Attachment 4.5

Consistency of the proposed Maritime Usage with the objectives of the Water Framework Directive (WFD)

Introduction

MARA is required to have regard to the Directive 2000/60/EC, the EU Water Framework Directive, and the associated implementing national legislation, the European Communities (Water Policy) Regulations 2003 and further implemented by the European Communities Environmental Objectives (Surface Water) Regulations, 2009. The Water Framework Directive requires all member states to protect and improve water quality in inland surface waters, transitional waters, coastal waters and groundwater so that good ecological status is achieved by 2027. Water bodies in moderate, poor, or bad ecological status require mitigation and restoration to achieve the good status objective. Additional measures apply to protected areas under the Directive. Protected areas which may be relevant to the proposed Maritime Usage, include:

- Areas designated for the protection of economically significant aquatic species under the Habitats Directive.
- Bodies of water designated as recreational waters, including areas designated as bathing waters under the revised Bathing Water Directive (2206/7/EC).
- Nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC.
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under the Habitats Directive or Birds Directive.

Zone of Influence and WFD status

Management under the WFD is organised by River Basin Districts, with objectives and measures set out in Ireland's River Basin Management Plans (RBMPs). Kilrush Marina is located within the Shannon River Basin District, where water body status is assessed using biological, physico-chemical, and hydromorphological quality elements. Within this district, the marina lies in the coastal waterbody of the Mouth of the Shannon (IE_SH_060_0000) and is directly adjacent to the transitional waterbody of the Lower Shannon Estuary (IE_SH_060_0300), both of which are within the zone of influence of the dredging activity and are included in this WFD consideration.

According to the 2016–2021 River Basin Management Plan (Cycle 2), the Mouth of the Shannon (IE_SH_060_0000) achieved good ecological status in the latest full WFD cycle (2nd cycle, 2016–2021). The

second WFD cycle assessment showed good status (with high confidence) across biological, hydromorphological, and chemical descriptors, with its WFD risk status also classified as not at risk.

Table 4.5.1– WFD status for the Mouth of the Shannon (IE_SH_060_0000), 2016-2021 cycle.

Status	Assessment Technique	Status Confidence	Value
Ecological Status or Potential	Monitoring	high confidence	Good
Biological Status or Potential			Good
Invertebrate Status or Potential			Good
Hydromorphological Conditions			Good
Supporting Chemistry Conditions			Good
General Conditions			Good
Nutrient Conditions			Good
Nitrogen Conditions			Good

For Cycle 2, the Lower Shannon Estuary also achieved good ecological status with high confidence across most biological and supporting quality elements, including phytoplankton, invertebrates, fish, hydromorphology, nutrients, and oxygenation conditions. However, the Lower Shannon Estuary did not achieve good chemical status, due to exceedances in benzo(b)fluoranthene concentrations during this cycle. Overall, its WFD risk status is assessed as not at risk.

Table 4.5.2 – WFD status for the Lower Shannon Estuary (IE_SH_060_0300), 2016-2021 cycle.

Status	Assessment Technique	Status Confidence	Value
Ecological Status or Potential	Monitoring	high confidence	Good
Biological Status or Potential			Good

Status	Assessment Technique	Status Confidence	Value
Phytoplankton Status or Potential			High
Invertebrate Status or Potential			High
Fish Status or Potential			Good
Hydromorphological Conditions			Good
Supporting Chemistry Conditions			Good
General Conditions			Good
Oxygenation Conditions			High
Dissolved Oxygen (% Sat)			High
Other determinant for oxygenation conditions			High
Nutrient Conditions			Good
Phosphorous Conditions			Good
Specific Pollutant Conditions			Pass
Chemical Surface Water Status			Failing to achieve good status

Impact of dredging on WFD status within ZOI

The proposed maintenance dredging at Kilrush Marina will be undertaken using plough dredging, a method that redistributes naturally occurring sediments within the approach channel to the marina. The activity is short in duration (typically 5–10 days) and limited in spatial extent, with total annual dredged material being less than 8000 tonnes. Within each dredging campaign, dredging will start 4 hours before highwater and last for up to 8 hours, ending no later than 4 hours after highwater on the ebb tide to facilitate dispersion into the main channel of the Mouth of the Shannon. Moreover, works will be scheduled outside the closed period of 1st October to 31st March to protect overwintering bird populations and associated habitats.

