

**APPENDIX 21.5**

Effect	Receptor and importance	Nature of Effect	Significance	Mitigation & Enhancement Measures	Residual Significance	Cumulative Effect	Significance (and Nature) of Cumulative Effect	Explanation
<b>Construction Phase</b>								
Underwater noise: Potential disturbance, auditory problems, loss of balance and coordination, from pile driving noise. In extreme cases possible mortality near pile driving source. Noise from hover barges.	Epifauna and fish High importance	Temporary Moderate Short-term Direct	Moderate significance Negative	Maintenance of 'noise free' window during times of peak migration.	Low significance Negative	None	-	The only proposed development which intrudes into the Estuary is development 26 (Port of Liverpool Post Panamax terminal). Approximately 32 km downstream it is too far away to have any direct cumulative effects. Due to the temporary nature and distance between the two developments further cumulative effects are not considered likely.
Underwater noise: Potential disturbance, auditory problems, loss of balance and coordination, from pile driving noise. In extreme cases	Marine mammals High importance	Temporary Moderate Short-term Direct	Moderate significance Negative	Establishment of a safety zone to protect marine mammals.	Low significance Negative			

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possible mortality near pile driving source. Noise from hover barges.								
Release of pollutants: Erosion of sediments/ spillages and leakages of material. Potential release of contaminants within intertidal zone e.g. planings containing tar.	Intertidal and Subtidal habitat High importance	Temporary (poss permanent depending on persistence of pollutant) Low to Moderate Short, medium or long-term (depending on what is released) Direct	Moderate significance Negative	Removal of excavated material and dewater to appropriate disposal sites. Adhere to relevant waste legislation (e.g. Duty of Care Guidance). Store hazardous materials in secure containers to avoid spillage and leakage.	Low significance Negative	Potential decrease in water quality damaging to aquatic organisms	Low Negative (Temporary, Medium term, Direct)	The only proposed development which intrudes into the Estuary is development 26 (Port of Liverpool Post Panamax terminal), approximately 32 km downstream. Development 26 is likely to involve disturbance to sediments, however modelling (see Chapter 8: Surface Water Quality) has shown that the effects from construction activities of the Project will not effect the water quality as far downstream as the Liverpool Docks.  Other developments, not in the Estuary itself, may cause additional discharges to the
Release of pollutants: Potentially direct damage to organisms if above Predicted No Effect	Infauna and Benthic algae High importance	Temporary (poss permanent depending on persistence of pollutant)	Moderate significance Negative	As above	Low significance Negative			

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Concentrations (PNECs) for specific taxa. Bioaccumulation of contaminants along food chain.		Low to Moderate Short, medium or long-term (depending on what is released) Direct and Indirect						estuary which could have an effect over a larger area. There is therefore potential for a low negative cumulative effect if drainage from other new developments near to the edge of the estuary, such as development 10, caused a cumulative decrease in water quality for aquatic species.
Release of pollutants: Potentially direct adverse effect on epifauna and fish species (depending on type of pollutant and its concentration in sediments/water column). Damage due to consumption of contaminated prey items and bioaccumulation of contaminants.	Epifauna and fish High importance	Temporary (possibly permanent depending on persistence of pollutant) Low to Moderate Short, medium or long-term (depending on what is released) Direct and Indirect	Moderate significance Negative	As above	Low significance Negative			
Habitat loss/disturbance	Intertidal and Subtidal	Temporary and	Low significance	None	Low significance	None	-	

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: Construction of tower, piers cofferdams and stone haul road. Direct loss of sediment habitat, tower surfaces would create a small area of new habitat.	habitat High importance	Permanent Low Short, medium or long-term (i.e. for sediments on which towers were built) Direct	Negative		Negative			intrudes into the Estuary is development 26 (Port of Liverpool Post Panamax terminal), approximately 32 km downstream. Development 26 is likely to involve disturbance to sediments, however modelling (see Chapter 7: Hydrodynamics and Estuarine Processes) has shown that the effects from construction activities of the Project will not effect sediments that far downstream.
Habitat loss/disturbance : Construction of tower, piers cofferdams and stone haul road. Direct loss of sediment habitat, tower surfaces would create a small area of new habitat.	Infauna and Benthic algae High importance	Temporary and Permanent Low Short, medium or long-term (i.e. for sediments on which towers were built) Direct	Low significance Negative	None	Low significance Negative	None	-	No proposed developments will intrude into the saltmarsh. Development 26 is located on previously developed land.

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Habitat loss/disturbance : Fish can move away from impacted areas and relocate to areas away from the site of construction. If stone haul road construction removes saltmarsh scrapes (potentially important habitat) this would decrease availability of potentially important intertidal refuge areas for fish. Cofferdam and pier structures may disorientate and impede salmon migration.	Epifauna and fish High importance	Temporary and Permanent Low Short, medium and long-term Direct	Low significance for most species but moderate for protected migratory fish. Negative	Ensure adequate space between pilings for fish to pass through.	Low significance Negative	None	-	No proposed developments will intrude into the saltmarsh. Development 26 is located on previously developed land.
Habitat loss/disturbance : Infilling of	Canal fauna and flora Moderate	Temporary Low Short-term	Low significance Negative	None	Low significance Negative	None	-	No proposed developments will intrude into the

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section of the St. Helen's Canal. Fish likely to be impacted. Displacement of organisms and reduction of available habitat for aquatic flora and fauna.	importance	Direct						saltmarsh. Development 26 is located on previously developed land.
<b>Operational Phase</b>								
Guanotrophy: Potential adverse impact due to increased organic input from roosting birds. Depletion of dissolved oxygen levels in water column due to increased bacterial activity. Potential local reduction in macro invertebrate	Canal fauna and flora  Moderate importance	Permanent  Low  Long-term  Direct & Indirect	Low significance  Negative	None	Low significance  Negative	None	-	No other proposed developments are likely to result in this effect. Therefore there is no potential for cumulative effects.

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diversity.								

Table 21.5. Cumulative effects relating to Aquatic Ecology arising from the Project