

7c – Measures to minimise risk to the environment, prevent undue interference to others and maintain navigational safety

Mitigation has been considered as an intrinsic and iterative part of the Scheme development and assessment process informed by consultation with stakeholders.

General mitigation measures that apply to all parts of the scheme apply equally to those elements that require a marine licence and are covered by this application. These are set out in Chapter 10 of the March 2016 ES (10.5.5 – 10.5.8) and are presented below:

- The Scheme would include standard measures to control pollution during construction and that these would be set out in a Construction Environmental Management Plan (CEMP) following the principles set out in the Pre-CEMP (March 2016 ES Appendix 3.2; main text updated as Appendix SR3.2 of the December 2016 ES Supplement). This includes the measures set out in the Outline Pollution Control and Prevention Plan (Annex E to Appendix 3.2) and the Outline Ground and Surface Water Management Plan (Annex G to Appendix 3.2).
- An Environmental Liaison Group would be established for the Scheme that would consist of key stakeholders including NRW. The Group would meet at regular intervals throughout the construction period to review progress of the Scheme and its construction, and to focus on specific environmental issues as required.
- An Environmental Co-ordinator (ECO) would be responsible for the interface between the environmental specialists and engineers. The ECO would have primary responsibility for managing environmental issues through the construction and post-construction monitoring phases and for obtaining relevant licences and consents.
- The Environmental Clerk of Works (ECOW) would support the ECO during construction and aftercare. The ECOW would be the site representative for the ECO and would be responsible for overseeing construction activities to ensure all environmental commitments are met and compliance with the conditions of all licences and permits. The ECOW would be based on site full time and would have the authority to direct members of the contractor's site staff on environmental issues.

Full details relating to the buildability of the scheme were set out in Appendix 3.1 of the ES which is updated in Appendix SR3.1 of the December 2016 ES Supplement. Relevant details relating to the marine elements are set out below.

1 - Measures to minimise risk to the environment

Design mitigation measures

The following are measures to minimise risk to the environment that are integral in the design of the scheme:

- No construction in the wetted channels of the Rivers Usk and Ebbw (defined in discussion with NRW as the channel below Mean High Water). Parts of some structures and works processes are required below MHWS and therefore form the content of this marine licence application, however, no works take place below MHW. This would avoid / reduce impacts on the river habitat and associated species, particularly migratory and estuarine fish and otter.
- Design of lighting of the River Usk and River Ebbw crossings to avoid lighting of the river channels and banks.

River Usk Crossing Bridge mitigation measures

Piling operations for the East Pylon (ET) and E1 tower would be carried out from prepared piling platforms, designed and installed to support the bearing loads of the piling rig and crane, and which would incorporate a fine grid geotextile to prevent migration of bentonite drilling fluid downwards into the ground during piling operations. The bentonite plant will be located landward of the Wales Coastal Path to ensure it is outside of the floodplain. Piling platforms will be made of stone placed to at least 1200mm thickness, over a membrane. The final design and thickness of the working platform will depend on the machinery to be used for the works, which will depend on the contractor, when appointed. All working areas will be within the footprint co-ordinates provided for the project location (see additional information provided for Q6b (ML_6b_Project location details_final)). Any stone that is

placed below MHWS as part of the working platform will be removed once construction of the towers is complete.

Additional controls on preventing the risk of spreading contamination as a result of piling would be implemented subject to the outcome of a piling risk assessment undertaken in line with NRW guidance, and in accordance with the agreed piling management plan. The piling risk assessment is currently underway and should be complete by the end of June 2018.

To mitigate the potential impact on fish within the River Usk SAC, activities that would generate noise / vibration are programmed to avoid the highest risk period for underwater noise related impacts on fish migration which is April to June inclusive. Such activities include piling and the installation of cofferdams at the East Pylon (ET) location. In accordance with Commitment 95 of the M4CaN Register of Environmental Commitments agreed with NRW, should piling for the east pylon be required between 1st April and 30th June, no piling activities would take place during the period from three hours before high water to one hour after high water.

