Tees Maintenance Dredging Annual Review 2006 - 2008

Tees Maintenance Dredging Review

PD Teesport

November 2009
Final Report
9V1491

A COMPANY OF

ROYAL HASKONING

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ENVIRONMENT

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1 INTRODUCTION

1.1 Rationale

The purpose of this document is to provide an annual review in which any changes to the existing maintenance dredging practices set against a baseline are documented. Additionally, any new information available in relation to baseline environmental information, and information regarding the Teesmouth and Cleveland Coast Special Protection Area (SPA) and Ramsar site and its interest features is presented where applicable. The baseline document (Royal Haskoning, 2008) was published in February 2008 and should be read in conjunction with this review.

The main headings of the review are self explanatory; however, the subheadings are intended to cover the various aspects of the baseline document that could potentially change. Changes to conclusions reached as a result of new information are provided and the review considers a short discussion relating to any recommendations made.

1.2 Background

The UK Government considers that where maintenance dredging has the potential to affect a Natura 2000 site (such as a SPA or a Special Area of Conservation (SAC)), maintenance dredging should be considered as a 'plan or project' for the purposes of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora; the Habitats Directive. Based on this interpretation, maintenance dredging operations would need to be assessed in accordance with Article 6(3) of the Directive. Whilst not endorsing this interpretation, the ports industry has agreed to co-operate with the Government to seek to devise arrangements which allow the effects of maintenance dredging on Natura 2000 sites to be reviewed in a way which does not impose a disproportionate burden on industry, Government, or its agencies.

In order to inform this process, a Draft Conservation Assessment Protocol on Maintenance Dredging and the Habitats Regulations 1994 (hereafter referred to as the 'Draft Protocol') has been developed to assist port authorities in fulfilling their statutory obligations, through the co-operation of the following organisations:

- British Ports Association;
- British Marine Federation;
- Cabinet Office;
- Department for Environment, Food and Rural Affairs (DEFRA);
- Department for Transport (DfT);
- Natural England; and
- UK Major Ports Group.

The Draft Protocol was produced in December 2003. Since this date it has been trialled at a number of ports, but has not yet been adopted. The Draft Protocol recommends that a 'Baseline Document' is prepared (see: Royal Haskoning, 2008). The baseline document should draw on existing and readily available information to describe current and historic patterns of dredging in relation to the conservation objectives of adjacent European Marine Sites (EMS).

A baseline document was produced for the Tees estuary in 2005 (ABPmer, 2005). Royal Haskoning (2008) represents an updated 'Baseline Document' for PD Teesport and contains information which is relevant to the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar site.

The presumption in assessing any potential consequences of dredging activity is that maintenance dredging will continue in line with the established practice (described herein). The Baseline Document also presumes that existing practice is part of the functioning of the existing system. It should, however, be noted that there are proposals to construct a deep sea container terminal (referred hereafter as the Northern Gateway Container Terminal; NGCT) at Teesport. This will require capital dredging to deepen the existing approach channel and berths. However, the studies undertaken as part of the Environmental Impact Assessment (EIA) for NGCT predict that the existing maintenance dredging practices will not be significantly altered following the capital dredge (Royal Haskoning, 2006). The Baseline Document will, therefore, be applicable following the construction of this scheme, should it go ahead.

Other developers are located on the estuary and several occupy riverside sites with associated quays and jetties that also need to be serviced by maintenance dredging. Prior to the global financial downturn of late 2008 and 2009 a number to developers were seeking to expand their operations on the river subject to planning approval and marine consents. The current status of these proposals are summarised in this review as part of an assessment of potential cumulative effects on the interest features of the SPA and Ramsar site.

1.3 Study area

The study area is defined as the area in which maintenance dredging is undertaken by PD Teesport, that is, the area commencing 185 m down estuary of the Tees Barrage at Blue House Point to the seaward limit of the Port Authority Area. This area effectively includes all river frontage and facilities within the estuary commencing near the Tees Barrage. Also included in this area are the port facilities within Hartlepool Bay. The study area is shown in Figure 1.1. This is subdivided into 13 sectors (0 – 12) and each is shown respectively in Figure 2.1a – 2.1m together with the respective volume of material dredged from 2001-2008 shown as a histogram.

1.4 The existing maintenance dredging regime

PD Teesport has a statutory duty to maintain navigation within the Tees estuary and into the Hartlepool docks. As part of this responsibility, PD Teesport must maintain the advertised dredge depths within designated areas (hereafter referred to as "the maintained areas"). In order to achieve this, PD Teesport carry out maintenance dredging in the reaches of the river shown in Figure 2.1a – 2.1m. Most dredging occurs in the approach channel and low-middle estuary in order to maintain access to berth pockets and impounded docks. The only other maintenance dredging undertaken within the study area is that carried out by Hartlepool Marina. This amounts to approximately 10,000 m^3 per annum but is not undertaken regularly. Up until the mid 1960s, most dredging was carried out on the River Tees by steam bucket dredgers. Trailer Suction Hopper Dredgers (TSHD) are currently used for the majority of the dredging and are supported by grab dredging and ploughing where required.

The present main channel has declared depths of 15.4 m below Chart Datum (CD) in the approach channel (i.e. in Tees Bay), 14.1 m below CD to upstream of Redcar Ore Terminal, 10.4 m below CD up to Teesport and then progressively less depth up to 4.5 m below CD in Billingham Reach. Parts of the channel now declared at 14.1 m below CD were originally dredged to a deeper depth. Berths and docks vary depending on the location and the vessels which require access. The approach channel to Hartlepool Docks is currently maintained to 5.7 m below CD. Victoria dock is maintained to 6.8 m below CD and the deep water berths within the docks are maintained to 9.5 m below CD.

A summary of dredged volumes (m^3) by each reach from 2001 – 2008 is provided in Table 2.1. Data on dredging has also been obtained from PD Teesport and extends the time series presented in Royal Haskoning (2008) from 2005 to 2008. This information is shown by reach in Figures 2.1a – 2.1m. No dredging has occurred in Reach 0 (Figure 2.1a) during the reporting period.

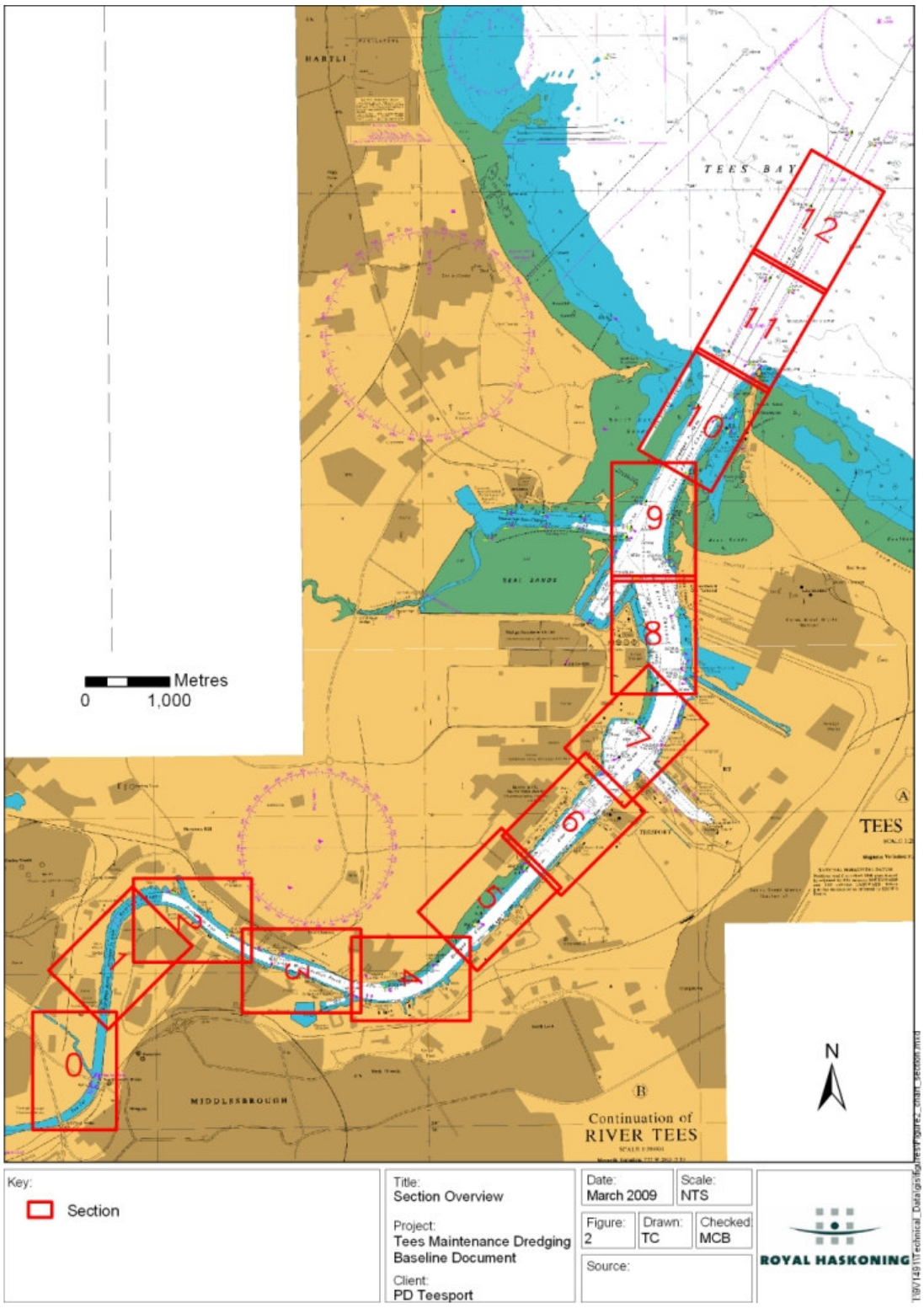

Figure 1.1. The study area showing the individual river reaches (0 – 12) used to describe the distribution of maintenance dredging activity on the River Tees during the period 2001 – 2008.

2 CHANGES TO EXISTING MAINTENANCE DREDGING

2.1 Existing practices

Practices have remained unchanged during the period 2006 – 2008.

2.2 New consents

2.2.1 Food and Environmental Protection Act (FEPA) 1985 (as amended)

Five new consents have been received since 2006 under FEPA in accordance with the Marine Works (EIA) Regulations 2007.

- Licence 33195/06/0 granted 05/09/06 – 04/09/08 (still valid subject to material quality) for 19,800 tonnes (Dawson`s North Sea Supply Base and TCP Heavy Lift Quay).

- Licence 32880/06/01 granted 14/09/06 – 14/04/09 for 88,000 tonnes (Billingham Reach Wharf, Tees Dock Turning Circle, Tees Dock Water Area and Corporation Dock).

- Licence 32717/08/0 granted 21/05/2008 – 20/05/2009 for the disposal of up to 1,934,836 tonnes of capital dredgings from Seaton Channel, the Holding Basin and Quays 10/11 of the Able (UK) yard was made by Able (UK) Ltd. on 2nd December 2004. The licence was approved in May 2008 for disposal at site A (TY160).

- Licence 34376/09/0 granted 26 October 2009 for works commencing no sooner than 1 January 2010 to the end of the day of 31 December 2013, for deposits in the sea in connection with marine construction works associated with the proposed QEII berth development.

- Licence 34377/09/0 granted 26 October 2009 for works commencing no sooner than 1 January 2010 to the end of the day of 31 December 2013, for the deposit of 42,000 tonnes (21,000 m^3) of capital dredged material (Mercia Mudstone constituent only) from the Queen Elizabeth II (QEII) berth, at disposal site Tees Bay C (TY150).

2.2.2 Northern Gateway Harbour Revision Order

PD Teesport obtained a Harbour Revision Order (HRO) for the NGCT. The HRO contained approval of the power to dredge for the construction and maintenance of the Northern Gateway development (see: Section 4.1).

2.3 Quantities

Table 2.1 provides a summary of the total volume of dredged material (m^3) from each reach of the river shown in Figures 2.1a – 2.1m. Other areas including Tees Berths, Hartlepool and the Seaton Channel are also shown. The total volume of dredged material from maintenance dredging has generally increased over the reporting period to 1.4×10^6 m^3 in 2008. This can be attributed primarily to operations at the Tees Berths, the Seaton Channel and other areas such as the Boulby outfalls since 2006.

2.4 Licence conditions

Extant licence conditions have remained unchanged during the period 2006 – 2008. Exclusions have remained unchanged since 2005.

Table 2.1. Summary of the total volume of dredged material (m^3) from each reach of the river Tees from 2001 to 2008. The most recent data run from 2006 – 2008.

