Note / Memo

HaskoningDHV UK Ltd.
Industry & Buildings

To:	Marine Management Organisation
From:	Royal HaskoningDHV
Date:	17 November 2022
Copy:	Joshua Riley
Our reference:	PC1084-RHD-SB-EN-NT-EV-1137
Classification:	Project related

Subject: **MLA/2020/00506/2 South Bank Quay Marine Licence Variation: Response to RFI 17**

---

1 Introduction

South Tees Developments Limited (STDL), otherwise known as 'Teesworks', are in the process of constructing a new quay at South Bank on the River Tees ('South Bank Quay'). The original marine licence was made by the Marine Management Organisation (MMO) on 17th December 2021 (L/2021/00333/1) and included activities for the demolition of existing structures, capital dredging of a new turning circle, capital dredging of the channel and berthing pocket, and placement of a rock blanket. A previous marine licence variation request to amend the dredging methodology, dredge depths, dredge areas and include an additional activity for enabling works (to facilitate access to and from South Bank Wharf) was determined by the MMO on 26th August 2022 (L/2021/00333/2).

The current (second) marine licence variation request (herein referred to as 'MLV2') follows a general enquiry (ENQ/2021/00205) discussed with the MMO in regular meetings and relates to a proposed increase to the capital dredge and disposal volumes to facilitate removal of the material between the existing OSPAR line[1] and line of the new quay wall together with minor corrections identified after determination of first marine licence variation request (herein referred to as 'MLV1'). The material between the existing OSPAR line and the line of the new quay wall is herein referred to as 'OSPAR material'.

On 28th October 2022, the MMO published a Request for Further Information – 'RFI 17' – following receipt of consultee comments on MLV2. Specifically, the MMO has requested the following:

1. A summary as to whether the changes requested in this variation will cause conditions outside of those that have already been evaluated / modelled?
2. Will the removal of bank material via dredging change the level of suspended sediment compared to those shown in the plume model and the mean value used in the SediChem tool previously or pose impacts different / greater than those covered in the EIA that has been previously provided?
3. In the previously submitted document – South bank quay – Technical note: Hydrodynamic and sediment plume modelling (document reference PC1084-RHD-SB-EN-RP-EV-1100), on page 8 it shows the dredging time in weeks. Is it expected that this variation will change the dredging times given here?

[1] The OSPAR line is taken to be the vertical level of Mean High Water Springs (MHWS). The material to be dredged which would be consented under MLV2 would therefore comprise the material that is currently landward of the vertical level of MHWS, but below the horizontal level of Mean High Water (MHW).

This note forms the response from Teesworks to RFI 17 and addresses each of the matters listed above in turn within the following sections.

2 Review of Assessments

The changes requested under MLV2 relate to dredge and disposal volumes to account for both additional dredging of the OSPAR material and a correction to include additional volume for dredging tolerances, together with non-material corrections of previous errors. As such, the review of assessments focussed on the scope and level of assessment into the potential effects of these changes upon marine water and sediment quality as well as hydrodynamic and sedimentary processes. Following this, consideration was made into whether secondary effects upon marine ecological receptors would arise, together with risks to navigation beyond those that have already been assessed in previous submissions.

2.1 Marine Water and Sediment Quality

Sediment sampling of the original dredge area was undertaken in September and analysed in October of 2019 for the MMO standard suite of determinands, including polybrominated diphenyl ethers (PDBEs). Further sediment sampling of the material proposed to be dredged between the existing OSPAR line and the line of the new quay wall (herein referred to as 'OSPAR material') and analysis was undertaken in March 2022 for the same determinands as the 2019 samples were tested for.

A review was carried out comparing the difference in concentrations of the determinands between the 2019 samples (from the original dredge area) and 2022 samples (from the OSPAR material). The review considered the minimum, maximum and mean values of all determinands analysed from the 37 boreholes of the 2019 sampling campaign and the 15 boreholes of the 2022 sampling campaign. Comparison of the minimum, maximum and mean determinand concentrations between the 2019 and 2022 samples are presented within **Appendix A Table A.1** to **Table A.4**.

This exercise identified that, across all determinands analysed, the mean determinand concentrations were **lower** in the 2022 samples (the OSPAR material) than in the 2019 samples (original dredge area).