Confirmation as to the requirement to include other piles (e.g. those for the west pylon and some of the viaduct piles) within this seasonal restriction would be determined following the test pile (to be drilled at ST 32491 85507) and associated noise monitoring in consultation with NRW.

Underwater noise monitoring is proposed during construction of the River Usk Crossing to determine the noise levels associated with construction related piling and validate predictions made within the ES and SIAA. Noise monitoring will be undertaken during installation of test piling of sheet piles for the East Pylon for the River Usk Crossing on the east bank of the River Usk. Data collected during noise monitoring will include:

- Background underwater noise levels in the vicinity of the Usk Crossing (e.g. from vessel traffic associated with Newport Docks); and
- Underwater noise levels throughout the wetted channel during vibropiling and during breaks in vibropiling (SIAA, March 2016, 6.2.1 – 6.2.2).

River Usk Crossing Bridge Protection measures mitigation

The construction and operation of the proposed River Usk Crossing bridge protection measures would not result in a significant change from the conclusions of the March 2016 ES and ES Supplements in September, December 2016 and March and April 2017 with respect to ecology.

The main impact associated with the proposed River Usk Crossing bridge protection works would be the loss of approximately 1.16Ha subtidal benthic habitats within the dock where Junction Cut is extended into the South Dock. There is no mitigation for this loss. However, these habitats are not listed under any nature conservation legislation and the habitats and species likely to be associated with these habitats are common and widespread both locally and nationally (Environmental Statement Supplement 5, August 2017, 3.1.31 – 3.1.33).

The vibro-piling to construct the combi-piled wall will generate underwater noise. On the basis of best practice guidelines for assessing the effects of underwater noise on fish species (i.e. Popper *et al.*, 2014), together with the magnitude of the noise likely to be generated as a result of construction operations (i.e. vibropiling), the risk to all fish species from mortality and potential mortal injury as a result of underwater noise, even in close proximity to the source (i.e., tens of metres) is considered to be low.

The most likely scenario is that during construction operations, fish present within the dock would redistribute to other parts of the dock during periods of elevated noise levels. The enclosed nature of the dock means that the resident species cannot entirely avoid these noise levels, but could move away from the location of Junction Cut to other areas of South Dock. Following cessation of noise generating construction activities, fish behaviour would quickly return to baseline levels.

The underwater environment of the dock is regularly exposed to elevated noise levels (e.g. from vessel movement or dredging) similar to those created by vibropiling. It is therefore, reasonable to assume that the resident fish population would have some tolerance to underwater noise. South Dock does not represent important habitat for fish species (e.g. spawning or nursery habitats or migratory routes) and the presence of protected fish species in the dock is considered to be low. Any

behavioural effects, should these occur at all, would not affect important life history stages of fish within the dock, nor would they pose a risk to protected fish species. As such, the impact from noise / vibration is predicted to be of minor magnitude resulting in a neutral to slight significance of effect and no mitigation measures are proposed (Environmental Statement Supplement 5, August 2017, 3.1.34 – 3.1.40).

The industrial nature of the history of the docks suggests that there could be potential for sediments in the dock around Junction Cut to contain contaminants. To prevent and minimise the release and resuspension of historically contaminated sediment, the methodology for the construction of the extension to Junction Cut does not include the removal or dredging of any sediments (see additional information for Q7 for detail of the method statement). The combi-sheet piled wall will be installed from marine and land-based plant and once the piling is completed for any particular area and the new sheet piles have been sealed against the existing dock wall, backfilling with sand would commence so that all sediments would be retained within the new structures. To further minimise the resuspension of sediments, silt curtains will be employed around the area of marine works when piling is being carried out.

River Ebbw East Bank Highway drainage outfall

The design and construction of the outfall is a standard design, requiring no unusual methods or materials. Concrete elements of the outfall may be pre-cast or cast on site. All materials used will be suitable for marine construction. Construction will take place from the landward side, to minimise working below MHWS. Installation of the sheet piling required for the outfall construction will take place in accordance with Commitment 95 of the M4CaN Register of Environmental Commitments agreed with NRW (see River Usk Crossing Bridge mitigation measures, above).

