

Autumn 2022



Regional Water Resources Plan—Eastern and Midlands

Natura Impact Statement
Appendix C



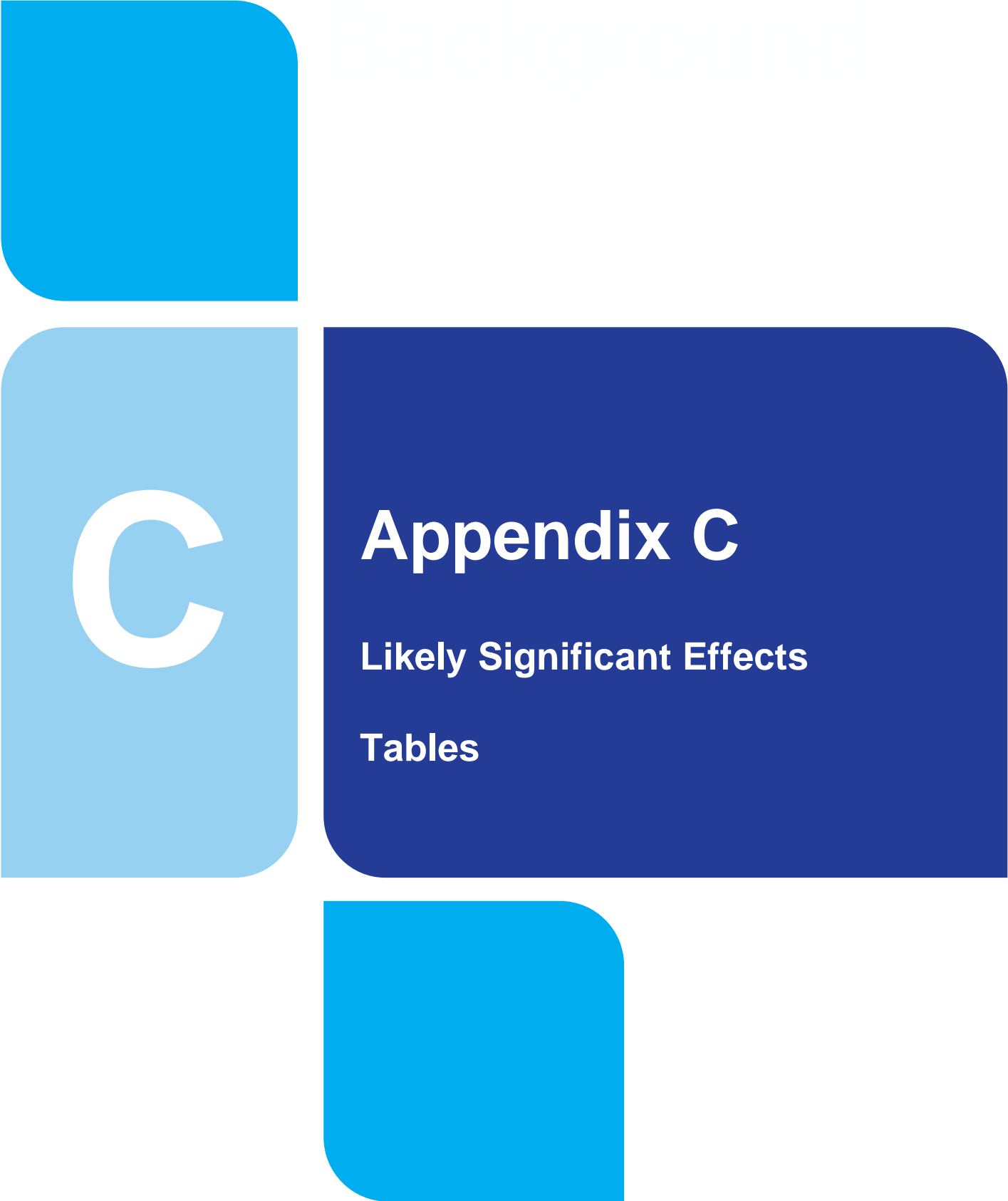
Tionscaldal Éireann
Project Ireland
2040

Data disclaimer: This document uses best available data at time of writing. Some sources may have been updated in the interim period. As data relating to population forecasts and trends are based on information gathered before the Covid 19 Pandemic, monitoring and feedback will be used to capture any updates. The National Water Resources Plan will also align to relevant updates in applicable policy documentation.

Baseline data included in the RWRP-EM has been incorporated from numerous sources including but not limited to; National Planning Framework, Central Statistics Office, Regional Spatial and Economic Strategies, Local Authority data sets, Regional Assembly data sets and Irish Water data sets. Data sources will be detailed in the relevant sections of the RWRP-EM. 2019 was selected as the base year to align with the planning period (2019-2025) of the NWRP.

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Appendix C

Likely Significant Effects

Tables

Note if option from Preferred Approach not listed below there were no European sites identified within the ZOI of that option (e.g. Preferred Approach options SA1-66 and SA1-42)

Table C1.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-503 (17c, 57c, 23c, 53c, 51c, 52c, 87) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Deputy's Pass Nature Reserve SAC (000717)	0km	Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	Option study area is directly adjacent to the SAC. - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Wicklow Mountains SAC (002122)	< 1km	Annex I Habitats Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to otter. No potential for impacts to QI habitats as study area is located downstream of the SAC.	No operational impacts are predicted.	Y
Vale of Clara (Rathdrum Wood) SAC (000733)	< 1km	Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	No potential impact pathway. Given distance from site, and the QI features it supports.	No operational impacts are predicted.	N
The Murrough Wetlands SAC (002249)	ca. 2.8km	Annex I Habitats Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	Option study area is hydrologically linked to this European site. -Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y
Wicklow Reef SAC (002274)	ca.4.5km	Annex I Habitats Reefs [1170]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Magherabeg Dunes SAC (001766)	ca.4.5km	<p><u>Annex I Habitats</u></p> <p>Annual vegetation of drift lines [1210]</p> <p>Embryonic shifting dunes [2110]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p> <p>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150]</p> <p>Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>-Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y
Buckroney-Brittis Dunes and Fen SAC (000729)	ca.4.5km	<p><u>Annex I Habitats</u></p> <p>Annual vegetation of drift lines [1210]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Embryonic shifting dunes [2110]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p> <p>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150]</p> <p>Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170]</p> <p>Humid dune slacks [2190]</p> <p>Alkaline fens [7230]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>-Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