Sediment quality in the approach channel to Kilrush Marina has been confirmed as clean and suitable for disposal at sea. A detailed sediment characterisation survey conducted in 2020, with follow-up resampling later that year, analysed metals, organochlorines, PCBs, hydrocarbons, organotins, and PAHs. With the exception of an initial elevated cadmium value at one station, which was later shown with resampling to be

within acceptable levels (0.3 mg/kg), all results were well below the lower Irish action limits for dredge material. Concentrations of PCBs, PAHs, hydrocarbons, and organotins were also consistently low, and the sediments were found to be composed primarily of clean fine sands with minor silt and clay fractions. Subsequent sampling in 2023 at four stations found that all heavy metals were below the lower action levels with exception to copper, nickel and zinc which were below their upper action levels. This demonstrates that the dredged material is naturally derived, uncontaminated, and poses no risk of introducing pollutants into the receiving environment. On this basis, no deterioration in chemical status is anticipated as a result of the works within the ZOI.

Sediment transport modelling undertaken for the plough dredging demonstrates effective dispersion and transport of the dredged material under both neap and spring tidal conditions. The simulation, which modelled a 12-hour disposal period followed by a 24-hour tracking phase, indicates that most of the dredged sediment remains in suspension and is dispersed downriver via the central estuary channel. Under neap tide conditions, sediment is largely removed from the dredge area within 18 hours, with minor deposition predicted south of the lock gate, Cappagh, Ballymote West (Aylevarroo Point), and Slattery Island. Spring tide conditions exhibit even stronger dispersion due to higher tidal velocities, with additional potential deposition areas including Moyne Point and Ballymacrinan Bay. Overall, the modelling confirms that all five dredging campaigns combined results in minimal long-term sediment accumulation within the ZOI (<0.1 mm to 35 mm), with dispersion reducing the risk of significant localised environmental impact. On this basis, no deterioration in ecological status is anticipated as a result of the works within the ZOI.

A Drop Down Video survey conducted in June 2025 encountered infaunal communities in the dredge area and surrounds that were consistent with the NPWS *subtidal sand to mixed sediment with Nucula nucleus community complex* community type for the area, alongside Laminaria-dominated assemblages at the more structurally complex rocky fringe. These communities are well adapted to naturally dynamic conditions, including high levels of suspended sediment and periodic siltation, due to the relatively strong tidal currents in the estuary (up to 1.5 m/s). The drop-down video survey confirmed that sediment conditions and associated assemblages remain stable and consistent with historic records, supporting the conclusion that the benthic environment is resilient to disturbance and dominated by silt-tolerant and opportunistic species.

Sensitivity assessments of the identified biotopes indicate low to medium vulnerability to dredging-related pressures, with infaunal sand and mud communities (SS.SSa.IMuSa.ArelSa) found to be largely tolerant of smothering, turbidity fluctuations, and sediment penetration, while Laminaria-dominated habitats (IR.MIR.KR.Ldig.Bo) show greater sensitivity to heavy siltation and abrasion but remain unlikely to be significantly impacted given local hydrodynamic conditions and minimal predicted deposition. Sediment transport modelling further confirms that plough disposal of fine sand and silt results in effective dispersion, with only minor, localised deposition (≤ 35 mm over five campaigns in eight years), thereby limiting the risk of

lasting habitat alteration. Although the model provides the ultimate fate of material settling to the seafloor from the dredging operation, it does not take into account the further dispersion and dilution of re-suspended dredged material from the sea floor. Sedimentation at the levels predicted (worst case scenario) will have little additional effect on epi- or infaunal communities in this region.

An intertidal survey in September 2025 recorded biotopes consistent with the NPWS community type *'Fucoid-dominated intertidal reef community complex'*, characteristic of rocky shore habitats within the Shannon Estuary. These communities are naturally adapted to fluctuating sediment regimes resulting from the large catchment size and high suspended sediment loads typical of the estuary. Strong tidal currents (up to 1.5 m/s) and substantial freshwater input generate high baseline turbidity and dynamic sediment transport conditions, resulting in faunal and floral assemblages tolerant of intermittent sediment deposition. The biotopes identified are generally resilient, with most exhibiting *low to medium* sensitivity to light siltation events (<5 cm), as may occur during maintenance dredging.