Reach	2001	2002	2003	2004	2005	2006	2007	2008
1	5911	127827	42384	70856	12361	27075	42701	49701
2	21768	122381	16470	73210	11649	12982	26028	19805
3	0	1366	4176	3205	412	412	1925	735
4	3131	1666	127	4468	676	282	1514	0
5	4621	1634	2751	3815	5997	1339	764	0
6	1625	5282	24645	4859	23640	12092	3088	18906
7	51303	4804	10765	3297	1243	2642	9841	55084
8	37075	76297	72261	39251	30172	56926	96160	82531
9	256158	252715	279054	330835	321316	347365	332679	349982
10	174248	118613	171950	137022	161349	168733	143089	178819
11	112437	296471	85385	121807	113304	230099	97682	92427
12	34747	28437	28156	48707	21307	28262	39441	23548
Tees Berths	148837	115219	141880	303869	164664	316696	254458	272520
Hartlepool	119847	157329	146457	114104	89811	137606	121605	132041
Other	0	10900	0	0	0	0	22279	34605
Seaton Channel	0	245	9809	0	0	312	23366	102463
Total (x 10^6)	**0.972**	**1.321**	**1.036**	**1.259**	**0.958**	**1.343**	**1.217**	**1.413**

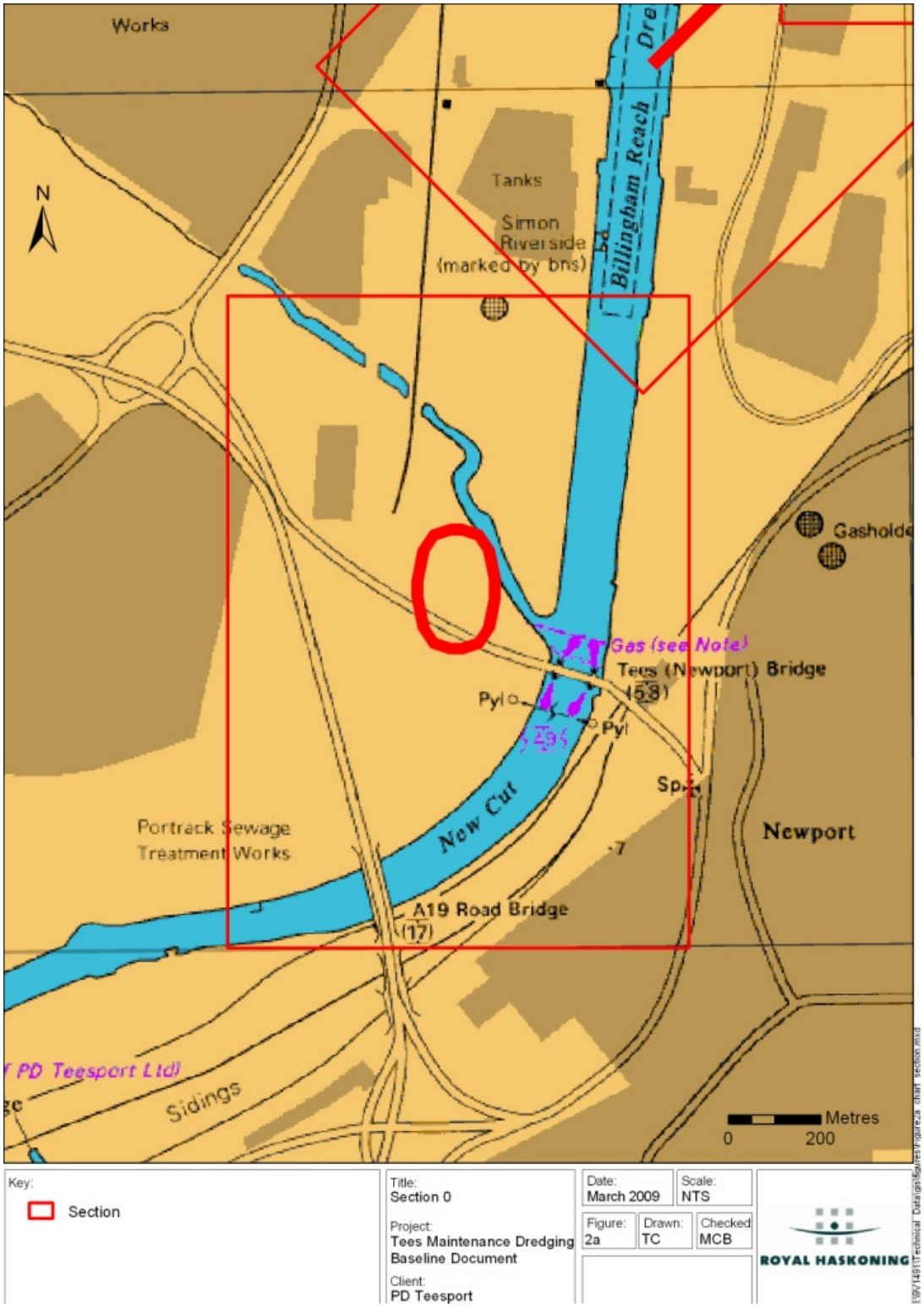

Figure 2.1a. The distribution of maintenance dredging by volume (m^3) in reach 0 during the period 2001 – 2008.

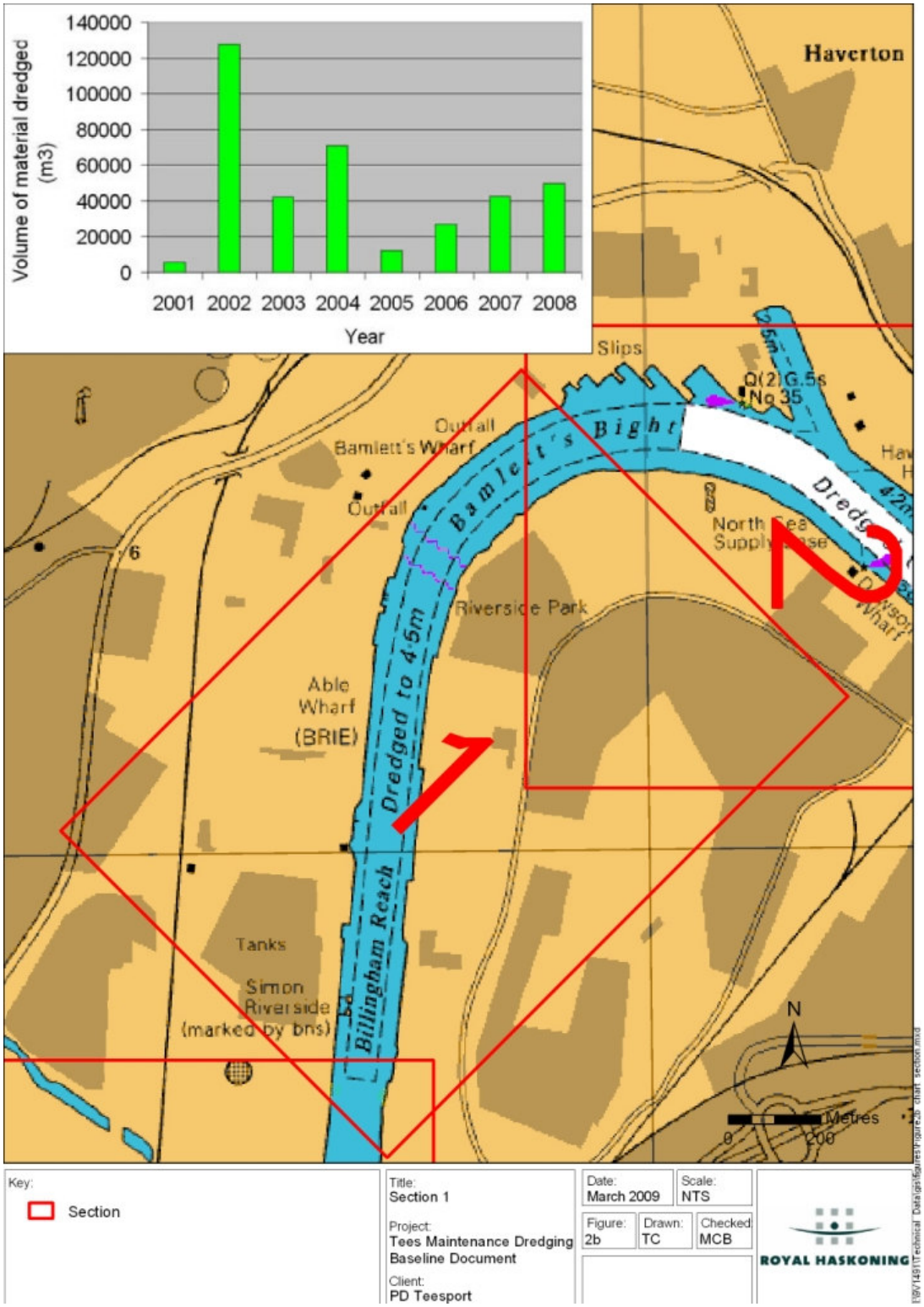

Figure 2.1b. The distribution of maintenance dredging by volume (m^3) in reach 1 during the period 2001 – 2008.

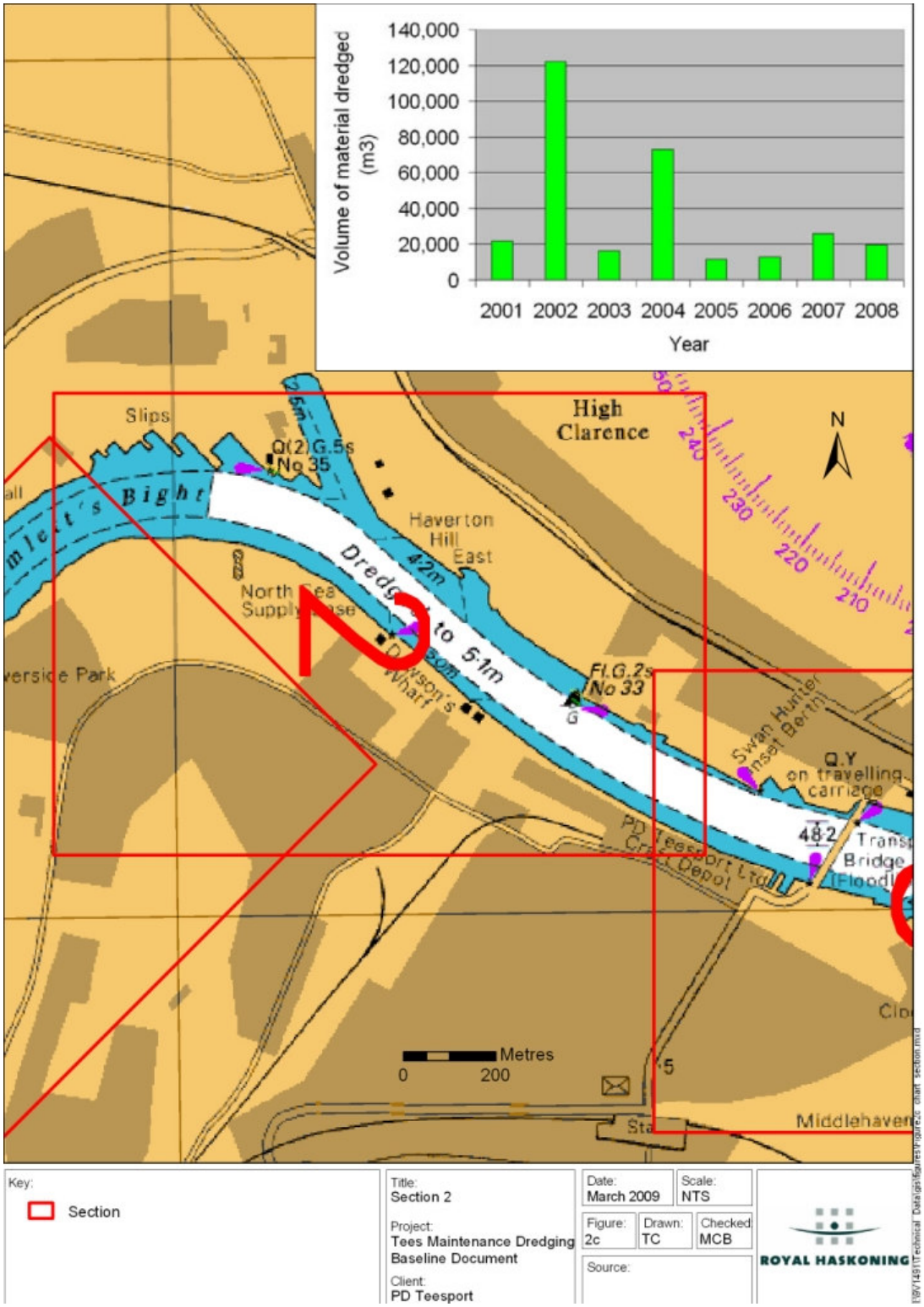

Figure 2.1c. The distribution of maintenance dredging by volume (m^3) in reach 2 during the period 2001 – 2008.