Table C1.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA1-503 (17c, 57c, 23c, 53c, 51c, 52c, 87) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Wicklow Mountains SPA (004040)	< 1km	Merlin (<i>Falco columbarius</i>) [A098] Peregrine (<i>Falco peregrinus</i>) [A103]	breed breed	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
The Murrough SPA (004186)	ca. 1.7km	Red-throated Diver (<i>Gavia stellata</i>) [A001] Greylag Goose (<i>Anser anser</i>) [A043] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Herring Gull (<i>Larus argentatus</i>) [A184] Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b breed	-Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
Wicklow Head SPA (004127)	ca. 4km	Kittiwake (<i>Rissa tridactyla</i>) [A188]	breed	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C1.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-514 (81, 82, 83) leading to potential LSEs. Note: No SPAs within Zol for SA1-Group 14

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Buckroneys-Brittis Dunes and Fen SAC (000729)	ca. 6km	Annex I Habitats Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Alkaline fens [7230]	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N
Kilpatrick Sandhills SAC (001742)	ca. 7.5km	Annex I Habitats Annual vegetation of drift lines [1210] Embryonic shifting dunes [2110]	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150]			

Table C1.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-30 leading to potential LSEs. Note: No SPAs within Zol for SA1-30

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Buckroney-Brittis Dunes and Fen SAC (000729)	ca. 11km	<u>Annex I Habitats</u> Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Alkaline fens [7230]	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C1.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-20 leading to potential LSEs. Note: No SPAs within Zol for SA1-20

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Vale of Clara (Rathdrum Wood) SAC (000733)	ca. 4.4km	Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	No potential impact pathway. Given distance from site, and the QI features it supports.	No operational impacts are predicted.	N
Buckroney-Brittis Dunes and Fen SAC (000729)	ca. 8.6km	Annex I Habitats Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Alkaline fens [7230]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C1.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-27 leading to potential LSEs. Note: No SPAs within Zol for SA1-27

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Buckroney-Brittis Dunes and Fen SAC (000729)	ca. 4.5km	Annex I Habitats Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190] Alkaline fens [7230]	No potential impact pathway, the distance of the Option works from the nearest watercourse (>700m), the distance from the European site, and the QI features it supports. At fine screening potential LSE were identified but on review the potential for LSE have been ruled out because of a lack of hydrological link.	No operational impacts are predicted.	N

Table C1.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-71 leading to potential LSEs. Note: No SPAs within Zol for SA1-71

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	800m	<p><u>Annex I Habitats</u></p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p><u>Annex II species</u></p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>-Habitat degradation – changes in water quality (pollution)</p> <p>Given the proximity of the site to this European site and the distance to the nearest watercourse (<500m) there is potential for LSE during construction.</p>	No operational impacts are predicted.	Y

Table C1.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-50 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Wicklow Mountains SAC (002122)	ca. 4.4km	<p><u>Annex I Habitats</u></p> <p>Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]</p> <p>Natural dystrophic lakes and ponds [3160]</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>European dry heaths [4030]</p> <p>Alpine and Boreal heaths [4060]</p> <p>Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130]</p> <p>Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]</p> <p>Calcareous rocky slopes with chasmophytic vegetation [8210]</p> <p>Siliceous rocky slopes with chasmophytic vegetation [8220]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p><u>Annex II species</u></p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given that the site is downstream of the SAC, the distance from site, and the QI features it supports there is no potential for LSE.</p>	No operational impacts are predicted.	N

Table C1.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA1-50 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Wicklow Mountains SPA (004040)	ca. 4.4km	<p>Merlin (<i>Falco columbarius</i>) [A098]</p> <p>Peregrine (<i>Falco peregrinus</i>) [A103]</p>	<p>breed</p> <p>breed</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C1.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-69 leading to potential LSEs. Note: No SPAs within Zol for SA1-69

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	ca. 4.8km	<p><u>Annex I Habitats</u></p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p><u>Annex II species</u></p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C1.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA1-70 leading to potential LSEs. Note: No SPAs within Zol for SA1-70

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	ca. 2.8km	<p><u>Annex I Habitats</u></p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p><u>Annex II species</u></p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaiite Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Phoca vitulina</i> (Harbour Seal) [1365]</p>			

Table C2.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-Group 2 (7b & 11b) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	5.4km	<p>Annex I Habitats</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Wicklow Mountains SAC (002122)	6.3km	<p>Annex I Habitats</p> <p>Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]</p> <p>Natural dystrophic lakes and ponds [3160]</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>European dry heaths [4030]</p> <p>Alpine and Boreal heaths [4060]</p> <p>Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130]</p> <p>Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]</p> <p>Calcareous rocky slopes with chasmophytic vegetation [8210]</p> <p>Siliceous rocky slopes with chasmophytic vegetation [8220]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Annex II species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 25km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
South Dublin Bay SAC (000210)	ca. 37.5km	<p>Annex I Habitats</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]</p>	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
North Dublin Bay SAC (000206)	ca. 42km	<p>Annex I Habitats</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110]</p>	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b			

Table C2.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-13 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Wicklow Mountains SAC (002122)	<600m	<u>Annex I Habitats</u> Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] <u>Annex II species</u> <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Disturbance to otter	No operational impacts are predicted.	Y
South Dublin Bay SAC (000210)	ca. 30km	<u>Annex I Habitats</u> Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
North Dublin Bay SAC (000206)	ca. 35.5km	<p>Annex I Habitats</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190]</p> <p>Annex II species</p> <p><i>Petalophyllum ralfsii</i> (Petalwort) [1395]</p>	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C2.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA2-13 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Poulaphouca Reservoir SPA (004063)	<1km	Greylag Goose (<i>Anser anser</i>) [A043] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]	non-b non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
Wicklow Mountains SPA (004040)	<1km	Merlin (<i>Falco columbarius</i>) [A098] Peregrine (<i>Falco peregrinus</i>) [A103]	breed breed	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
South Dublin Bay and River Tolka Estuary SPA (004024)	ca.38km	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b passage breed passage	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
North Bull Island SPA (004006)	ca. 41.5km	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C2.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-35 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Wicklow Mountains SAC (002122)	1.5km	Annex I Habitats Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Calcareous rocky slopes with chasmophytic vegetation [8210] Siliceous rocky slopes with chasmophytic vegetation [8220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	- Disturbance: there is potential for disturbance to otter.	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Annex II species <i>Lutra lutra</i> (Otter) [1355]</p>			
Slaney River Valley SAC (000781)	2.2km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance 	No operational impacts are predicted.	Y
Raven Point Nature Reserve SAC (000710)	ca. 59km	<p>Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Dunes with <i>Salix repens ssp. argentea</i> (<i>Salicion arenariae</i>) [2170] Humid dune slacks [2190]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N
Long Bank SAC (002161)	ca. 67km	<p>Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b			

Table C2.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-38 leading to potential LSEs. Note: No SPAs within Zol for SA2-38

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	ca. 3.6km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

Table C2.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-20a leading to potential LSEs. Note: No SPAs within Zol for SA2-20a

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	ca. 3km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>			

