

Thames Tideway Tunnel
Thames Water Utilities Limited



Application for Development Consent

Application Reference Number: WWO10001

Examining Authority's Second Written Round of Questions and Requests for Information Response from Thames Water

Coastal / River Change

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**Thames
Tideway Tunnel**



Creating a cleaner, healthier River Thames

Responses to second written questions Q22 Coastal/River change

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1 Question: 22.1

Can the Applicant confirm whether the moorings described in the Detailed Scour Assessment for Chambers Wharf as “various moorings at China Wharf” include Downings Roads Moorings?

1.1 Our response

- 1.1.1 We can confirm that the moorings described in the [HR Wallingford Detailed Scour Assessment for Chambers Wharf](#) (Doc ref: 9.09.08, Section 6, p. 6) as “various moorings at China Wharf” do include the Downings Roads Moorings.

2 Question: 22.2

Can the Applicant provide further analysis of the predicted effects of scour and deposition in relation to Downings Roads Moorings, together with any site-specific mitigation measures which may be appropriate, in relation to both the temporary and permanent works proposed at Chambers Wharf?

2.1 Our response

2.1.1 We can provide further analysis to show the minimal temporary predicted effects of scour and accretion (deposition) on the Downings Roads Moorings (see paras. 2.1.2 to 2.1.6 below). We will also set out details of our proposed strategies for monitoring and mitigation.

Predicted effects of scour and accretion

2.1.2 In a meeting with the Tower Bridge Yacht and Boat Company on 20 November 2013, we briefly discussed scour and accretion, the discussions regarding this are summarised below.

Table 2.1 Summary of Tower Bridge Yacht and Boat Company meeting items regarding scour and accretion

Concern	Our explanation/analysis
Scour	Scour would be unlikely as the cofferdam would cause little change to the river's velocity at the Downings Roads Moorings. Bathymetric surveys have been undertaken 400m upstream and 350m downstream and would continue four times per year during construction.
Accretion	We would dredge if accretion occurs. Monitoring would however pick up any impacts which will be dealt with as they arise.

2.1.3 The [HR Wallingford Detailed Scour Assessment for Chambers Wharf](#) (Doc ref: 9.09.08, Figure 5, p. 24) shows a typical scenario for predicted river flow change in the vicinity of Chambers Wharf and the Downings Roads Moorings. The scenario is during the temporary works phase where an annual mean river flow of 65m³/second coincides with a mean high spring flood tide. The scenario shows the worst-case at the Downings Roads Moorings for all situations that were modelled. Figure 5 illustrates that river velocities are predicted to reduce nominally by 0.1 to 0.3m/s under this scenario. If river flows were to decrease marginally, there may be some minor accretion at the Downings Roads Moorings during the temporary works phase. We do not anticipate that this would affect mooring usability.

2.1.4 The predictions made in the *HR Wallingford Detailed Scour Assessment for Chambers Wharf* were based on earlier preliminary river bed surveys that did not gather all the required detailed information below and around the Downings Roads Moorings. Recently instigated pre-construction

surveys (see para. 2.1.8) are using different techniques, which may include side-scan sonar surveys, to obtain the missing data and ensure that the whole area is covered.

- 2.1.5 Scour at the Downings Roads Moorings is not predicted to occur in any of the modelled scenarios. Predicted scour during the temporary works is limited to areas immediately adjacent to the walls of the cofferdam at Chambers Wharf. There is also the possibility of minor contraction scour in the river channel to the north of that site.
- 2.1.6 Once the permanent works are in place, the river is expected to return to its present flow regime. Therefore we have not made predictions regarding permanent works at this site. We would however monitor the area post-construction and mitigate any scour or accretion that did occur (see para. 2.1.8).