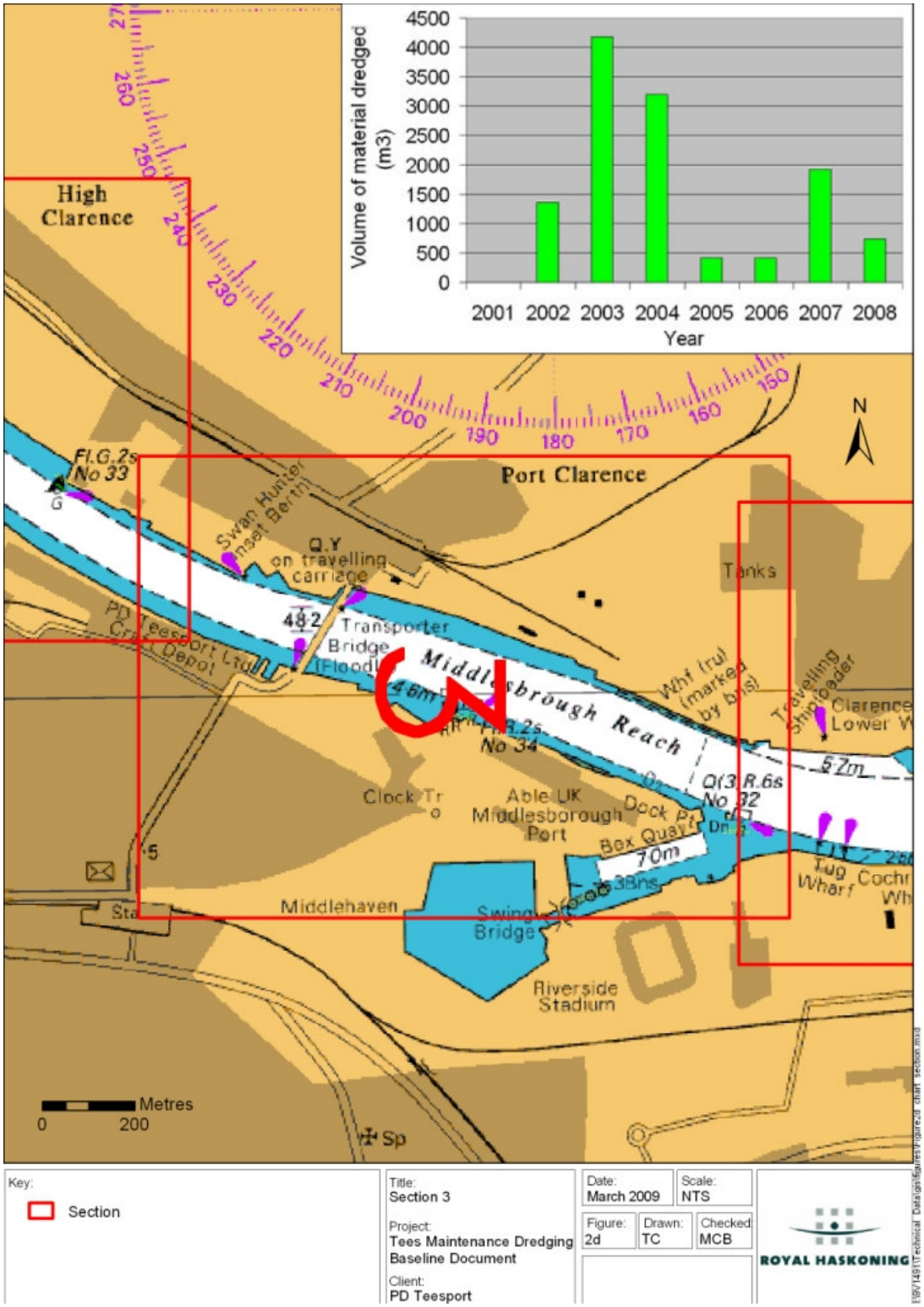

Figure 2.1d. The distribution of maintenance dredging by volume (m^3) in reach 3 during the period 2001 – 2008.

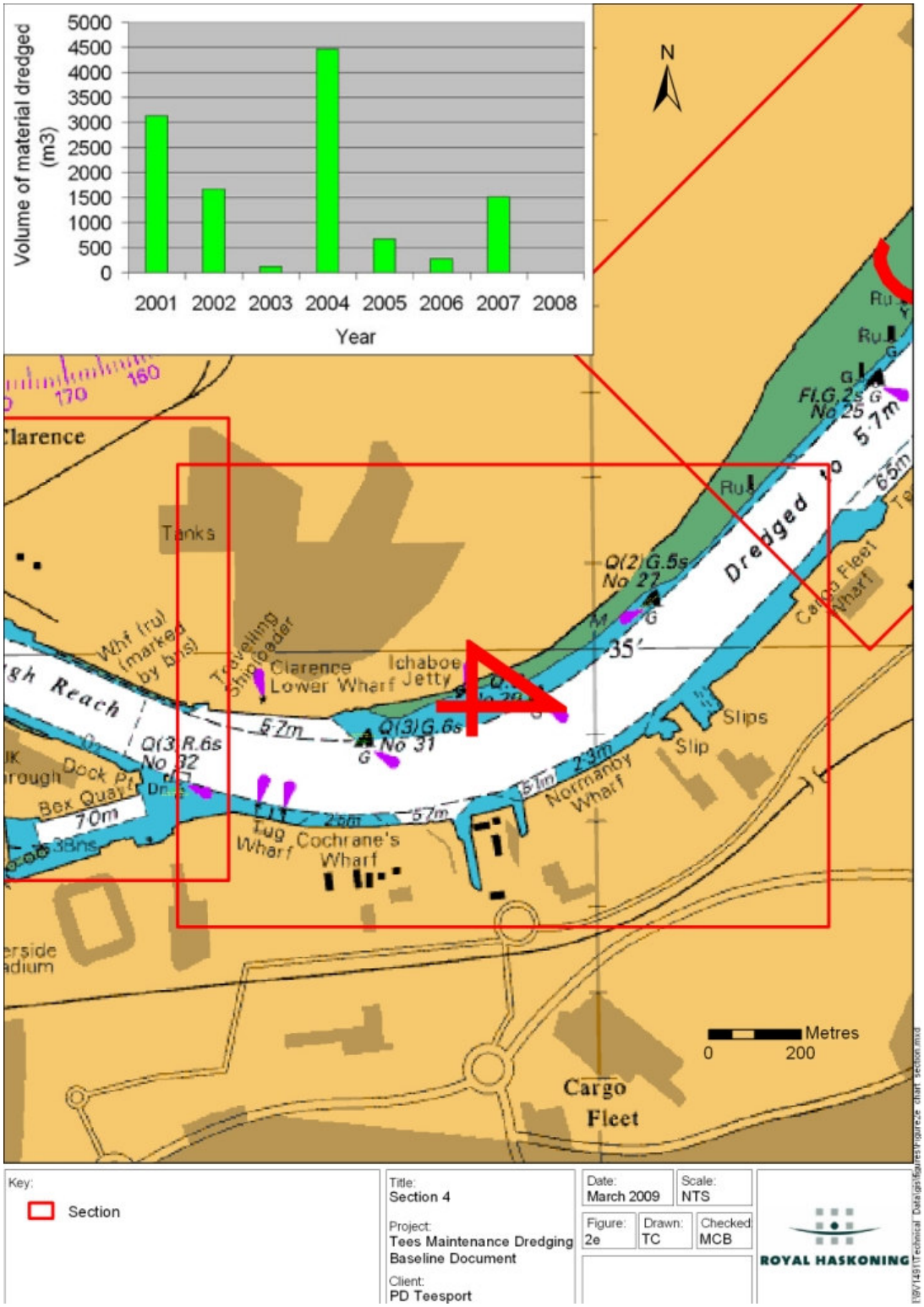

Figure 2.1e. The distribution of maintenance dredging by volume (m^3) in reach 4 during the period 2001 – 2008.

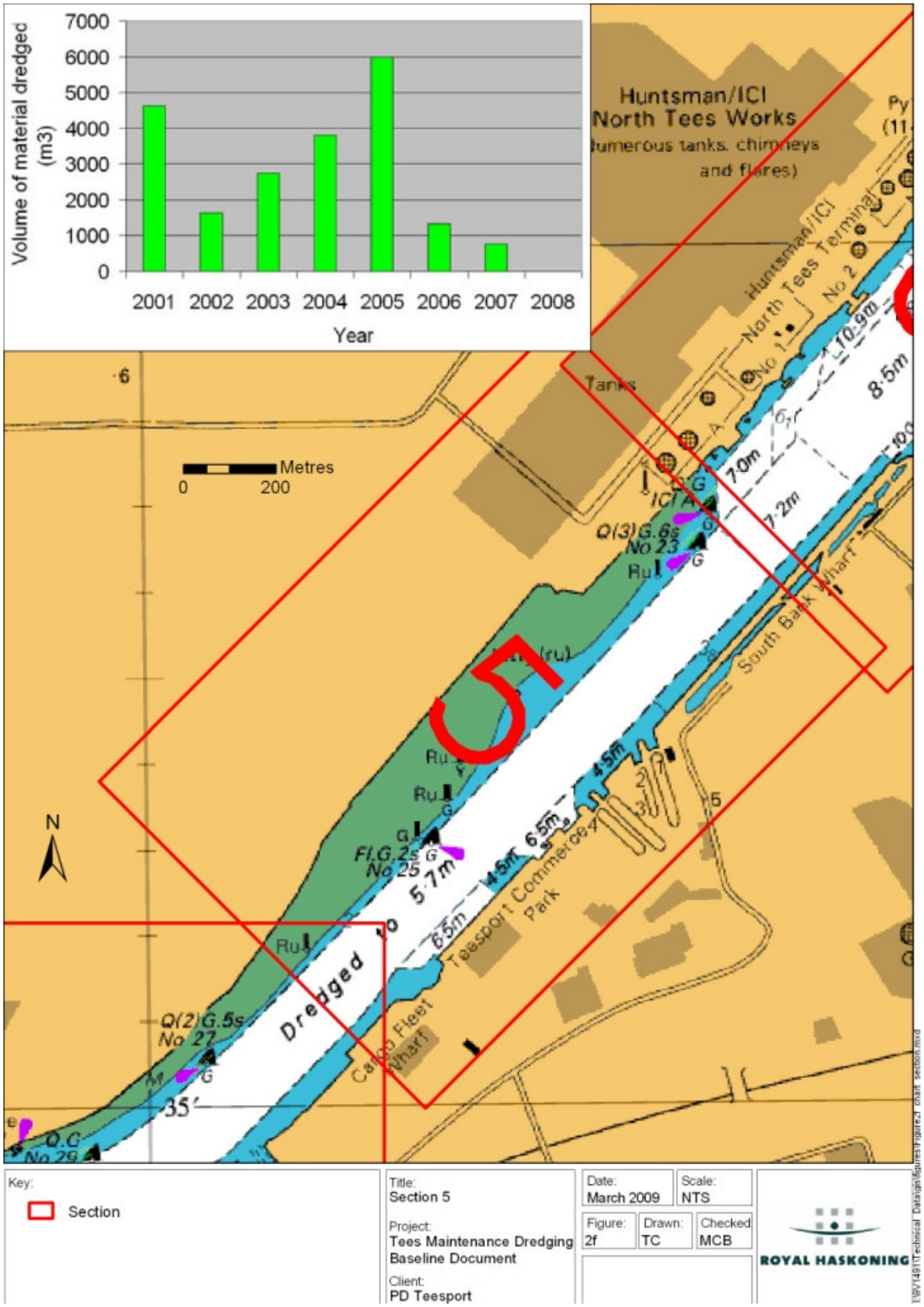

Figure 2.1f. The distribution of maintenance dredging by volume (m^3) in reach 5 during the period 2001 – 2008.