Table C2.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-24 leading to potential LSEs. Note: No SPAs within Zol for SA2-24.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	3.9km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Phoca vitulina</i> (Harbour Seal) [1365]			
River Barrow and River Nore SAC (002162)	15.4km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>-Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

Table C2.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-40 leading to potential LSEs. Note: No SPAs within Zol for SA2-40

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	1.8km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>-Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>			

Table C2.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-30d leading to potential LSEs. Note: No SPAs within the ZoI for SA2-30d

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	0km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106]</p>	<p>Option pipeline crosses this European site three times. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]			

Table C2.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-01 leading to potential LSEs. Note: No SPAs within the Zol for SA2-01

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	0km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	<p>Option pipeline crosses this European site. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y
Holdenstown Bog SAC (001757)	ca.2.6km	<p>Annex I Habitats</p> <p>Transition mires and quaking bogs [7140]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N

Table C2.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-17 leading to potential LSEs. Note: No SPAs in the Zol of SA2-17

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	2km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports. At fine screening potential LSE were identified but on review the potential for LSE have been ruled out because of a lack of hydrological link.	No operational impacts are predicted. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N

Table C2.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA2-28 leading to potential LSEs. Note: No SPAs in the Zol of SA2-28

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slaney River Valley SAC (000781)	ca. 280m	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p>	- Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]			

Table C3.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA3-523 (96, 100, 97, 98, 102, 99, 101) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Boyne and River Blackwater SAC (002299)	0km	<p>Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is directly adjacent to this European site. Option pipeline crosses this European site. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Lough Bane and Lough Glass SAC (002120)	0km	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	<p>Option study area is directly adjacent to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
White Lough, Ben Loughs and Lough Doo SAC (001810)	2.5km	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	Impacts are unlikely given distance from site, and the QI features it supports.	No operational impacts are predicted.	N
Lough Lene SAC (002121)	3.6km	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	Impacts are unlikely given distance from site, and the QI features it supports.	No operational impacts are predicted.	N
North Dublin Bay SAC (000206)	10.7km	<p>Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190]</p> <p>Annex II species <i>Petalophyllum ralfsii</i> (Petalwort) [1395]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Malahide Estuary SAC (000205)	14.5km	Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Boyne Coast and Estuary SAC (001957)	15km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C3.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA3-523 (96, 100, 97, 98, 102, 99, 101) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Boyne and River Blackwater SPA (004232)	0km	Kingfisher (<i>Alcedo atthis</i>) [A229]	Breed	Option study area is directly adjacent to this European site. Option pipeline crosses this European site - Mortality - Disturbance - Habitat degradation: changes in water quality (pollution)	No operational impacts are predicted.	Y
River Nanny Estuary and Shore SPA (004158)	ca. 3.7km	Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Herring Gull (<i>Larus argentatus</i>) [A184] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
South Dublin Bay and River Tolka Estuary SPA (004024)	10.7km	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137]	non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Malahide Estuary SPA (004025)	14.5km	Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Pintail (<i>Anas acuta</i>) [A054] Goldeneye (<i>Bucephala clangula</i>) [A067] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Boyne Estuary SPA (004080)	15km	Shelduck (<i>Tadorna tadorna</i>) [A048] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169]	non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999]	breed			

Table C3.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA3-77 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Boyne And River Blackwater SAC (002299)	5.7km	Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Habitat degradation: changes in water quality (pollution) - Disturbance (including biological disturbance)	This option includes a new surface water abstraction from upstream of this European site. Option study area is hydrologically linked to this European site. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
Killyconny Bog (Cloghbally) SAC (000006)	7.6km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from the site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C3.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA3-77 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Boyne and River Blackwater SPA (004232)	5.7km	Kingfisher (<i>Alcedo atthis</i>) [A229]	Breed	Option study area is hydrologically linked to this European site. - Habitat degradation: changes in water quality (pollution)	No operational impacts are predicted.	Y

Table C3.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA3-88 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Killyconny Bog (Cloghbally) SAC (000006)	4.4km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from the site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N
River Boyne And River Blackwater SAC (002299)	5.5km	Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Habitat degradation: changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Boyne Coast and Estuary SAC (001957)	ca. 40km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C3.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA3-88 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Boyne and River Blackwater SPA (004232)	5.5km	Kingfisher (<i>Alcedo atthis</i>) [A229]	Breed	Option study area is hydrologically linked to this European site. - Habitat degradation: changes in water quality (pollution)	No operational impacts are predicted.	Y
Boyne Estuary SPA (004080)	ca. 40km	Shelduck (<i>Tadorna tadorna</i>) [A048] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Sanderling (<i>Calidris alba</i>) [A144] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999]	non-b non-b non-b non-b breed			

Table C3.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA3-47 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Boyne And River Blackwater SAC (002299)	0km	Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	Option study area is within this European site. Option study area is hydrologically linked to this European site. - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	This option involves an increase in existing ground water abstraction from this European site. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
Boyne Coast and Estuary SAC (001957)	ca. 16km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C3.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA3-47 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Boyne and River Blackwater SPA (004232)	0km	Kingfisher (<i>Alcedo atthis</i>) [A229]	Breed	Option study area is directly adjacent to this European site. - Mortality - Disturbance - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y
Boyne Estuary SPA (004080)	ca.16km	Shelduck (<i>Tadorna tadorna</i>) [A048] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C3.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA3-89 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Boyne and River Blackwater SAC (002299)	6.8km	Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	No potential impact pathway given the minor nature of the Option works, the distance from the nearest connected watercourse (290m), the distance from the European site, and the QI features it supports.	No operational impacts are predicted.	N

Table C3.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA3-89 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Boyne and River Blackwater SPA (004232)	7.3km	Kingfisher (<i>Alcedo atthis</i>) [A229]	Breed	No potential impact pathway given the minor nature of the Option works, the distance from the nearest connected watercourse (290m), the distance from the European site, and the QI features it supports.	No operational impacts are predicted.	N

Note if an option from Preferred Approaches is not listed below then there were no European sites identified within the Zol of that option.