Monitoring

- 2.1.7 Our proposed [*Scour and accretion monitoring and mitigation strategy for temporary and permanent works in the foreshore*](#) (Doc ref: APP03.05.01) would apply to the Downings Roads Moorings. This strategy would be secured under a condition to be attached to the Deemed Marine Licence included in the [*Draft DCO*](#) (Doc ref: 9.20.02, Schedule 15, Part 2, para. 11, p. 264) and by protective provisions for the Environment Agency and the Port of London Authority within the order (Schedule 16, Parts 2 and 3, pp. 268 to 278), as set out in para. 1.3.1 (p. 2) of the strategy. Section 2.2 of the strategy (pp. 7 to 13) sets out how we intend to survey and monitor changes in river bed level.
- 2.1.8 We have already instigated pre-construction bathymetric surveys of the river bed and laser surveys of the intertidal foreshore. We would carry out quarterly surveys for two years before construction, during construction and up to five years post-construction. This would be extended if there is clear evidence of on-going scour or accretion as a direct result of the project. The extent of the surveys for this site includes the full river width, 600m upriver and 550m downriver of the proposed barging facility at Chambers Wharf, which encompasses the Downings Roads Moorings. We do not anticipate having to disturb any moorings in order to carry out the surveys.
- 2.1.9 The objective of the surveys is to monitor the effect of the proposed works on the river bed profile. The surveys prior to the works would provide baseline information and help to distinguish between natural river bed changes and possible changes due to the proposed works. Thames Water (or the relevant infrastructure owner) or the contractor would be responsible for mitigating changes to the natural river bed that are attributable to the proposed works.

Mitigation

- 2.1.10 The *Scour and accretion monitoring and mitigation strategy for temporary and permanent works in the foreshore* (para. 2.4.4, p. 16) outlines mitigation that we would propose to carry out in the event of accretion

occurring. At the Downings Roads Moorings this could for example involve moving moored houseboats for short periods of time in order to dredge beneath them. At this stage however, we do not anticipate accretion to affect mooring usability (see para. 2.1.2 above) and we therefore consider that such measures would be unlikely. In the event that accretion did occur, we would need to know where anchors and chains attached to the moorings are located and would liaise closely with mooring owners and operators before, during and after construction. As part of ongoing engagement with Tower Bridge Yacht and Boat Company, we will request details of the moorings so that we are able to take due account of them prior to construction starting.

3 Question: 22.3

Can the Applicant provide further analysis of the effects of scour and deposition in relation to houseboats at Nine Elms Pier, taking account of any proposed dredging? This should identify any site-specific mitigation measures which may be appropriate, including any measures required to enable houseboats to return to berths vacated during the works.

3.1 Our response

3.1.1 We can provide further analysis to show the minimal temporary predicted effects of scour and accretion (deposition) on the Nine Elms Pier houseboats. This will include an assessment of the effects of dredging at Kirtling Street (see paras. 3.1.5 to 3.1.10 below). We will also set out details of our proposed strategies for monitoring and mitigation which would enable the houseboats to return to berths vacated during the works.

Existing situation at Nine Elms Pier

3.1.2 All vessels moored at Nine Elms Pier presently ground at low water spring tide. The foreshore in the area is dominated by soft muddy material. Sands and gravels are present to either side, which indicates a local sedimentation process. The depth of the muddy deposit is unknown. The present source of this sedimentation is considered to be reduced currents associated with the concrete core within Nine Elms Pier. This may be enhanced by drag caused by the piles of the pier and flow blockage effects attributable to the array of moored vessels.

3.1.3 Soft muddy sediment is likely to settle within the heavily piled area under the pier, acting as a source of fine material in the immediate area between the pier and the river bank.

3.1.4 No evidence of self-scouring around any of the moored vessels has been observed.

Predicted effects of scour and accretion

3.1.5 Dredging for the Kirtling Street jetty would increase the cross-section of the river in the vicinity by up to one to two per cent. A negligible change in river currents is anticipated from these works; however, some current increases between the proposed Kirtling Street jetty and Nine Elms Pier were observed during modelling.

3.1.6 While dredged material removed from the area of the Kirtling Street jetty would be taken away from the river, a small amount of material would inevitably be disturbed and mobilised. The current increases described in para. 3.1.5 above would carry some of this material towards Nine Elms Pier. The disturbed material would be spread over a relatively large area.

