**MINUTES of A SPECIAL MEETING OF the littlehapton harbour board held in THE mILLENIUM CHAMBER, LITTLEHAMPTON TOWN COUNCIL on THURSDAY 12TH SEPTEMBER 2013 at 2Pm**

**Present:** Councillor N Peters (Chairman)

Mr P Bush (Vice Chairman)

Councillor A Squires

Councillor Dr J Walsh

Councillor D Wensley

Mr Gary Langton

**In Attendance:** Mr B Johnson (Harbour Master)

Mr A Walker (Environment Agency)

Mr J Denner (CH2M (Halcrow))

Mrs J Harris (Notes Secretary)

**463. WELCOME AND APOLOGIES**

463.1 The Chairman welcomed Mr Walker from the Environment Agency and Mr Denner from CH2M (Halcrow).

463.2 There were apologies from Councillors Elkins, Gammon, Patel, Mr O’Flynn and Mr Braby (Treasurer to the Board).

**464. DECLARATIONS OF INTEREST**

464.1 In view of the financial contribution towards the cost of the East Bank Flood Defence Works by Arun District Council Councillors Squires, Dr Walsh and Wensley declared personal interests as District Councillors in the item regarding the Environment Agency S43 Consent application. Mr Bush declared a personal interest as a member of the Arun Yacht Club regarding the discussion on the changes to berthing arrangements in the item relating to the Environment Agency S43 Consent application.

**465. MINUTES**

465.1 It was **RESOLVED** that the Minutes of the meeting held on 2nd September 2013 be deferred for consideration at the next meeting of the Board.

**466. PUBLIC FORUM**

There were no members of the public present.

**467. Littlehampton Harbour and Arun Drainage Outfall Act S43 CONSENT – ENVIRONMENT AGENCY – EAST BANK FLOOD DEFENCE WORKS**

467.1 An application had been received from the Environment Agency for consent for flood defence works planned for the East Bank. Given the scale of the project and issues involved, the Harbourmaster had chosen to refer consideration of the application to the Board rather than consider it under delegated authority. The Board received a report from the Harbour Master, which set out the design and construction methods of the proposed works to improve the flood defences on the East Bank as they related to each of the six Reaches throughout the Harbour (copy attached to the minutes). The report contained an assessment of the impact of the proposed works on safety of navigation in the Harbour and detailed the mitigation measures proposed at each Reach.

467.2 The Harbour Master explained that before carrying out the works the EA had applied for the required S43 Consent. It was noted that various other consents were necessary including a marine license from the MMO. In order to better understand the impact of the works and judge the nature of the mitigation measures that would be required the Harbour Master, his deputy and the pilots had attended a two-day ship-handling workshop, which simulated the Harbour environment as envisaged during and post completion of the works.

467.3 The main purpose of the meeting therefore was to consider recommendations from the Harbour Master on the conditions that should be attached to the S43 Consent in order to maintain an open port and safety of navigation in the Harbour. The Board considered the design aspects of the scheme in more detail and the following points were noted from the ensuing discussion;

467.4 Regarding Reaches 1and 2, Members noted the less visually obtrusive nature of the proposed design of the railings and sought assurances regarding public safety and the ability to continue traditional seaside activities such as crabbing in the river. Mr Denner confirmed that the design met RoSPA (The Royal Society for the Prevention of Accidents) standards and that the continuation of traditional seaside activities had been addressed as part of the design brief. He agreed to send a copy of the RoSPA report to the Board.

467.5 Turning to the impact on the tidal current flow in Reaches 1and 2, Members noted that the encroachment would narrow this part of the river resulting in an estimated 5% increase in flow rate. Members discussed the impact this would have on the river at the entrance to the harbour and it was suggested that this should be examined at some point after the works were complete. The Harbour Master reported that following modelling work and exhaustive consideration by the design team at Halcrow/CH2M, projected increase in flow rates in the river should not prevent leisure craft entering the harbour. Regarding commercial shipping, some marine mitigation measures have been agreed and it was recommended that these be incorporated in a navigational risk assessment that he would undertake.

467.6 Concerning the revetments in Pier Road, it was noted that contrary to popular belief, they did not mitigate the effect of problem waves and this was born out by a paper completed by Halcrow CH2M. However, it had become apparent that one or two piles in this stretch would need to be realigned as a result of the works. The Harbour Master stated that a review of berthing arrangements on both sides of the river at that point might be required. The impact of this on the Arun Yacht Club moorings was discussed and it was agreed that the Harbour Master would raise this with the Arun Yacht Club at their management meeting.