The minimum determinand concentrations of the 2022 samples were either lower or generally consistent with the minimum determinand concentrations of the 2019 samples, with the exception of the following:

- Heavy metals and organotins:
  - Mercury (0.0mg/kg in the 2019 samples, 0.01mg/kg in the 2022 samples)
- Polyaromatic hydrocarbons (PAHs) and total hydrocarbon content (THC):
  - C1-Napthalenes (<0.001mg/kg in the 2019 samples, 0.00158mg/kg in the 2022 samples)
  - Phenanthrene (<0.001mg/kg in the 2019 samples, 0.00116mg/kg in the 2022 samples)
- Polychlorinated biphenyls (PCBs):
  - ICES 25 (0.00199mg/kg in the 2019 samples, 0.002mg/kg in the 2022 samples)
- PBDEs:
  - BDE209 (<0.0001mg/kg in the 2019 samples, <0.0001mg/kg in the 2022 samples)
  - All other BDEs (<0.00002mg/kg in the 2019 samples, <0.00005mg/kg in the 2022 samples)

The maximum determinand concentrations varied more in the 2022 samples compared with the 2019 samples. All maximum determinand concentrations of the 2022 samples were lower than the 2019 samples with the exception of the following:

- Heavy metals and organotins:
    - Nickel (47.3mg/kg in the 2019 samples, 48.4mg/kg in the 2022 samples)
    - Lead 296.0mg/kg in the 2019 samples, 573.0mg/kg in the 2022 samples)

In general, the majority of minimum, mean and maximum determinand concentrations in the 2022 samples (representing the OSPAR material) are below those analysed for the 2019 samples, which underpinned the Environment Impact Assessment (EIA) Report (Royal HaskoningDHV, 2020) that in turn supported the original marine licence application. As such, it is considered that any potential effect upon water quality arising from the dredging of OSPAR material is within the parameters assessed as part of the EIA submitted in support of the original marine licence application.

Further, no exceedances of Cefas Action Level 1 (AL1) thresholds for PAHs, THC or PCBs were recorded in the minimum, average or maximum concentrations across the 2022 samples. Whilst the average and maximum nickel (Ni) concentrations exceeded AL1, nickel levels remain closer to the AL1 threshold than the AL2 threshold. Other metals with maximum concentrations that exceed the respective AL1 thresholds include Arsenic (Ar), Cadmium (Cd), Chromium (Cr) and Zinc (Zn). Again, these concentrations are all closer to their respective AL1 thresholds than the respective AL2 thresholds.

The maximum concentration of Zinc (Zn) in the 2022 samples exceeds the AL2 threshold for that determinand. However, this has been mitigated through a commitment to dispose of sediment to land where the sediment is location within identified 'hotspots' of AL2 exceedances.

Given that the concentrations of all determinands sampled in 2022 are similar or less than those sampled in 2019, the conclusion of this review is that the assessment of water quality (including the assessment of effects on the integrity of Water Framework Directive (WFD) waterbodies) set out within the EIA Report (Royal HaskoningDHV, 2020) remain valid and unchanged as a result of the changes applied for as part of MLV2. Consideration of SediChem calculations is presented within **Section 3** of this note.

2.2 Hydrodynamic and Sedimentary Processes

The Hydrodynamic and Sediment Plume Modelling report (Royal HaskoningDHV, 2022) submitted in support of MLV1 (MLA/2020/00506/1) considered sedimentary processes in the event that 1,200,000m^3 of material would be dredged using a cutter suction dredger as part of the South Bank Quay project during Phase 1. Whilst the changes applied for within MLV2 are for a total of 1,347,000m^3 of sediment to be dredged during Phase 1 of the project, 214,000m^3 (comprised of both OSPAR material and material within the channel / berth area which is not suitable for disposal at sea) of this is not being dredged by cutter suction dredger. The volume of OSPAR material being disposed to land (as identified within 'MLV2 Options Paper – Final' (uploaded in support of MLV2) is being removed by land-based excavators.

The volume of material to be removed by cutter suction dredger therefore equates to the volume of material applied to be disposed of at sea (1,133,000m^3), which falls within the parameters modelled as part of the Hydrodynamic and Sediment Plume Modelling report (Royal HaskoningDHV, 2022). As such, the model outputs presented within that note submitted in support of MLV1 remain the worst case. Therefore, the conclusions presented within the Hydrodynamic and Sediment Plume Modelling report remain valid for MLV2.

2.3 Marine Ecology, Fish and Ornithology

MLV2 is for additional volumes of dredged material associated with the dredge of material behind the current OSPAR line. It is considered that the only potential increases in suspended sediment and effects

upon water quality are likely to be associated with this change, although it is recognised that such effects may result in secondary effects on marine ecology (including fish and ornithological receptors).

The change in dredging methodology approved under MLV1 has resulted in a reduction in dredging programme. It is noted that this would therefore decrease the duration to which ecological receptors may be subjected to any potential effects as a result of the dredging activities associated with South Bank Quay.

In light of the review of the marine water and sediment quality assessment and hydrodynamic and sedimentary processes, it is considered that the conclusions of previous assessments presented within the EIA Report (Royal HaskoningDHV, 2020) submitted in support of the original marine licence application remain valid for the changes applied for in MLV2. As such, there are not anticipated to be any effects upon marine ecology, fish or ornithological receptors beyond those concluded within the EIA Report previously submitted.

