockpile, the bund would continue to be extended and the islands formed using material from the stockpile.

Stage 5

The spit/bund would be completed; no further marl would be stockpiled.

Stage 6

The surface of the islands would be dressed with either cockle shells or material specially selected from the capital dredging or imported (e.g. sand/gravel) to create island habitats. To suppress vegetation growth, a geotextile membrane would be placed on the surface of the islands prior to the placement of the surface dressing.

Stage 7

The flow control structure would be completed and become operational, with the existing outfall closed up.

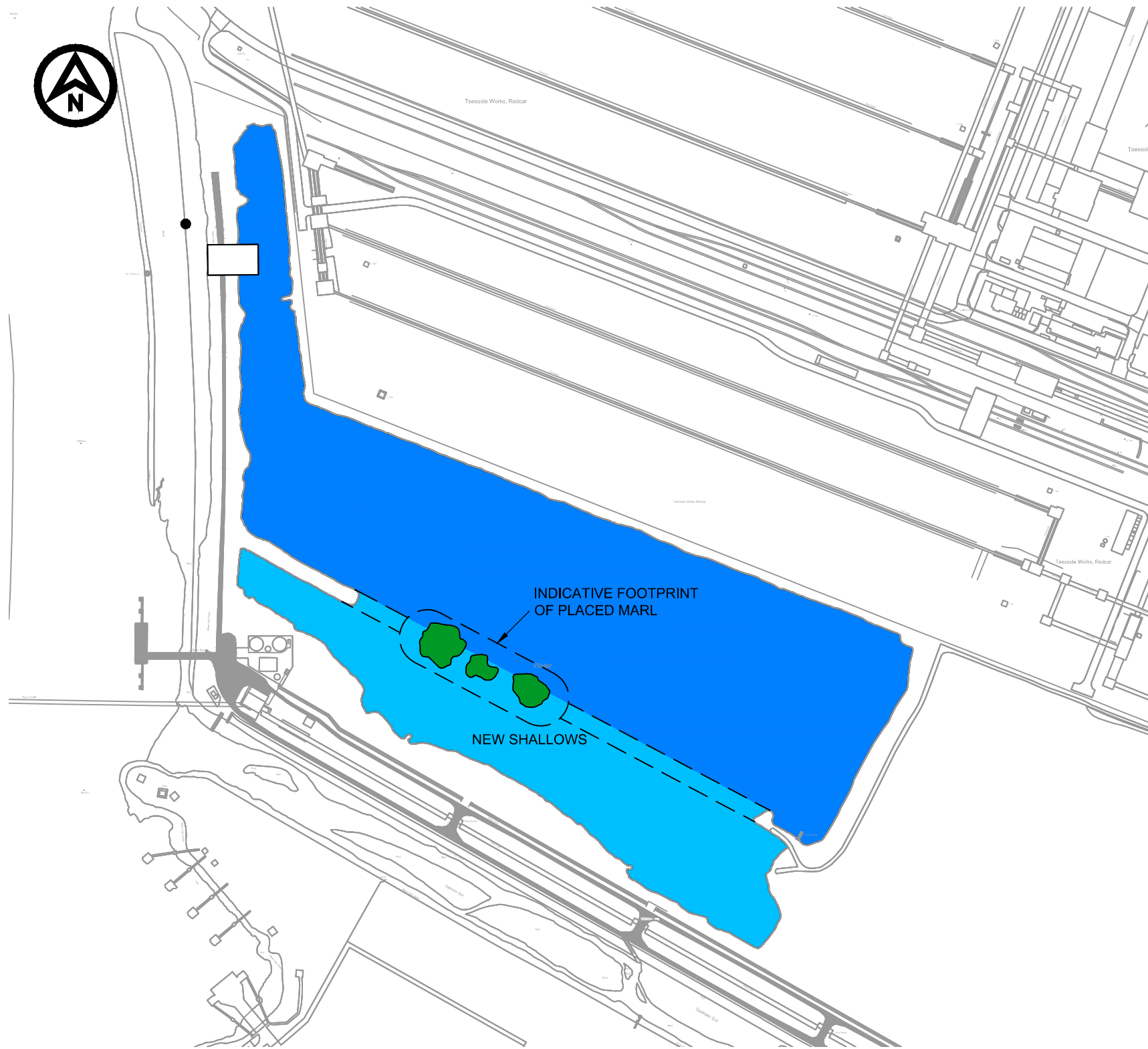
A silt box would be installed. This is a temporary structure that would contain a number of tanks or baffles that would be used to minimise the volume of silt which would be discharged from the area where maintenance material is to be placed (in Stage 8) as the dredged material dewatered to the Tees estuary (i.e. a pollution prevention measure).

Stage 8

Uncontaminated and fine (i.e. silt) maintenance dredged material would be pumped into the placement area. This will be constructed to a level to be defined following monitoring of surface water level variation in the lagoon.

Stage 9

When the desired level has reached, pumping of dredged material would cease and the silt box would be removed.



KEY

- PROPOSED NEW SHALLOWS
- OPEN WATER OF THE LAGOON
- PROPOSED ISLANDS

NOTES

1. THE TOP SURFACE AREA OF THE ISLANDS IS APPROXIMATELY 3,500m².
2. MAX HEIGHT OF ISLANDS TO BE +4.00mOD.
3. APPROXIMATE AREA OF NEW SHALLOWS IS 5.40ha.
4. THIS DRAWING IS ONLY INTENDED TO BE ILLUSTRATIVE OF THE FINAL SCHEME. SIZES AND POSITIONS OF THE VARIOUS ELEMENTS ARE SUBJECT TO FURTHER REVISION.
5. THIS DRAWING HAS BEEN PRODUCED TO ILLUSTRATE ONE POSSIBLE METHOD OF DELIVERING THE PROPOSED ENVIRONMENTAL ENHANCEMENTS TO THE BRAN SANDS LAGOON. HOWEVER, THE AREA AND HEIGHT PARAMETERS STATED WILL APPLY REGARDLESS OF HOW THE PROPOSALS ARE IMPLEMENTED.