 467.8 It was therefore **RESOVLED** that;

1. The scheme be approved in Reaches 1 and 2 on condition that a navigational risk assessment of operations in the harbour is completed by the Harbourmaster fully detailing the agreed marine mitigation measures including the provision of additional channel marker lights, fendering and a Portable Pilotage Unit for pilotage operations to be in place prior to the completion of the works.
2. The Board receive a copy of the RoSPA report on the safety of the proposed public railings at Reaches 1 and 2.
3. The Harbour Master raises the possible need to review berthing arrangements with the Yacht Club with their management committee.

467.9 In view of the minimal impact of the scheme on the safety of navigation in Reach 3, It was **RESOVLED** that;

The scheme be approved in Reach 3 on condition that measures are taken to minimise encroachment and that all public access points to the river are replaced like-for-like.

467.10 In view of the minimal impact of the scheme on the safety of navigation in Reach 4, it was **RESOVLED** that the scheme be approved in Reach 4.

467.11 In view of the minimal impact of the scheme on the safety of navigation in Reach 5, it was **RESOVLED** that the scheme be approved in Reach 5.

467.12 Regarding Reach 6, Members noted that the proposed design would not preclude further development of the site in the future. The Harbour Master confirmed that he was aware of historic legislation that permitted the use of this area for net drying by local fisherman and stated that it was unlikely that the design would prevent this activity. Mr Walker confirmed that the EA would work in consultation with local conservation organisations on the bioengineering aspects of the work to create a salt marsh and mud flat on the West [East] bank at this point. There was no impact on the safety of navigation in Reach 6 and it was therefore **RESOLVED** that the scheme be approved in Reach 6.

467.12 The Board went on to consider the impact on the harbour during the construction phase of the scheme. The Harbour Master explained that although the works had been timed to take place during the quietest period on the river, the construction phase would still have a significant impact on both the safety of navigation and operations within the Harbour. The report set out the construction methodology at all points in the river and the Board was asked to consider a range of recommendations designed to mitigate the impact of the construction works on the operation of the river.

467.13 It was noted that a significant sized workboat would be required to transport construction materials up and down the river and that this activity would need to be carefully managed to prevent conflicts with other traffic. The Harbour Master was confident that this could be managed locally but recommended that the Harbour Pilotage Directions be modified with a view to permitting an exemption for the workboat subject to certain conditions. Members were supportive of this suggestion and it was noted that the Board would be required to authorise any subsequent changes to the Harbour Pilotage Directions.

467.14 In relation to the backfill behind the new wall at Reaches 1 and 2, Mr Denner confirmed that the wall would be backfilled and compacted in accordance with the appropriate construction standards. It was noted that access to the lifeboat station in Reach 3 would be maintained at all times but mooring pontoons in Reaches 2 and 3 would need to be relocated during the works. Mr Walker confirmed that compensation packages for those impacted by this were being negotiated but added that the EA would appreciate any help in finding mooring space. The Harbour Master stated the Harbour Board had a primary responsibility to its berthholders and he would need to check the availability of pontoons further up the river.

467.15 Regarding Reach 5, whilst it was noted that the work in this area was largely landward, there would be a requirement for scaffolding on the exterior of the Arun View pub. It was therefore agreed that workboat operations and scaffolding requirements be discussed with the Harbour Master as part of the additional mitigation measures.

*Councillor Dr Walsh left the meeting at 3.35pm*

467.16 It was therefore **RESOLVED** that subject to the following additional mitigation measures consent for the construction works be approved;

1. That the Harbour Pilotage Directions be modified to allow Pilot Exemption Certificates (PECs) to be issued where appropriate and that the modified Directions be brought to the Board for approval.
2. Any movement or relocation of pontoons to be agreed in advance with Harbour Master.
3. Any works equipment or other obstruction encroaching into the river to be adequately marked and lit at night and in poor visibility by flashing orange beacon.
4. Workboat operations and scaffolding requirements in Reach 5 be discussed with the Harbour Master.
5. All movements of steel, workboats, jack-up barges and pontoons or any other machinery or equipment likely to present a risk to safety of navigation be agreed with the Harbour Master.

The meeting closed at 3.40pm.