2.4 Navigation

Risks to navigation were previously assessed within section 14 of the EIA Report (Royal HaskoningDHV, 2020) (submitted in support of the original marine licence application) and the Navigational Risk Assessment (NRA) Addendum (Marico Marine, 2022), which was submitted in support of the first marine licence variation request. The NRA Addendum considers revised disposal volumes of 1,235,000m^3 for Phase 1 of the South Bank Quay project, whilst the total disposal volume applied for in MLV2 is 1,133,000m^3. It is also noted that the original NRA (included as Appendix 9 of the EIA Report (Royal HaskoningDHV, 2020)) provided an analysis of navigational risk based on a total disposal volume 1,600,000m^3.

It is therefore considered that the scope of changes requested under MLV2 are within the parameters assessed within both the NRA Addendum (Marico Marine, 2022) and the navigational risk presented within the EIA Report (Royal HaskoningDHV, 2020) submitted in support of the original marine licence. As such, the conclusions of navigational risk set out within the NRA Addendum and EIA report remain unchanged as a result of MLV2.

2.5 Offshore disposal

MLV2 applies for an additional 231,000m^3 of dredged material to be disposed offshore (to a total of 1,133,000m^3), mainly resulting from the additional volume of sediment associated with dredging the OSPAR material. As noted in **Section 2.4**, the Hydrodynamic and Sediment Plume Modelling report (Royal HaskoningDHV, 2022) submitted in support of MLV1 assumed a disposal volume of 1,200,000m^3. For this reason it is considered that the sediment plume modelling presented within the Hydrodynamic and Sediment Plume Modelling report submitted in support of MLV1 remains valid and applicable for MLV2 given that the model is based on larger volumes of dredged material.

As per **Section 2.1** above, the concentration of determinands within samples of the OSPAR material taken in 2022 are lower than those within the samples taken within the dredge area in 2019. It is therefore considered that the sediment quality is within the parameters assessed within the EIA Report (Royal HaskoningDHV, 2020) that supported the original marine licence application and that the conclusions of the EIA report remain valid and applicable for MLV2.

2.6 Habitats Regulations Assessment

Given that there are not considered to be any changes to the conclusions of the assessments on water and sediment quality and hydrodynamic or sedimentary processes (as per **Section 2.1** and **Section 2.2** respectively), no change to the conclusions of the original Habitat Regulations Assessment (HRA) is considered to arise as a result of MLV2 either. As such, the worst case, and conclusions of the assessment, remain as presented within the HRA set out within section 29 of the EIA Report (Royal HaskoningDHV, 2020) submitted in support of the original marine licence application.

3 Suspended Sediment Levels

In light of the review of assessments set out in **Section 2** above, it is not considered necessary to update the SediChem modelling to take account of the additional material to be dredged given that the average concentrations of chemical determinands within the OSPAR boreholes are lower than those analysed for the original boreholes. It is considered that the existing SediChem modelling presents a suitably realistic worst case and is representative of the changes applied for in MLV2.

4 Clarification on Dredging Programme

The material to be dredged and disposed of within MLV2 was considered within the updated Hydrodynamic and Sediment Plume Modelling report (Royal HaskoningDHV, 2022). Whilst MLV2 requests an increase to the disposal volume, this total volume is less than what was modelled as part of the Hydrodynamic and Sediment Plume Modelling report. As such, there is no change to the required durations of dredging as proposed and assessed as part of MLV1.

References

Marico Marine (2022) Tees Valley Combined Authority: Tees South Bank Navigation Risk Assessment – Addendum. Report number 22UK1862

Royal HaskoningDHV (2020) South Bank Quay EIA Report. Document reference PC1084-RHD-SB-EN-RP-EV-1100

Royal HaskoningDHV (2022) South Bank Quay Technical Note: Hydrodynamic and Sediment Plume Modelling. Document Reference PC1084-RHD-ZZ-XX-RP-Z-0001

Appendix A – Sediment Sample Analysis Comparison Tables

Table A.1 Summary of heavy metal and organotin sample analysis of material form the current capital dredge area compared to the OSPAR line dredge samples and the Cefas Action Levels (yellow indicates exceedance of Cefas AL1, red indicates exceedance of Cefas AL2

Data Set		Heavy metals and organotins as mg/kg dry weight									
		Arsenic	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc	DBT	TBT
Current capital dredge area	Min	2.2	0.1	9.0	5.4	0.0	10.0	3.5	28.0	<0.05	<0.005
	Mean	11.8	0.4	41.7	46.2	0.4	28.8	67.3	127.9	0.020	0.026
	Max	27.1	2.3	165.0	180.0	1.6	47.3	296.0	461.0	0.065	0.117
OSPAR line dredge	Min	1.1	<0.04	3.2	3.4	0.01	1.3	2.4	13.4	0.004	<0.001
	Mean	6.6	0.2	22.3	16.1	0.01	23.7	26.6	54.9	0.004	0.004
	Max	41.6	1.0	51.8	29.9	0.18	48.4	573*	271	0.004	0.009