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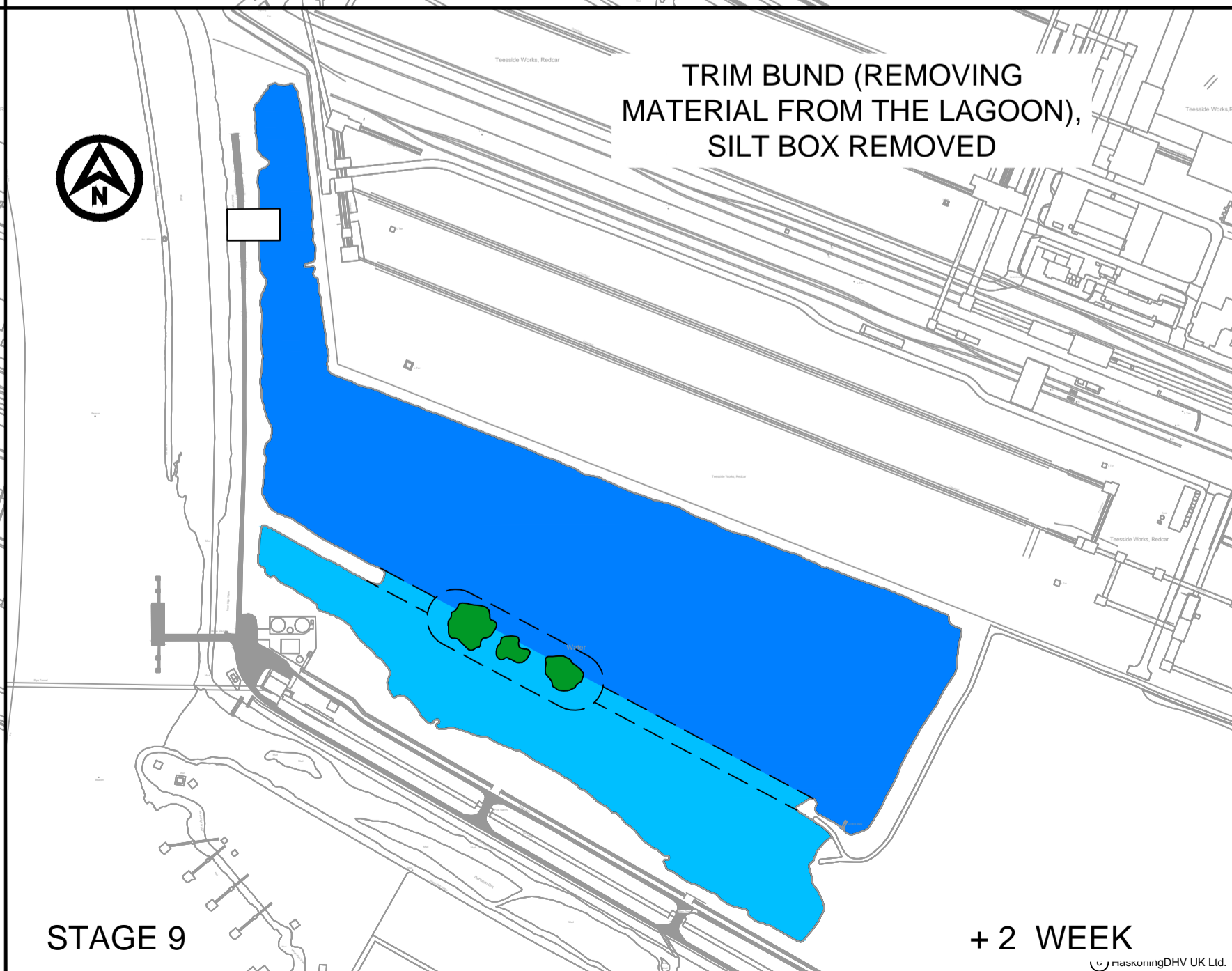
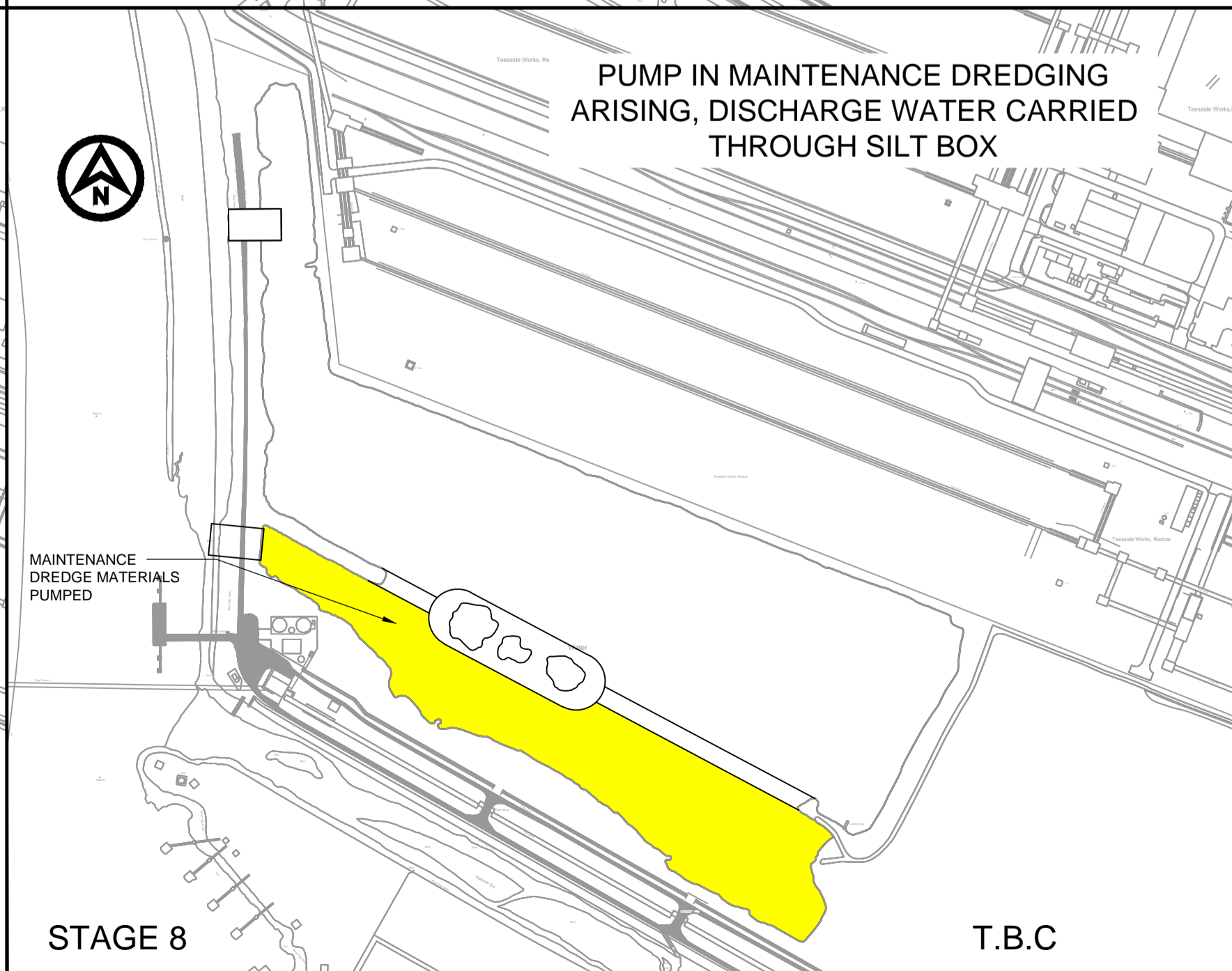
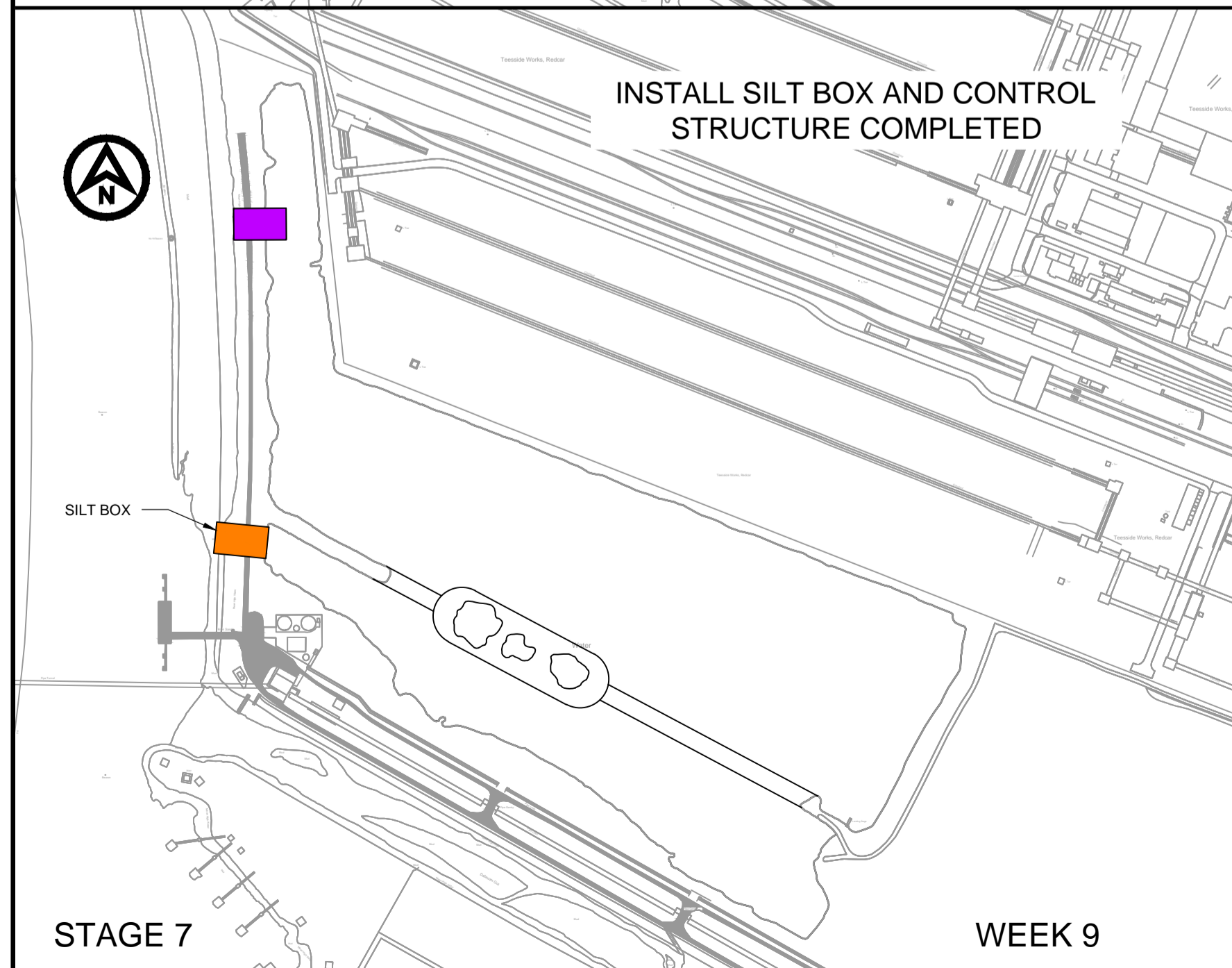
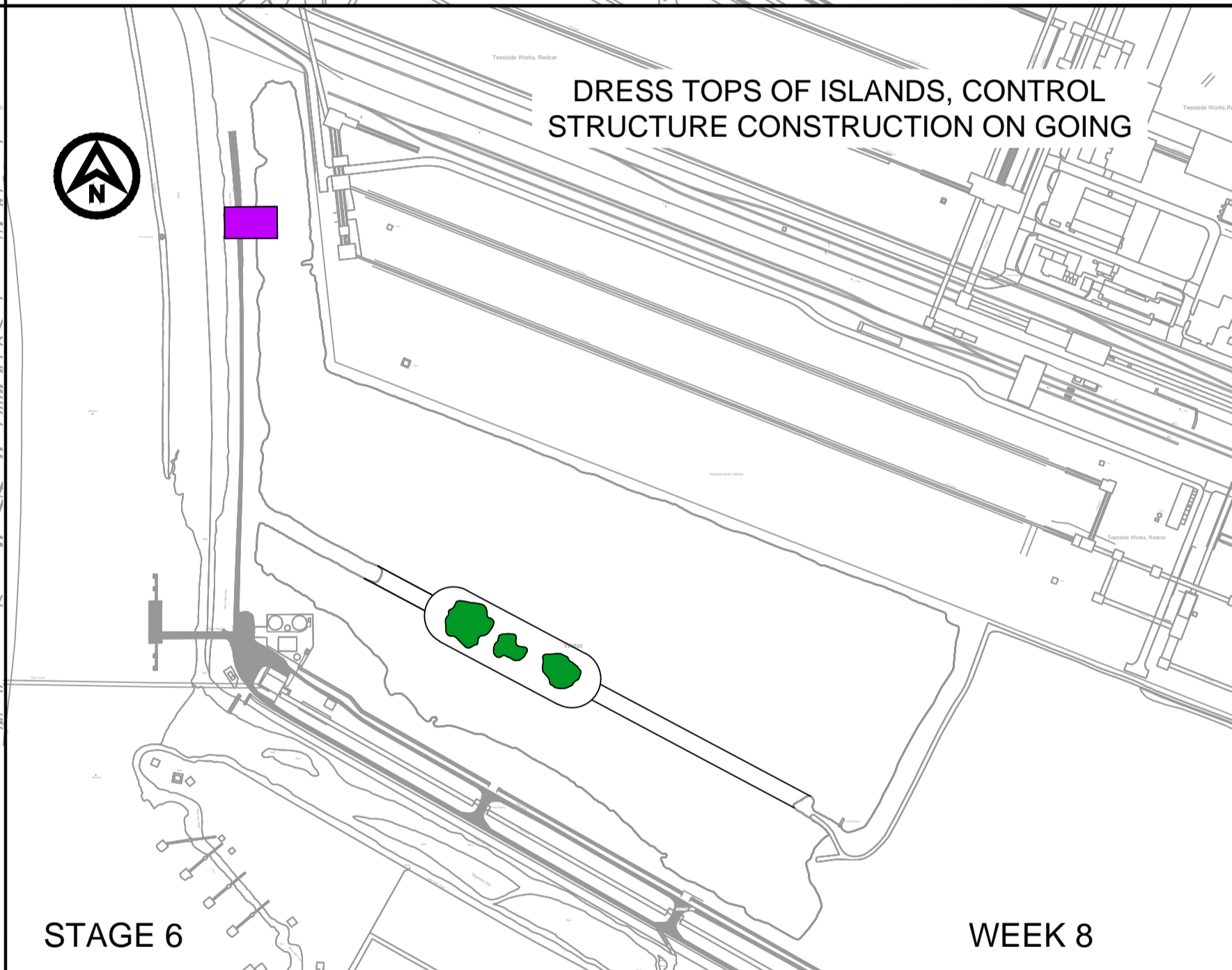