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 **CHAIR**

**Report to: LHB**

**Report by: HM Date: 9th Sep 13**

**Subject: EA EAST BANK FLOOD DEFENCE WORKS S.43 CONSENT**

The Environment Agency proposes to carry out works on the east bank of the River Arun to manage the risk of tidal flooding to the town of Littlehampton. The scheme extends along the east bank of the river for approximately 2.5km north from the harbour mouth. The project will involve a number of improvement works being carried out to the existing flood defences including the construction of new sheet piled walls and raising of existing earth embankments along with the setting back of earth embankments to create saltmarsh/mudflat habitat.

The Littlehampton Harbour and Arun Drainage Outfall Act 1927, Section 43, states “Subject to the provisions of this Act a person shall not make any embankment or erect any building or work in the bed or on the banks of the harbour or drive any pile therein without the written consent of the Harbour Board which consent shall be given unless in the opinion of the Harbour Board any such embankment building work or pile would interfere with or endanger the use of the waterways of the harbour.”

The LHB’s main concern therefore is for the safety of navigation. In order for works to take place various additional permissions must be gained by the applicant including local authority planning permission as well as a marine licence from the MMO, the Board however should consider any proposal primarily in terms of safety to navigation and approval should not be dependent on the issue of other consents.

This paper is split into two parts. Overall scheme design is considered in each of the planned six reaches with reference to the statutory requirement to maintain an open port and ensure safety of navigation in the harbour. Construction methods in each reach are then considered in the context of maintaining safety of navigation while works are in progress.

1. **Scheme Design**

**Design - Reach 1, Arun Parade**

**Reach 1FD (Flood Defence works)** A new sheet piled vertical flood defence wall installed

directly riverward of the existing sheet piled wall and capped with a decorative precast concrete coping. The wall will be approximately 300m long and 1.3m higher than the existing defence.

The wall will generally be 0.5m higher than the new river promenade level and will comprise a new visually transparent railing for health and safety. The level difference between existing and proposed will be transitioned using a combination of pedestrian and seating steps, planting terraces and ramps. These elements will be arranged in a simple repetition along the whole length of Reach 1 and 2. A new footpath adjacent to Arun Parade will be provided at the lower level.

**Reach 1PR (Public Realm works)** Extensive public realm works landward side will comprise high quality in-situ decorative concrete paving, planting complementing the coastal landscape character, bespoke timber seating, low terraced corten steel (a ready rusted steel used in architectural applications) walls to the planting and a high quality co-ordinated range of replacement street furniture such as litter bins, finger post signs and lighting. Accessibility features including steps and ramps will be located on desire lines and access points to adjacent land uses. Replacement access to the river will be provided.

**Design - Reach 2, Pier Road**

**Reach 2FD (Flood Defence works)** A new sheet piled vertical flood defence wall installed

directly riverward of the existing sloping concrete revetment and capped with a decorative

precast concrete coping. The wall will be approximately 150m long and 1.0m higher than the

existing defence and landside works will comprise extensive public realm works to match the

proposal for Reach 1. The wall will generally be 0.2m higher than the river promenade level

and will comprise a new visually transparent railing for health and safety. The position of the

piles will create a wider area between the river and Pier Road creating space for seating and

steps up to the raise promenade.

**Reach 2PR (Public Realm works)** The extensive public realm enhancement works described for Reach 1 above will be extended into Reach 2. Replacement access to the pontoons will be provided. The fish kiosk will be moved temporarily during construction.

**Effect on safety of navigation:**

Encroachment.

Work in Reaches 1 and 2 involves an encroachment into the river of around 2.2m (2.5m including fendering). Potential negative impact on commercial shipping operations by narrowing this part of the river is obvious. Following a two-day ship handling workshop at BMT Argoss in Fareham we have been able to conclude that current shipping operations can be maintained. Some marine mitigation measures have been agreed and these will be incorporated into a navigational risk assessment made by the Harbour Master.

Increase in Tidal Current Flow.

Potential increase in tidal current flow in the area of the narrows has been raised as a concern for smaller craft and leisure sailors entering the harbour. Advice from designers at CH2M (Halcrow) is that increases in velocity in the area of the narrows is expected to be in the region of 5%. This would see a 6kt peak current flow increase to 6.3kts. This is assessed to be reasonable and should not prevent smaller craft and leisure sailors from entering the port.

**Recommendation:**

That the scheme be approved in Reaches 1 and 2 with the condition that agreed marine mitigation measures (provision of additional channel marker lights and a PPU for pilotage operations) be put into place prior to completion of works.