Indirect disturbance will occur through increased turbidity associated with sediment resuspension during dredging and disposal activities. Elevated turbidity levels may temporarily reduce light penetration, impairing primary productivity in shallow waters and causing localised stress to filter-feeding organisms. While these effects are generally confined to the immediate dredging plume and are reversible following cessation of activity, there is potential for short-term reductions in prey availability for species reliant on benthic and epibenthic organisms, including waterbirds, fish, and marine mammals. Given the spatially restricted footprint of works relative to the wider Shannon Estuary, the overall scale of prey depletion is expected to be limited, with alternative foraging areas available to mobile species

Protected areas relevant to the project include the Lower River Shannon SAC (002165) and the River Shannon and River Fergus Estuaries SPA (004077). These designations require that water body status is maintained to protect the integrity of habitats and species. The dredging was subject to appropriate assessment and the production of a Natura Impact Statement. When considered in the context of species-specific sensitivities, ecological function, and the widespread dispersion of dredged material demonstrated by the modelling, the physical disturbance associated with the proposed works is unlikely to result in significant adverse effects on the conservation objectives of nearby Natura 2000 sites. Implementation of standard best-practice mitigation measures, including operational controls, pre-start monitoring, and buffer zones for sensitive species, will further reduce the potential for ecological impacts and ensure that physical disturbance remains within acceptable, reversible limits.

In summary, the method and scale of works are consistent with the WFD's objective to maintain good ecological and chemical status in the Lower Shannon Estuary and the Mouth of the Shannon. With mitigation and monitoring in place, the works are not expected to compromise the integrity of relevant Natura 2000 sites.

Table 4.5.3 WFD Compliance Screening – Kilrush Marina maintenance dredging

WFD Quality Element / Objective	Potential Interaction from Project	Assessment Outcome
Ecological Status (biological elements: benthic invertebrates, fish, phytoplankton)	Temporary disturbance of benthic habitats within dredge boundary	Short-term and localised; no long-term status change anticipated
Chemical Status (priority substances under EQSD)	No chemical inputs from project; sediments not contaminated	No deterioration
Hydromorphology (tidal regime, morphology, sediment dynamics)	Sediment redistributed within existing channel; follows natural dispersion	No alteration beyond natural variability
Supporting Physico-chemical Conditions (nutrients, dissolved oxygen, salinity)	Possible short-lived turbidity increase during dredging	Within natural background variation; no lasting effect
Achievement of Future Status Objectives	Project scale and method compatible with achieving targets	No constraint on future improvements

Impact on Bathing Waters within the Zone of Influence

There are four designated bathing waters monitored for bathing water quality within the ZOI: Cappagh Pier (IESHBWC060_0000_0100), Carrigaholt (IESHBWC060_0000_0050), Ballybunion North (IESHBWC060_0000_0200), and Ballybunion South (IESHBWC060_0000_0300). Under the Bathing Water Quality Regulations 2008 (S.I. No. 79 of 2008), which transpose the EU Bathing Water Directive (2006/7/EC) into Irish law, the EPA is the national authority responsible for monitoring, classification, and reporting on bathing water quality. As of 2024, all four sites were classified by the EPA as being of Excellent quality, the highest of the four classification categories (Excellent, Good, Sufficient, Poor). In line with the objectives of both the Bathing Water Directive and the Water Framework Directive, these designations aim to protect public health and safeguard water quality in designated recreational areas. Given the WFD assessment above, together with supporting evidence from sediment chemistry analysis, dispersion modelling and ecological surveys, the quality of bathing waters within the ZOI was considered unlikely to be adversely affected by the proposed maintenance dredging campaigns.

Statement of Authority

Dr. Aidan Long is a Principal Marine Consultant with over nine years of experience across consultancy, government, and academia, with a PhD in marine ecology from the University of Galway. His career has focused on the assessment and management of environmental impacts in the marine environment, with specialist expertise in Environmental Impact Assessment, Appropriate Assessment, Marine Usage Licences, and Dumping at Sea permits. He has successfully managed and delivered complex multidisciplinary projects for high-profile clients in Ireland, Australia, and Brazil in sectors including fisheries, aquaculture, offshore renewables, ports, and wastewater, authoring over 30 major technical reports. His background includes detailed ecological and water quality assessments, monitoring programme design, and statistical analysis, supported by peer-reviewed publications and international research collaborations. Drawing on this expertise and his in-depth knowledge of EU and Irish environmental legislation, Dr. Long is suitably qualified to provide a robust consideration of the project's consistency with the objectives of the Water Framework Directive.