



MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS (AMENDED) (2017) – ASSESSMENT OF SOUTH BANK QUAY – PHASE 1 (MLA/2020/00506) AND PHASE 2 (MLA/2020/00507)

Reference Number: MLA/2020/00506 & MLA/2020/00507

From: Rebecca Faulkner
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Date: 8th February 2021
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To: Emmanuel Mulenga – MMO
Cc: Joe Perry – Cefas

Underwater Noise Advice

1. With reference to the above application for South Bank Quay – Phase 1 and Phase 2 and your request for comments dated 23rd December 2020, please find my comments below in my capacity as advisor on underwater noise.
2. This minute is provided in response to your advisory request in relation to the above proposal in my capacity as scientific and technical advisor for underwater noise. The response pertains to those areas of the application request that are of relevance to this field. This minute does not provide specialist advice regarding benthic ecology, marine processes, shellfisheries or fish and fisheries, as, whilst these are within Cefas' remit, they are outside my area of specialism.
3. **MLA/2020/00506:** In providing this advice I have spent 7.5 hours of the allocated 7.5 hours by the MMO. I have booked my time to C8167B373.
4. **MLA/2020/00507:** In providing this advice I have spent 7.5 hours of the allocated 7.5 hours by the MMO. I have booked my time to C8167B374.

Document (s) reviewed, as requested

5. South Bank Quay EIA Report dated 6th November 2020. Reference: PC1084-RHD-SB-EN-RP-EV-1100 – relevant sections including Chapter 10 Marine Mammals, and Chapter 13 Fish and Fisheries.

Description of the proposed works

6. South Tees Development Corporation (STDC) is proposing to construct a new quay at South Bank in the Tees estuary. The proposed scheme is required to support STDC's landside proposals for general industry and storage or distribution uses within part of the South Industrial Zone. It is envisaged that the new quay would be utilised predominantly by the renewable energy industry, as well as supporting more general industrial and storage/distribution activities.
7. The proposed scheme comprises demolition, capital dredging, offshore disposal of dredged material and construction and operation of a new quay (to be set back into the riverbank). Further details are provided in Annex I of this advice minute for reference.
8. The application for the proposed works has been split into two separate consultations with the MMO (MLA/2020/00506 and MLA/2020/00507) to give consideration to Phases 1 and 2 of the works.

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However, as the EIA presented does not differentiate between the two phases in terms of my advisory remit, the advice for both consultations is identical.

Cefas comments in response to questions raised by the MMO (note, all comments are observations unless otherwise stated):

Question 1: To the best of your knowledge is the description of the environment and potential impacts accurate?

9. Please note that I defer to Cefas fisheries advisors for comments on the fish baseline environment. The EIA report appropriately identifies the key migratory fish species in the Tees estuary and recognises the Tees as an important migration route for salmon. I also defer to Natural England for comments on the marine mammal baseline. The four marine mammal species considered in the EIA Report are harbour porpoise, minke whale, grey seal and harbour seal.
10. In terms of potential impacts, the EIA Report confirms that the proposed new quay wall (and all piling works required to construct the quay would be on land (see section 10.1). Therefore, the potential impacts for marine mammals are primarily associated with the capital and maintenance dredging, movement of vessels and the installation of the rock blanket within the berth pocket. I agree, and it is appropriate that the potential impacts of injury and disturbance from underwater noise have been assessed.
11. Likewise, for fish, the primary potential impact considered is the proposed dredging activity. I am of the opinion that piling on land will present little risk to marine species, provided that there will be no contact with the water. The EIA Report states that the closest piling is approximately 20 m from the river edge, and that there are no piling works proposed within the water.

Question 2: Has the appropriate evidence base been used? Is the evidence complete for its intended use i.e. is there sufficient information to allow a decision on the application to be made? If not please explain why and what you would expect to see and any additional work.