3.1.7 The [HR Wallingford Detailed Scour Assessment for Tideway Walk \(Kirtling St/Heathwall\)](#) (Doc ref: 9.09.05, Figure 5, p. 24) shows a typical scenario for predicted river flow change in the vicinity of Nine Elms Pier. The

scenario is for the temporary works phase where an annual mean river flow of 65m³/second coincides with a mean high spring flood tide. This scenario is the worst case at Nine Elms Pier for all situations that we have modelled. Figure 5 illustrates that river velocities at the pier are predicted to reduce nominally by 0.1 to 0.4m/s in this scenario, mainly on the shore side of the pier.

- 3.1.8 The predictions made in the *HR Wallingford Detailed Scour Assessment for Tideway Walk (Kirtling St/Heathwall)* were based upon earlier preliminary river bed surveys which did not gather all the required detailed information below and around the Nine Elms Pier houseboats. Recently instigated pre-construction surveys (see para. 3.1.12) are using different techniques, which may include side-scan sonar and laser surveys, to obtain the missing data and ensure that the whole survey area is covered.
- 3.1.9 If river flows were to decrease marginally, there may be some additional minor accretion around the houseboats at the pier during the temporary works phase. We do not anticipate that this would affect mooring usability. Removing some of the moored vessels would locally increase river velocity, which would further help to limit accretion. The natural accretion described in para. 3.1.2 above would likely continue during construction.
- 3.1.10 Scour at Nine Elms Pier is not predicted to occur during any of the modelled temporary works scenarios. Predicted scour during the temporary works is limited to areas immediately adjacent to the walls of the cofferdam at the Heathwall Pumping Station site. There is also the possibility of minor contraction scour in the river channel to the north of the Kirtling Street and Heathwall Pumping Station sites.

Monitoring

- 3.1.11 Our proposed [Scour and accretion monitoring and mitigation strategy for temporary and permanent works in the foreshore](#) (Doc ref: APP03.05.01) will apply to Nine Elms Pier. This strategy would be secured under a condition to be attached to the Deemed Marine Licence included in the [Draft DCO](#) (Doc ref: 9.20, Schedule 15, part 2, para. 11, p. 264) and by protective provisions for the Environment Agency and the Port of London Authority within the order (Doc ref: 3.1, Schedule 16, parts 2 and 3, pp. 268 to 278), as set out in para. 1.3.1 (p. 2) of the strategy. Section 2.2 of the strategy (pp. 7 to 13) sets out how we intend to survey and monitor changes in river bed level.
- 3.1.12 We have already instigated pre-construction bathymetric surveys of the river bed and laser surveys of the intertidal foreshore. We will carry out quarterly surveys for two years before construction, during construction and up to five years post-construction. This would be extended if there is clear evidence of on-going scour or accretion as a direct result of the project. The extent of the surveys for this site includes the full river width, 300m upriver and 450m downriver of the proposed jetty at Kirtling Street, which encompasses Nine Elms Pier. We do not anticipate having to disturb any moorings in order to carry out the surveys.

- 3.1.13 The objective of the surveys is to monitor the effect of the proposed works on the river bed's profile. The surveys prior to the works will provide baseline information and help to distinguish between natural river bed changes and possible changes due to our proposed works. Thames Water (or the relevant infrastructure owner) or the contractor would be responsible for mitigating changes to the natural river bed that are attributable to the proposed works.

Mitigation

- 3.1.14 The *Scour and accretion monitoring and mitigation strategy for temporary and permanent works in the foreshore* (para. 2.4.4, p. 16) outlines mitigation that we would propose to carry out in the event of accretion occurring. At Nine Elms Pier this could, for example, involve moving moored houseboats for short periods of time in order to dredge beneath them. At this stage, however, we do not anticipate accretion to affect mooring usability (see para. 3.1.9 above) and we therefore consider that such measures would be unlikely. In the event that accretion did occur we would anticipate that there would be a limited amount of muddy material to remove, similar to that described in para. 3.1.2 above. We would liaise closely with mooring owners and operators before, during and after construction to enable the contractor to dredge and reinstate the berths.

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