Table C4.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA4-99 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts. Note: No SPAs within Zol for SA4-99.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Boyne and River Blackwater SAC (002299)	5km	<p>Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Mount Hevey Bog SAC (002342)	8.5km	<p>Annex I Habitats Active raised bogs (7110) Degraded raised bogs still capable of natural regeneration (7120) Depressions on peat substrates of Rhynchosporion (7150)</p>	No potential impact pathway.	No operational impacts are predicted.	N

Table C4.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA4-98 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts. Note: No SPAs within Zol for SA4-98.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 11.5km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			

Table C4.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with grouped option SA4-501 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lough Ennell SAC (000685)	3m	<p>Annex I Habitats Alkaline fens [7230]</p>	<p>Option study area is directly adjacent and hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Lough Lene SAC (002121)	25m	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	<p>Option study area is adjacent to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
River Boyne and River Blackwater SAC (002299)	200m	<p>Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Lough Owel SAC (000688)	670m	<p>Annex I Habitats</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140] Transition mires and quaking bogs [7140] Alkaline fens [7230]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	- Disturbance (including biological disturbance)		
Raheenmore Bog SAC (000582)	1.9km	<p>Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]</p>	<p>Option study area is hydrologically linked to this European site. However, no potential impact pathway as the SAC is upstream of the option study area.</p>	No operational impacts are predicted.	N
Scragh Bog SAC (000692)	2km	<p>Annex I Habitats Transition mires and quaking bogs [7140] Alkaline fens [7230]</p> <p>Annex II species <i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]</p>	<p>Option study area is hydrologically linked to this European site. However, no potential impact pathway as the SAC is upstream of the option study area.</p>	No operational impacts are predicted.	N
Mount Hevey Bog SAC (002342)	2.3km	<p>Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]</p>	<p>Option study area is hydrologically linked to this European site. However, no potential impact pathway as the SAC is upstream of the option study area.</p>	No operational impacts are predicted.	N
Split Hills and Long Hill Esker SAC (001831)	2.8km	<p>Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p>	<p>Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N
White Lough, Ben Loughs And Lough Doo SAC (001810)	3.9km	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p> <p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	<p>Given the distance from the site and the QI features it supports there is no potential for construction related impacts.</p>	No operational impacts are predicted.	N
The Long Derris, Edenderry SAC (000925)	4km	<p>Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p>	<p>Given the distance from the site and the QI features it supports there is no potential for construction related impacts.</p>	No operational impacts are predicted.	N
Wooddown Bog SAC (002205)	4.4km	<p>Annex I Habitats Degraded raised bogs still capable of natural regeneration [7120]</p>	<p>Given the distance from the site and the QI features it supports there is no potential for construction related impacts.</p>	No operational impacts are predicted.	N
Lough Bane And Lough Glass SAC (002120)	5.2km	<p>Annex I Habitats Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]</p>	<p>Given the distance from the site and the QI features it supports there is no potential for construction related impacts.</p>	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Annex II species <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>			
River Barrow and River Nore SAC (002162)	7.4km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y
Garriskil Bog SAC (000679)	9km	<p>Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]</p>	<p>Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y
Charleville Wood SAC (000571)	9.5km	<p>Annex I Habitats Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	<p>Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slieve Bloom Mountains SAC (000412)	12.1km	<p>Annex I Habitats</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y
Lough Ree SAC (000440)	13.2km	<p>Annex I Habitats</p> <p>Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p> <p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Alkaline fens [7230]</p> <p>Limestone pavements [8240]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Bog woodland [91D0]</p> <p>Annex II species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

Table C4.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with grouped option SA4-501 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Iron SPA (004046)	0m	<p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Coot (<i>Fulica atra</i>) [A125]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>Wetland and Waterbirds [A999]</p>	<p>Non-b</p> <p>Non-b</p> <p>Non-b</p> <p>Non-b</p> <p>Non-b</p> <p>Non-b</p> <p>Non-b</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Physical loss of habitats/supporting habitat</p> <p>- Mortality</p> <p>- Habitat degradation – changes in water quality (pollution)</p> <p>- Disturbance (including biological disturbance)</p>	No operational impacts are predicted.	Y
River Boyne and River Blackwater SPA (004232)	225m	<p>Kingfisher (<i>Alcedo atthis</i>) [A229]</p>	<p>Breed</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p> <p>- Disturbance (including biological disturbance)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Ennell SPA (004044)	250m	Pochard (<i>Aythya ferina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125] Wetland and Waterbirds [A999]	Non-b Non-b Non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Lough Derravarragh SPA (004043)	270m	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Pochard (<i>Aythya ferina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Lough Owel SPA (004047)	670m	Shoveler (<i>Anas clypeata</i>) [A056] Coot (<i>Fulica atra</i>) [A125] Wetland and Waterbirds [A999]	Non-b Non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Glen Lough SPA (004045)	6.3km	Whooper Swan (<i>Cygnus cygnus</i>) [A038]	Non-b	Option study area is hydrologically linked to this European site. However, no potential impact pathway as the SPA is upstream of the option study area.	No operational impacts are predicted.	N
Garriskil Bog SPA (004102)	9km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	Non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y
Slieve Bloom Mountains SPA (004160)	12.1km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	Breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Lough Ree SPA (004064)	13.2km	Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Shoveler (<i>Anas clypeata</i>) [A056] Tufted Duck (<i>Aythya fuligula</i>) [A061] Common Scoter (<i>Melanitta nigra</i>) [A065] Goldeneye (<i>Bucephala clangula</i>) [A067] Coot (<i>Fulica atra</i>) [A125] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	Non-b Non-b Non-b Non-b Non-b Non-b Breed Non-b Non-b Non-b Non-b Breed	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y

Note if option from Preferred Approach not listed below there were no European sites identified within the ZoI of that option (e.g. Preferred Approach option SA5-33)

Table C5.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-02 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Suck Callows SPA (004097)	ca. 4.6km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	Option includes a new ground water abstraction. Option study area overlies a karst aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) There is a risk to the wetland used by migratory waterbirds due to the underlying Karst/gravel aquifer at the abstraction point.	Y

Table C5.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-09a leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lough Ree SAC (000440)	<600m	Annex I Habitats Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Alkaline fens [7230] Limestone pavements [8240] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Bog woodland [91D0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	This option includes an increase in abstraction downstream of this SAC. Option study area is hydrologically linked to this European site. - Disturbance to otter	This option includes an increase in abstraction downstream of this SAC. Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (hydrological changes) - Changes in water table/availability from abstraction	Y
River Shannon Callows SAC (000216)	1.1km	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species	This option includes an increase in abstraction from the River Shannon. Option study area is hydrologically linked to this European site. - Physical loss of habitats/supporting habitat - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	This option includes an increase in SW abstraction from the River Shannon. - Habitat degradation – changes in water quality (hydrological changes) - Changes in water table/availability from abstraction	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lutra lutra</i> (Otter) [1355]			
Crossword Bog SAC (002337)	4.2km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Ballynamona Bog and Corkip Lough SAC (002339)	ca. 8.7km	Annex I Habitats Turloughs [3180] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] Bog woodland [91D0]	Study area is located downstream of this site. Therefore, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Pilgrim's Road Esker SAC (001776)	ca. 10km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Mongan Bog SAC (000580)	ca. 10km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C5.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-09a leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Ree SPA (004064)	<600m	Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Shoveler (<i>Anas clypeata</i>) [A056] Tufted Duck (<i>Aythya fuligula</i>) [A061] Common Scoter (<i>Melanitta nigra</i>) [A065] Goldeneye (<i>Bucephala clangula</i>) [A067] Coot (<i>Fulica atra</i>) [A125] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b breed non-b non-b non-b breed	- Disturbance: there is potential for disturbance to QI birds within the SPA, using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Middle Shannon Callows SPA (004096)	1.1km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b breed non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds within the SPA, using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
River Suck Callows SPA (004097)	ca. 18km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, given the distance from site, and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C5.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-17a leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Shannon Callows SAC (000216)	ca. 15km	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. However, given the distance from site, and the QI features it supports there is no potential for LSE.	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N