12. In general, yes, I believe an appropriate evidence base has been used; detailed comments below.

Marine mammals:

13. The underwater noise assessment for marine mammals has been based on some noise modelling conducted for the nearby Hartlepool approach channel scheme, located approximately 9 km from the proposed scheme footprint. The Hartlepool assessment refers to appropriate peer-reviewed literature, and also considers the potential effects of 24-hour dredging for both a fleeing and stationary marine mammal receptor. The results of the Hartlepool assessment are not directly applicable to South Bank Quay site, given the more open location at Hartlepool (in comparison to the restricted river channel at South Bank). Nevertheless, I believe it is reasonable that the conclusions of the Hartlepool assessment can be used to inform the assessment of potential impacts at South Bank.
14. The Hartlepool assessment concludes that noise levels for Trailer Suction Hopper Dredging (TSHD) are predicted to be higher than those for backhoe dredging. For a stationary animal and TSHD, the assessment predicts auditory injury (in the form of permanent threshold shift, PTS) impact ranges of 30 m for seals, and 220 m for harbour porpoise. Temporary threshold shift (TTS) impact ranges are 340 m and 1.9 km for seals and harbour porpoise respectively.
15. The potential impacts of auditory injury in marine mammals from cumulative exposure to dredging should not be dismissed. However, considering the location of the proposed dredging works, it is unlikely that a receptor would remain in close proximity of the dredging vessel (i.e. that particular stretch of river) for extended periods of time (e.g. 24 hours in this instance). I agree with the EIA Report that there is the



potential for “short, perhaps medium-term behavioural reactions and disturbance to marine mammals in the area during dredging activities”. Seal sands (a haul out site for harbour seal) is located in the near vicinity of the proposed works.

Fish:

16. For fish, the assessment refers to an underwater noise survey and modelling exercise undertaken by Royal Haskoning in 2014. Please note that I have not reviewed this report, so I am unable to provide detailed comments on this aspect. This modelling exercise appears to refer to appropriate noise exposure criteria for fish species.
17. I believe that the risk of mortality from the cumulative exposure to dredging noise is likely to be very low. There is a risk of recoverable injury and temporary auditory impairment from the cumulative exposure to dredging noise, but I am of the opinion that this risk (of significant impact) is likely to be low. Fish species are unlikely to remain within the vicinity of the dredging operations for extended periods of time. Nevertheless, another consideration is that the river channel is more restricted than a more open water environment.
18. Furthermore, the EIA Report acknowledges that temporary behavioural alterations and masking may also occur. However, the report does highlight that resident species are likely to have a level of acclimatisation to fluctuating noise levels caused by passing vessels and almost daily maintenance dredging, which I believe is a reasonable assumption.
19. **Major comment:** On page 316, the report states that “underwater noise levels expected during TSHD use are likely to fall within the range experienced with passing vessels, although it will be sustained for as long as dredging is ongoing (a period of approximately four months)”. Page 317 then states that “the TSHD campaign is predicted to last for approximately four weeks”. Please can the duration of the proposed dredging works be clarified?
20. Assuming the TSHD campaign would last approximately four weeks (duration to be clarified by the applicant), the dredge/disposal cycles will run continuously during this period, each cycle time is estimated to last 175 to 190 minutes, of which only 60 to 75 minutes will be spent loading, with 115 minutes spent discharging and commuting to and from the disposal site. The EIA Report suggests that there are windows in which normal migratory patterns can occur during the dredging campaign. Noise levels at the site will abate for the majority of each dredge/disposal cycle while the TSHD vessel transports material to and from the disposal site. The report concludes that the significance of a potential barrier effect on migratory species caused by noise from TSHD is considered to be minor adverse. I believe this conclusion is reasonable and as per point 17 above, there will already be some level of disturbance in the Tees as a result of the maintenance dredging activities and vessels. However, the proposed dredging operations will add additional acoustic disturbance into the river, and there is a risk that this could impact migratory species in particular. My other concern is the potential for cumulative effects on migratory species in particular, this is discussed under Question 10.
21. **Minor comment:** I have briefly reviewed Appendix 8 Underwater noise assessment, which considers the risk of transmission of underwater noise into the river from a piled quay wall, and the potential impacts of this noise on sensitive receptors present in the river. I find this assessment somewhat confusing as it is not clearly explained. Furthermore, it is not clear in section 4.1, how 159 dB SEL_{ss} is equivalent to 185 dB SEL_{cum} based on an assumption of 10 minutes exposure (i.e. this would be equivalent to 187 dB SEL_{cum}). Nevertheless, as noted in point 10 above, I am of the opinion that piling on land will present little risk to marine species, provided that there will be no contact with the water.