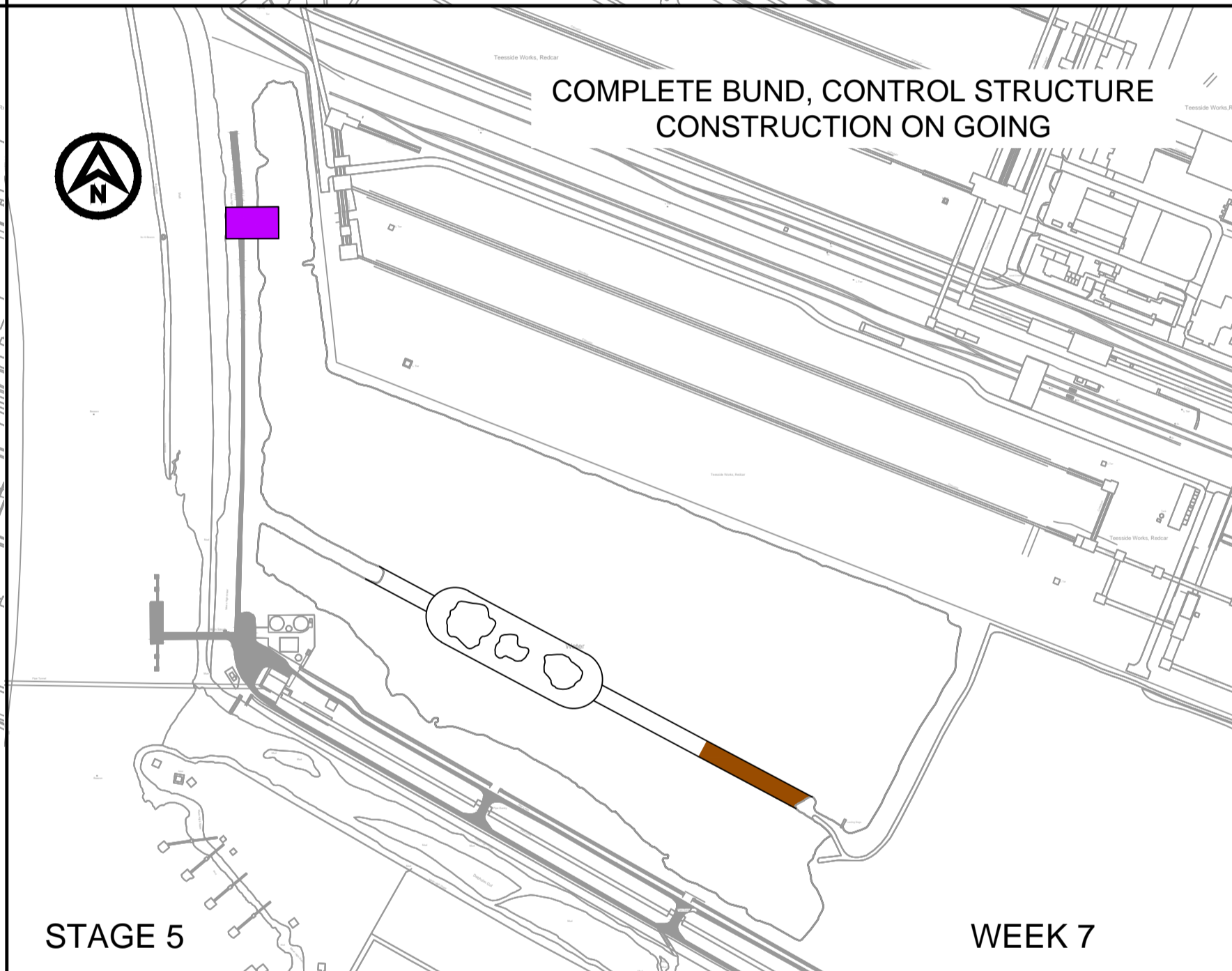
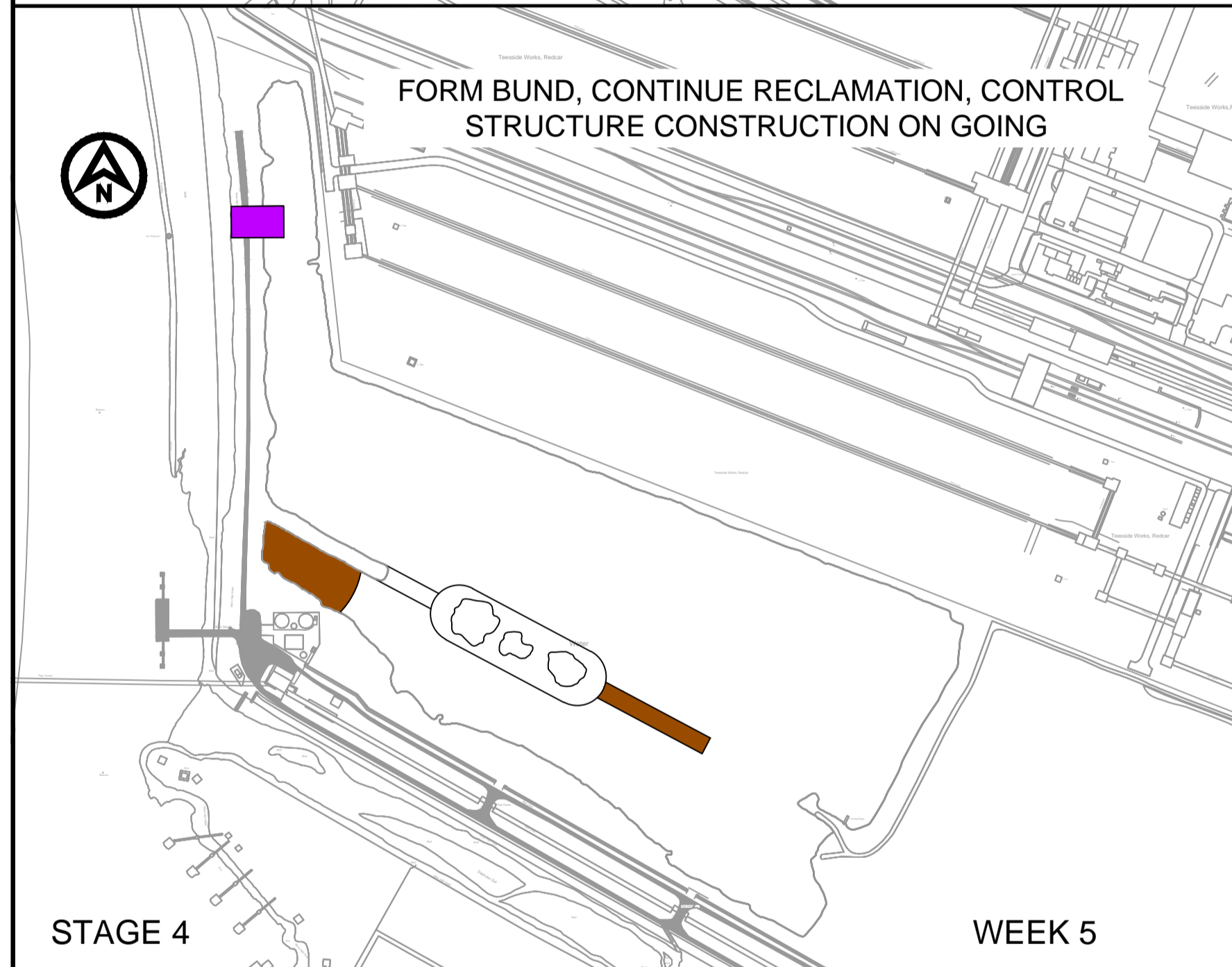
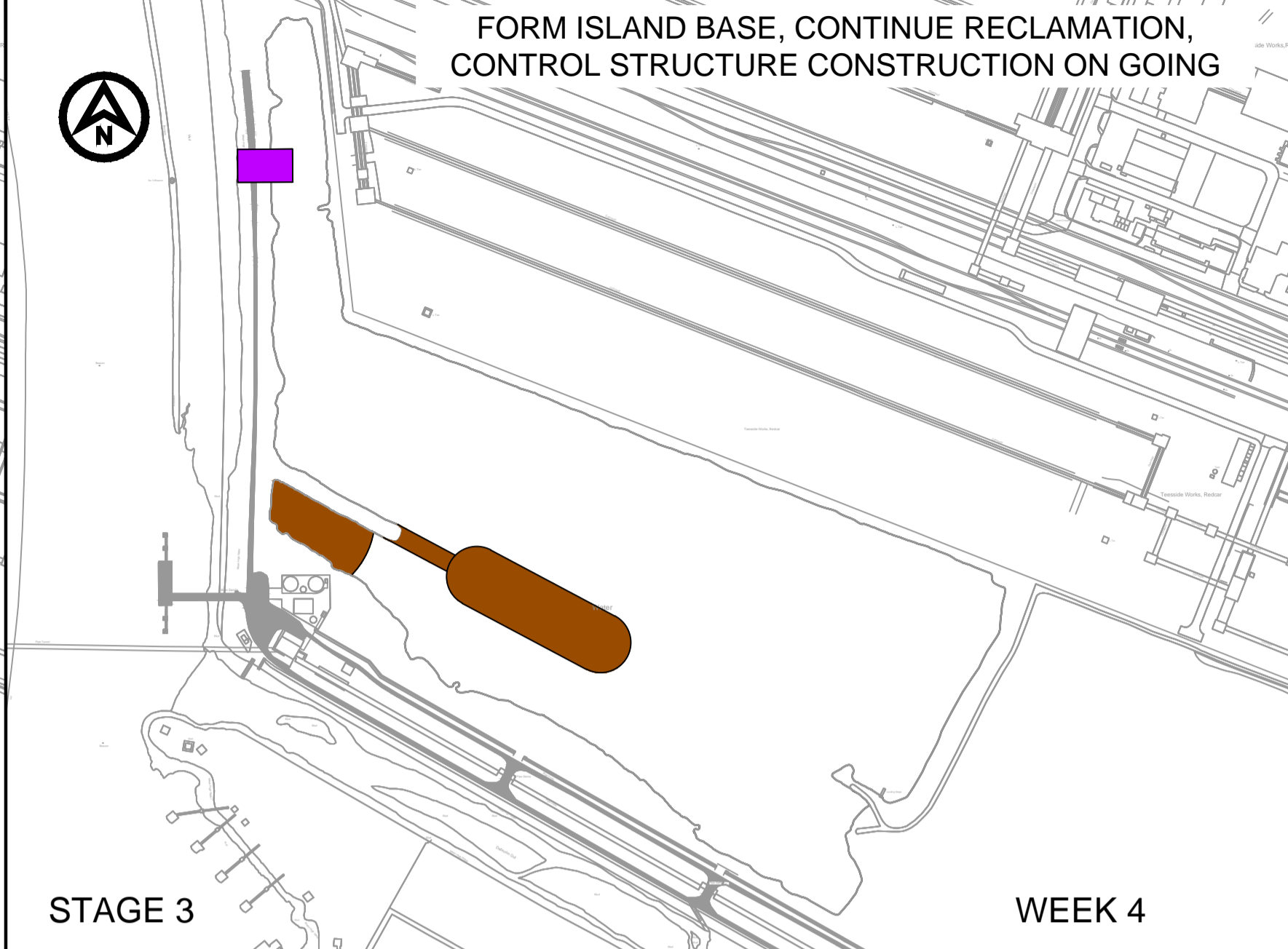
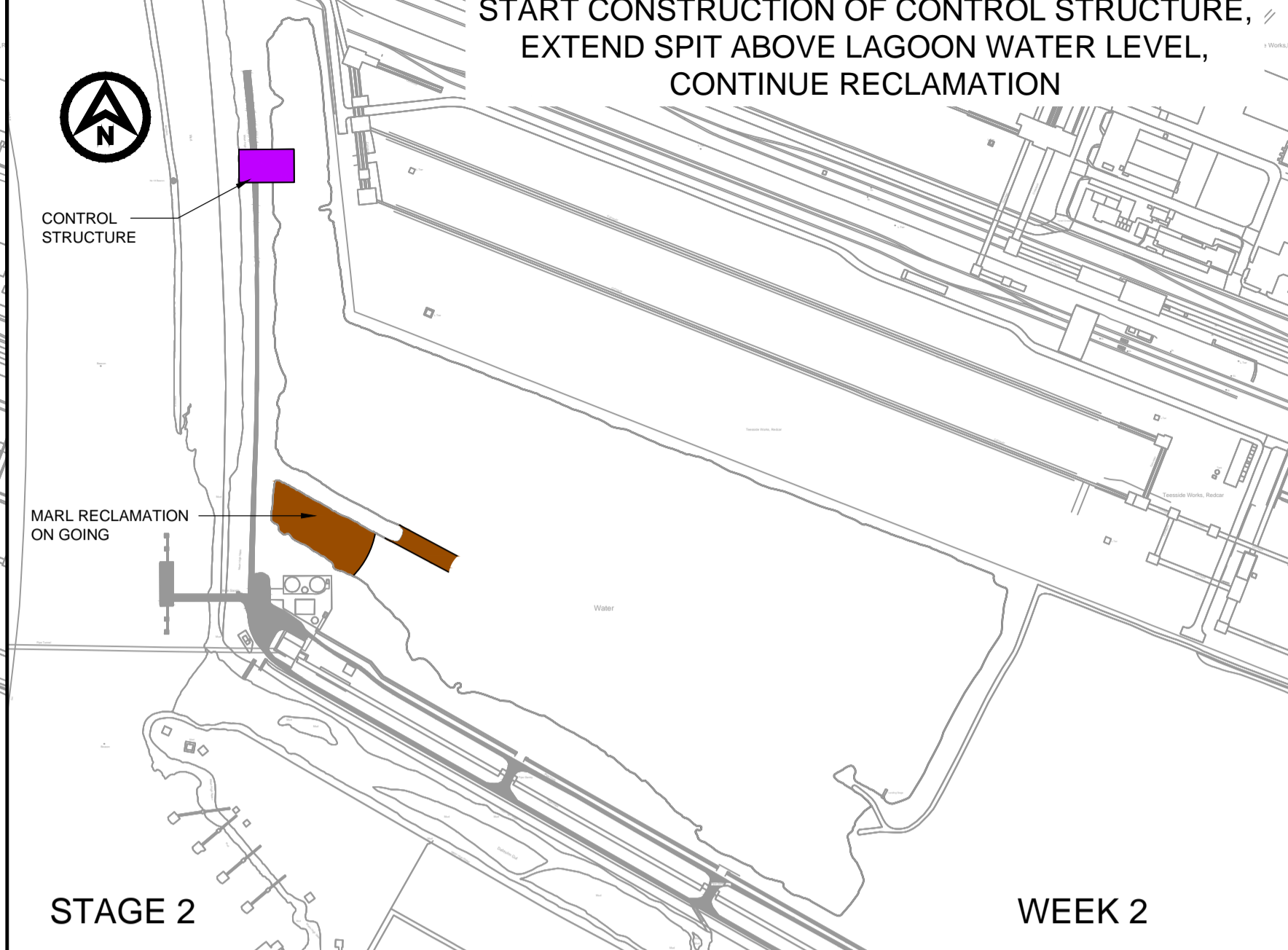
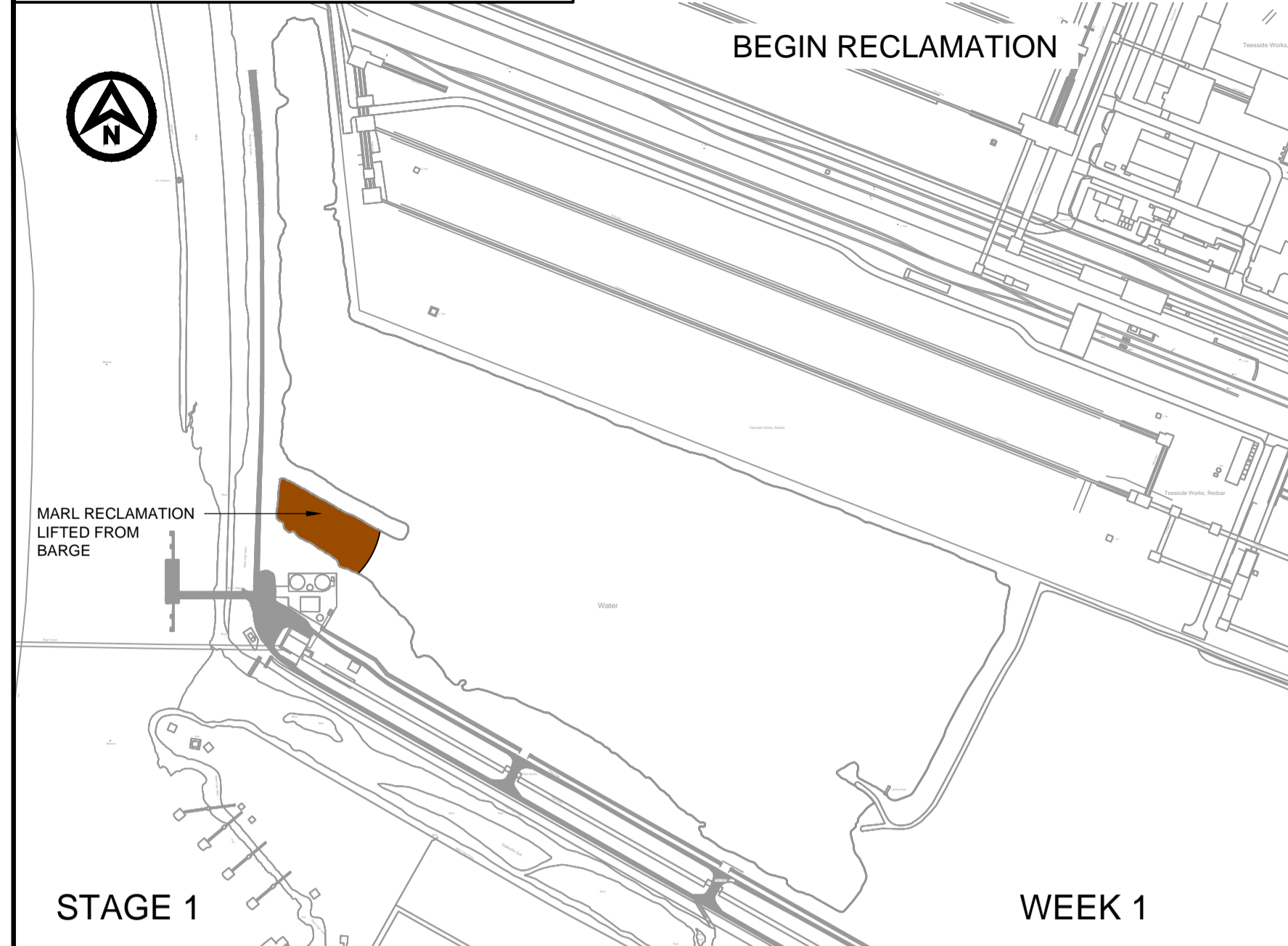
PROJECT
YORK POTASH