Operational mitigation

During operation, the principal effects to water quality are from routine highways drainage and the effect of the permanent works on flood risk. There are two highway drainage outfalls into the River Ebbw to the south of the River Ebbw crossing bridge. The eastern outfall is located partially in the licensable marine area. The west outfall discharges the drainage from approx. 300m of main and slip road carriageways via a petrol interceptor. There is no specific attenuation. The drainage to the east outfall is similar, but drains a longer length of carriageway on the western approach to the River Usk crossing bridge (approx 1,600m: ch10150 to ch8550). The remainder of the River Usk crossing bridge eastwards (ch10150 to ch11075; 925m) drains to the Pollution Control Lagoon (but no oil interceptor) on the east side of the Usk, the outfall headwall of which is above MHWS (currently). The principle of the highway drainage strategy is agreed with NRW.

2 - Measures to prevent undue interference to others

Interference to others relates mainly to the construction effects of the scheme, including traffic, access, noise and related potential nuisance. The area of the construction for the marine licensable elements of the scheme is predominantly industrial in nature, such that there are few residential receptors.

Normal construction working hours will be 07:00 to 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays. Some elements of construction will require 24-hour working (e.g. concrete pouring for piling cap and construction of the pylon upper legs on the River Usk crossing bridge). (Appendix SR3.1 Buildability Report Update, December 2016, 1.7.1)

Temporary boundary fencing will be installed around the perimeter of the whole site to prevent unauthorised access. Wherever possible, site access points would be installed to reduce the need to run construction traffic through residential areas. Accesses would consist of hardstanding and wheel wash facilities would be provided where necessary (Buildability Report Update, Appendix SR3.1, December 2016, 2.2.9 – 2.2.10).

The key objective of the construction traffic management strategy would be to avoid the use of the existing M4 and local road network where possible. The early establishment of haul roads is essential to delivering the programmed earthworks as they provide a direct route between each section of work along the route (Buildability Report Update, Appendix SR3.1, December 2016, 3.1.1).

The main access routes for materials and machinery for the River Usk and River Ebbw crossings are via the ABP Newport site. The initial plant delivery access to the River Usk and River Ebbw crossings would be via the A4810 /Dock Way for the eastern abutment of the Ebbw and western approach to the River Usk Crossing via the ABP main gate for the western pylon, and via Corporation Road for the eastern pylon and eastern approach spans.

Discussions with ABP Newport regarding maintaining safe dock operations throughout construction and minimising impacts to dock operations. Following award of the Scheme to the Costain Vinci Joint Venture (CVJV) a dedicated Liaison Manager was appointed to co-ordinate contact between CVJV and ABP. Current and planned land use has been discussed with ABP and considered to minimise compound and working area impact on port activity as far as possible. Internal port access roads and vehicles movements have also been discussed at length with ABP and considered to maintain free traffic on all critical routes both in the permanent operational and temporary construction conditions.

The Liaison Manager has also held meetings with businesses operating within the Port to ensure the impact of the construction methodology is minimised as far as possible.

Figure 7c1 shows the areas within the docks that will be used for access and independent access would be created to enter the Area 1. Access to Area 2 would be possible from Area 1 by crossing West Way via a secure gate system. Similarly, access to Area 3 would be from Area 2 via the existing level crossing (Buildability Report Update, Appendix SR3.1, December 2016, 6.3.1 – 6.3.6).

Access to Area 4 would either be by exiting Area 1 and using the ABP road (a security gate from Area 1 to the ABP road could be installed, if needed) or through the existing ABP East Gate from the A48.



Figure 7c1 – Areas within ABP Newport docks to be used for access and construction of the scheme
Source: Buildability Report Update, Appendix SR3.1, December 2016, 6.3.9, figure 6.1

Areas 1 to 3 would be “outside” ABP security and fenced to the same level of security that ABP facilities currently have. Area 4 would be “inside” ABP security and would be secured in the same way as currently (Buildability Report Update, Appendix SR3.1, December 2016, 6.3.7 – 6.3.16).