Table C5.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-17a leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Suck Callows SPA (004097)	0m	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance: there is potential for disturbance to QI birds given the proximity to the SPA.	Option includes an increase in surface water abstraction. Option study area overlies a karst aquifer. - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

Table C5.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-80 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Shannon Callows SAC (000216)	<550m	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Physical loss of habitats/supporting habitat - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Redwood Bog SAC (002353)	ca. 6km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	Option study area is hydrologically linked to this European site. However, given the distance from site, and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C5.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-80 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Middle Shannon Callows	ca. 550m	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140]	non-b non-b breed non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
SPA (004096)		Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b non-b			
All Saints Bog SPA (004103)	3.7km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
River Little Brosna Callows SPA (004086)	5km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	Given the distance from site, and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C5.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-81 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Shannon Callows SAC (000216)	2.5km	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
All Saints Bog and Esker SAC (000566)	ca. 2.5km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	Given the distance from site, and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Depressions on peat substrates of the Rhynchosporion [7150] Bog woodland [91D0]			

Table C5.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-81 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Middle Shannon Callows SPA (004096)	2.5km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b breed non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
All Saints Bog SPA (004103)	2.5km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
River Little Brosna Callows SPA (004086)	4.5km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y

Table C5.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-517 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Shannon Callows SAC (000216)	ca. 15km	<p>Annex I Habitats</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510]</p> <p>Limestone pavements [8240]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given the distance from site, and the QI features it supports there is no potential for LSE.</p>	No operational impacts are predicted.	N

Table C5.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-517 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Dovegrove Callows SPA (004137)	3.7km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	<p>Option study area is hydrologically linked to this European site.</p> <p>- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).</p>	<p>Option includes a surface water abstraction. Option study area overlies a karst aquifer.</p> <p>- Changes in water table/availability from abstraction</p> <p>- Habitat degradation – changes in water quality (hydrological changes)</p> <p>There is a risk to the wetland used by migratory waterbirds due to the underlying karst/gravel aquifer at the abstraction point.</p>	Y
River Little Brosna Callows SPA (004086)	6.4km	<p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Lapwing (<i>Vanellus vanellus</i>) [A142]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</p> <p>Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</p> <p>Wetland and Waterbirds [A999]</p>	<p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p> <p>non-b</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given the distance from site, and the QI features it supports there is no potential for LSE.</p>	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N

Table C5.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-84 leading to potential LSEs. Note: No SPAs within Zol for SA5-84

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Moyclare Bog SAC (000581)	700m	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	Given the distance from site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N
Clara Bog SAC (000572)	ca. 2km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] Bog woodland [91D0]	Given the distance from site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N
Ferbane Bog SAC (000575)	2.2km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	Given the distance from site, lack of hydrological link and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N
River Shannon Callows SAC (000216)	ca. 7km	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y

Table C5.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-37b leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Four Roads Turlough SAC (001637)	1.2km	Annex I Habitats Turloughs [3180]	No potential impact pathway given distance from site, lack of hydrological connection and the QI feature it supports.	Option includes an increase in ground water abstraction. Option study area overlies a karst aquifer. - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) Abstraction point is within a karstic aquifer which connects the site to the SAC within 5km.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lisduff Turlough SAC (000609)	3.4km	Annex I Habitats Turloughs [3180]	No potential impact pathway given distance from site, lack of hydrological connection and the QI feature it supports.	<p>Option includes an increase in ground water abstraction. Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) <p>Abstraction point is within a karstic aquifer which connects the site to the SAC within 5km.</p>	Y
Aughrim (Aghrane) Bog SAC (002200)	4.4km	Annex I Habitats Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from site, lack of hydrological connection and the QI feature it supports.	No operational impacts are predicted.	N
Ballygar (Aghrane) Bog SAC (002199)	4.9km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from site, lack of hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Lough Croan Turlough SAC (000610)	5km	Annex I Habitats Turloughs [3180]	No potential impact pathway given distance from site, lack of hydrological connection and the QI feature it supports.	<p>Option includes an increase in ground water abstraction. Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) <p>Abstraction point is within a karstic aquifer which connects the site to the SAC within 5km.</p>	Y

Table C5.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-37b leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Suck Callows SPA (004097)	0km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	<p>Option study area is directly adjacent to this European site.</p> <p>-Disturbance: there is potential for disturbance to QI birds, within the SPA, using supporting habitats in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).</p>	<p>Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
Four Roads Turlough SPA (004140)	1.2km	Golden Plover (<i>Pluvialis apricaria</i>) [A140] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b	-Disturbance: there is potential for disturbance to QI birds using supporting habitats in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	<p>Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
Lough Croan	5km	Shoveler (<i>Anas clypeata</i>) [A056]	non-b	No potential impact pathway given distance from site, lack of hydrological connection and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Turlough SPA (004139)		Golden Plover (<i>Pluvialis apricaria</i>) [A140] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b			

Table C5.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-86 leading to potential LSEs. Note: No SPAs within ZoI for SA5-86

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Charleville Wood SAC (000571)	3.2km	Annex I Habitats Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	New GW abstraction, mains, pump and storage, and WTP upgrades. Abstraction from gravel aquifer with no European sites present within aquifer, and abstraction over 5km from any European sites. Option study area is hydrologically linked to this European site. However, no potential impact pathway given that the river flow of the study area flows away from the European site, and the QI features it supports.	No operational impacts are predicted given there are no European sites within the aquifer the abstraction is within and all European sites are over 5km from the abstraction point.	N
Clara Bog SAC (000572)	3.2km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] Bog woodland [91D0]	No potential impact pathway given distance from site, lack of hydrological connection and the QI features it supports.	No operational impacts are predicted.	N