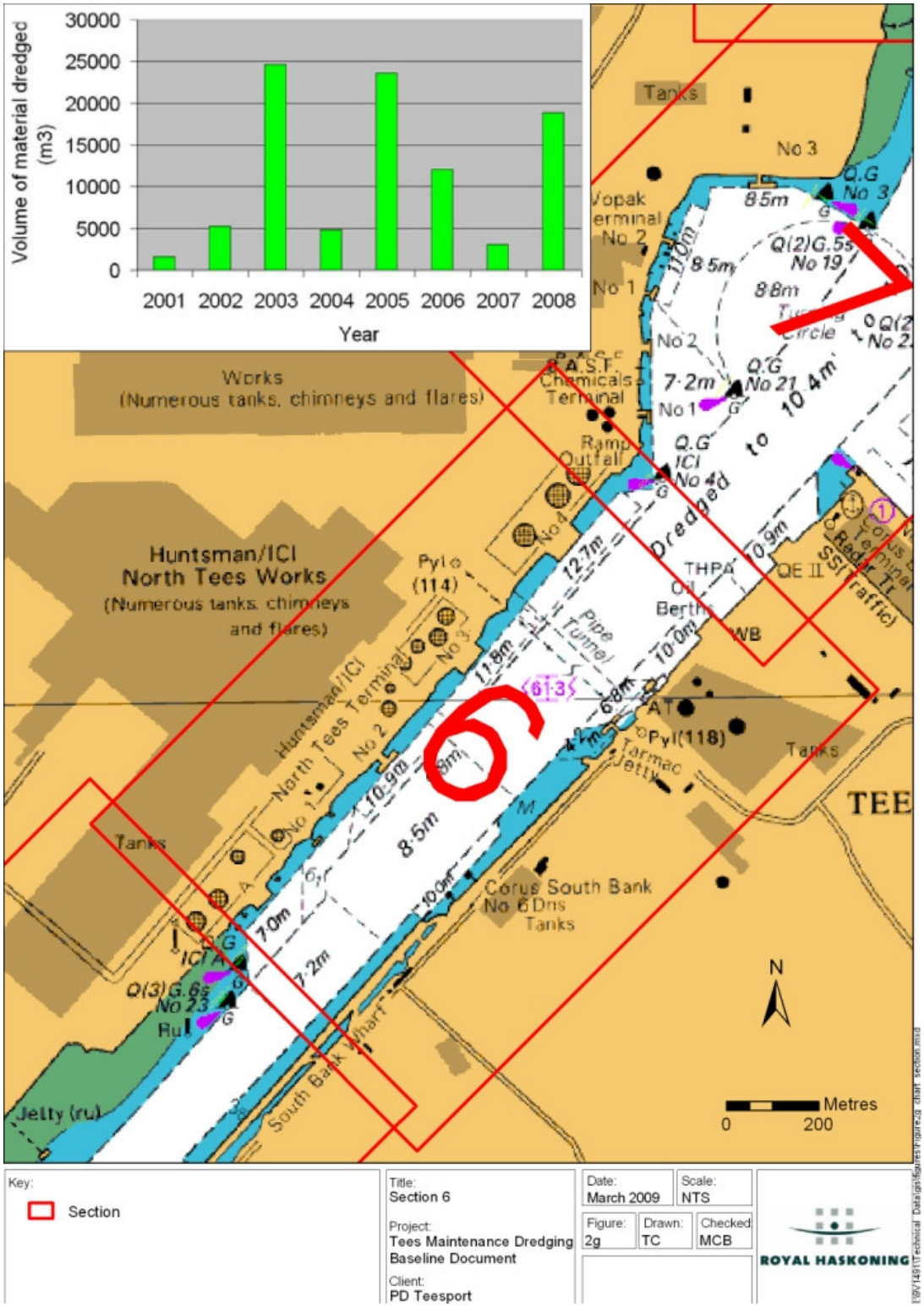

Figure 2.1g. The distribution of maintenance dredging by volume (m^3) in reach 6 during the period 2001 – 2008.

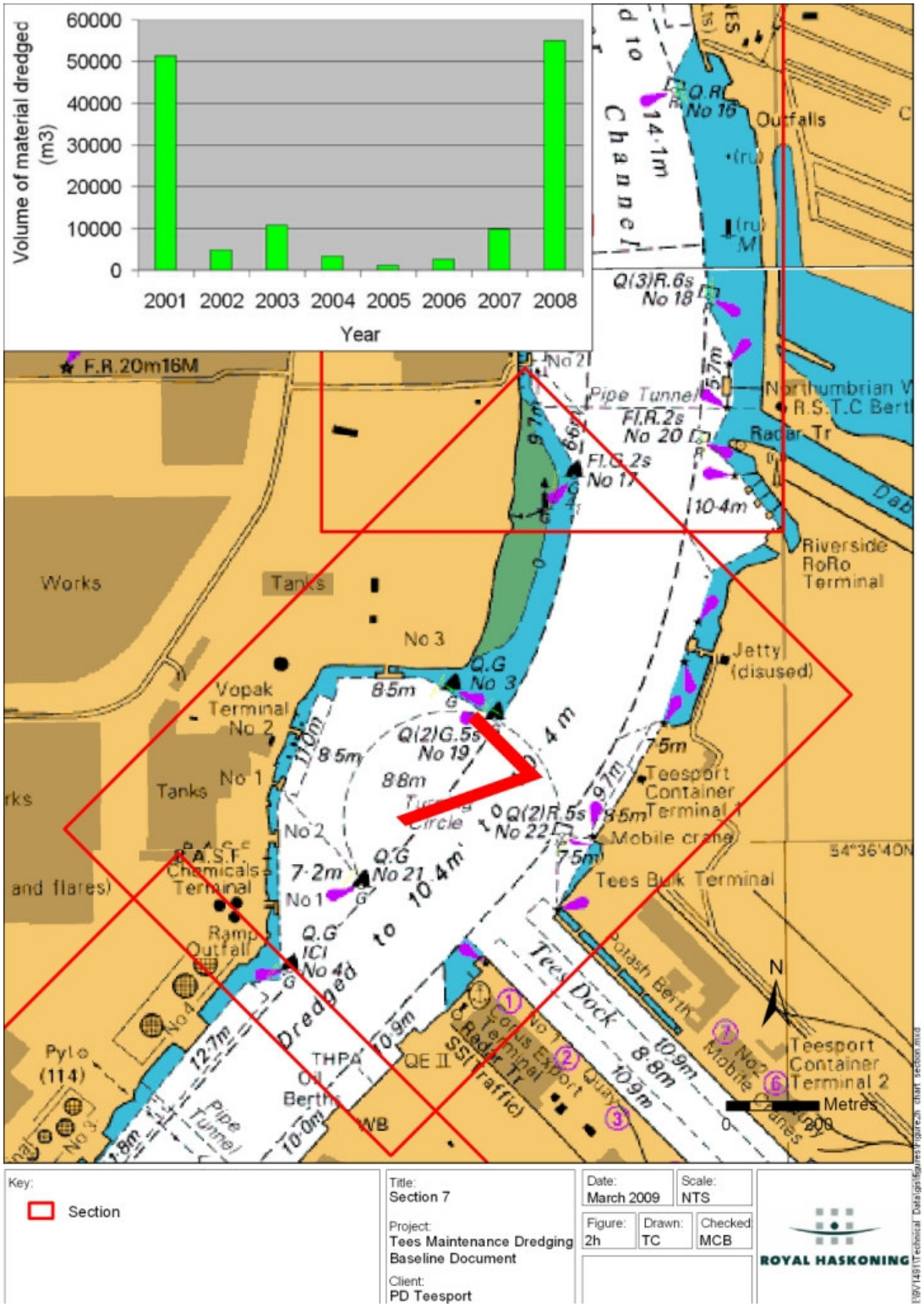

Figure 2.1h. The distribution of maintenance dredging by volume (m^3) in reach 7 during the period 2001 – 2008.

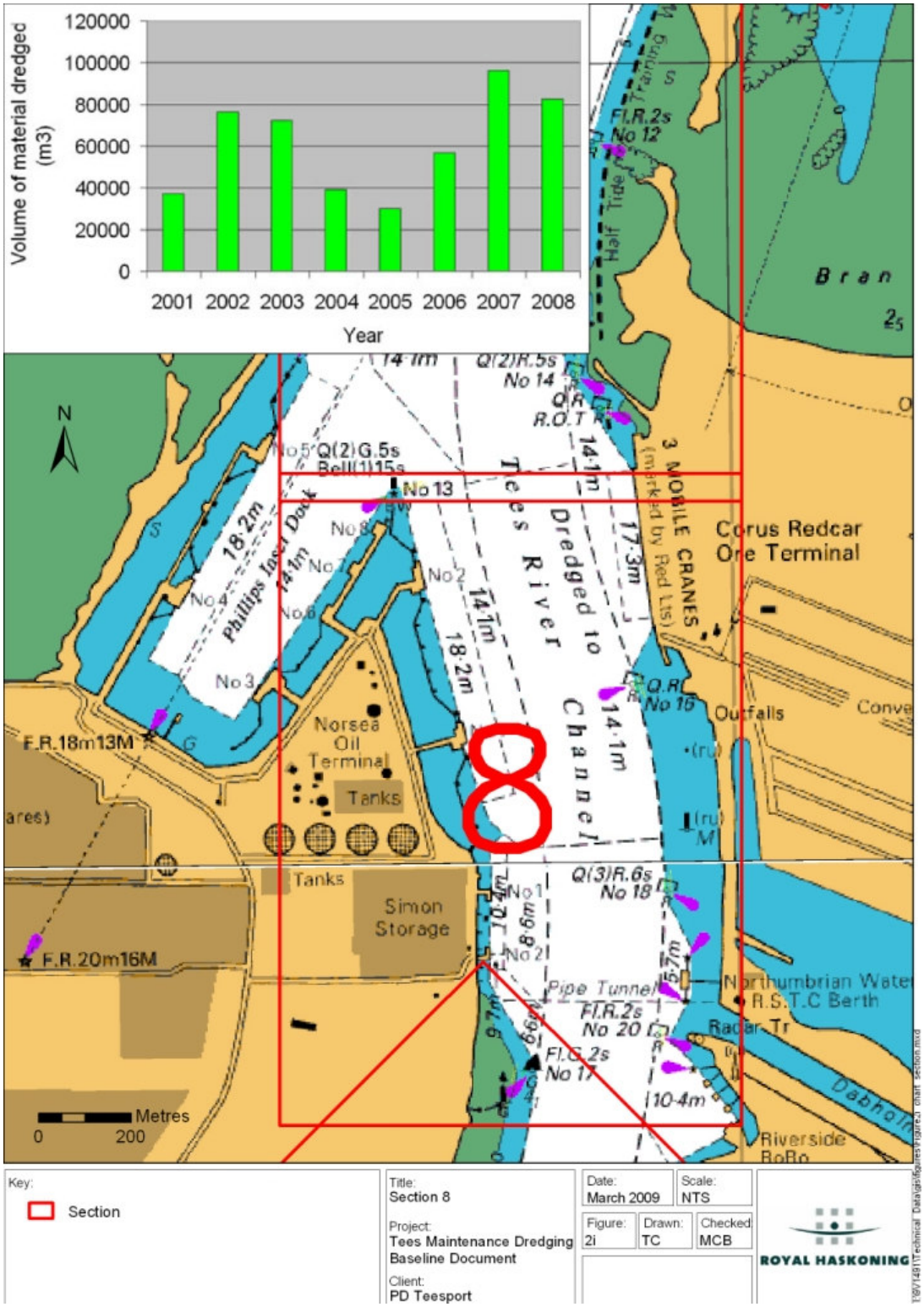

Figure 2.1i. The distribution of maintenance dredging by volume (m^3) in reach 8 during the period 2001 – 2008.

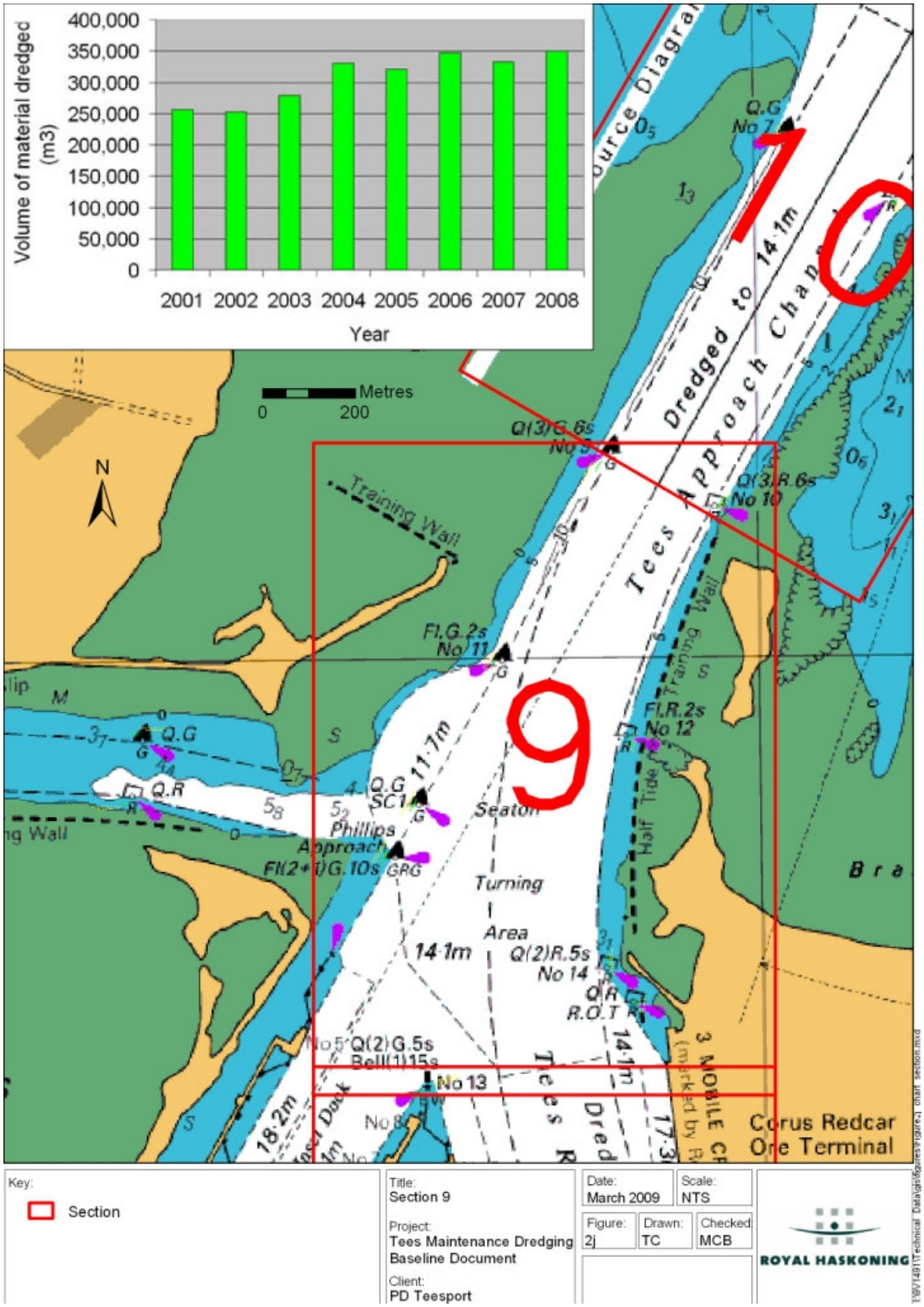

Figure 2.1j. The distribution of maintenance dredging by volume (m^3) in reach 9 during the period 2001 – 2008.