The anticipated total number of deliveries to site by HGVs during the whole construction period is estimated to be in the range of 23,000 vehicles. On the west side, the figures are the numbers of vehicles entering either through the new dedicated gate (80%) (before ABP’s West Gate as described above) or through the ABP East Gate (20%). During the busiest months, there would be up to 1,500 lorry deliveries per month. In addition to HGVs, it is estimated that approximately 99,000 additional light vehicles would enter / exit the site from the West Compound area as well (mainly staff and

operatives vehicles coming to and from work on site) (Buildability Report Update, Appendix SR3.1, December 2016, 6.3.17 – 6.3.21). Only a proportion of these would be associated with the works to which the marine licence application relates.



Figure 7c2 – Usk east bank areas to be used for access and construction of the scheme
Source: Buildability Report Update, Appendix SR3.1, December 2016, 11.2.1, figure 11.2

On the east side of the River Usk, the main access will be via Meadows Road, access for standard road going vehicles could also be from Corporation Road. The main traffic entering these compounds would come from the delivery of the concrete materials, the steel reinforcing bars (rebar), the structural steel beams and the earthwork operations, including removal of the excavated materials that would be taken away and processed for re-use if suitable (Buildability Report Update, Appendix SR3.1, December 2016, 11.2.1).

The anticipated total number of deliveries by HGVs during the whole construction period is approximately 23,000 deliveries and the total estimated number of light vehicles is 76,000 deliveries. During the busiest months, there would be up to 1,500 lorry deliveries per month entering and exiting from the east compound areas (Buildability Report Update, Appendix SR3.1, December 2016, 11.2.2 – 11.2.5).

3 - Measures to maintain navigational safety

The information provided below is taken from the Navigation Risk Assessments undertaken for the scheme (Appendix ESS6, October 2017 1.1 Navigation Risk Assessment).

A Navigation Risk Assessment workshop was undertaken in November 2016 and reported on in the December 2016 Environmental Statement Supplement (ESS) and finalised in the October 2017 ES Supplement, identifying the main risks to navigation in the River Usk as a result of the construction and operation of the Usk Crossing. Mitigation measures were proposed which included the provision of warnings, active river traffic management, pollution control and the preparation of a marine safety management plan.

A further navigation risk assessment workshop which focused on the risk of vessels potentially colliding with the proposed bridge over the Newport Docks, with the proposed mitigation measures in place, was held on 10th August 2017. This risk assessment found the proposed mitigation measures to be acceptable.

The minimum navigation clearance between the mean high water springs (MHWS) level and the underside of the soffit of the bridge across the River Usk would be 33.54m.

Within the docks at Junction Cut, the bridge design allows for a 26.2m vertical clearance between the maximum retained dock water level of 8.40m(AOD) and the underside of the soffit of the proposed bridge of 34.60 m (AOD).

During construction, the main risks to navigation are:

- Vessel collision with the bridges crossing the Usk and Ebbw
- Collapse of bridge deck and / or dropped bridge deck section
- Other dropped objects (e.g. tools)
- Pollution caused by construction activities and/or floating debris
- Congested navigation
- Conflict with radio communications
- Presence of background light from construction activities / road lighting
- Congested Newport docks during periods of restricted access to North Dock

Following construction, the main risks to navigation are:

- Vessel collision with the bridges crossing the Usk and Ebbw
- Dropped objects (e.g. tools) during maintenance
- Pollution caused by maintenance activities and/ or floating debris
- Falling objects from the bridge
- Congested Newport docks during periods of restricted access to North Dock

Bridge protection measures have been incorporated into the Scheme design. These are described and assessed in the April, August and October 2017 ES Supplements, which should be read alongside the published March 2016 ES, and the previous ES Supplements. Additional mitigation measures are proposed for both the construction and operational phases of the scheme. The measures are summarised below.