Table C5.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA5-518 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Ballynamona Bog and Corkip Lough SAC (002339)	ca. 1.3km	Annex I Habitats Turloughs [3180] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] Bog woodland [91D0]	Study area is located downstream of this site. Therefore, impacts are unlikely given distance from site and the QI features it supports.	Option study area overlies a karst aquifer. - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
Killeglan Grassland SAC (002214)	ca. 2.1km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	No potential impact pathway given distance from site, lack of hydrological connection and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Castlesampson Esker SAC (001625)	ca. 3.5km	<p>Annex I Habitats</p> <p>Turloughs [3180]</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p>	<p>Study area is located downstream of this site. Therefore, impacts are unlikely given distance from site and the QI features it supports.</p>	<p>Option includes an increase in ground water abstraction. Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
Lough Ree SAC (000440)	ca. 4km	<p>Annex I Habitats</p> <p>Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p> <p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Alkaline fens [7230]</p> <p>Limestone pavements [8240]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Bog woodland [91D0]</p> <p>Annex II species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
River Shannon Callows SAC (000216)	ca. 8.5km	<p>Annex I Habitats</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510]</p> <p>Limestone pavements [8240]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Although there is a groundwater abstraction and the site overlies a karst aquifer, this is over 5km from this site so no operational impacts are predicted.</p>	Y
Pilgrim's Road Esker SAC (001776)	ca. 14km	<p>Annex I Habitats</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	<p>No operational impacts are predicted.</p>	N
Mongan Bog SAC (000580)	ca. 14km	<p>Annex I Habitats</p> <p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Depressions on peat substrates of the Rhynchosporion [7150]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	<p>No operational impacts are predicted.</p>	N

Table C5.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA5-518 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Ree SPA (004064)	ca. 4km	Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Shoveler (<i>Anas clypeata</i>) [A056] Tufted Duck (<i>Aythya fuligula</i>) [A061] Common Scoter (<i>Melanitta nigra</i>) [A065] Goldeneye (<i>Bucephala clangula</i>) [A067] Coot (<i>Fulica atra</i>) [A125] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b breed non-b non-b non-b non-b breed	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland). - Habitat degradation – changes in water quality (pollution)	Option study area overlies a karst aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
River Suck Callows SPA (004097)	ca. 4km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland). - Habitat degradation – changes in water quality (pollution).	Option study area overlies a karst aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
Middle Shannon Callows SPA (004096)	ca. 8.5km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b breed non-b non-b non-b non-b	No potential impact pathway given the distance from this site and the QI features it support.	No potential impact pathway. Although there is a groundwater abstraction, this is over 5km from this site. Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N
Mongan Bog SPA (004017)	ca. 14km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	Option study area is hydrologically linked to this European site. No potential impact pathway given the distance from this site and the QI features it support.	No operational impacts are predicted.	N

Note if option from Preferred Approach not listed below there were no European sites identified within the ZoI of that option.

Table C6.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-193 leading to potential LSEs. Note: No SPAs within the ZoI for SA6-193.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	0km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option pipeline crosses this European site. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Slaney River Valley SAC (000781)	ca. 40m	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p>	<p>Option study area is adjacent to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]			

Table C6.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-197 leading to potential LSEs. Note: No SPAs within the Zol for SA6-197.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	<200m	<u>Annex I Habitats</u> Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	Option study area is adjacent to this European site. Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
		<u>Annex II species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421]			

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-19 leading to potential LSEs. Note: No SPAs within the Zol for SA6-19.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	<100m	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes refurbishment of existing GW abstraction. Option study area is within a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y

Table C6.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-24 leading to potential LSEs. Note: No SPAs within the Zol for SA6-24.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 4.4km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No potential impact pathway. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

Table C6.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-191 leading to potential LSEs. Note: No SPAs within the Zol for SA6-191.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	<400m	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			

Table C6.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-33 leading to potential LSEs. Note: No SPAs within the ZOI for SA6-33.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Blackstairs Mountains SAC (000770)	1km	<p>Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030]</p>	<p>Option study area is hydrologically linked to this European site. However, given that the study area is downstream of this site there is no potential for LSE.</p>	<p>No operational impacts are predicted. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.</p>	N
River Barrow and River Nore SAC (002162)	1.3km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p>	<p>Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)</p>	<p>Option includes a new GW abstraction. Option study area overlies a gravel aquifer. - Changes in water table/availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)</p>	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex and Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			
Slaney River Valley SAC (000781)	3.6km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex and Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

Table C6.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-38 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
The Loughans SAC (000407)	720m	Annex I Habitats Turloughs [3180]	Option study area is hydrologically linked to this European site. Option includes a new GW abstraction within a karstic aquifer. However, given that the study area is downstream of this site there is no potential for LSE.	Option includes a new GW abstraction within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
Spahill and Clomantagh Hill SAC (000849)	2.1km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	No potential impact pathway given distance from site and the QI feature it supports.	No potential impact pathway. Given the QI features it supports there is no potential for LSE.	N
River Barrow and River Nore SAC (002162)	ca. 11.5km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No potential impact pathway. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

Table C6.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-38 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	ca. 14km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C6.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-45a leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	0km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	Option study area is within this European site. Option study area is hydrologically linked to this European site. - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes a new GW abstraction within 1.3km of this European site within a productive fissured aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

Table C6.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-45a leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	ca. 11km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C6.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-53a leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Galmoy Fen SAC (001858)	ca. 2.5km	Annex I Habitats Alkaline fens [7230]	Impacts are unlikely given distance from site, lack of hydrological link and the QI features it supports.	Option includes an increase in GW abstraction. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
River Barrow and River Nore SAC (002162)	ca. 8.3km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No potential impact pathway. Although there is a groundwater abstraction, the SAC is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-53a leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	ca. 10km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C6.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-57a leading to potential LSEs. Note: No SPAs within the ZoI for SA6-57a.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Mountmellick SAC (002141)	7.5km	Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	Impacts are unlikely given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
River Barrow and River Nore SAC (002162)	8.8km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	Option study area is hydrologically linked to this European site. Option study area is within a karstic aquifer. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes a new GW abstraction. Option study area is within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			

Table C6.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-64 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 3km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p>	<p>Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-64 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Bloom Mountains SPA (004160)	1.6km	Hen Harrier (<i>Circus cyaneus</i>) [A082]		Impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C6.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-69a leading to potential LSEs. Note: No SPAs within the ZoI for SA6-69a

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 2.3km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	Option includes an increase in GW abstraction. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-77 leading to potential LSEs. No SPAs within the Zol for SA6-77

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 1km	<u>Annex I Habitats</u> Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] <u>Annex II species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103]	Impacts are unlikely given distance from site, lack of hydrological link and the QI features it supports.	Option includes an increase in ground water abstraction. Option study area is within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-86a leading to potential LSEs. No SPAs within the Zol for option SA6-86a

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	2.4km	<p>Annex I Habitats</p> Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] <p>Annex II Species</p> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Ballyprior Grassland SAC (002256)	12.0km	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.19: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-90 leading to potential LSEs. No SPAs within the Zol for option SA6-90