TITLE
**BRAN SANDS LAGOON
PROPOSED HABITAT
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DATE	MAR '15	CLIENT'S REF.			
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E	11/02/15	FOR APPROVAL	SA	RWP	RWP
D	09/02/15	FOR APPROVAL	SA	RWP	RWP
C	30/01/15	FOR APPROVAL	SA	RWP	RWP
B	28/01/15	FOR APPROVAL	SA	RWP	RWP
A	21/01/15	FOR APPROVAL	SA	RWP	RWP

REVISIONS

PROJECT
YORK POTASH HARBOUR FACILITIES

TITLE
BRAN SANDS LAGOON PROPOSED HABITAT ENHANCEMENT DELIVERY METHODOLOGY

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DRAWN	SA	CHECKED	PASSED
DATE	21/01/15	CLIENT'S REF.	
SCALE AT A1	1:5000	AUTOCAD REF.	PB1586-SK466
DRAWING No.	PB1586-SK466	REVISION	H

The level of the spit/bund would be reduced so that it is below the water level, with excess material incorporated into the islands.

The desired location of the proposed islands was discussed at the meeting held on 5 February 2015. It was concluded that it would be preferable for the islands to be constructed along the alignment of the bund itself rather than in the deeper water of the lagoon to the north of the proposed bund. Islands along the alignment of the bund would be easier to deliver (in terms of constructability) due to the shallower water depth, would be less vulnerable to erosion by waves, would increase the linear 'edge effect' for feeding waders and would avoid impacts on deeper water feeding habitats for diving birds.

4.3 Design parameters

The proposed area of the new shallows is dictated by the area of the lagoon that lies to the south of a line drawn between the two existing short spits of land that protrude into the lagoon and this area. This area is approximately 5.4ha in area and the 'islands' would comprise a combined area of approximately 0.35ha.

In order to accurately determine the design elevation of the new shallows, a programme of surface water level monitoring would be undertaken to fully define the water level variation in the lagoon over a cycle of spring and neap tides. The objective would be to achieve a maximum depth of water above the placed dredged material of 30cm. In addition, further survey of the bathymetry of the lagoon would be undertaken. A specification for this monitoring and survey is being developed.

4.4 Water exchange between the lagoon and the Tees estuary

It is proposed that the existing pipe that connects the lagoon with the Tees estuary through the embankment would be replaced with a new pipe, with a flow control structure, during the construction of the port terminal. The aim of the control structure would be to maintain the current range of water levels experienced.

Depending on the form that the structure takes and the valve mechanism used, the invert level may be slightly different from that that exists at present. What is important is that the range of water levels remains consistent and close to those currently experienced, and the nature of water exchange between the lagoon and the Tees estuary does not change (so as not alter the ground water regime currently experienced within the landfill). Because solid material would be added to the lagoon, for the same range of water levels, the flow of water through the control structure would need to be reduced compared to what it is now. No active control of water levels is currently proposed beyond this. However, the lagoon would be able to be temporarily isolated from the Tees in the event of a pollution incident, for example.

At the meeting on 5 February 2015, the above proposals were discussed and the justification for not proposing to actively change the existing water level regime was acknowledged. However, it was agreed that having the ability to adjust water levels in the lagoon in the future would be desirable and would provide flexibility in future management. For example, increasing tidal exchange could provide further conservation benefit through increasing food supply and invertebrate colonisation of the new shallows. It is proposed, therefore, that a second pipe and flow control structure would be constructed when the existing pipe is replaced. This second pipe would not be operational initially, but could become active should this be desirable in the future and if the monitoring demonstrates that alteration of the water level regime would be acceptable (and the limits thereof). This should be able to be confirmed when the functioning of the lagoon,

following the implementation of the habitat enhancement, is understood through the proposed monitoring (in particular, the relationship between Bran Sands landfill and water exchange with the lagoon).

4.5 Programme for delivery of the habitat enhancement

The habitat enhancement works would be implemented in parallel with the capital dredging works. It is not possible to implement the habitat enhancement measures in advance of the capital dredging because the material required to form the bund to retain the maintenance dredged material and create the islands is to be derived from the capital dredged arisings.

Drawing PB1586-SK466 shows the proposed phasing of the creation of the new habitat, and includes an indicative timescale. There is an area of uncertainty in the overall timescale for the construction related to the timing of availability of maintenance dredged material. However, maintenance dredged arisings are deposited offshore each month (see **Table 4.1**; Royal HaskoningDHV, 2014b) and, therefore, material could reasonably be expected to be available at the appropriate time in the construction sequence for the habitat enhancement. The general quantity of material deposited offshore each month far exceeds that which would be required for the habitat enhancement proposals.

It is estimated that the overall duration of the works for construction of the habitat enhancement proposals would be 3 to 4 months.

Table 4.1 Average disposal quantity per month from 2006 to 2013

Month	Disposal Quantity (m ³)	Month	Disposal Quantity (m ³)
January	107,660	July	113,638
February	105,918	August	105,710
March	104,518	September	121,143
April	116,146	October	118,050
May	109,154	November	113,109
June	97,281	December	70,861

4.6 Substratum

It is proposed that the new shallows would be created using uncontaminated, silty material that is dredged during the maintenance of the navigation channel in the Tees. The marine licence that authorises the disposal of maintenance dredged material in the marine environment requires that the quality of the sediments (i.e. concentrations of various contaminants) is routinely tested and the licence is only granted if the sediment meets appropriate standards.

Consequently, it is not expected that there would be a concern with regard sediment quality that would preclude the use of the material in the habitat enhancement proposals.

Maintenance dredging is undertaken within 13 reaches throughout the Tees estuary and the nature of the dredged material (in terms of particle size) varies according to location throughout the estuary. It would,

therefore, be possible to select silty material from maintenance dredging of an appropriate reach of the estuary for use within the habitat enhancement proposals.

Maintenance dredging and disposal is undertaken by PD Ports and the MMO has indicated that PD Ports' marine licence (for disposal of dredged material) could be varied to include Bran Sands lagoon as a location for the placement of maintenance dredged material. This would represent an alternative use of dredged material (i.e. other than offshore disposal); seeking alternative uses is a requirement of the marine licensing process for disposal of dredged material. Consultation with PD Ports will, therefore, be undertaken as part of the design of the habitat enhancement proposals.

4.7 Ecological development of the habitat enhancement proposals

4.7.1 Introduction

A number of habitat enhancement / improvement schemes have been implemented in the UK and the ecological development of these schemes is typically monitored over a period of years, with benthic invertebrate community development and waterbird populations normally forming part of the monitoring programme.

To inform this document, a review of the monitoring results for a habitat creation / improvement scheme that Royal HaskoningDHV was closely involved with for a number of years has been undertaken and is summarised below, along with results from monitoring of a newly created saline lagoon at Teesmouth (Evans and Lucas, 2000). It should be noted that any habitat creation / improvement scheme will evolve in response to the environmental conditions prevailing at the site.

4.7.2 Trimley Marshes managed realignment scheme (Orwell estuary, Suffolk)

The Trimley Marshes managed realignment was created in November 2000 on the east bank of the Orwell estuary. Since June 2001 the site has been monitored to assess the success of the realignment in terms of contributing to the status of the Stour and Orwell Estuaries SPA. At the time of creation, the realigned area was recharged with maintenance dredged silts.

This example is considered to have some parallels to the proposals at Bran Sands lagoon in that the managed realignment site (prior to breaching the seawall between the estuary and the site) was agricultural land and, therefore, had no intertidal/estuarine invertebrate interest. The monitoring therefore describes the evolution of a site that had no invertebrate value and was recharged with maintenance dredging. Although Bran Sands lagoon is tidally influenced, it is not directly connected to the Tees estuary and does not currently represent intertidal habitat.

The following provides a summary of the findings of the monitoring programme reported in Royal Haskoning and HR Wallingford (2011).