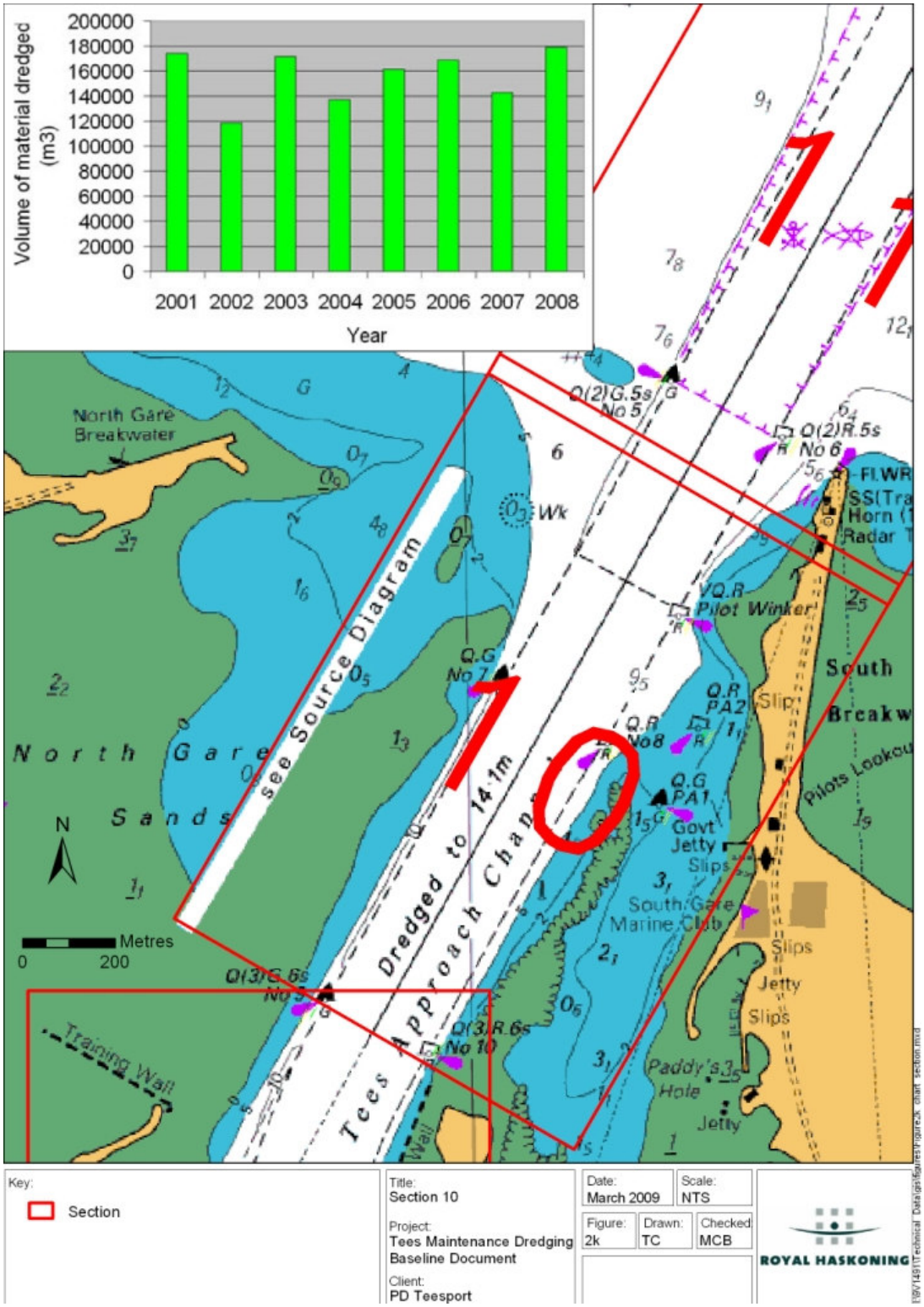

Figure 2.1k. The distribution of maintenance dredging by volume (m^3) in reach 10 during the period 2001 – 2008.

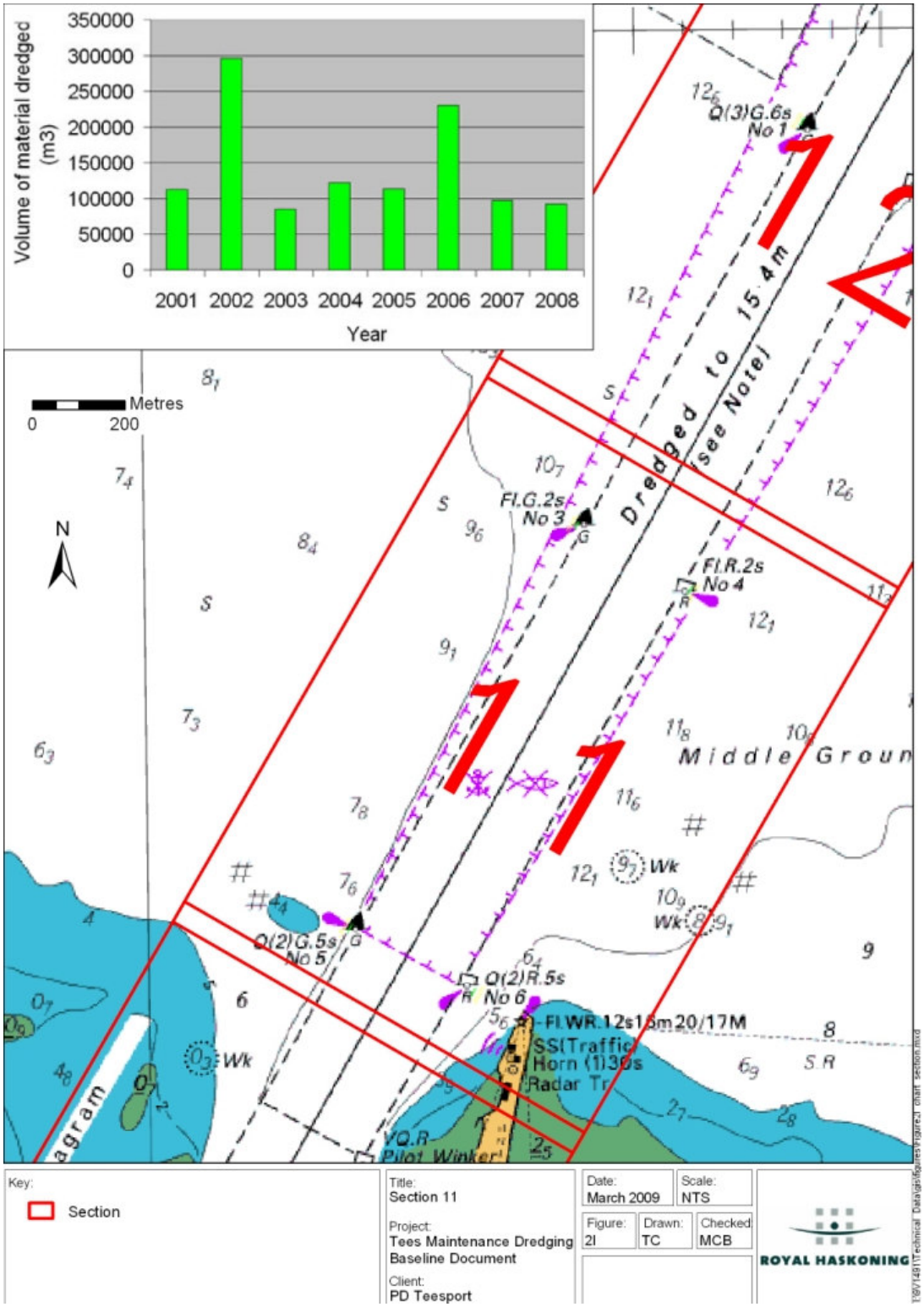

Figure 2.1l. The distribution of maintenance dredging by volume (m^3) in reach 11 during the period 2001 – 2008.

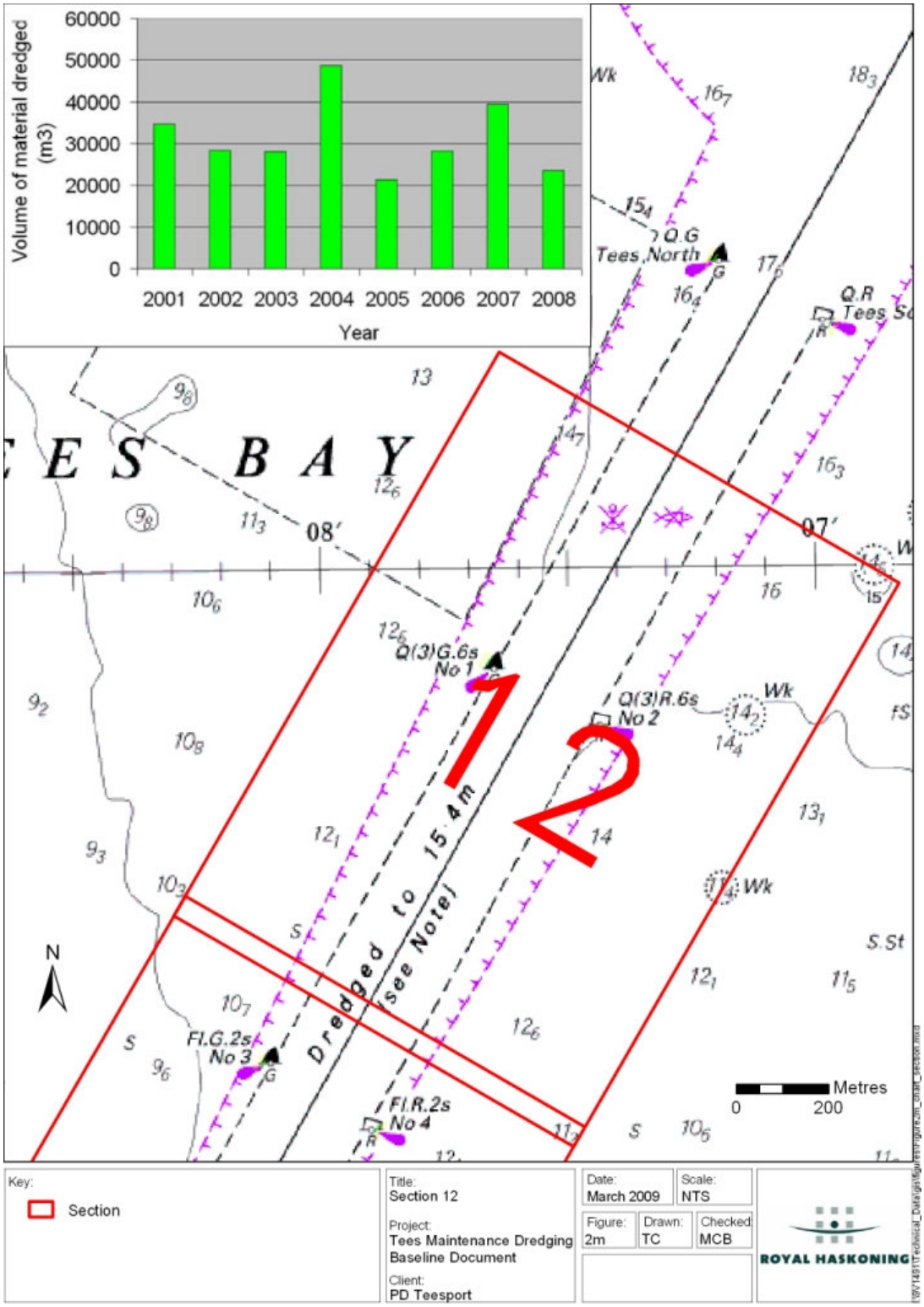

Figure 2.2m. The distribution of maintenance dredging by volume (m^3) in reach 12 during the period 2001 – 2008.

3 CHANGES TO DISPOSAL STRATEGY

3.1 Location and quantities

No changes have occurred to the location of the offshore disposal sites during the reporting period. Historically, dredged material was disposed of in reclamation areas around the Tees estuary. Since 1970, however, material has been deposited at the Tees Bay offshore disposal sites due to the increase in finer arisings not suitable for reclamation purposes. Additionally, areas to reclaim within the estuary are limited. The active disposal sites present in Tees Bay are summarised in Table 3.1. In general, Site A (TY160) is used for the disposal of maintenance dredge arisings while Site C (TY150) is used for capital dredge arisings (Figure 3.1). Site B (TY110) and Tees Bay Foreshore (TY170) are closed.