**Design - Reach 3**

**Walkway** No works are needed for at least 20 years, when the existing flood defence will need to be raised to maintain the 1 in 300 Standard of Protection.

**Private frontage** A raised new vertical sheet piled flood defence wall installed riverward of the existing wall and capped with concrete. The wall will be approximately 100m long and 1.0m higher than the existing wall. Replacement access to the pontoons will be provided and private gardens will be reinstated.

**Effect on safety of navigation:**

Encroachment.

Limited impact on safety of navigation at this point.

**Recommendation:**

That the works be approved in Reach 3 with the conditions that measures are taken to minimise encroachment and that all public right of way access points to river are replaced like-for-like.

**Design - Reach 4, Pharos Quay** In the southern end of this frontage (approximately 40m), in the area subject to planning permission, a retaining wall will be installed to a height of approximately 1.0m above footpath level. This retaining wall will take a landward alignment and will be installed alongside the footpath. Vehicular and pedestrian access to the private quay (Pharos Quay) will be provided. Works to the northern end of this frontage (adjoining to the footbridge), which are permitted development, comprise a new vertical sheet piled wall with concrete cap to a level approximately 0.9m higher than the existing wall. This reach will be designed to reflect the Conservation Area status and will included a raised area to allow people to gain a view of the river with an area of low level ground cover planting between the footpath and raised area.

**Effect on safety of navigation:**

Minimal impact on safety of navigation.

**Recommendation:**

That the works be approved in Reach 4.

**Design - Reach 5, Arun View Public House** The river-facing walls of the Arun View public house will be flood-proofed using concrete and flood glass units. The walls alongside *t*he patios will be raised using flood glass units and access to the pontoons will be reinstated.

**Design - Reach 5 (Wharves)** A 300m length (approximately) of the existing flood defences will be raised by construction of a 0.4m high reinforced concrete wall. To the southern/eastern end of this reach the existing concrete cap will be raised, but for the majority of this reach works will comprise a retaining wall constructed in-situ on an alignment immediately landward of the existing wall.

**Effect on safety of navigation:**

Minimal impact on safety of navigation.

**Recommendation:**

That the works be approved in Reach 5.

**Design - Reach 6 (Non-Realigned)** The existing flood defence level will be raised by 0.8m through installation of approximately 600m length of steel sheet piled wall driven through the existing embankment, aligned along the riverward side of the existing embankment crest. In the northern 200m length of this reach, the existing embankments will be raised by 1.0m with imported fill (approximately 2,500m). The scour protection at the top of the existing embankment will be repaired using open stone asphalt (which will be of a similar construction detail to the existing protection). The embankments will be reseeded as required with a species rich seed mix.

**Design - Reach 6 (Realignment)** The objective in this area is to establish a bio-engineered set-back embankment to promote a salt marsh and mudflat with scour protection at the toe of the A259 highway embankment. The salt marsh and mudflat will be created by removing part of the existing flood embankment and re-using approximately 50% of the material to raise existing ground levels behind. The scour protection will be provided by grassing the highway embankment slopes to the 120 yr design life elevation of 5.45m Above Ordnance Datum. A working platform will be created along the toe of the highway embankment to allow future maintenance of the scour protection and highway embankment. The elevation of this working platform will be approximately 3.85m Above Ordnance Datum (which will be above current ground levels) so that it is accessible during the design life of the

scheme (100 years). The platform will be constructed from the remaining 50% of the flood bund material (approximately 2,500m³). A 50m section of new earth flood embankment will be constructed using 3,000m³ of imported fill to join the realigned flood defence with the existing defence. The A259 highways embankment will be protected by the addition of earthworks to form the working platform and the scour protection. Native trees and shrubs will be planted on the road embankment to replace the planting lost. A coastal grass seed mix would be planted on the riverward side of the embankment and a species rich mix on the landward side.

**Effect on safety of navigation:**

No effect on safety of navigation.

**Recommendation:**

That the works be approved in Reach 6.

1. **Construction Phase of Scheme**

The construction works themselves will have a significant effect on safety of navigation and operations within the harbour.