Benthic invertebrate abundance

Invertebrate numbers have been increasing overall since the site was created, but fluctuations can be seen from year to year much of which can be attributed to the presence of the mud snail *Hydrobia ulvae* (see **Figure 4.1**). In survey 20, the decline in overall mean abundance was influenced more by the reduced numbers of other species, rather than the decline in *Hydrobia ulvae*.

Species diversity

Diversity is generally used as a measure to describe the structure and 'health' of a community and involves the consideration of two components: species richness and evenness. Species richness is the number of species present in the community, while evenness is the degree of similarity of abundances between species.

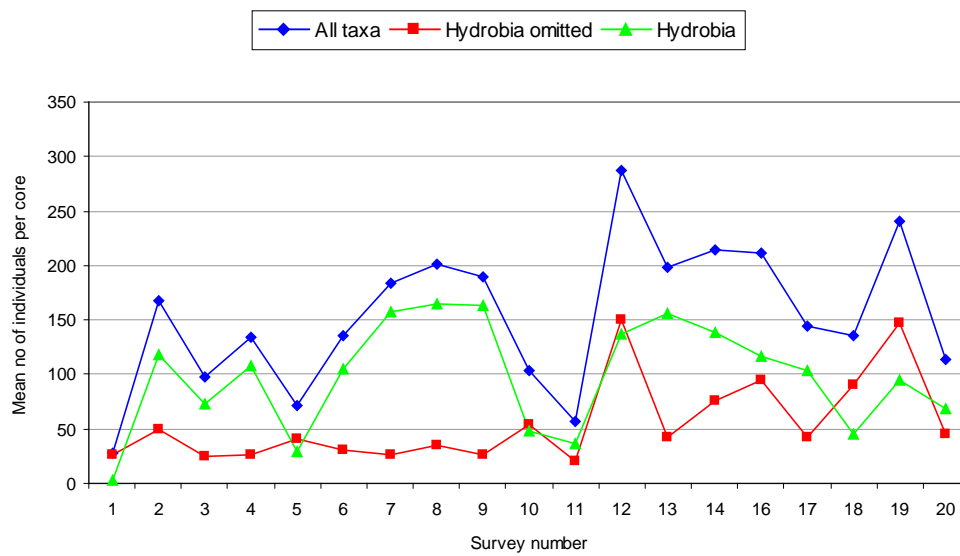


Figure 4.1 Mean number of individuals of benthic macrofauna recorded per core for each survey between survey 1 (June 2001) and survey 20 (September 2010)

The increase in species diversity at the site over the monitoring period is shown in **Figure 4.2**.

Benthic community biomass

Biomass (measured as weight of benthic invertebrates per core) can provide an important indicator of a habitat's ability to support predators such as birds.

The biomass of benthic invertebrates increased since the site creation in June 2001 as would be expected (**Figure 4.3**). The biomass of polychaetes present in the samples remained low but constant throughout the surveys and molluscs dominated the samples. There was a decline in biomass in survey 20 (September 2010) due to decreased abundance of mollusca, which is dominated by the mud snail *Hydrobia ulvae*.

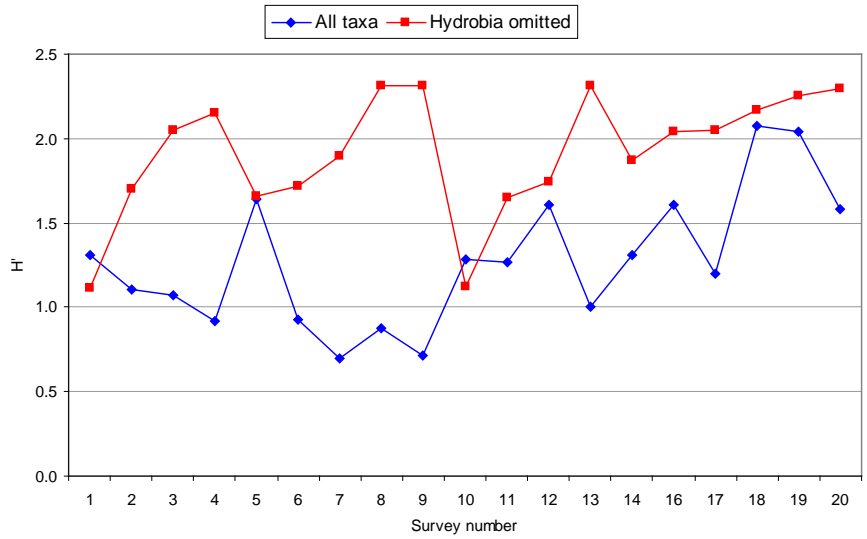


Figure 4.2 Mean Shannon-Weiner diversity index (H') for each survey between survey 1 (June 2001) and survey 20 (September 2010)

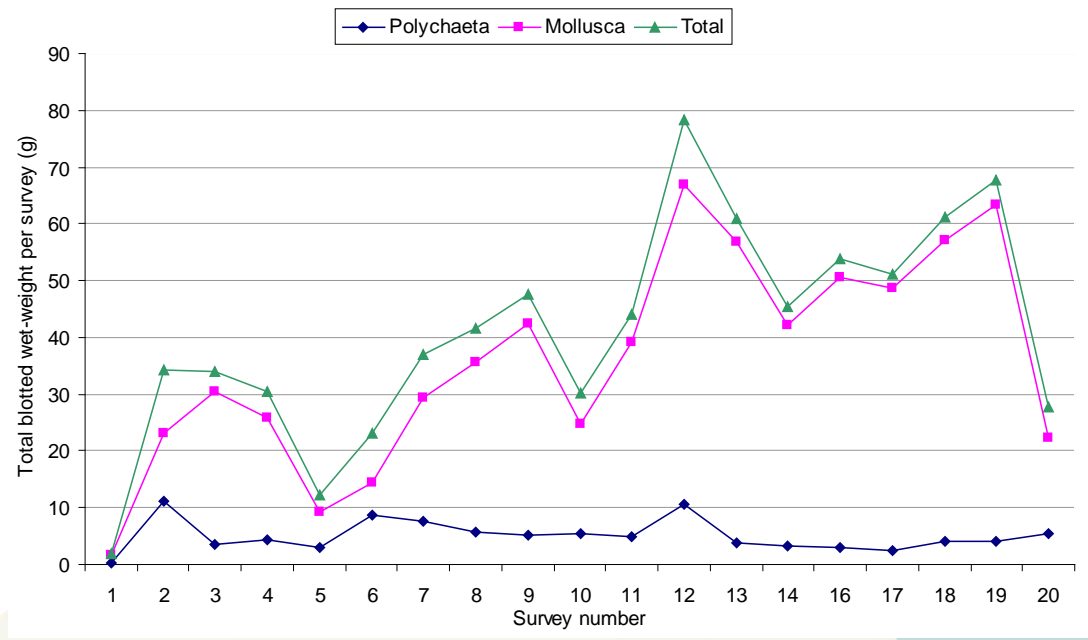


Figure 4.3 Blotted wet-weight biomass (g) of polychaetes and molluscs in all samples between survey 1 (June 2001) and survey 20 (September 2010)

Waterbirds

Since the monitoring began in 2000/01, the mean number of waterbirds increased from 1 up to 181 birds in 2009/10. Up to 2009/10, a total of 24 species were recorded on the site (excluding gulls) over all of the surveys.

The managed realignment site is now included within the Stour and Orwell Estuaries SPA and is considered to have successfully met its objectives.

4.7.3 Colonisation of a newly-created saline lagoon at Teesmouth

Evans and Lucas (2000) report the findings of monitoring of a newly-created saline lagoon at ICI No 4 Brinefield, Greatham Creek, Teesmouth. Sampling was undertaken in April, July, August and October 1999 and January 2000 for a range of physical and chemical parameters and invertebrate colonisation.

The study concluded that colonisation of the lagoon occurred rapidly since the baseline survey in April 1999, with a range of typical brackish water species recorded (e.g. *Nereis diversicolor*, *Corophium volutator*, *Neomysis integer* and *Palaemonetes varians*). A substantial increase in abundance occurred during the sampling period. It was noted that the density of *Nereis* (720 per m² in October 1999 and 660 per m² in January 2000 on average) was lower than that occurring in many silty intertidal habitats, but was expected to increase further as the organic content of the sediment increases (Evans and Lucas, 2000).

Evans *et al* (1998) (cited in Evans and Lucas, 2000) reported *Nereis* densities of over 2000 per m² in a recreated intertidal area at Teesmouth when new silt layers had deposited over compacted sediment created as a consequence of the engineering works required to create the habitat.

4.7.4 Likely mechanism of colonisation of habitat enhancement scheme at Bran Sands Lagoon

Bolam and Whomersley (2003) studied the nature of invertebrate colonisation of fine grained sediments (maintenance dredgings) placed in an area of eroding saltmarsh adjacent to a marina in the Crouch estuary, Essex. The study reported the mechanisms by which the invertebrate community may develop in maintenance dredged material recharged onto an intertidal area, namely:

1. Direct transfer within the dredged material.
2. Vertical migration up through the placed sediment.
3. Lateral migration from adjacent areas.
4. Planktonic recruitment (settlement of larvae).

The fourth mechanism (planktonic recruitment) was stated as being potentially the most important given that most estuarine invertebrates have a planktonic larval stage which develops in the water column and settle when ready to metamorphose (Bolam and Whomersley, 2003).

For the proposed habitat enhancement in the lagoon, vertical migration (mechanism 2) is highly unlikely to occur due to the smothering effect and depth of sediment associated with the placement of the dredged material. Some lateral migration (mechanism 3) may occur between the sediments of the lagoon and the habitat enhancement scheme, but this is likely to be limited due to the level difference between the bed of the

lagoon and the surface of the proposed habitat enhancement, and the presence of a retaining bund. No lateral migration could occur between the lagoon and the Tees due to the lack of direct connection between sedimentary habitats in the estuary and lagoon.

In the case of the proposed habitat enhancement scheme, mechanisms 1 and 4 are considered the most likely means of colonisation of the maintenance dredged material. Planktonic recruitment is considered likely to occur through the exchange of water between the estuary and the lagoon, but also through larvae released from the benthic community within the lagoon itself.

4.7.5 Conclusion

It is considered that the habitat enhancement proposals for Bran Sands lagoon are likely to develop an initial invertebrate community rapidly, within weeks of creation, due to the direct transfer of invertebrates. Predation by waterbirds would decrease the biomass of the invertebrate community, with planktonic recruitment likely to represent the key mechanism for longer term establishment and development of an invertebrate community.

The speed of colonisation through planktonic recruitment would depend on the timing of the placement of dredged material, given that estuarine invertebrate reproduction is seasonal and restricted to late spring or early summer. However, colonisation would be effective once the first spring/summer season occurs.



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5 Other Mitigation Measures of Relevance to SPA Interest Features

5.1 Mitigation for indirect effects

In addition to the direct loss of habitats used by waterbirds, the ES and HRA describe and assess a number of further indirect potential impacts on waterbirds related to disturbance, largely during the construction phase of the proposed Harbour facilities.

5.2 Noise

Noise attenuation barriers are proposed as mitigation for the potential impact of noise and visual disturbance during the construction phase. It is proposed that barriers would be positioned:

- along the embankment between Bran Sands lagoon and the proposed construction works for the port terminal; and,
- on either side of the route of the overland conveyor should it be constructed in the southern corridor (i.e. between the lagoon and Dabholm Gut and the construction works for the conveyor); or,
- between Bran Sands lagoon and the construction works for the conveyor should the conveyor be constructed in the northern corridor.

The noise attenuation barriers would most likely constitute a 3m high hoarding above ground level.

In addition, the proposed use of a noise reduction curtain over the hammer piling rig during percussive operations for the quay construction is to be investigated. This would further mitigate the predicted noise impact during quay construction. The ES and HRA were undertaken on the assumption that construction works would not be seasonally constrained.

5.3 Lighting

As part of the construction phase lighting design, the strategies set out below would be adopted to ensure that the effect of construction phase lighting on the surrounding environment is minimised as far as possible and minimises the lighting effect on Bran Sands lagoon and Dabholm Gut:

- Artificial lighting during the construction phase would only be used during the hours of darkness, during low levels of natural light or for specific construction methods or tasks.
- Lighting would be directed to focus inwards to the site wherever possible to reduce external glare.
- The luminaires to be mounted on lighting columns would comprise of a flat glass construction, appropriate to the nature and location of the installation. The aiming angle of the peak intensity of the luminaire would be limited to maintain the light output from the luminaire within five degrees from the downward vertical. This would control the lighting of the area and minimise any potential glare, sky glow and obtrusive lighting to the surrounding areas. The luminaires to be mounted on the lighting columns would also incorporate the appropriate photometry reflectors to control the distribution of light from the luminaires and maintain the illumination within the construction development areas, boundary or task area. The proposed horizontal lighting illuminance levels (minimum and average levels) would comply with the lighting standard and guidance documents relevant to the method and construction work being undertaken.

- During low levels of activity, public holidays or lulls in construction, the contractors would be required to maintain only appropriate minimum levels of illumination around the proposed development.
- HGVs and other site traffic during the construction phase, during the hours of darkness, would be subject to a travel plan strategy that limits traffic and, therefore, vehicle lighting during hours of darkness.

5.4 Conclusion

It is predicted that with these mitigation measures in place, the risk of indirect impacts on waterbirds would be reduced to an insignificant level and would not have an adverse effect on the waterbird population of the Teesmouth and Cleveland Coast SPA. This conclusion was discussed at the meeting on 5 February 2015, and Natural England's view was that the conclusion that the impact would reduce to an insignificant level could only be drawn if it could be guaranteed that the construction works would avoid the wintering period. However, Natural England accepted that these disturbance impacts would not have an adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA due to the limited time period over which disturbance would occur (3 to 4 months) in combination with the mitigation proposed.

A further point raised at the meeting on 5 February 2015 was that the provision of artificial nesting platforms should be considered beneath the suspended deck of the quay (should an open quay structure be proposed). It was felt that such measures could be of particular benefit for nesting shags. YPL confirmed that they will provide artificial nesting platforms if an open quay structure is developed. The final design of the nesting platforms and the number to be provided will be agreed with the local planning authority and the MMO, in consultation with Natural England during later stages of the design of the quay.



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6 Monitoring and Indicators of Success

6.1 A Monitoring Plan

It is proposed that a detailed pre- and post-construction monitoring plan will be developed and agreed with Natural England, the Environment Agency, Cefas and the MMO. However, the principles for the required monitoring programme are set out below.

Monitoring is required for two main purposes:

1. To inform the design of the habitat enhancement proposals.
2. To describe the baseline conditions and to monitor the success of the proposals.

Monitoring to inform the design would comprise measuring existing surface and groundwater levels in order to inform the development of a hydrogeological model, to test the conceptual model developed as part of the EIA process. A specification for this monitoring is currently being developed.

Ultimately, the success of the proposals would be defined by the value of the habitat provided for waterbirds and a key aspect of the monitoring plan will be to define how success is to be judged.

It is considered that the waterbird data currently available for the lagoon represents an appropriate baseline for further monitoring, and monitoring would need to continue pre- and post-construction. It should comprise waterbird counts, recording of activity (feeding, roosting and nesting) and the production of distribution plots. Waterbird counts would be undertaken simultaneously across Bran Sands lagoon, Dabholm Gut and the intertidal area to avoid double counting of birds that can otherwise occur.

In addition to waterbird monitoring, the development of the benthic invertebrate community would be monitored, that is, species diversity, abundance, biomass and community type would be measured. This would be undertaken on an annual basis at the same time of year (in autumn, following the settlement of invertebrate larvae) and it is envisaged that this would comprise taking replicate core samples along a series of transects distributed across the habitat enhancement area. This would include monitoring of the baseline situation, although it is acknowledged that the creation of the new shallows would result in a change in elevation of the substratum and, therefore, results of post-construction invertebrate monitoring would not be directly comparable to the pre-construction situation.