Table 3.1. Active disposal sites present in Tees Bay.

Disposal site	Status	Description	Comment
Tees Bay A (TY160) Within the area bounded by joining the points 54 40.800 N 01 03.500 W 54 41.500 N 01 02.200 W 54 41.000 N 01 00.300 W 54 40.200 N 01 01.500 W 54 40.800 N 01 03.500 W	Active	Active Inner site for soft non-cohesive maintenance material.	DEFRA records show volume fluctuating from 0.3 million to 2.4 million wet tonnes over a 15 year period. Volumes drop off post 1996. Largest volume since 1996 was 1.8 million wet tonnes deposited.
Tees Bay C (TY150) Within the area bounded by joining the points 54 42.600N 00 58.600W 54 41.900N 00 57.400W 54 41.400N 00 58.700W 54 42.300N 00 59.900W 54 42.600N/00 58.600W	Active	Predominantly used for capital dredged material. Some maintenance dredging has been disposed of here.	DEFRA records show period small scale usage. Peak volume deposited in 1999 of 1.9 million wet tonnes associated with the construction of the downstream Ro-Ro berths. Usual yearly volume is 0.1 million wet tonnes. Some years show no usage at all.

Where suitable, a proportion of dredged arisings are proposed for beneficial use within the estuary. Areas of interest include the North Tees mudflat where regeneration of the mudflat and the construction of bird habitats are being considered. Although beneficial use has been looked at to re-charge North Tees mudflat it is only to be considered if natural processes do not work once the half-tide embankment has been reinstated. The embankment repair (Application Reference: 34107/080709) was consented in late 2008. It comprises the refurbishment of a half-tide embankment. Work involves the placement of an impermeable bund in a 150 m breach of the embankment followed by the deposition of silt fines behind to allow sedimentation to occur. The bund is to be made

up of concrete cast blocks, but an application to vary this consent was submitted in March 2009 to replace the use of concrete blocks with dredged sand and geo-bags.

3.2 Mechanism of disposal

The mechanism for disposal during the reporting period has been for the dredger to steam out to Site A (TY160) and to release the dredged arisings over the disposal site a bottom door release (capital arisings from operations on the Tees are disposed of via a split hopper). Able (UK) have been involved in capital dredging and disposal via split hopper methods.

There are no other changes to report over the baseline document.

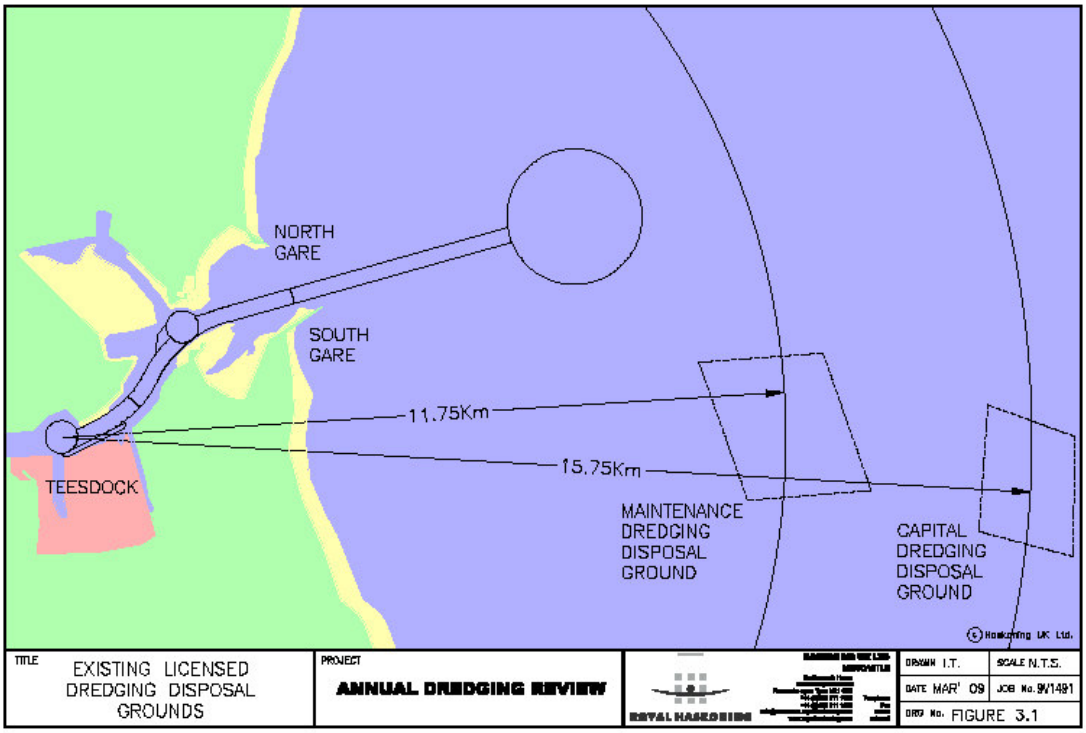

Figure 3.1. The location of dredging disposal grounds TY160 (Maintenance dredging) and TY150 (Capital dredging) and their distance (km) offshore from Tees Dock.

4 NEW ENVIRONMENTAL INFORMATION, LICENCES AND CONSENTS

4.1 Northern Gateway Container Terminal

In April 2008, PD Teesport received approval of a HRO (and received outline planning permission from the local planning authority) relating to the construction of the NGCT. The HRO included the power to dredge for the purposes of construction and maintaining the works and affording access to the works by vessels from time to time to deepen, dredge, scour, cleanse, alter and improve the river bed, shores and channels in the vicinity of NGCT operations. Baseline information for this application was supplied from the Northern Gateway Environmental Impact Assessment (see: Royal Haskoning, 2006).

4.2 Northern Gateway Container Terminal Ground Investigations

The 2008 HRO and outline planning permission for NGCT allowed an extensive programme of ground investigations to be taken forward within the river and adjacent terrestrial sites. Currently, the ground investigation programme is out to tender and no samples have been collected with the exception of the Queen Elizabeth II jetty (see below).

4.3 Queen Elizabeth II Jetty EIA

As part of the investigations in support of the EIA for the development of the Queen Elizabeth II Jetty (QEII) a limited number of boreholes and grab samples were undertaken in early 2009 from the vicinity of the existing QEII berth. In addition, a sediment dispersion modelling study relating to the proposed development was also undertaken. Subsequent chemical analyses has shown that unconsolidated sediments from the proposed capital dredge area are contaminated to such a level as to preclude their disposal to licensed offshore disposal sites. As such, alternative disposal/reuse options are currently the subject of further investigations. The Mercia Mudstone constituent of the proposed capital dredge required for this development (approximately 42,000 tonnes or 21,000 m^3) has been licensed for offshore disposal at the Tees Bay C (TY150) site (FEPA licence 34377/09/0).

4.4 Seaton Channel and Able (UK) Ltd.

Due to the recent expansion of ship recycling operations at the Able(UK) yard at the head of the Seaton Channel, maintenance dredging to 8.1m below CD was undertaken in early 2009 to facilitate the passage of vessels due to be broken at the yard. Table 2.1 shows an increase in the volume of dredged material removed from the site since 2007 although no new baseline information other than the dredged depth is available.

A FEPA licence application (Licence 32717/08/0) for the disposal of up to 1,934,836 tonnes of capital dredgings from Seaton Channel, the Holding Basin and Quays 10/11 of the Able (UK) yard was made by Able (UK) Ltd. on 2nd December 2004. The licence approved disposal at site A (TY160) for a period of 12 months from 21st May 2008. During 2008 capital dredging by Able (UK) Ltd, disposed 100,500 m^3 of dredged arisings at site A. The May 2008 FEPA licence to dispose of 1.94 million m^3 of capital material (i.e. the capital dredge of the Seaton Channel to 9.5m LAT) is still valid.

4.5 Teesside Offshore Windfarm

Discussion with the developer has indicated that the geotechnical investigations of the windfarm site in Tees Bay have recently been completed and that a report is expected in 2009. A baseline debris survey of the site is also due to be reported in 2009.

4.6 Other developments

A number of other developments on the river have been proposed during the reporting period including Vopak Jetty No4, and new jetties at Simon Storage and Conoco Phillips on the north bank. These are located within reaches 7, 8, and 9 (see Figure 2.1a – 2.1m) extending from a point opposite Tees Dock downstream to the Seaton Channel. Each of these three proposals have been postponed until further notice and prior to any dredging activity taking place. The reason for the delays has been attributed to the global financial downturn of late 2008 and 2009.

4.7 Monitoring buoys

The monitoring buoys are sited on the south bank at Tees Dock (in the main channel) and on the North side close to the entrance to Seaton Channel. They monitor turbidity in Formazin turbidity units (FTUs) and dissolved oxygen (DO) as a percentage at 1 m below surface.

As a condition of consent for the QEII Berth Development, one of PD Teesport's monitoring buoys is to be relocated to approximately 400 m upstream of the QEII berth, prior to the commencement of works. The buoy will monitor DO during the capital dredging works, with a threshold trigger value of 5 mg/l. Should levels fall below this value, dredging must cease until levels have improved.

5 IMPACTS OF NEW INFORMATION ON EXISTING BASELINE

5.1 New information in relation to the SPA and Ramsar site

New information published during the reporting period, which relates to maintenance dredging operations and is relevant to the SPA, includes the QEII berth development ES (Royal Haskoning, 2009a). This proposed development was granted EIA Consent by the MFA on 9 October 2009. Potential future sources of relevant information include the technical report of the geotechnical investigations of the Teesside offshore windfarm.

5.2 New potential impacts on the integrity of the SPA and Ramsar site

5.2.1 Conservation Objectives

Under Regulation 33(2)(a) of the Conservation (Natural Habitats &c.) Regulations 1994, Natural England has a duty to advise relevant authorities as to the conservation objectives for a EMS. Natural England's advice for the Teesmouth and Cleveland Coast EMS (English Nature, 2000), details the sites conservation objectives and provides information on how to recognise 'favourable condition' (as defined through the conservation objectives). Three conservation objectives apply to the Teesmouth and Cleveland coast SPA and Ramsar site.

1) For the internationally important populations of the regularly occurring Annex I bird species is as follows:

- Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 bird species, under the Birds Directive, in particular:
  - Sand and shingle;
  - Intertidal sandflat and mudflat; and
  - Shallow coastal waters.

2) For the internationally important populations of the regularly occurring migratory bird species is as follows:

- Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the regularly occurring migratory bird species, under the Birds Directive, in particular:
  - Rocky shores;
  - Intertidal sandflat and mudflat;
  - Saltmarsh.

3) For the internationally important assemblage of waterfowl, the conservation objective is:

- Subject to natural change, maintain in favourable condition the habitats for the internationally important assemblage of waterbirds, under the Birds Directive, in particular:
  - Rocky shores;
  - Intertidal sandflat and mudflat;
  - Saltmarsh.

The relevant favourable condition targets for the SPA are presented in Table 5.1.

Table 5.1. Favourable condition table for Teesmouth and Cleveland Coast SPA

Feature	Sub-feature	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring Annex 1 bird species (little tern, Sandwich tern)		Disturbance	Reduction of displacement of birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change	Significant disturbance to human activities can result in increased energy expenditure (flight and/or reduced food intake, displacement to areas of poorer feeding conditions)
		Extent and distribution of habitat	Area (ha) measured during reporting cycle	No decrease in extent from an established baseline, subject to natural change	These habitats provide both breeding and roosting sites for terns.
	Sand and Shingle	Vegetation characteristics	Predominantly open ground with sparse/short vegetation and bare surfaces (colonial nesting).	Vegetation height and density at nesting sites should not deviate significantly from an established baseline, subject to natural change.	Vegetation cover of <10% required throughput the areas used for nesting by little tern
	Intertidal sand and mudflats	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to sight lines, subject to natural change	Sandwich tern require views >200m to allow early detection of predators at roost sites
	Shallow coastal waters	Food availability	Presence and abundance of marine fish, crustaceans, worms and molluscs. Measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Crustacea, annelids. Sandeel and sprats are important for little tern and Sandwich terns

Table 5.1 continued.

Feature	Sub-feature	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring migratory species knot (winter), redshank (autumn) and of the internationally important assemblage of waterbirds		Disturbance	Reduction or displacement of birds.	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure
		Extent and distribution of habitat	Area (ha) measured during reporting cycle	No decrease in extent from an established baseline, subject to natural change	Rocky shores have particular significance for feeding knot at Teesmouth. Existing saltmarsh habitats are mere remnants of those of the original Tees estuary
	Rocky Shores	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to sight lines, subject to natural change	Waders require views over >200m to allow early detection of predators when feeding and roosting during the non-breeding season (at Teesmouth this is July-March inclusive)
		Food availability	Presence and abundance of surface and sub-surface invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	*Mytilus* spat are important prey for knot
	Intertidal sand and mudflats	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to sight lines, subject to natural change	Waders require views over >200m to allow early detection of predators when feeding or roosting
		Food availability	Presence and abundance of surface and sub-surface invertebrates Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Prey items include *Hydrobia*, *Macoma*, *Corophium*, *Nereis* (redshank and shelduck), *Macoma*, *Mytilus/Cerastoderma* spat, *Hydrobia* (knot), *Bathyporeia, Nerine, Mytilus*, wrack flies, sandhoppers (sanderling)

Table 5.1 continued.