Question 3: Do you agree with the conclusions reached?

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22. For marine mammals, the impact of significance for auditory injury, temporary injury and disturbance, as a result of underwater noise has been assessed as negligible and the assessment concludes that no mitigation is required. In my opinion, these conclusions are not unreasonable. As noted previously, it is unlikely that seals (or porpoise) would remain in close proximity to the dredging operations for extended periods of time sufficient to cause TTS or PTS. Disturbance has been assessed as negligible, although I would highlight that the effects of disturbance/displacement are largely unknown. Nevertheless, it is expected that animals would return to an area/resume normal activity once the disturbance had ceased.
23. For fish, I believe the general conclusions and the points raised in the EIA Report are not unreasonable, although please see my comments/concerns under Question 10.

Question 4: Are the proposed mitigation and monitoring measures sufficient?

24. No mitigation is proposed for marine mammals.
25. For fish, it is proposed to limit dredging to working within one side of the river at a time (along the axis of the river, rather than dredging across the width of the river). This measure is implemented to reduce the potential for impacts on migratory species from changes in water quality but the report states that this will help to ensure that noise levels at the opposite side of the river from the dredger remain as low as possible over a dredge/disposal cycle (although elevated noise levels will be detectable across the entire width of the river).
26. At this stage, it is difficult to say whether the proposed mitigation for fish is sufficient. I do have some concerns regarding the potential cumulative impacts on fish species, particularly migratory species; please see my comments under Question 10.

Question 5: Are there any minor technical or presentational comments that affect the overall confidence in the conclusions? Please insert as an annex.

27. No comments to note.

Question 6: Is the project description clearly presented and consistent throughout the ES?

28. Yes, I believe that the project description is clearly presented and consistent throughout the ES.

Question 7: Is there an adequate description of the baseline physical and biological environment?

29. Please see my comments under Question 1.

Question 8: Is the EIA methodology and assessment presented clearly and fully justified?

30. Yes, generally the EIA methodology and assessment are clearly justified.

Question 9: Is there an adequate description of the potential project impacts and effects on the physical and biological environment?

31. Yes, please see my comments under Question 1 which address this.

Question 10: Is there an adequate description of the potential cumulative and inter-related impacts and effects on the physical and biological environment?

32. Cumulative effects are considered in chapter 27 of the EIA Report. Please note that I am unable to comment fully on this aspect; as I do not have a full understanding/awareness of other projects that may overlap with South Bank. The cumulative assessment acknowledges that the proposed works at South Bank could coincide with one or more of the NGCT (Northern Gateway Container Terminal) scheme (located approximately 1.5 km downstream), the Anglo American Harbour facilities scheme (located



immediately downstream) and the ongoing maintenance dredging. The EIA Report concludes that cumulative noise impacts are considered not significant.

33. **Major comment:** It is clear that there will be a lot of activity going on in the Tees estuary, particularly various dredging campaigns, and I believe that the activities are going to have to be carefully managed to avoid potential impacts on migratory species in particular. In this regard I recommend applicants liaise with the MMO. A clear overview is required of what works will be taking place and when (months of the year) to identify any overlap with sensitive migration periods. For example, it is not yet known what months of the year the proposed dredging operations for South Bank are expected to take place.

Question 11: Is there an adequate description of the potential transboundary impacts and effects on the physical and biological environment?

34. No, there is no description of the potential transboundary impacts and effects. I believe transboundary impacts are not relevant in this instance.

Question 12: Are measures to avoid, reduce or remedy significant adverse effects clearly presented and appropriately justified?

35. Please see my comments under Question 4 which address this.

Question 13: Are monitoring proposals and recommendations clearly presented and appropriately justified?

36. Not applicable to underwater noise.

Question 14: In collecting data have details of any quality standards or assurance methods been given? If not please explain what you would expect to see and if they have, please explain if such standards and methods are suitable.

37. Not applicable to underwater noise.

Question 15: Please assess the methodology used to prepare and gather evidence. Have they used standard practices?

38. In general, I believe so yes.

Question 16: Is the timeliness of the data appropriate for the intended use?

39. Yes, the timeliness of the data is appropriate for the intended use.

Question 17: Is the evidence that has been supplied appropriate (i.e. proportionate and targeted) for its intended use?