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	800m	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	<p>Option includes an increase in GW abstraction.</p> <p>- Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)</p>	Y
Ballyprior Grassland SAC	12.0km	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI feature it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
(002256)					

Table C6.20: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-94 leading to potential LSEs. Note No SPAs within the ZoI for option SA6-94

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	2.4km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes an increase in GW abstraction. Option study area is within a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
Ballyprior Grassland SAC (002256)	12.0km	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]	No potential impact pathway given the distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C6.21: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-99 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	7.7km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Galmoy Fen SAC (001858)	8.0km	<p>Annex I Habitats</p> <p>Alkaline fens [7230]</p>	No potential impact pathway given the distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Cullahill Mountain SAC (000831)	12.3km	<p>Annex I Habitats</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]</p>	No potential impact pathway given the distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C6.22: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-99 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	8.5km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	No potential impact pathway given the distance from site and the QI feature it supports.	No operational impacts are predicted.	N
Slieve Bloom Mountains SPA (004160)	11.1km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway given the distance from site and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.23: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-104 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	0.17km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes an increase in GW abstraction. Study area is within a productive fissured bedrock aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			
Slieve Bloom Mountains SAC (000412)	2.3km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs [7130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	No potential impact pathway given the distance from site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Coolrain Bog SAC (002332)	2.9km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	No potential impact pathway given the distance from site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Knockacoller Bog SAC Site Details (002333)	4.6km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	No potential impact pathway given the distance from site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C6.24: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-104 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	3.1km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y
Slieve Bloom Mountains SPA (004160)	4.3km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway given the distance from site and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.25: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-105 leading to potential LSEs. Note: No SPAs within the Zol for option SA6-105.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Ballyprior Grassland SAC (002256)	2.2km	<u>Annex I Habitats</u> Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]	No potential impact pathway given the distance from site, lack of a hydrological link and the QI features it supports.	No operational impacts are predicted.	N
River Barrow and River Nore SAC (002162)	4.2km	<u>Annex I Habitats</u> Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (Cratoneurion) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <u>Annex II Species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes an increase in GW abstraction. Option study area is within a gravel aquifer overlying a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

Table C6.26: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-113a leading to potential LSEs. Note: No SPAs within the Zol for option SA6-113a.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	2km	<p>Annex I Habitats</p> <p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes an increase in GW abstraction.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
Ballyprior Grassland SAC (002256)	12.5km	<p>Annex I Habitats</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) [6210]</p>	No potential impact pathway. Given distance from site, lack of hydrological link and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.27: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-122 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slieve Bloom Mountains SAC (000412)	ca. 500m	<p>Annex I Habitats</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given that the SAC is upstream of the option study area, the distance from site and the QI feature it supports, there is no potential for LSE.</p>	<p>Option includes an increase in GW abstraction.</p> <p>Option study area is within a productive fissured aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y
River Barrow and River Nore SAC (002162)	ca. 4.5km	<p>Annex I Habitats</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Reefs [1170]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</p> <p>European dry heaths [4030]</p> <p>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</p> <p>Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twait Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) 	<p>No operational impacts are predicted</p>	Y

Table C6.28: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-122 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Bloom Mountains SPA (004160)	<100m	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	- Disturbance	No operational impacts are predicted.	Y
River Nore SPA (004233)	ca. 8km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. No potential impact pathway. Given distance from site and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.29: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-553 (139, 144e) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lisbigney Bog SAC (000869)	ca. 180m	Annex I Habitats Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210] Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	No potential impact pathway given the lack of a hydrological link and the QI features it supports.	Option includes an increase in GW abstraction. Option study area is within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y
River Barrow and River Nore SAC (002162)	500m	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes an increase in GW abstraction. Option study area is within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaites Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			

Table C6.30: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-553 (139, 144e) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	560m	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	- Disturbance	Option includes an increase in GW abstraction. Option study area is within a karstic aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

Table C6.31: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-126 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	3.5km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	Option study area is within a gravel aquifer. Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes an increase in GW abstraction. Option study area is within a gravel aquifer. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			
Lisbigney Bog SAC (000869)	4.5km	<p>Annex I Habitats Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]</p> <p>Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	No potential impact pathway given distance from site and the QI feature it supports.	<p>Option includes an increase in GW abstraction. Option study area is within a gravel aquifer adjacent to a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y

Table C6.32: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-126 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	3.7km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	<p>Option study area is hydrologically linked to this European site.</p> <p>No potential impact pathway given the distance from site and the QI feature it supports.</p>	No operational impacts are predicted.	N

Table C6.33: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-156 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	ca. 7km	<p><u>Annex I Habitats</u> Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p><u>Annex II Species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes an increase in GW abstraction.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) <p>Further study on the levels of GW contribution to the SAC are required given the abstraction is directly linked to highly sensitive downstream Freshwater Pearl Mussel.</p>	Y
Lisbigney Bog SAC (000869)	9.8km	<p><u>Annex I Habitats</u> Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210]</p> <p><u>Annex II Species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	No potential impact pathway given distance from site and the QI feature it supports.	No operational impacts are predicted.	N

Table C6.34: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-156 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	ca. 7km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	<p>Option study area is hydrologically linked to this European site.</p> <p>No potential impact pathway. Given distance from site and the QI feature it supports.</p>	No operational impacts are predicted.	N

Table C6.35: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-552 (180c, 184) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Clonaslee Eskers and Derry Bog SAC (000859)	1.2km	<p>Annex I Habitats Alkaline fens [7230]</p> <p>Annex II Species <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]</p>	<p>New pumps, storage and mains, WTP upgrades. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Charleville Wood SAC (000571)	1.6km	<p>Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Annex II Species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Slieve Bloom Mountains SAC (000412)	ca. 1.3km	<p>Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs (* if active bog) [7130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given that the SAC is upstream of the option study area, the distance from site and the QI features it supports, there is no potential for LSE.</p>	No operational impacts are predicted.	N
River Barrow and River Nore SAC (002162)	ca. 2.3km	<p>Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p>	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II Species</p> <p><i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaiite Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p> <p><i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			

Table C6.36: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-552 (180c, 184) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Bloom Mountains SPA (004160)	2m	Hen Harrier (<i>Circus cyaneus</i>) [A082]	Breed	Mains run adjacent to SPA boundary. - Disturbance	No operational impacts are predicted.	Y

Table C6.37: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA6-149 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
River Barrow and River Nore SAC (002162)	3.1km	<p>Annex I Habitats</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Reefs [1170]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p>	<p>Option study area is within a gravel aquifer. Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p> <p>- Disturbance (including biological disturbance)</p>	<p>Option includes an increase in GW abstraction. Option study area is within a gravel aquifer.</p> <p>- Changes in water table/ availability from abstraction</p> <p>- Habitat degradation – changes in water quality (hydrological changes)</p> <p>Further study on the levels of GW contribution to the SAC are required given the abstraction may be linked to highly sensitive downstream Freshwater Pearl Mussel.</p>	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p><u>Annex II Species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]</p>			
Lisbigney Bog SAC (000869)	4.9km	<p><u>Annex I Habitats</u> Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]</p> <p><u>Annex II Species</u> <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	No potential impact pathway given distance from site and the QI feature it supports.	<p>Option includes an increase in GW abstraction. Option study area is within a gravel aquifer adjacent to a karst aquifer.</p> <ul style="list-style-type: none"> - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes) 	Y

Table C6.38: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA6-149 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Nore SPA (004233)	4km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	<p>Option study area is hydrologically linked to this European site.</p> <p>No potential impact pathway given the distance from site and the QI feature it supports.</p>	No operational impacts are predicted.	N

Note if option from Preferred Approach not listed below there were no European sites identified within the Zol of that option.