The Usk River Crossing bridge protection measures form part of the measures to maintain navigational safety for the M4CaN scheme i.e. bridge protection measures within Newport Docks. The bridge protection measures are designed to remove or reduce the risk of collision by vessels or dock machinery / vehicles with the River Usk crossing bridge to acceptable levels, for the safe operation of both the new motorway and the docks. The extension and narrowing of Junction Cut will prevent vessels of a height capable of collision with the bridge from getting close enough to strike the structure, while the proposed virtual tripwire system at South Dock Sea Lock will alert the harbour operator that a vessel of a height capable of striking the bridge has entered the lock and to take appropriate action. The bridge protection measures proposed (see Appendix ESS6 1.1 to the October 2017 Environmental Statement Supplement (8.1.5)) would be either:

- Narrowing of Junction Cut to 11.0m width. analysis of historical vessel movements within the Dock has shown that vessels with beam width of 11m or less do not have a high enough air draught to make contact with the bridge. This option does not require a virtual trip wire at South Lock.
- Narrowing of Junction Cut to 13.5m with a virtual trip wire system located at the South Lock. The wider Junction Cut narrowing to 13.5m would have a lesser impact on shipping accessing North Dock. At 13.5m contact between the superstructure of a vessel and the bridge would not occur but mast impact is possible.

With the adoption of these measures the risk of ship impact with the bridge is mitigated to an acceptable level. While the bridge protection measures are being constructed, there will be a 20m easement zone around the works. No ship movements within the dock areas should enter this easement zone, except as agreed by ABP for passage between the North and South Docks (Environmental Statement Supplement, August 2017, 3.1.13).

In addition to the Usk River Crossing bridge protection measures, a number of mitigation measures are also provided for to maintain navigational safety during construction of the scheme itself, where the bridge supports and platform cross the licensable marine area. These are described in Appendix

ESS6 1.1 to the October 2017 Environmental Statement Supplement (8.1.2) and are reproduced below.

Marine Safety information:

- Navigation warnings and notices to mariners (NTMs) are to be promulgated to all river users in order to inform them of any construction activities and in particular periods when navigation will be restricted.
- Engagement by the project team with stakeholders, dock and river users in order to ensure that navigational warnings have been received and understood.
- Navigation lights to be installed on the river crossings, both upstream and downstream, in order to identify the best point of passage for mariners and river users.
- Safety signage to be in place on the river banks in order to warn river users of low bridge heights, the vertical clearance and identify best point of passage during the day.
- Major bridge maintenance works are to be communicated by Notices to Mariners and navigation warnings.

Vessel Traffic Management measures:

- River access to be actively managed during deck launching/lifting over water, when restrictions on navigation may be imposed.
- Continual monitoring of traffic, with a guard vessel available in order to assist in enforcing any restrictions.
- Vessel movements and personnel access at Dallimore's Wharf, to be managed during bridge construction and maintenance operations.
- Small vessels using the River Ebbw are to be monitored by project personnel during construction and maintenance operations.
- No vessels and/or personnel are to be beneath a suspended load during any lifting operations.
- Tugs and small vessels presently berthing in the Newport North Dock in the vicinity of the 'Junction Cut' are to be relocated

Dropped object management measures:

- Dropped object prevention measures are to be implemented at the construction site and during maintenance works.
- Bridge design to include reasonable measures to prevent falling objects.
- Unauthorised access to be prevented by appropriate security controls.
- Dropped object recovery plan to be implemented.
- Mariners and stakeholders to be advised of any dropped objects and/or floating debris which may affect navigation.

Marine Safety Management System:

- The Port Marine Safety Code requires ABP as the statutory harbour authority (SHA) to maintain marine safety management plan system (MSMS) for marine operations and navigation within Newport Docks. The MSMS must be based on formal risk assessment of these operations.
- Develop interface document and a marine management plan to formalise interfaces, including the emergency primacy between parties
- Clear communications plan between relevant parties during critical construction activities

Pollution Control measures:

- Construction Environmental Management Plan (CEMP) to include pollution containment procedures and good housekeeping practices
- Harbour Authority Oil Pollution Preparedness and Response Plan (OPRC).
- Bridge maintenance manual to include pollution response procedures

Direct Interference management measures:

- Consider interference of construction radio communications with vessel radio communications, dedicated channels to be in use.
- Construction site flood lighting equipment set-up to consider impairment of mariners' night vision (i.e. positioning / direction of lighting)