The elevation and profile of the placed dredged material would also be monitored (in part to establish item 1 above).

6.2 Indicators of success

Given the assessed impact of the proposed Harbour facilities, it is proposed that the indicators of success of the habitat enhancement should be related to:

1. Successful maintenance of the created shallows, and intertidal mud, and of the sand/gravel islands.
2. Delivering a level of usage by waterbirds equivalent to or exceeding that of the intertidal area that would be lost due to the construction of the port terminal.
3. Not adversely affecting the existing level of waterbird usage at the lagoon.

The success of the proposals (in the context of items 2 and 3 above) would be judged by analysis and comparison of peak and mean species counts before and for a number of years after implementation of the works. This would enable the usage of the habitat enhancement area and the effect of the proposals on the waterbird populations of the wider lagoon to be determined. A critical part of this analysis would be to assess any trends in the context of population changes in the Tees estuary, and regional and national population trends, given that many factors affect waterbird populations in addition to those operating at a local level.

Surface water level monitoring within the lagoon would continue post-construction.

6.3 Intervention measures

Should the monitoring indicate that the habitat enhancement proposals are not achieving their defined objectives (and this is agreed with Natural England, the Environment Agency, Cefas and the MMO), and that this is demonstrated to be due to reasons that are reasonably within the control of York Potash Ltd, intervention measures will be implemented. The measures applicable will depend on the reasons why the scheme was considered to not be meeting its objectives, but could include (for example) actively adjusting the rate of water exchange between the Tees and the lagoon, recharging the shallow water area with additional maintenance dredged material, and vegetation management (e.g. on the islands, should vegetation develop that is considered detrimental through reducing sight lines or impacting on ability to nest or roost).

Responsibility for the management of the habitat enhancement scheme (in terms of meeting the agreed objectives) would rest with York Potash Ltd.



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7 References

Bolam, S.G and Whomersley, P (2003). Invertebrate recolonisation of fine-grained beneficial use schemes: An example from the southeast coast of England. *Journal of Coastal Conservation* 9: 159-169, 2003.

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Evans, P.R., Ward, R.M., Bone, M and Leakey, M (1998). Creation of temperate-climate intertidal mudflats: factors affecting colonisation and use by benthic invertebrates and their bird predators. *Marine Pollution Bulletin* 37: 535-545.

Royal HaskoningDHV (2014a). York Potash Project Harbour Facilities Habitats Regulations Assessment. Prepared for York Potash Ltd, December 2014.

Royal HaskoningDHV (2014b). Tees Maintenance Dredging Annual Review 2013. Prepared for PD Ports.

Royal Haskoning and HR Wallingford (2011). Mitigation and monitoring for the Stour and Orwell Estuaries SPA and Hamford Water SPA: Annual Review 2010/11. Prepared for the Harwich Haven Authority.

Appendix A

Correspondence with Natural England

Minutes

HASKONINGDHV UK LIMITED
INDUSTRY, ENERGY & MINING

Present : Deborah Hall (DH), Des O'Halloran (DO'H) (Natural England); Allan Gamble (AG), James Barrie (JB), Will Woods (WW) (York Potash Ltd); Sian John (SJ), Matt Simpson (MS) (Royal HaskoningDHV)

Absent :

Date : 15 January 2015

Copy :

Our reference : 9Y0989/C/303957/Leeds

Subject : YPL/NE Strategy Meeting (telecon)

SUMMARY OF KEY POINTS AND ACTIONS

1. Project update

SJ provided an overview of the status of the various YPP applications.

Mine and MTS: NYMNPA has not formally requested further information, but has raised a series of questions.

YPL is to provide supplementary environmental information (SEI) in connection with changes to the design at Dove's Nest Farm (DNF). AG clarified that the changes amount to an additional temporary screening bund in the area of the welfare building to accommodate additional excavated materials; this requires re-designing this area rather than wholesale changes. The basic scheme is unchanged. A proposed ventilation shaft at north is to be removed (incorporated in MTS and production shafts). Further details are to be provided on emissions mitigation at DNF and the MTS Intermediate Shaft Sites. The SEI will be submitted at the end of January or early February.

The implications of the changes will be assessed in the SEI, before determination of the Mine and MTS applications.

MHF application is unaffected by SEI. MHF application is progressing; RCBC will wait for the SEI before determining, but this application likely to be determined sooner than the Mine and MTS.

AG confirmed that YPL has withdrawn the DCO application following a Marron's telecom with PINS, which suggested that options that are presented for some aspects of the project need to be refined. PINS have not provided specific feedback yet, and a meeting is scheduled for 21 January with PINS to discuss the issues further.

YPL will then re-submit the DCO application, for validation.

PINS have stated that there were no issues with the ES or HRA, in terms of validation.

Application for Whitby P&R made, Construction Village and P&R application to be made by end of January 2015.

2. DAS and likely future work (for Natural England)

NE has reviewed/is reviewing the Harbour HRA under the DAS, however, the target fee for the DAS is about to be reached. Unsure as to what further work may be required under the DAS at present.

DH described the relationship between the DAS and NSIP process (there has been recent changes to the guidance). Up to examination, NE still work under the DAS, apart from dealing with Statements of Common Ground and preparing Relevant Representations.

Site visits and iterations on the habitat enhancement strategy for the port (for example) would be chargeable under DAS, as would any additional air quality or landscape consultation meetings outside of the statutory consultation process.

ACTION: DH to respond to YPL to advise on what NE feels would be an appropriate budget for a DAS extension, based on identified topics and deliverables.

3. Harbour DCO mitigation (habitat enhancement in Bran Sands lagoon)

DO'H stated that NE's view is that the documentation included excellent bird data.

DH raised questions about the mitigation (habitat enhancement) proposed and how this relates to impacts on the SPA interest features. In addition, there is an existing SPA interest at Bran Sands Lagoon and NE feel that a better understanding is required regarding how the measures proposed could affect this interest (i.e. diving ducks using deeper water areas of the lagoon).

The proposed habitat enhancements are welcomed by NE, but are still at the conceptual stage and NE's view is that a higher level of detail is required. NE indicated that Option 2 appears most desirable.

DH stated that there is a need to link the proposals - including habitat enhancement - specifically to the effects on the SPA interest features (present a table of interest features and clearly define the aims of the habitat enhancement), inclusive of clarification on what a successful proposal will look like; how it is to be practically achieved (deliverability); over what timescale and how this will be measured; countermeasures etc. (from email of 12/01/15 to SJ).

SAJ proposed that RHDHV develop a Mitigation and Monitoring Strategy for issue to NE, in advance of a site meeting, which would address the above. DH to provide specific feedback and further guidance on NE's expectations.

MS stated this would consider the effect of the proposals on the overall assemblage, including key groups of birds (e.g. diving ducks, dabbling ducks, waders). DH added it should specifically address curlew.

Following production of the Mitigation and Monitoring Strategy, a site meeting (NE/MMO/EA) is to be held. The meeting is to focus on deliverability of the habitat enhancement proposals. The EA's primary interest is interaction with the Environmental Permit for Bran Sands landfill; the MMO's interest is the fact that the creation of the habitat enhancements are a licensable activity under the Marine and Coastal Access Act 2009 (would be part of the deemed marine licence).

DO'H summarised by stating that in NE's view there are two key stages to come:

- (1) Development and agreement of Head of Terms / Indicators of Success (and a Mitigation and Monitoring Strategy).
- (2) YPL development of firm proposals for mitigation. However, on this latter point, NE is hopeful that that the Mitigation and Monitoring Strategy and site visit will give enough confidence that the mitigation is deliverable.

SJ proposed that the Strategy should form an Annex to the Harbour HRA.

ACTIONS:

- a) **DH to provide further feedback and guidance on the further information sought with respect to the habitat enhancement proposals (by 21/1/15).**
- b) **MS to develop template for Mitigation and Monitoring Strategy (by 21/1/15) based on emailed advice already provided by NE.**
- c) **MS/SJ prepare Mitigation and Monitoring Strategy (by 29/1/15), with the intention being that this would be issued ahead of the site visit.**
- d) **RHDHV to contact the MMO and EA and fix a date for the site meeting (dates proposed are 5, 10 and 11 February)**

4. Determination of the Mine / MTS and MHF applications

SJ questioned whether the HRA provided as part of the Harbour DCO application enabled NE to advise RCBC and NYMNPA that sufficient information now existed such that the Mine / MTS/ MHF applications could be determined.

DO'H stated that given the adoption of the approach set under item 3, and assuming that the Mitigation and Monitoring Strategy meets NE's requirements, NE is likely to be able to advise other authorities that there is sufficient information for them to determine the applications in terms of the Habitats Regulations. Subsequently, NE would formally respond to the SEI, which will include the Harbour HRA (accompanied by the together with the Mitigation and Monitoring Strategy). On the assumption that NE can get confidence in early February about the lagoon proposals, DO'H expected that NE could confirm that the SEI was acceptable by Early March.

5. Landscape impacts associated with the Mine and MTS

Following a brief discussion on NE's landscape objection it was proposed that YPL would consider the potential for further visual mitigation and that this, should such mitigation be forthcoming, would be covered in the SEI.

Date: 21 January 2015
Our ref: DAS 1093a/ 141561
Your ref: Doc 6.3 HRA Sian John



Sian John
Sector Director Environment
Royal HaskoningDHV
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Dear Sian

Discretionary Advice Service (Charged Advice) DAS 1093a/ 141561

Development proposal and location: York Potash – Dove's Nest Farm, Whitby to Wilton International site, near Redcar; and Bran Sands, Teesport

Thank you for your consultation on the above which was received by Natural England on 19 December 2014 and further advice in discussion on 15 January 2015.

This advice is being provided as part of Natural England's Discretionary Advice Service. Royal Haskoning DHV has asked Natural England to provide advice upon:

- York Potash Project Harbour Facilities Habitats Regulations Assessment Doc 6.3 and information to support the production of an outline Mitigation and Monitoring Strategy.

This advice is provided in accordance with the Quotation and Agreement dated 09 December 2013. The following advice is based upon the information within the above document and elements of the Environmental Statement available on the Planning Inspectorate website;

The revised HRA included in the application for the York Potash Project Harbour Facilities (now withdrawn) is a significant improvement on the previous version and we welcome the inclusion of matters raised in correspondence and meetings. However the proposal as described does not provide, in Natural England's opinion, sufficient confidence and certainty (for HRA purposes) to conclude that the mitigation is practically achievable. Following the teleconference with you on 15 January, we are working with you to address this shortcoming, which we think can be resolved by adding more detail on aspects of the evidence, assessment and mitigation in the HRA. To this end we welcome your offer to produce draft the Heads of Terms of a mitigation and monitoring strategy ahead of the proposed site visit. This would clarify what is actually intended and enable the meeting to focus on the deliverability of these measures.

Bird Data

Natural England welcomes the provision of the waterbird assemblage data previously not present in the assessment, which demonstrates that the area affected by the proposal supports approximately 5% of the Tees Estuary's waterbirds during the winter.

Section 7.5 of the HRA contains more detailed data, showing the relative importance of each species. These tables indicate for the sections of the site used by SPA/Ramsar site birds that:



- **Bran Sands Lagoon** - redshank, shelduck, mallard, pochard, goldeneye, red-breasted merganser and little grebe are most significant. Bird counts from the lagoon of those species which tend to forage on exposed mudflats, such as redshank and shelduck, do not all relate to roosting / loafing birds. Some redshank currently feed around the periphery of the lagoon and shelduck also feed in areas of shallower water.
- **Dabholm Gut** - redshank, shelduck and teal are key.
- **The river frontage** – supports a much smaller numbers of birds (Table 7.5 confirms) amongst which the handful of redshank are most notable.
- **The NWL jetty** - hosts a cormorant roost, up to 600 of these birds have historically been accommodated on the nearby ConocoPhillips jetty the loss of the structure is not considered to be of critical importance.

Other general points requiring further clarification contained in the HRA

- Natural England notes the use of an enclosed grab (to barge) for the contaminated section of the approach channel and berth pocket. Further details on the safe transport and disposal of these sediments should be given thorough consideration (10.3.36)
- Although it is clear from this section (10.3.49) that the product will not be exposed to the atmosphere Natural England still requires clarity on the impacts of polyhalite on the marine environment in case of accidental or unforeseen events. .
- From a Health and Safety (and dredging vessel availability) perspective how likely is it that these dredging operations will be allowed to coincide with the other consented schemes by the harbour authority? (11.3.10). It is also not clear if the combined dredging impacts (one commencing directly after another) of other consented schemes (e.g. Northern Gateway) have been considered in the HRA

Mitigation Measures - Construction

We are satisfied with the proposals for lighting and screening, but we still have some concerns around the overshadowing effect of the northern conveyor route on the Bran Sands lagoon as well as the potential for annexing the site. Section 10.3.79 does refer to potential fragmentation of the lagoon habitat – hopefully a discussion at the proposed site visit will usefully be able to address these issues.

10.3.50 of the HRA notes ‘the conveyor would be covered or enclosed along its entire length due to the need to ensure the product is dry’. We suggest that this is full enclosure when near to the lagoon in order to prevent accidental spillages and consequent nutrient input to the lagoon environment.

Mitigation Measures - Operation

As we described during the teleconference of 15 January, we consider that the terminology used for the mitigation is confusing, notwithstanding your explanation that it is used because the enhancement proposals are built into the project. The enhancement proposals need to be devised and set out primarily – for Habitats Regulations purposes - as mitigation for the impacts of the scheme on SPA/Ramsar site birds using the sites, or at least demonstrate, *inter alia*, that they serve to achieve this. We do however recognise that some elements may also provide enhancement.

In order to avoid misunderstanding, we use the term mitigation throughout the rest of this response, with this purpose in mind. It is also worth re-stating that these types of proposals do need to ensure that at least like for like is deliverable and normally would require a 2:1 ratio of habitat creation. We have recognised that whilst ordinarily we would be looking for additional habitat, in this instance we

have indicated that this particular site has the potential to be improved through the creation of islands and intertidal shallows which could develop the quality of the site for a range of birds sufficiently to, at a minimum, maintain the existing bird populations. Obviously it would be preferential if wider benefits could be achieved with a higher quality of habitat present providing a long term sustainable future for the site and the birds it contains. The reinstatement of the islands could provide suitable nesting sites again for common tern for example.

It is important that the mitigation and monitoring strategy includes:

- **The aims of the mitigation and what a successful proposal will look like i.e.**
 - The interest features which are to be retained at the whole of the site affected and how they will be accommodated in the proposals including some detail on wildfowl such as shelduck and teal as well as diving species. It is important to note that the Lagoon currently holds the majority of the estuary's goldeneye and red-breasted merganser for example which need to be retained in the scheme. Please note that redshank is also a specific SPA interest feature. These interest features will need to be itemised in your Heads of Terms document.
 - Details of areas subject to loss and disturbance and the agreed areas for new roosting islands and shallows.
 - How the site will be managed e.g. the nature and scheduling of vegetation control on the islands, necessary to retain optimum conditions for roosting and nesting birds.

In addition there are requirements to:

- Describe the specific element of mitigation required for the loss of the habitats on the river frontage. Currently 9.6.6 of the ES asserts that feeding habitat up to double the area of lost to the construction of the port terminal (4.6ha) would be created. However, Bran Sands Lagoon already contains habitats of high value to significant numbers of waterbirds. Rather, the newly created shallows and margins will augment the existing suite of habitats present here, provided sufficient areas of deeper water are maintained – Option 2 (drawing PB1586-SK458) is the best design to achieve this based on our current knowledge.
 - Describe mitigation for the range of potential impacts affecting Bran Sands Lagoon and Dabholm Gut – these are for the most part disturbance impacts.
- **How this will be practically achieved:**
 - Over what timescale?
 - Detail on how careful calculations of levels and placement of bunds/dredgings will be undertaken to ensure success when there will not be a mechanism to tweak the degree of tidal exchange through the connecting pipe.
 - Details of suitable substrates – the non-toxic fines from maintenance dredgings – and the level of tidal exchange expected to ensure invertebrates will colonise to provide food for birds
 - To ensure the success of the mitigation proposal for Bran Sands lagoon Natural England suggests grab samples are taken at the proposed dredge site to ground truth the suitability of the sediment (particle size and lack of contamination) .(10.3.18)
 - Measures investigated to increase the regularity of inflow and outflow (assuming that the magnitude of water level changes cannot be increased due to the adjacent landfill site). For example, could more regulated pipes, only opened on low tides, deliver more exchange?
 - Natural England requires clarity on the time it will take for the mitigation proposal to provide habitat of sufficient maturity to support bird populations and consequently the amount of time the birds will be unable to utilise the habitat due to disturbance during its creation, smothering of existing habitat/prey and time to colonise the new habitat by invertebrates. As a general principle, establishment of mitigation should be created prior to habitat loss.