**Construction Methodology - Reaches 1 and 2**

The sheet steel pile wall will be installed using a 100-120 tonne crawler crane which will drive the piles in panels using guide frames set up on temporary piles. The piles will be driven using a resonance free vibrating technique and, where needed, a percussion impact hammer will be used to drive the piles to design toe level. The existing pontoons in Reach 2 will be temporarily re-located by agreement with the Harbour Board to enable piles to be transported by pontoon from Reach 5 and unloaded by the crane. A mobile crane will install the new gangway to the permanent pontoons. A 25 tonne 360° excavator will break out the existing revetment, place backfill material and attend construction of the concrete retaining wall and capping beam. The crane and excavator will operate from Pier Road, which will be closed to traffic for the duration for the work. A pedestrian access will be maintained next to the businesses on the east side of the road, and provisions will be made to facilitate vehicle deliveries to the businesses during agreed hours to limit disruption to local businesses. Steel or timber mats will be used to protect basements and the low pressure gas main which runs along Pier Road from heavy equipment movements. If necessary, backfill will be placed behind the new wall as piling progresses to provide passive support to the existing wall and avoid excessive loading on the wall from the crane. It is envisaged that work will progress linearly from the south end of the Reach 1 heading north. A second piling gang will work concurrently in Reach 2 (again probably heading south to north), in order to minimise the construction period and the disruption to businesses and the public. Piling will be followed up by installation of the reinforced concrete capping beam. The existing reinforced concrete capping beam will be demolished and the existing promenade paving broken up and removed within the footprint of the proposed new works. The landscape and public realm works will follow which will comprise the steps and ramps, new surfacing, seating and other street furniture and lighting. The planting would be carried out after the hard landscape works have been completed.

**Effect on safety of navigation:**

**Reaches 1 and 2 - Piling**

Temporary steelwork for the installation of piles will intrude into the river channel in Reach 1 for the duration of the works in this area (expected November 2013 to February 2014). The steel frames will be about 2m wide and 15m long, moving progressively along the river wall. In Reach 1, the works will be fed by a barge about 25m long by 8m wide. The barge will be moored alongside the wall, but will be relocated when larger vessels enter the port.

**Construction Methodology - Reach 3**

Due to the closeness of existing buildings to the river wall and consequent lack of access for large equipment, floating plant will be used to install the sheet piles to this reach. To maximise the available working time, a jack up barge and 70 tonne crane will be used. The existing pontoons in front of the wall will be temporarily re-located following discussion with the Harbour Board until the new pile capping is constructed and new risers and ladders are installed. Sheet piles will be installed in panels and driven using a vibrating technique and potentially a percussion piling to drive the piles to design toe level if necessary. If water jetting is required to drive the piles using the presser, a silt curtain will be used to contain any disturbed chalk in the river. The piling equipment will be resonance free to minimise vibration to adjacent properties and acoustic shrouds and screening will be provided to try and reduce the impact on receptors. Due to the lack of working area behind the piles at that stage, placing backfill material will also be undertaken using the jack up barge. Granular material will be delivered by pontoon from Reach 5 in 1 tonne bags, which the crane will lift and empty behind the piles. Once the backfill material is placed, access for operatives and small equipment will be available from points along the reach to the backfilled area behind the piles. The remaining work (construction of the capping beam, timber access steps, paving, reinstatement of gardens etc) will be undertaken from land using mini excavators, mini dumpers and a static line concrete pump. A pontoon will be used to provide access for operatives to the riverward side of the wall for the capping beam and to install the new pontoon risers and ladders.

**Effect on safety of navigation:**

**Reach 3 - Piling**

Temporary steelwork for the installation of piles will intrude into the river channel in Reach 3. Piling in Reach 3 will be installed using a jack-up barge, which will be about 18m by 18m in size. Again, this vessel will be moved out of the way when larger vessels enter or leave the port. Steel sheet piling will also need to be moved from the storage area in Reach 5 by pontoon along the river to the various reaches where it is required.

**Effect on safety of navigation:**

**Reaches 2 and 3 - Pontoons**

Mooring pontoons in Reaches 2 and 3 will need to be relocated for the duration of works in these locations (expected November 2013 to March 2014 and March 2014 to May 2014 respectively). Alternative mooring locations will be provided during this time. This work will therefore take place outside the main tourist season. It may, however, result in some disruption to commercial and recreational activities on the river, resulting in temporary **moderate adverse impacts.**

**Effect on safety of navigation:**

**Reach 3 - Emergency Services Access**

Marine and land access to the Royal National Lifeboat Institution station in Reach 3 will be maintained at all times. **No impact** expected.