Feature	Sub-feature	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring migratory species (knot (winter), redshank (autumn) and of the internationally important assemblage of waterbirds	Saltmarsh	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to sight lines, subject to natural change	Waders require views over >200m to allow early detection of predators when feeding or roosting
		Vegetation characteristics	Open, short vegetation or bare ground predominating (feeding and roosting)	Vegetation height throughout areas should not deviate significantly from an established baseline, subject to natural change	Vegetation of <10cm is required throughput areas used for roosting
		Food availability	Presence and abundance of aquatic invertebrates, measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	*Hydrobia, Corophium* are important for redshank, shelduck and teal. These habitats provide supplementary feeding opportunities especially at high water
			Presence and abundance of seed-bearing plants. Measure periodically (frequency to be determined)	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change	*Salicornia* and *Atriplex* are important for teal during the non-breeding season (November – March) while *Salicornia* seeds may be taken by shelduck

As maintenance dredging practices have remained unchanged during the reporting period (2006 – 2008), there is no potential for additional impacts on the interest features of the SPA or Ramsar site to have arisen.

Of the new consents received since 2006 (including Licence 33195/06/0 for disposal of 19,800 tonnes from Dawson`s North Sea Supply Base and TCP Heavy Lift Quay; Licence 32880/06/01 for disposal 88,000 tonnes from Billingham Reach Wharf, Tees Dock Turning Circle, Tees Dock Water Area and Corporation Dock; and Licence 34377/09/0 for the disposal of 42,000 tonnes of Mercia Mudstone from the QEII berth) none are expected to have an adverse effect on the integrity of the SPA and Ramsar site (see respective applications). With regards to the QEII berth development, it was concluded in the ES that the effect of the scheme on the current maintenance dredging regime within the estuary will be insignificant, and no changes the current dredging strategy will be required (Royal Haskoning, 2009a).

Currently, low water counts of birds on the mudflats and sand flats of the estuary are undertaken by RPS Group on behalf of Northumbrian Water Limited (NWL). Recent data covering the period of this report are not available in the public domain; however, PD Teesport contributes to the cost of data collection and the trends revealed in the NWL data have been made available and are summarised below.

5.2.2 Summary of NWL bird count data

Data supplied by RPS Group (RPS, 2009) have been reviewed to determine any trends with regards to ornithology in the estuary. Peak count data for WeBS years (July to June) from 2004 to 2008 have been provided for Seal Sands, Bran Sands, North Gare Sands and North Tees Mudflats, based on the interest features listed for the SPA. Peak water bird assemblage counts are calculated by summing individual species maxima during the WeBS year, irrespective of the month in which they occurred.

As presented in Figure 5.1, sandwich tern counts appear to be highly variable, with none recorded during the 2004 WeBS year. Maximum counts appear to vary between the sites of Bran Sands and North Gare Sands, though by 2008 only 3 birds were observed at North Gare. Little tern were not counted.

The number of knot recorded at Seal Sands have increased yearly from approximately 100 birds in 2004 to a maximum of 955 in 2007, though counts returned to near previous levels in 2008 (Figure 5.2). Counts of knot at Bran Sands and North Gare Sands peaked in 2005, and then significantly decreased to only three recordings at both sites in 2006. The numbers of knot at these two sites now appear to be increasing.

The number of redshank at Seal Sands increased from 357 counts in 2004, to a peak of 987 in 2005, with numbers appearing to have remained relatively stable over the following three years to 2008 (Figure 5.3). Counts of redshank at Bran Sands and North Gare Sands have remained relatively stable over the recording period (2004 to 2008), with an average of 114 and 19 counts respectively. Counts of redshank at North Tees Mudflats appear to have decreased over the same recording period.

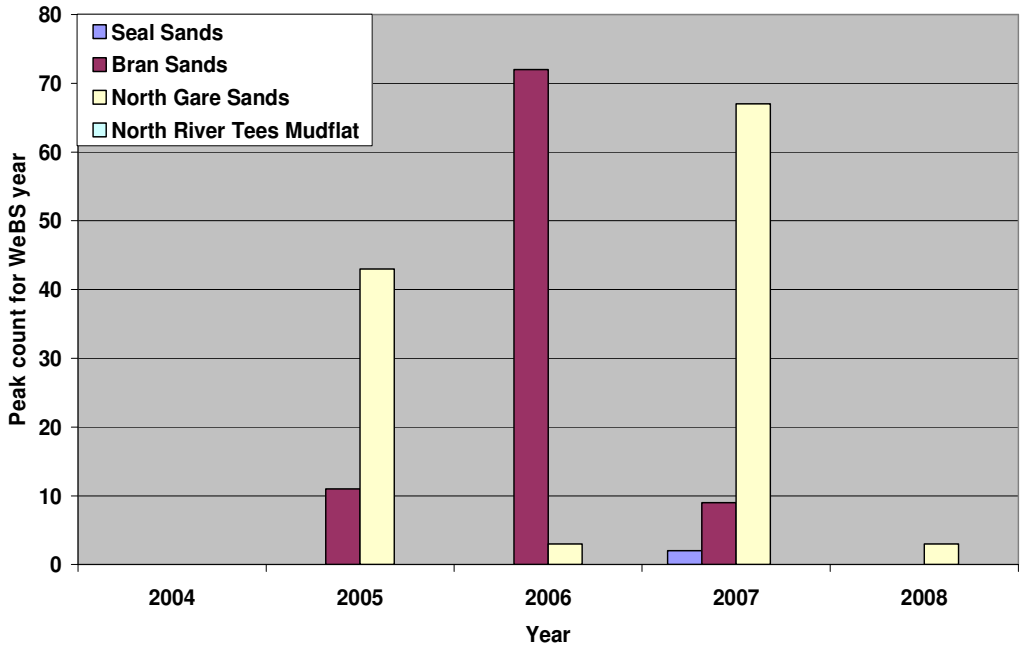

Figure 5.1 Low water usage of Sandwich Tern recorded on the major intertidal sites of the Tees Estuary from 2004 until 2008.

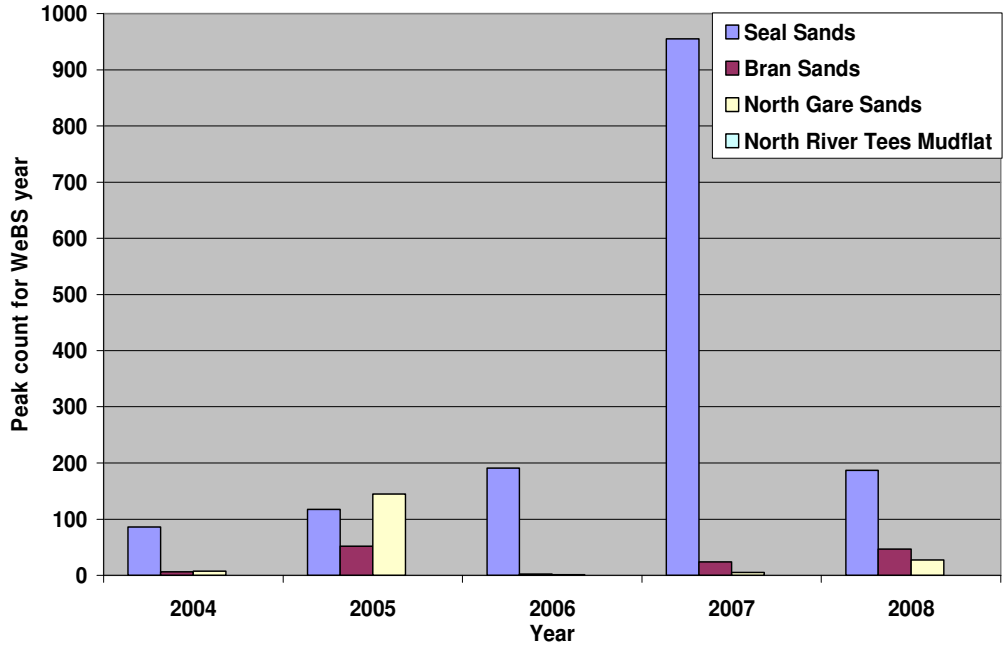

Figure 5.2 Low water usage of Knot recorded on the major intertidal sites of the Tees Estuary from 2004 until 2008.

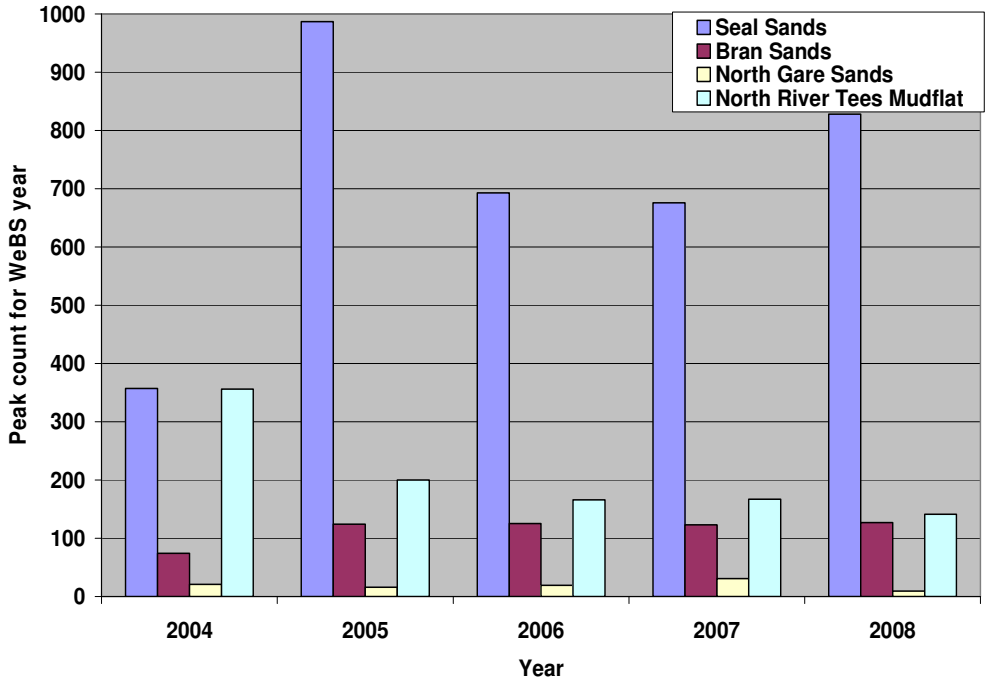

Figure 5.3 Low water usage of Redshank recorded on the major intertidal sites of the Tees Estuary from 2004 until 2008.

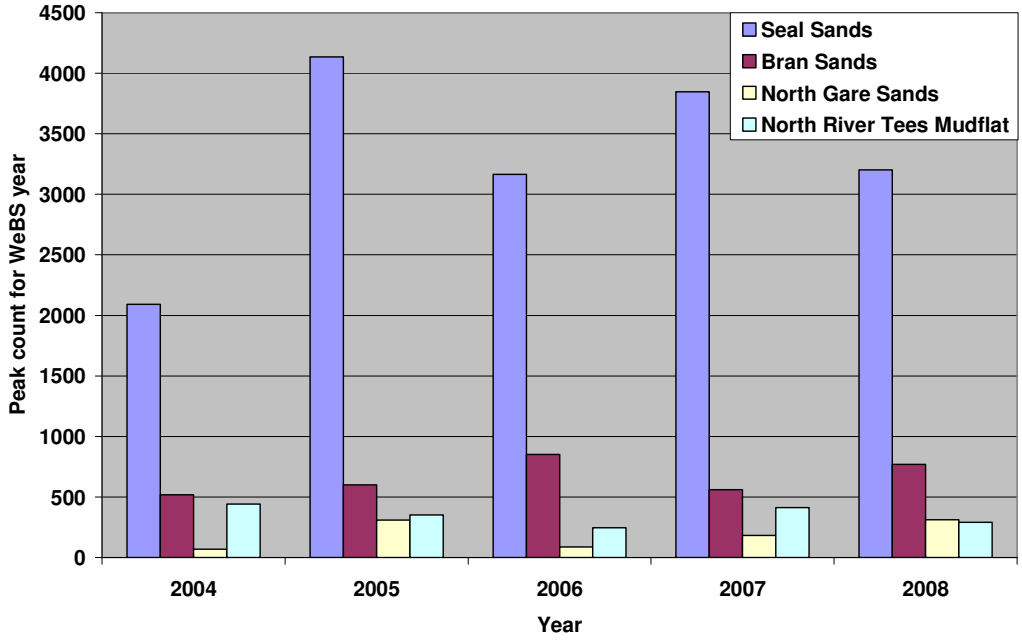

Figure 5.4 Waterbird Assemblage recorded on the major intertidal sites of the Tees Estuary from 2004 until 2008.