Monitoring Programme

The monitoring programme will need to define in more detail – some is already in the ES but is broad brush at present – the following:

- Monitoring to be undertaken to include bird survey data gathering, water level monitoring, invertebrate surveys (pre-construction and ongoing)
- Submission of a pre and post construction monitoring plan for the lagoon. This would seek to establish a baseline and assess the success of the mitigation in terms of invertebrate colonisation, bird usage etc (10.3.19)
- How this data is to be used for e.g. for the hydrogeological model the monitoring should be in place prior to construction so that the conceptual model can be confirmed and refined.
- Indicators of Success and over what timescale this is to be achieved – and how success is measured. Bird counts?
- Countermeasures should success not be achieved – options available.

I hope these clarifications help in the task. We are looking forward to seeing the draft Heads of Terms for the strategy and the opportunity to comment on them, as soon as possible. For clarification of any points in this letter, please contact Deborah Hall on 0300 0602259.

As the Discretionary Advice Service is a new service, we would appreciate your feedback to help shape this service. We have attached a feedback form to this letter and would welcome any comments you might have about our service.

The advice provided in this letter has been through Natural England's Quality Assurance process

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Yours sincerely

Deborah Hall
Land Use Operations
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Date: 09 February 2015
Our ref: DAS 5909/ 144213
Your ref: Mitigation and Monitoring Strategy



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Dear Sian

Discretionary Advice Service (Charged Advice) DAS 5909/ 144213

Development proposal and location: York Potash – Dove's Nest Farm, Whitby to Wilton International site, near Redcar; and Bran Sands, Teesport

Thank you for your consultation on the above which was received by Natural England on 30 January 2015.

This advice is being provided as part of Natural England's Discretionary Advice Service to York Potash Limited (YPL). Royal Haskoning DHV has asked Natural England to provide advice upon:

- York Potash Harbour Facilities Mitigation and Monitoring Strategy dated 29 January 2015

This advice is provided in accordance with the Quotation and Agreement dated 02 February 2015. The following advice is based upon the information within the above document and the subsequent site visit and meeting of 5 February 2015.

The Mitigation and Monitoring Strategy (MMS), site visit and meeting have most usefully addressed our remaining reservations about the proposal with respect to two elements of the provision of our advice to Competent Authorities: for the wider applications at the mine, MTS and MHF; for the Harbour NSIP proposal.

1. The wider applications for the project to be determined by North York Moors National Park Authority and Redcar & Cleveland Borough Council

We are now in receipt of a range of information on impacts arising from proposals for the York Potash Harbour Facilities. This includes information contained within the revised HRA / amended ES and now the MMS on the mitigation and monitoring. You have undertaken to update the MSS document in line with our 5 February discussion and agreement on a number of aspects (as recorded below). We consider that, once the MSS is so amended, the information provided is sufficient to satisfy the North York Moors National Park Authority and Redcar and Cleveland Borough Council that the in-combination impacts at the Harbour site can be considered within their appropriate assessment and any appropriate assessments for the whole of the York Potash Project. It is our view that it is possible to conclude that the proposal will not result in adverse effects on site integrity of Teesmouth and Cleveland Coast SPA.

We understand that YPL will submit a revised MMS document, along with a revised HRA, to the North York Moors NPA as part of the Supplementary Environmental Information (SEI) for the



minehead/MTS applications in the next week or so. We also understand that the Harbour NSIP application, along with an amended HRA is to be re-made in the next couple of months. In the absence of a currently active Port NSIP submitted application, we are satisfied that the SEI, as described above, will demonstrate that mitigation for HRA matters can be secured and is deliverable, and that it is YPL's intention to submit this as part of a re-made NSIP port proposal.

2. Detailed comments as discussed on 5 February and agreed revisions / suggested wording

Section 2.2 - The 'Teemouth WeBS Sector' should actually be referred to as the 'Tees WeBS site'. The Tees WeBS site now comprises 28 individual count sectors, of which Bran Sands South is only one! This correction needs to be repeated in table 2.3.

Section 3.1, Table 3.1 – The table as we agreed needs to include the overshadowing / over-sailing impacts from the project and in particular the overhead conveyors.

Section 3.2 – We welcome the inclusion of consideration of the different elements of the bird assemblage and in particular the diving ducks that use the deeper water in the lagoon

Sections 4.1 & 4.2 – Whilst we fully support the selection of Option 2 as previously recommended, we provide the following words used in the meeting, which capture how we agreed the most suitable location for the islands:

'There is no need to create islands in deeper water. It would be preferable to construct them along the alignment of the bund itself (which was their original location before ICI removed them). Excess material from the bund could be incorporated into these islands. This is essentially what is proposed as a 'variation on Option 2'. Such islands would be easier to construct owing to the shallower surrounding waters, less vulnerable to erosion by wave action, increase the linear 'edge effect' for feeding waders and avoid greater impacts on deeper water feeding habitats for diving birds. A membrane should be deployed to suppress vegetation growth on the islands, and top-dressing with cockle shell applied.'

We discussed various elements of the phasing of works and the use of the silt box to ensure understanding and MMO confirmed the wording they would like to see used to include bullets on sediment quality and particle size i.e. only want 'uncontaminated fines' for this project.

Timing of the works in the Lagoon – we agreed that there would be no adverse effect, but that the potential disturbance from the activities should be captured within the HRA. The disturbance would be for a limited time – potentially 3-4 months in total. It would however be preferable to carry out these activities in the late summer months, if possible to avoid such impacts.

Section 4.4 – The replacement of the existing pipe with a new flow control structure is to be greatly welcomed, as was the positive discussion on site and in the meeting. We agreed in discussion that, whilst YPL needed to be precautionary due to the potential for unintended effects on groundwater flow associated with the adjacent landfill site, there could be considerable conservation benefit in being able to vary water levels. Specifically the area of intertidal habitat could be increased to the benefit of the bird assemblage.

Since a new pipe is to be fitted and a 'hole is to be dug' we agreed that two pipes could easily be put in at the beginning (it would not be possible to easily retro-fit another pipe) with the understanding that the second pipe's flow control structure would be closed in the immediate term. This would enable YPL in the future management of the site to have greater ability to further manipulate the flow, not only to isolate the lagoon in case of pollution events, but also to permit tweaking of water levels within the lagoon and to increase tidal exchange (thereby increasing invertebrate settlement and food supply). Indeed, this is implied by the text on page 23, which refers to "actively adjusting the rate of water exchange between the Tees and the lagoon".

Section 4.7.2 – Mike Leakey supplied Matt Simpson with a useful a monitoring report regarding the No4 Brinefield Saline Lagoon: *Colonisation of the newly-created saline lagoon at Teesmouth monitoring report: April 1999-January 2000* Evans P.R. and Lucas M.C., University of Durham Department of Biological Sciences, and details of the following recommend paper which focuses on an example of intertidal habitat restoration on the Tees Estuary: *Creation of Temperate Climate Intertidal Mudflats; Factors Affecting Colonization and Use by Benthic Invertebrates and their Bird Predators* Evans P.R. et al, Marine Pollution Bulletin 37: 535-545.

Section 5 - We note that no seasonal restrictions on construction activities are proposed here. Instead, reliance is placed on the efficacy of a suite of practical measures such as acoustic barriers, a noise reduction curtain over the hammer piling rig and controls over artificial lighting. We are not fully convinced that the overall result will be that 'the risk of indirect impacts on waterbirds would be reduced to an insignificant level. This could only be guaranteed if you avoided the winter period. However, at the same time we accept that these impacts are unlikely to have an adverse effect on integrity given the limited time period involved.

Section 6 - We broadly agree with the indicators of success presented here and recognise we will have an opportunity 'post-consent' to refine this in more detail to include advice on the baseline surveys needed. We recommend that invertebrate monitoring should take place in autumn (after the settlement of larvae etc). Vegetation control on the islands will need to be routinely undertaken.

We noted that the DCO requirements would need to ensure that the MMS was fully captured to satisfy ourselves and PINS of its deliverability. Indeed this is the case for the proposed BAP enhancement and contributions to wider initiatives.

Shags etc. - Please note that if YPL opt for an open quay structure, the provision of artificial nesting platforms for shags beneath the suspended deck should be considered, along with the other construction techniques that can be employed to create biodiversity benefits adjacent to the estuary.

In conclusion, with reference to HRA, we note that there are a number of Likely Significant Effects (LSE) on the bird assemblage in Bran Sands Lagoon. However, taking the draft HRA and MMS into account, we accept that some of these will be avoided through the YPL proposals and others will be satisfactorily mitigated for. We agree that an overall conclusion of No Adverse Effect on Integrity could be concluded by a competent authority in the event of these proposals, as set out currently, being advanced. Likewise we agree there is scope for delivering actual benefit to the assemblage, should the proposals as set out be consented and implemented.

Thank you for providing the MMS in advance of the very helpful site visit and meeting. We are hoping that resolving these issues now at pre-application stage will facilitate an easier written process through the Examination stage.

For clarification of any points in this letter, please contact Deborah Hall on 0300 0602259.

As the Discretionary Advice Service is a new service, we would appreciate your feedback to help shape this service. We have attached a feedback form to this letter and would welcome any comments you might have about our service.

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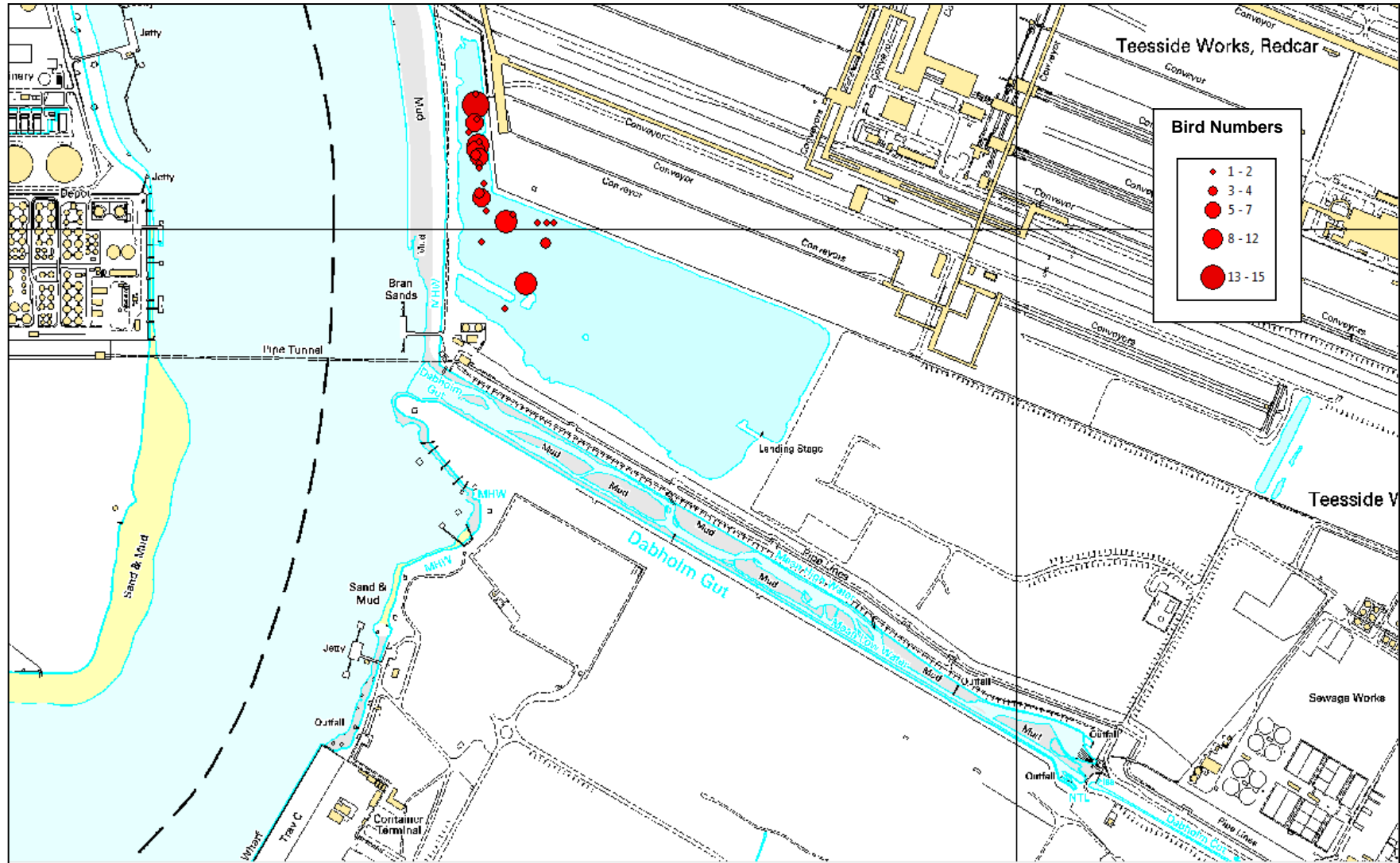
Yours sincerely