**Construction Methodology - Reach 4**

The existing British Telecommunications cable and 11 kilovolt buried cable crossing the river will be located by trial excavation if necessary to ensure piling stops short of the cables. The sheet piles forming the new flood defence will be installed using a mobile crane and piled from the land. The majority of the installation will use vibro-piling, but some percussion piling may be required to drive the piles to design toe level. This will require a temporary closure of River Road from the junction with Wharf Road to the first residential property to the south. Once piles have been installed, the road will be opened to one-way traffic until the remaining works are completed. The footbridge will remain open during construction. The concrete retaining wall will be constructed from land. A trench will be excavated for the foundation of the wall using an excavator.

**Effect on safety of navigation:**

**Reach 4**

Nil.

**Construction Methodology - Reach 5:**

The Arun View public house may be closed for certain periods during construction. The working periods at the public house will be in agreement with the freeholder and leaseholder. However, it is envisaged that work at the public house will be carried out during the winter of 2013 to 2014, before the start of the tourist season. Small land based equipment will be used for the construction of the new capping beam and installation of glass panel floodwalls at the public house, and to raise the existing pile cap along Railway Wharf. Work by the public house will be programmed to cause the minimum disruption to the business. Where necessary, access to the riverward side of the wall will be from a small pontoon or workboat.

**Effect on safety of navigation:**

**Reach 5**

Minor. Workboat operations to be discussed with Harbour Master

**Construction Methodology - Reach 6**

Access will be from Reach 5 and using the existing access spur from the roundabout on the A259. The sheet piles to the downstream section of the reach will be installed using a 25-30 tonne 360° excavator and excavator mounted piling vibrator, working from a temporary access track along the top of the embankment. Piles will be transported from the storage area in Reach 5 using a tractor and trailer. A 25 tonne 360° excavator will attend the sheet piling installation, excavating a narrow and shallow lead trench along the line of the piles. Further excavations may be required to remove buried obstructions. Sheet piles for Reach 6 will need to be delivered by road from the storage location in the main compound in Reach 5. This will require approximately 10 loads. The excavator will also place the materials for repair to the scour protection. A 25 tonne 360° excavator and dumper will be used for the construction and transport of materials and the possible demolition of the disused sewage treatment works.

Re-aligning the embankment and repairs to the scour protection within the managed realignment is expected to be undertaken from March 2014 onwards during the summer months using 25 tonne 360 excavators, 20 tonne dumper trucks, a dozer and a roller. The new embankment will be constructed behind the existing one, and the material from existing will be used locally within reach to create suitable levels for saltmarsh establishment. Scour protection will be provided in the southern part of the reach and along sections of the embankment to be retained using open stone asphalt. Topsoil will be brushed over the surface of the asphalt and seeded to encourage rapid establishment of vegetation and assimilation into the landscape.

**Effect on safety of navigation:**

**Reaches 5 and 6 - Summer Season Works**

In some areas upstream, the works will extend into the tourist season and has the potential to result in disruption to both commercial and recreational activities on the river, resulting in temporary **moderate adverse impacts**.

**Mitigation Measures Planned by EA**

The works have been programmed to avoid weekend and bank holiday working, and the peak tourist season in Reaches 1 and 2. The Littlehampton Harbour Board is being consulted on all construction activities that could affect the river network over the course of works in the river channel. All vessel

and pontoon movements will be agreed with the Harbour Board and they will be suspended when commercial shipping is navigating to and from Railway Wharf. Alternative mooring locations to be provided where pontoons in Reaches 2 and 3 are affected, for the duration of works (expected November 2013 to March 2014 and March 2014 to May 2014 respectively). These alternative access points will be adequately signed. Once work is complete, access will be reinstated.

**Suggested Additional Mitigation**

Pilotage Requirement.

Workboats (above 50GRT) required to take an authorised LHB pilot.

Jack-up barge required to take an authorised LHB pilot.

PECs to be issued where appropriate iaw LHB Pilotage Directions.

Pontoons.

Any movement or relocation of pontoons to be agreed in advance with Harbour Master.

Marking of Works and Obstructions.

Any works equipment or other obstruction encroaching into the river to be adequately marked and lit at night and in poor visibility by flashing orange beacon.

Vessel Movements.

All movements of steel, workboats, jack-up barges and pontoons or any other machinery or equipment likely to present a risk to safety of navigation be agreed with the Harbour Master.

**Recommendation**

That the works be approved with the conditions discussed above.