40. Overall, yes, I believe that the evidence is appropriate for the intended use.

Question 18: Is the evidence consistent with that submitted for operations of a similar nature?

41. I believe the evidence is consistent with that submitted for operations of a similar nature.

Question 19: For evidence that relies on modelled data has an unbiased statistical accuracy assessment been carried out?

42. Not applicable to underwater noise.

Summary

43. There is the potential for underwater noise to disturb marine mammals and fish species during the dredging operations at South Bank. Auditory injury from cumulative exposure to dredging should not be dismissed, although I believe the risk of auditory injury in marine mammals and fish is likely to be low. It



is reasonable to assume that receptors present in the Tees estuary are likely to be habituated to some level of anthropogenic noise, from vessel traffic and maintenance dredging operations.

44. Nevertheless, it is clear that there will be a lot of activity going on in the Tees, particularly various dredging campaigns. I believe activities are going to have to be carefully managed to avoid potential impacts on migratory species in particular. A clear overview is required of what works will be taking place and when (months of the year) to identify any overlap with sensitive migration periods. For example, it is not yet known what months of the year the proposed dredging operations for South Bank are expected to take place.

Rebecca Faulkner
Underwater Noise Impact Scientist
Noise & Bioacoustics Team

<i>Quality Check</i>	<i>Date</i>
Joe Perry	08/02/2021

Annex I – Further details of the proposed works

Demolition works:

The site of the proposed scheme is currently occupied by a dilapidated wharf approximately 750m in length, two jetties immediately downstream, a further jetty at the extreme downstream end of the proposed scheme footprint with associated conveyor and various buildings and structures on the riverbank and the adjacent hinterland.

Demolition works are limited to the dilapidated wharf, three jetties downstream of the wharf (with the associated conveyor at the downstream end), a live electrical substation on the hinterland, pipework which previously abstracted water from the Tees estuary associated with the pumping station.

The piles supporting the concrete jetties and the wharf, as well as the pipework feeding the pumping station would all be removed to avoid issues arising during the subsequent capital dredge. It is proposed that the piles would be extracted using vibration techniques. It is anticipated that such works would be undertaking using a jack-up barge with crawler crane, a slave barge and a safety/workboat. This marine plant would be supported through the use of divers.

Quay construction:

The assessment pile requirements are summarised in Table 3.1:



Table 3.1 *Assessed piling requirements*

Feature	Type of pile	Maximum pile diameter	Maximum number of piles
Combi-wall	King piles – installed using percussive techniques then drilled into the Mercia Mudstone	2,500mm	400
Anchor wall	Tubular steel piles / sheet piles	1,500mm	400
Heavy load platform	Bored concrete piles	800mm	1,000
Relieving platform	Bored concrete piles	800mm	1,200
Total number of piles			3,000

The assessed form of construction for the quay wall is a combi-wall comprising steel tubular king piles with steel sheet pile infills. An anchor structure (typically a steel sheet pile wall/combi-wall or discrete anchor structures such as tubular steel piles) would be constructed approximately 50 m inland of the combi-wall to provide lateral restraint to the combiwall. Tie rods would be used to connect the combi-wall to the anchor structure.

King piles for the combi-wall would be up to 2,500 mm in diameter and it is assumed that these would be installed using percussive techniques through the softer material, and then drilled into the underlying Mercia mudstone. Up to 400 piles are envisaged for the combi-piled wall. The form of construction for the anchor structure is yet to be confirmed, however it would either comprise steel sheet piles or tubular piles; if a steel sheet piled wall is progressed, up to 1,250 m of sheet piles would be required. Alternatively, up to 400 tubular piles of up 1,500 mm in diameter would be used.

The quay is proposed to contain two heavy lift areas along its length which would comprise concrete ground slabs supported on approximately 500 vertical bored cast in-situ piles to support each of the heavy lift areas (i.e. up to 1000 piles for the heavy lift areas). Each heavy lift area would be approximately 150m x 30m in size.

A relieving platform is also proposed behind the combi-wall. The diameter of the anchor wall piles would reduce, and the thickness of the combi-wall and the anchor wall would reduce. Given the uncertainty in the design at this stage, the worst-case scenario is that a relieving platform is adopted as part of the design. The relieving platform would require in the order of 1,200 bored concrete piles approximately 800 mm in diameter.