Deborah Hall
Land Use Operations
cc commercialservices@naturalengland.org.uk

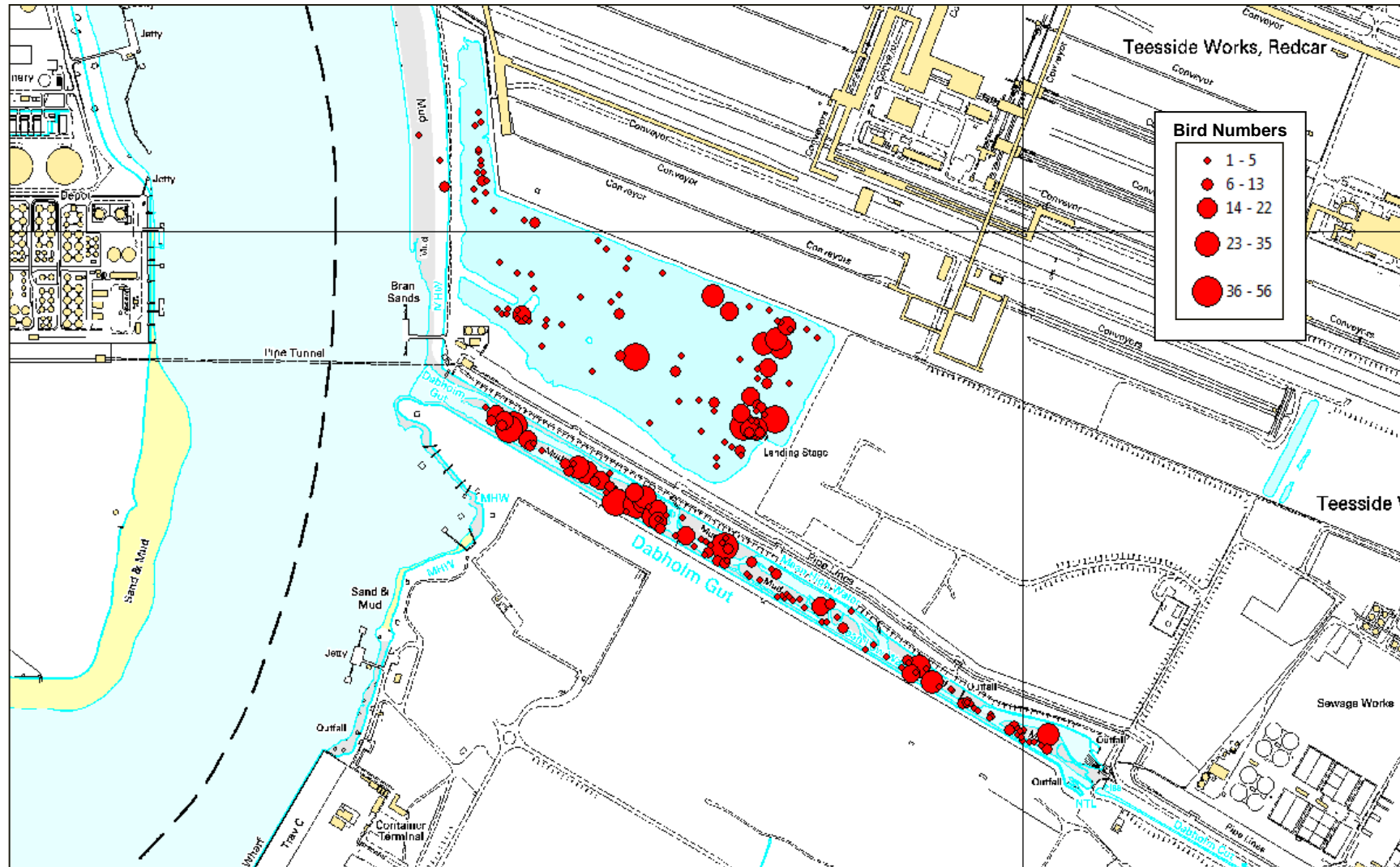
Appendix B

Waterbird Distribution Plots

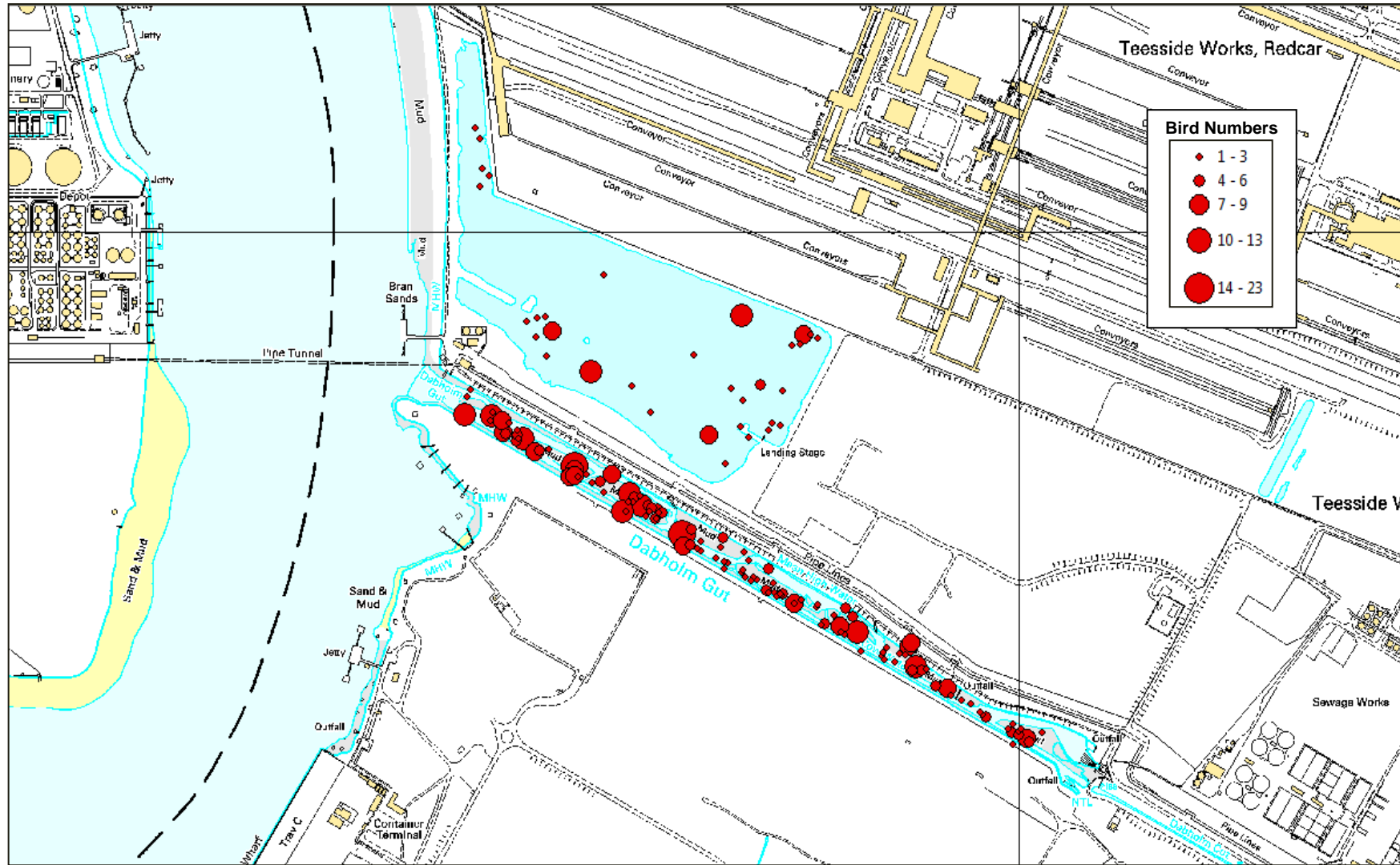
Little Grebe



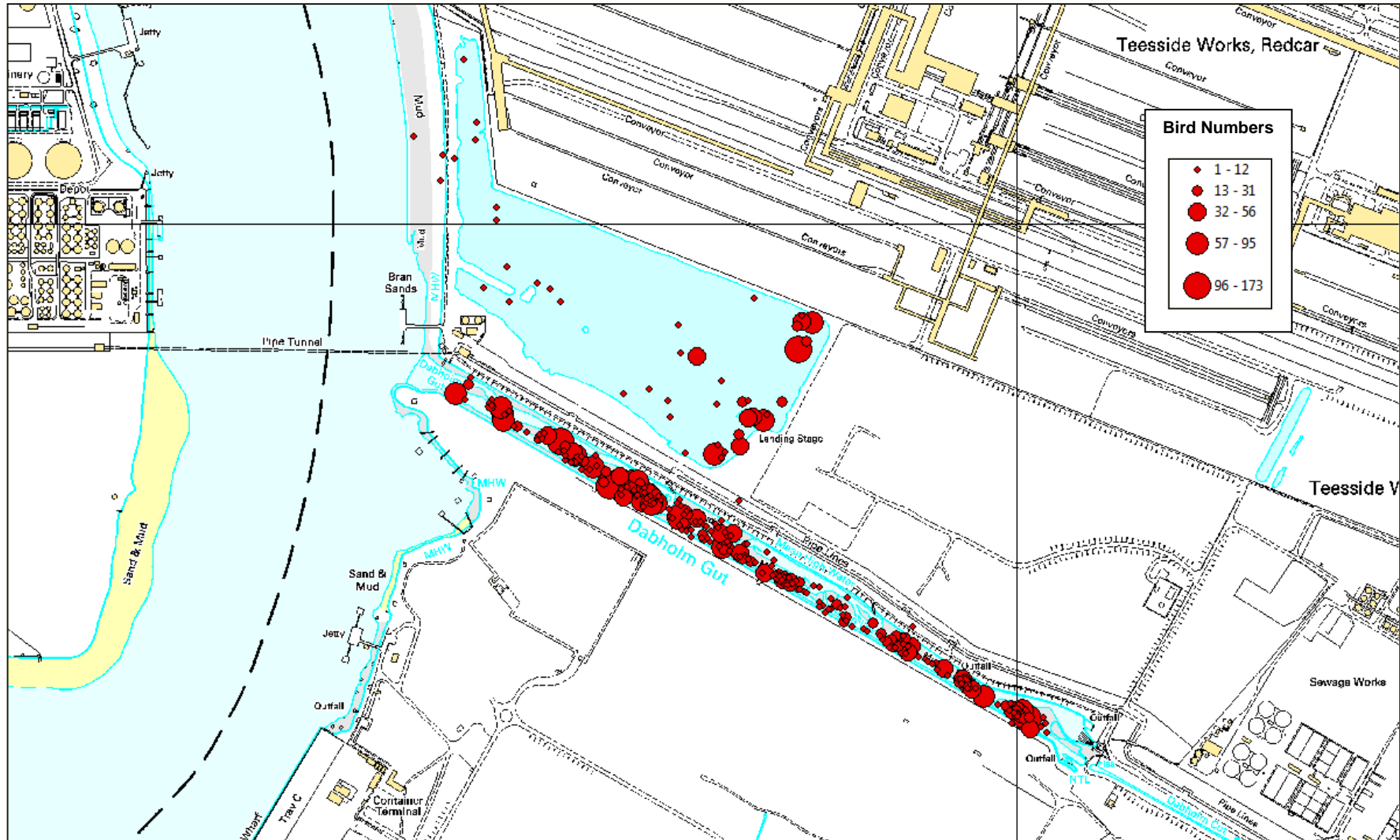
Shelduck



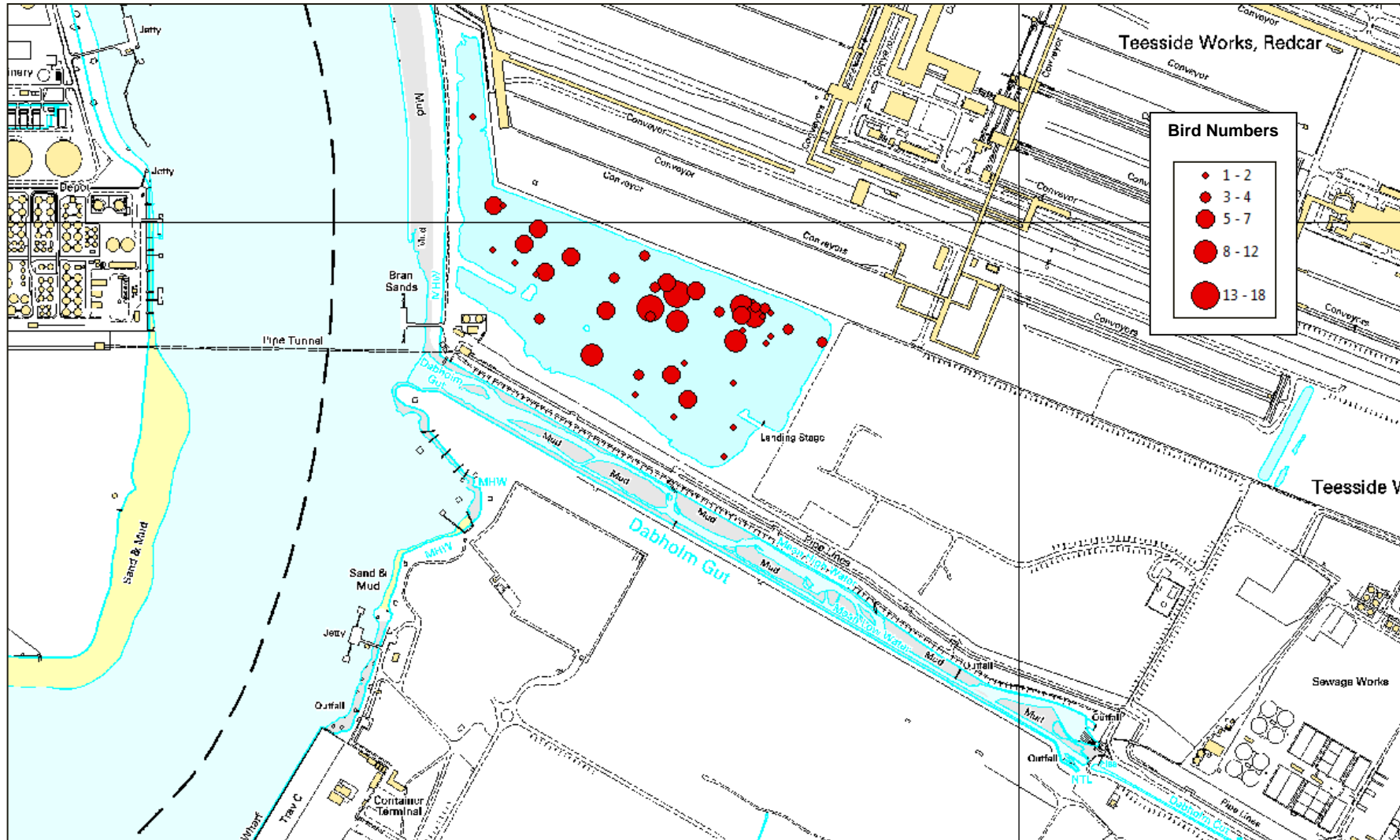
Mallard



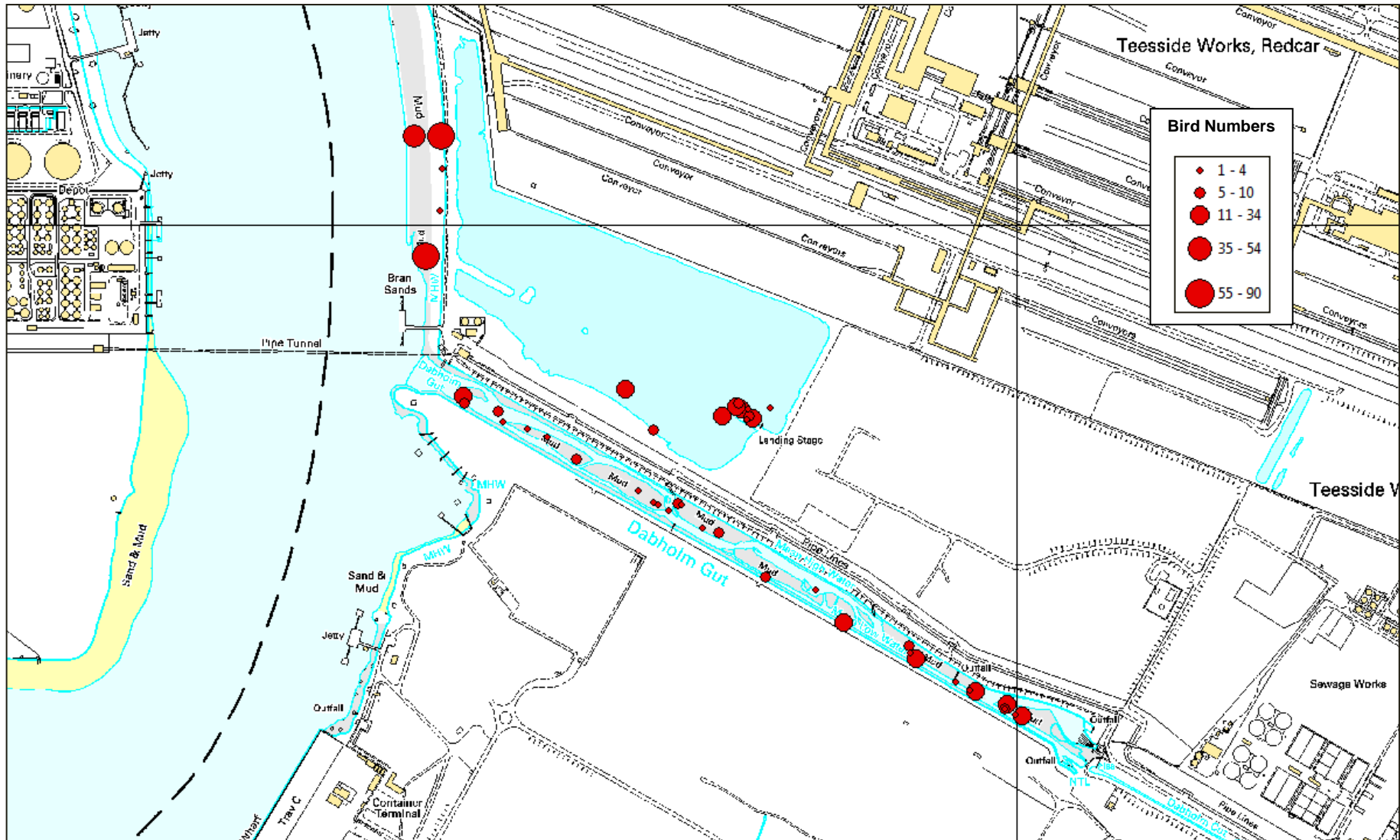
Teal



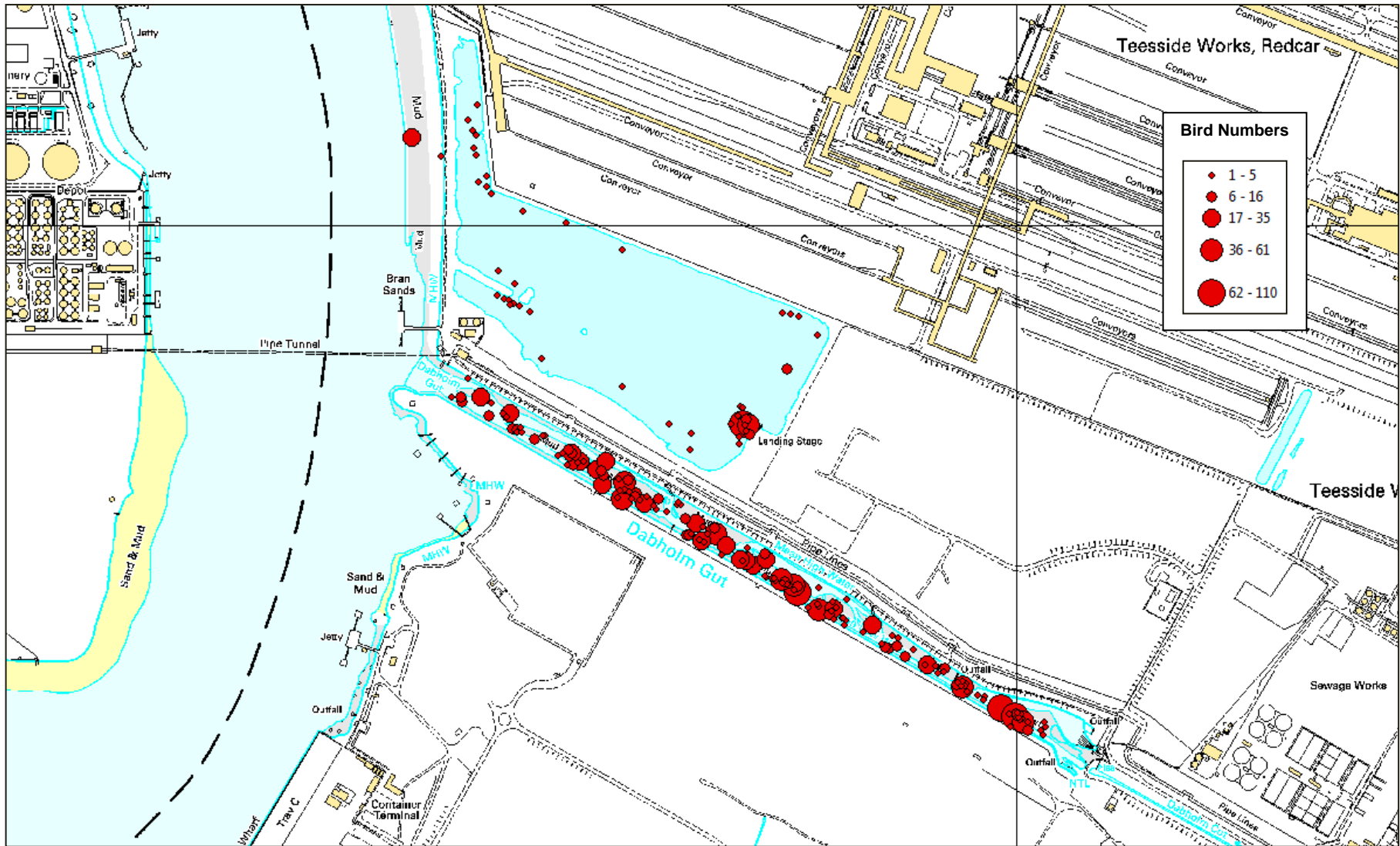
Goldeneye



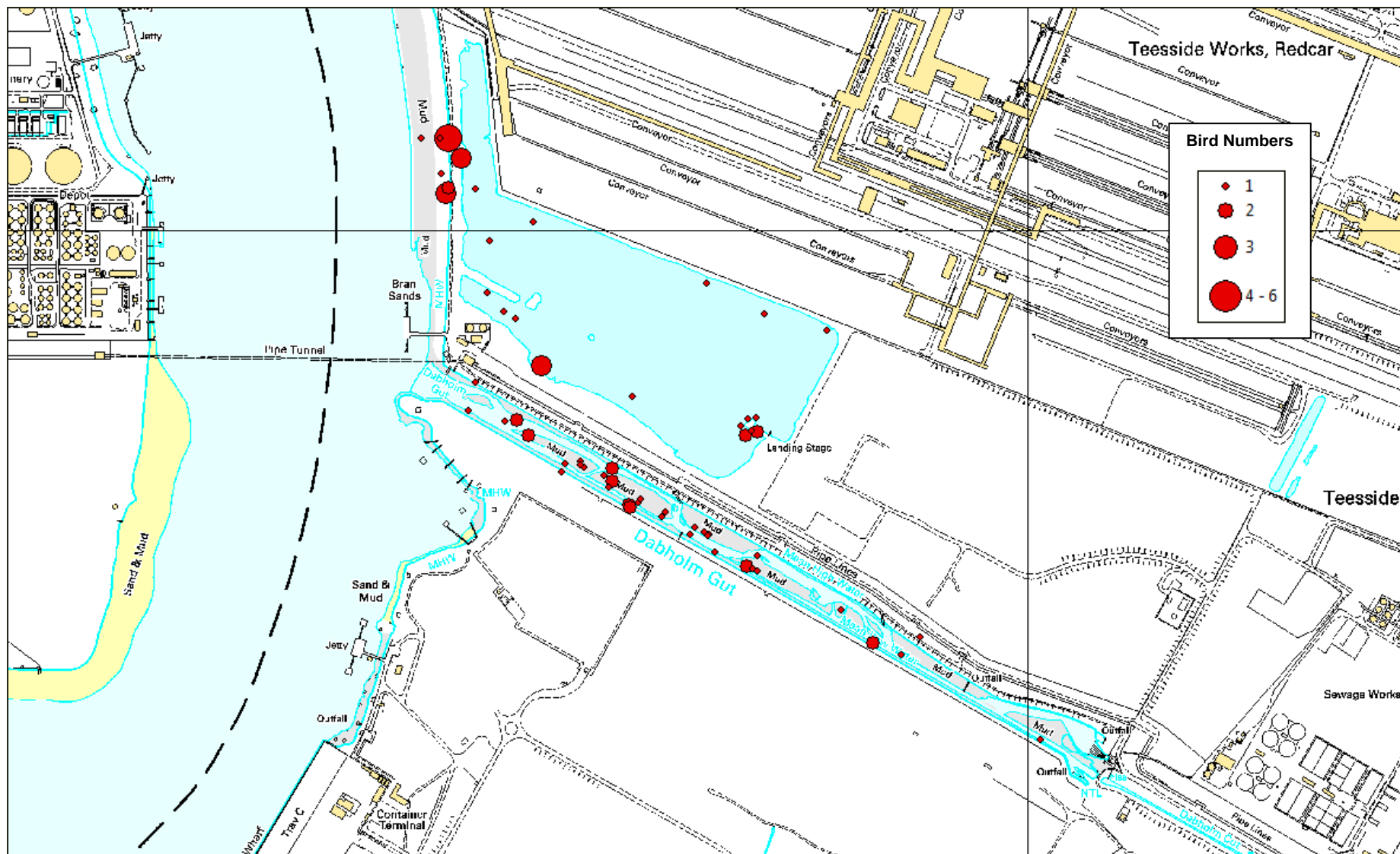
Lapwing



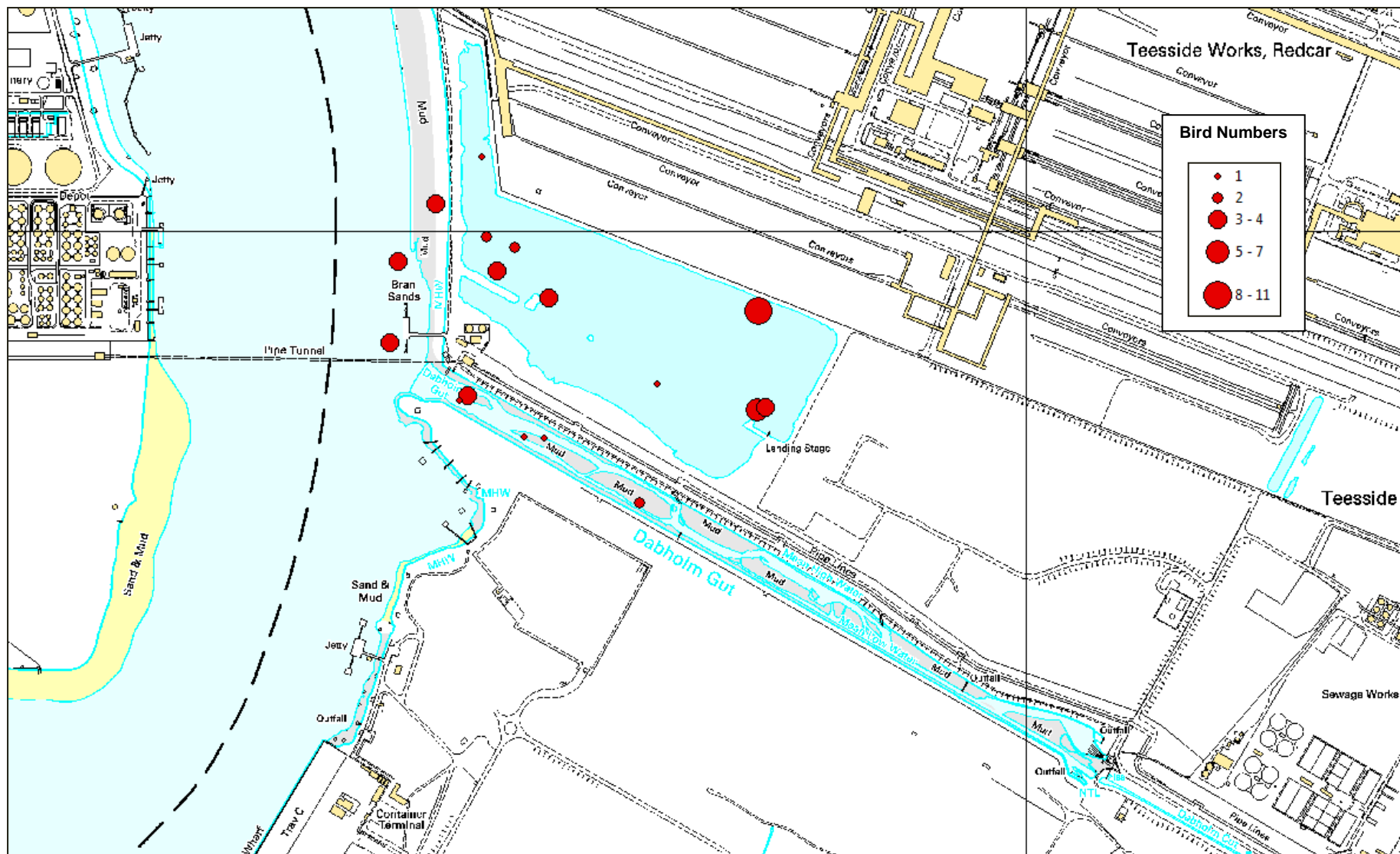
Redshank



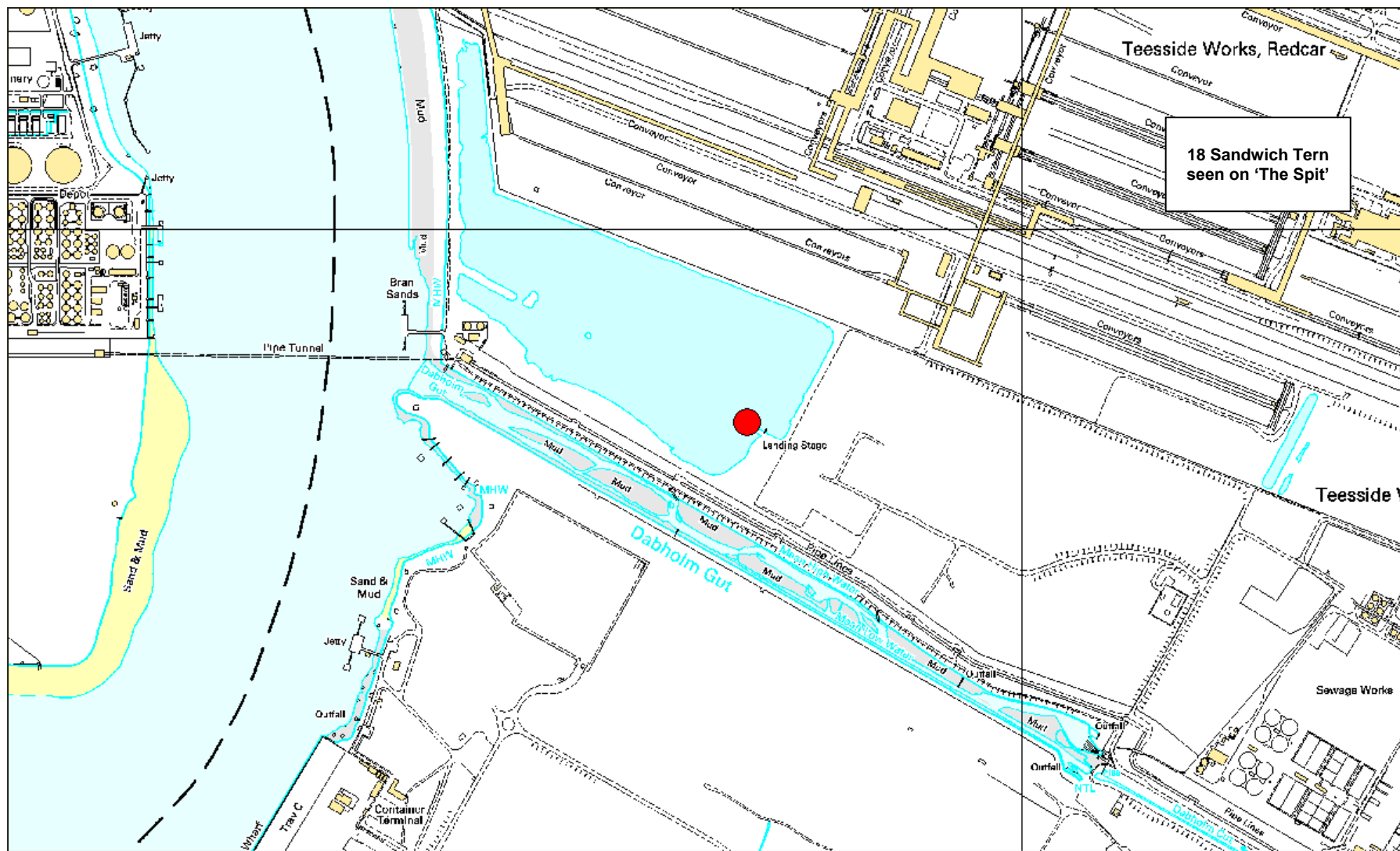
Curlew



Common Tern



Sandwich Tern



Other diving ducks