* Sediments identified with concentrations in excess of AL2 will be removed to land, in accordance with the proposals set out in 'MLV2 Options Paper – Final'

Table A.2 Summary of PAH and THC sample analysis of material form the current capital dredge area compared to the OSPAR line dredge samples and the Cefas Action Levels

PAH / THC mg/kg dry weight	Current capital dredge area			OSPAR line dredge		
	Min	Mean	Max	Min	Mean	Max
Acenapthene	<0.001	1.07	35.8	<0.001	0.0172	0.339
Acenapthylene	<0.001	0.22	1.93	<0.001	0.00489	0.112
Anthracene	<0.001	0.28	2.18	<0.001	0.0173	0.332
Benz[a]anthracene	<0.001	0.47	4.49	<0.001	0.0436	0.648
Benzo[a]pyrene	<0.001	0.48	4.53	<0.001	0.0463	0.565
Benzo[b]fluoranthene	<0.001	0.45	4.19	<0.001	0.0562	0.545
Benzo[g,h,i]perylene	<0.001	0.37	2.84	<0.001	0.0814	0.348
Benzo[e]pyrene	<0.001	0.44	3.68	<0.001	0.0856	0.488
Benzo[k]fluoranthene	<0.001	0.22	1.80	<0.001	0.0186	0.312
C1-Napthalenes	<0.001	1.78	12.0	0.00158	0.275	0.932
C1-Phenanthrenes	<0.001	0.83	4.94	<0.001	0.243	0.711
C2-Napthalenes	<0.001	1.38	8.61	<0.001	0.210	0.807
C3-Napthalenes	<0.001	1.10	6.15	<0.001	0.192	0.817
Chrysene	<0.001	0.45	3.79	<0.001	0.0643	0.562
Dibenz[a,h]anthracene	<0.001	0.08	0.64	<0.001	0.0101	0.0883
Fluoranthene	<0.001	0.83	8.19	<0.001	0.0841	2.05
Fluorene	<0.001	0.51	10.8	<0.001	0.0368	0.18

PAH / THC mg/kg dry weight	Current capital dredge area			OSPAR line dredge		
	Min	Mean	Max	Min	Mean	Max
Indeno[123-c,d]pyrene	<0.001	0.32	2.87	<0.001	0.0250	0.344
Napthalene	<0.001	0.80	5.29	<0.001	0.0851	0.558
Perylene	<0.001	0.15	1.27	<0.001	0.0143	0.168
Phenanthrene	<0.001	0.91	7.13	0.00116	0.206	0.76
Pyrene	<0.001	0.91	9.04	<0.001	0.102	1.93
Total hydrocarbon content (mg/kg)	<1	111.88	1,280	<1	92	441

Table A.3 Summary of PCB sample analysis of material form the current capital dredge area compared to the OSPAR line dredge samples and the Cefas Action Levels (yellow indicates exceedance of Cefas AL1)

PCB mg/kg dry weight	Current capital dredge area			OSPAR line dredge		
	Min	Average	Max	Min	Average	Max
ICES 7	0.00056	0.00780	0.08760	0.00056	0.00058	0.00119
ICES 25	0.00199	0.1774	0.19626	0.00200	0.00204	0.00329

Table A.4 Summary of PBDE sample analysis of material form the current capital dredge area compared to the OSPAR line dredge samples and the Cefas Action Levels

PBDE mg/kg dry weight	Current capital dredge area			OSPAR line dredge		
	Min	Average	Max	Min	Average	Max
BDE17	<0.00002	0.00048	0.00438	<0.00005	<0.00005	<0.00005
BDE28	<0.00002	0.00043	0.00366	<0.00005	<0.00005	<0.00005
BDE47	<0.00002	0.00198	0.01520	<0.00005	<0.00005	0.00016
BDE66	<0.00002	0.00045	0.00365	<0.00005	<0.00005	<0.00005
BDE85	<0.00002	0.00014	0.00095	<0.00005	<0.00005	<0.00005
BDE99	<0.00002	0.00211	0.01570	<0.00005	<0.0005	0.00034
BDE100	<0.00002	0.00028	0.00199	<0.00005	<0.00005	<0.00005
BDE138	<0.00002	0.00002	0.00012	<0.00005	<0.00005	0.00006
BDE153	<0.00002	0.00042	0.00335	<0.00005	<0.00005	0.00006
BDE154	<0.00002	0.00023	0.00192	<0.00005	<0.0005	0.00006
BDE183	<0.00002	0.00040	0.00480	<0.00005	<0.00005	<0.00005
BDE209	<0.00001	0.05683	0.25300	<0.0001	0.0005	0.0045