All piles would be installed through soils on land; no piling is proposed in the river channel. It has been assumed that all piling works will be undertaken using land-based plant, with a safety / workboat proposed to support any activities following the removal of material in front of the quay. The number of piling rigs to be used on site would be driven by the construction programme; however, for the purposes of assessment, it is envisaged that up to four piling rigs would be working at the same time.

All construction materials are predicted to be transported to site by road, with the exception of the following which are anticipated to arrive on site by vessel:

Transportation of materials to site:



- steel required for piling – delivered using up to six vessels in Phase 1 and six vessels in Phase 2 (12 vessels in total);
- rock required for the rock blanket in the berth pocket – delivered using up to six vessels in Phase 1 and seven vessels in Phase 2 (13 vessels in total); and,
- tie rods – delivered using up to one vessel per phase of development (two vessels in total).

Capital dredging:

Dredging is anticipated to be required within part of the Tees Dock turning circle, within parts of the existing navigation channel and within areas not currently subject to maintenance dredging to create a berth pocket. It is anticipated that dredging will be undertaken using a combination of a Trailing Suction Hopper Dredger (TSHD) and a backhoe dredger. It is envisaged that up to three barges will be required to support with the transport of sediment dredged using the backhoe dredger to the offshore disposal site.

Installation of rock blanket:

It has been conservatively assumed that there is a requirement to install a rock blanket within the footprint of the proposed berth pocket. The berth pocket would need to be dredged to a greater depth initially to allow placement of the 2m thick rock blanket. The berth pocket would then be maintained at a depth of 13.0 m. It has been assumed that a split hopper barge would be used to supply and deposit rock within the berth pocket. Approximately 200,000 m³ of rock is proposed to form the rock blanket, with a weight of 400,000 tonnes.

Programme of construction works:

STDC is intending to commence construction of the facility during 2021 to enable operation of the facility by 2023 (an approximately three-year construction phase). It is proposed that the quay is constructed in phases, with an initial berth length of approximately 450 m proposed in Phase 1, housing one heavy lift area.

The Phase 1 quay wall would extend 90 m either side of the berth pocket to retain the dredged slopes back up to the existing bed level, resulting in a Phase 1 quay length of up to 630 m (usable berth length of 450 m). The quay would be extended (equating to a total useable berth length of 1,050m) as required in Phase 2, based on market demands. Phase 2 may be constructed many years following completion of Phase 1, and may not be constructed at all if market conditions do not require it. In addition, the length of quay to be constructed during each phase may also be subject to change depending on financial availability and the market requirements at the time of construction.

The EIA has assessed the worst-case scenario of building the quay and dredging the channel in one phase. However, the assessment recognises that the reported effects or impacts would only be partially realised should the development be constructed in phases. In reality, there would be construction phase effects or impacts arising during Phase 1, followed by repeated effects / impacts of a similar magnitude (or likely less magnitude in most instances) during Phase 2.

It is envisaged that construction works would be undertaken 24 hours a day, seven days per week. It is anticipated that the proposed works would be undertaken in the sequence set out above; i.e. demolition would take place first, following by construction of the quay and then excavation in front of the quay wall and capital dredging. The rock blanket would be installed following completion of the dredge. Piling would not be continuous through the full construction phase for the quay. There would be periods of downtime associated with transport of the piling rig(s) to the next location to undertake works. Piling across the two



phases of work is predicted to take approximately 15 months in total (seven months for Phase 1 and eight months for Phase 2). See Table 3.3 below.

Table 3.3 *Indicative durations of proposed main activities*

Activity	Phase 1 duration	Phase 2 duration	Phase 1 and 2 combined	Comment
Demolition	-	-	12 months	
Quay construction	14 months	14 months	28 months	-
Excavation of soils in front of the quay wall	4 months	5 months	9 months	-
Capital dredging	2 months	3 months	5 months	This assumes all dredging plant are working at full capacity without any restrictions.
Installation of rock blanket in berth pocket	2 months	2 months	4 months	-

Operational phase:

It has been estimated that up to 390 offshore wind vessel calls would take place at the facility on an annual basis. This includes approximately 300 vessel calls per year associated with offshore wind staging and 90 vessel calls per year associated with offshore wind manufacturing activities.