Water bird assemblage counts at Seal Sands are an order of magnitude higher than for the other three sites surveyed, with peak counts consistently over 3000 for the past four years (Figure 5.4). Counts for water bird assemblage at Bran Sands increased from approximately 500 in 2004 to 852 in 2006, with a slight decrease recorded in 2007. Water bird assemblages at North Gare Sands and North Tees Mudflat are variable, ranging from 70 to 441 counts.

5.2.3 Conservation objectives

Taking each of the three conservation objectives in turn, the internationally important populations of little tern and sandwich tern addressed by conservation objective 1 are most likely to be affected by disturbance and habitat loss on areas of sand and shingle while nesting and roosting, and over shallow coastal waters while feeding. Sandwich tern also require views >200 m to allow early detection of predators at roost sites. Of these factors, habitat loss through maintenance dredging activities could be considered most relevant; however, no loss of sand and shingle areas due to maintenance dredging has been shown during the reporting period. Similarly, there is little evidence to suggest that tern feeding success has been affected by dredger movements in the estuary or in Tees Bay, and sight lines across areas of intertidal sand and mudflats have not been affected by maintenance dredging activity.

In terms of conservation objective 2 that relates to maintaining in favourable condition, the habitats of internationally important populations of regularly occurring migratory species; in particular, knot (winter), redshank (autumn), in areas of rocky shores, intertidal sandflat and mudflat, and saltmarsh, none of the sub-feature attributes (disturbance, extent and distribution of habitats, absence of obstructions to sight lines, or food availability) have been shown to be adversely affected during the reporting period by maintenance dredging. The availability, abundance and species diversity of invertebrates in intertidal areas of mud and sand has not been shown to be affected by maintenance dredging activity. The potential for beneficial use of dredged arisings is subject to constant review so that these important habitats can be managed successfully for the benefit of the bird species that use them. Saltmarsh habitats in the Tees estuary are largely located to the north at Greatham creek and the closest maintenance dredging activity commonly occurs approximately 3 km downstream at the confluence of the Seaton Channel with the main river.

With regard to conservation objective 3: maintaining favourable condition of the habitats for the internationally important assemblage of waterbirds particularly in areas of rocky shores, intertidal sandflat and mudflat, and saltmarsh, the observations above remain true. Saltmarsh habitats in the Tees estuary are largely located to the north at Greatham creek and the closest maintenance dredging activity commonly occurs approximately 3 km downstream at the confluence of the Seaton Channel with the main river.

5.3 The Water Framework Directive

The environmental objectives of the Water Framework Directive (WFD) fall under Article 4(1) of the Directive, which states:

"Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status at the latest 15 years after the date of entry into force of this Directive."

In addition, Article 4 (7) of the WFD states that:

"Member States will not be in breach of this Directive when:

- *failure to achieve good groundwater status, good ecological status or, where relevant, good ecological potential or to prevent deterioration in the status of a body of surface water or groundwater is the result of new modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater, or*
- *failure to prevent deterioration from high status to good status of a body of surface water is the result of new sustainable human development activities,*

and all the following conditions are met:

a. *all practicable steps are taken to mitigate the adverse impact on the status of the body of water;*
b. *the reasons for those modifications or alterations are specifically set out and explained in the River Basin Management Plan required under Article 13 and objectives are reviewed every 6 years;*
c. *the reasons for those modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives set out in paragraph 1 are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and*
d. *the beneficial objectives served by those modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option."*

Therefore, if it can be demonstrated that the maintenance dredging programme has met with the conditions set out in Article 4 (7), the retrospective assessment of disposal consents from 2008 currently underway will show that maintenance dredging has not been in breach of the WFD.

5.3.1 Tees Transitional Water Body (GB510302509900)

Current status

The Tees transitional water body is currently designated as a Heavily Modified Water Body (HMWB) for reasons of flood protection and navigation. Annex B of the Northumbria River Basin Management Plan (RBMP) states that the current status of the Tees transitional water body is Moderate Ecological Potential with low confidence that the water body is at less than good status.

Elements of the water body that are considered to be achieving less than Good Ecological Potential include:

- Biological status
  - Macroalgae.
- Chemical status
  - Dissolved Inorganic Nitrogen.
  - Phenol.
- Hydromorphological status
  - Freshwater flows into transitional waters.
  - Hydromorphology (no specific details given in RBMP).

Pressures

Annex G of the Northumbria RBMP (Environment Agency, 2009) provides a summary of the significant pressures and the risks resulting from human activities on the status of surface water and groundwater. Within these pressures those that are relevant to the proposed development within the Tees transitional water body include:

- *Physical modification morphology including land claim, shoreline reinforcement, and dredging activities.*
- *Indirect effects of sediment from current and historic point and diffuse sources of pollution.*

Actions

Annex C of the Northumbria RBMP (Environment Agency, 2009) identifies actions that are already taking place within the River Basin District and also further actions and when it is planned to achieve these. Those that are relevant to maintenance dredging include:

- *Investigation of losses from sediments and appraise options for remediation to meet EQS and reduce / cease losses in this or subsequent rounds.*
- *Ports, harbours and navigation authorities to prepare a dredging and disposal strategy, such as this baseline document as recommended under the Maintenance Dredging Protocol.*
- *Sediment monitoring, modelling and bioaccumulation studies on heavy metals which may be related to sediment movements.*
- *Apply national guidance framework on disposal of dredgings to refine local measures as appropriate (where not disproportionately costly or technically infeasible).*

All of the above actions have been addressed either within the Northern Gateway Container Terminal Environmental Statement (Royal Haskoning, 2006), QEII Berth Development Environmental Statement (QEII ES) (Royal Haskoning, 2009a) or will be addressed through the regular update of the Tees Maintenance Dredging Protocol by PD Teesport, of which this review document forms an integral part. Although dredging operations may have the potential to affect the extent of marginal habitats and levels and dispersal of suspended sediment in the river, it is not considered that maintenance

dredging at current permitted levels has any impact upon marginal habitat. Where appropriate, the beneficial use of dredged arisings should be intended to deliver a significant improvement to marginal habitat in the wider Tees transitional water body.

5.3.2 Eston to Teesport (Tidal Tees) freshwater body (GB103025076000)

The Eston to Teesport freshwater body discharges into the River Tees. This river is not designated (i.e. it is not a HMWB or an artificial water body (AWB)) but its Ecological Status has not yet been assessed and therefore it has no actions or pressures associated with it.

5.4 The potential impacts of the dredging regime

5.4.1 Tees transitional water body

Impact on hydromorphological quality

No means have been identified by which the current maintenance dredging programme can adversely affect the overall estuary morphology and the ongoing morphological processes which are at work to a significant extent. It can therefore be concluded that maintenance dredging at current permitted levels will have no significant impact on the hydromorphological quality of the Tees transitional water body.

Impact on biological quality

The effect of maintenance dredging at current permitted levels within the Tees transitional water body will have no significant impact on its marine ecology. There may be an impact of minor adverse significance due to direct loss of intertidal and subtidal benthic communities during capital dredging, although it is not considered that capital projects such Northern Gateway for example would have a significant adverse impact on the transitional water body as a whole (refer to Royal Haskoning, 2006). Similarly, the effect of dredging on the local fisheries resource within the Tees transitional water body will be of negligible significance. It can therefore be concluded that maintenance dredging will have no impact on the biological quality of the Tees transitional water body.

Impact on chemical quality in the water and sediments

At current permitted levels, the effects of maintenance dredging on the marine water and sediment quality within the Tees transitional water body is not likely to be significant in the future. There will be a short term, localised impact on water quality of minor adverse significant during dredging activities, although it is considered that this would not have a significant adverse impact on the water body as a whole in the long term. It can therefore be concluded that the scheme will have no impact on the chemical quality of the Tees transitional water body.

Impact on Ecological Potential

As all predicted impacts on hydromorphological, biological and chemical quality elements are of minor adverse significance or less, it is not considered that maintenance dredging at current permitted levels will cause a deterioration in the ecological potential of the Tees transitional water body.

5.4.2 Eston to Teesport (Tidal Tees) area fresh water body

As the fresh water body has not been classified, it is not possible to undertake a full assessment of it. However, as the scheme is holding the existing defence line, maintenance dredging at current permitted levels is unlikely to have any significant adverse impacts.

5.5 Cumulative Impacts

Because of the global financial downturn of late 2008 and 2009 a number of development proposals on the Tees estuary have been postponed prior to formal applications being made (see: Section 4.1). The extent of maintenance dredging on the estuary is therefore expected to increase within the limits and conditions of existing consents for the foreseeable future and no change to the extent or type of cumulative impacts previously identified is expected to occur.

5.6 Changes to previous recommendations

Previous recommendations regarding the management and mitigation of potential effects on the Tees and Cleveland Coast SPA and Ramsar site were presented in Section 5 of the Baseline Document (Royal Haskoning, 2008). The Baseline document identified that maintenance dredging has the potential to affect the SPA and Ramsar site through the following parameters:

- Changes to habitats as a result of hydrodynamic change leading to changes in the morphology of the estuary.
- Increases in levels of suspended sediment during dredging operations. This could potentially impact on the food resource of the SPA interest features; particular the little tern which feeds on sandeels and small fish in the mouth of the estuary.
- The remobilisation and redistribution of sediments which may be contaminated within the study area. These sediments could potentially impact on the intertidal benthic organisms used by the waterbirds as a feeding resource.
- Increased disturbance. Potentially, an increase in noise levels could impact on SPA waterbird populations. This is of particular concern during the winter period when waterbirds feed and gather energy.

The Baseline Document discussed the potential for direct and indirect impacts of the following:

- Maintenance dredging on the morphology of the SPA.
- The resuspension of contaminated sediment.
- Changes in water quality.
- Noise disturbance of waterbird species.

The Baseline Document concluded that the existing maintenance dredging activity being undertaken in the study area does not appear to be having or has historically had, an impact on the designated site which would alter its condition. From the condition assessments provided for the SSSIs, it was assumed that the majority of the SPA would be deemed to be in favourable condition, with the exception of Seal Sands.

Where the condition assessments for the relevant SSSIs state that the condition of the site has been affected, practices related to land management are given as the reasons

for unfavourable condition. For example, the presence of *Enteromorpha* mats on Seal Sands is reported to be due to poor water quality associated with agricultural practices. The Baseline Document recommended that these conclusions must be reviewed if a significant change in maintenance dredging practices should occur as a result of new developments. Of particular note were the issues associated with the deposition of sediment on Seal Sands and the possible changes to the growth of *Enteromorpha* mats by altering the sediment transport pathways. Although it was considered unlikely that the existing maintenance dredging was having a significant impact on these mats, as part of a wider estuary project, monitoring proposals had been developed. These proposals were designed to monitor the sedimentation issue over a period of five years. They provided an opportunity to discuss the results and any possible working practices which could be adopted to alter any impacts measured. For example, the existing working practices in Seaton Channel may be altered as a result of this monitoring.

Section 6 of the Northern Gateway Container Terminal Environmental Statement (Royal Haskoning, 2006) predicted that, as a consequence of the capital dredging in the lower reaches of the estuary, some deposition of material re-suspended by the dredging will occur on Seal Sands. This area is particularly of concern due to its designated status and the potential impact of the deposited sediment on the feeding resource of waterbirds. Ways in which this potential effect will be managed were detailed in Section 4.3. of the Environmental Statement (Royal Haskoning, 2006).

Within the Northern Gateway Environmental Statement (Royal Haskoning, 2006), the area of concern with regard to potential in-combination effects related to the requirement for maintenance dredging to be undertaken during the capital works. This was discussed in more detail in the Supplementary Report (Royal Haskoning, 2007b) and predicted that in-combination effects were not significantly different from those predicted as a consequence of the capital dredging alone.

In-combination studies were undertaken for other relevant projects and plans and were presented in the Northern Gateway Environmental Statement (Royal Haskoning, 2006). Since it was concluded that the proposed scheme did not have the potential to result in a significant in-combination effect with the other plans or projects, the management of the combined effects of these projects do not form part of the dredging protocol (Royal Haskoning, 2007a).

Dredging activity in the Seaton channel since 2007 has removed a large volume of sediment from the bed of the channel; however, the width of the channel has not been significantly affected and the area of most activity has been at the head of the channel in the vicinity of the AbleUK yard rather than at the confluence of the Seaton channel with the main river channel. Subsequently, the North Gare sands are not considered to be at additional risk as a result although Seal Sands may be at a higher risk as a result of these dredging operations. The current sediment monitoring plan (see above) is suitably placed to inform of any unexpected change or adverse effect to the sedimentary regime at this location.

The proposed dredging operations in relation to the QEII Berth Development have been subject to a number of conditions to allow for consent to be granted. This includes the use of a sealed bucket or grab dredger and also sealed barges for the dredging of unconsolidated contaminated sediments. These measures were discussed in detail with both the Regulatory Authorities and Statutory Consultees and a Dredging Plan for the QEII berth was produced (Royal Haskoning, 2009b). The Dredging Plan outlines the

mitigation measures most appropriate for the proposed dredging operations and, as such, it was possible to conclude that on adoption of such measures, no adverse effect upon the integrity of the Teesmouth and Cleveland Coast SPA was predicted from these operations.

6 REFERENCES

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