Table C7.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-55 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lough Derg, North-east Shore SAC (002241)	0km	<p>Annex I Habitats</p> <p><i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130]</p> <p>Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]</p> <p>Alkaline fens [7230]</p> <p>Limestone pavements [8240]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p><i>Taxus baccata</i> woods of the British Isles [91J0]</p>	<p>Option includes an increase in abstraction from this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<ul style="list-style-type: none"> - Habitat degradation – changes in water quality (hydrological changes) - Changes in water table/availability from abstraction 	Y
River Shannon Callows SAC (000216)	<500m	<p>Annex I Habitats</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510]</p> <p>Limestone pavements [8240]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II Species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<ul style="list-style-type: none"> - Habitat degradation – changes in water quality (hydrological changes) - Changes in water table/availability from abstraction 	Y
Barroughter Bog SAC (000231)	5.4km	<p>Annex I Habitats</p> <p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]</p>	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Kilcarren-Firville Bog SAC (000647)	6.8km	<p>Annex I Habitats</p> <p>Active raised bogs [7110]</p> <p>Degraded raised bogs still capable of natural regeneration [7120]</p> <p>Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]</p>	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N

Table C7.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-55 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon) SPA (004058)	0km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is within this European site. -Disturbance: the site is directly adjacent to the SPA there is potential for disturbance to QI birds using SPA designated habitats (e.g. grassland, arable farmland).	- Habitat degradation – changes in water quality (hydrological changes) - Changes in water table/availability from abstraction	Y

Table C7.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-504 (36b, 43a, 54b) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Scohaboy (Sopwell) Bog SAC (002206)	1.8km	Annex I Habitats Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational effects are predicted.	N
Liskeenan Fen SAC (001683)	6.1km	Annex I Habitats Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	A productive fissured bedrock aquifer extends between this SAC and the option site, the distance is greater than 600m effect of abstraction however therefore no operational effects are predicted.	N
Kilduff, Devilsbit Mountain SAC (000934)	6.4km	Annex I Habitats European dry heaths [4030] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational effects are predicted.	N
Kilcarren-Firville Bog SAC (000647)	7.6km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational effects are predicted.	N
Sharavogue Bog SAC (000585)	10.5km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational effects are predicted.	N
Lough Derg, North-east Shore SAC (002241)	10.9km	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational effects are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Taxus baccata</i> woods of the British Isles [91J0]			

Table C7.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-504 (36b, 43a, 54b) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon) SPA (004058)	11.3km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, given the distance from site, and the QI features it supports there is no potential for LSE.	No operational effects are predicted.	N

Table C7.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-44 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slieve Bloom Mountains SAC (000412)	4.8km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs (* if active bog) [7130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Lisduff Fen SAC (002147)	4.8km	Annex I Habitats Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Alkaline fens [7230] Annex II species <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Island Fen SAC (002236)	5.5km	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Sharavogue Bog SAC (000585)	5.5km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway given distance from site, the lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Depressions on peat substrates of the Rhynchosporion [7150]			

Table C7.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-44 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Bloom Mountains SPA (004160)	8.2km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway given distance from site and the QI feature it supports.	No operational impacts are predicted.	N
Dovegrove Callows SPA (004137)	12.5km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	No potential impact pathway given distance from site and the QI feature it supports.	No operational impacts are predicted.	N

Table C7.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-63 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Sharavogue Bog SAC (000585)	1km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) Although there is a WTP within 1km proximity of Sharavogue Bog SAC, this was deemed as having no potential impact as there was no pathway between the closest WTP and the SAC. There is potential for impact from a WTP approx. 8.9km from Sharavogue Bog SAC as this is hydrologically linked to the SAC.	No operational effects are predicted.	Y
Lisduff Fen SAC (002147)	7.5km	Annex I Habitats Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Alkaline fens [7230] Annex II species <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	No potential impact pathway given distance from site, lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
Slieve Bloom	ca. 10km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs [7130]	No potential impact pathway given distance from site, that the option study area is downstream, and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Mountains SAC (000412)		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]			
Island Fen SAC (002236)	10.7km	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	No potential impact pathway given distance from site, lack of a hydrological connection and the QI features it supports.	No operational impacts are predicted.	N
River Barrow and River Nore SAC (002162)	ca.19km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaiite Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]	Option study area is hydrologically linked to this European site. No potential impact pathway given distance from site.	No operational impacts are predicted.	N

Table C7.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-63 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Bloom Mountains SPA (004160)	5.7km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
River Nore SPA (004233)	ca.12km	Kingfisher (<i>Alcedo atthis</i>) [A229]	breed	Option study area is hydrologically linked to this European site. However, given the distance from the site there is no potential for LSE.	No operational impacts are predicted.	N
Dovegrove Callows SPA (004137)	ca. 13km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
River Little Brosna Callows SPA (004086)	ca. 20km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C7.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-60 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Bolingbrook Hill SAC (002124)	5km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C7.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-60 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slievefelim to Silvermines Mountains SPA (004165)	1.6km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway. Habitats surrounding the WTP are predominantly agricultural for 1km and unlikely to support hen harrier. At fine screening potential LSE were identified but on review the potential for LSE have been ruled out because of a lack of suitable nesting or foraging habitat within the vicinity of the WTP.	No operational impacts are predicted.	N

Table C7.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-23 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Kilcarren-Firville Bog SAC (000647)	1.5km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Option study area is hydrologically linked to this European site. However, given the distance upstream from site, and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N
Lough Derg, North-east Shore SAC (002241)	1.6km	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Taxus baccata woods of the British Isles [91J0]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	Y
Sharavogue Bog SAC (000585)	3.2km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Option study area is hydrologically linked to this European site. However, given the distance upstream from site, and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N
Ballyduff/Clonfinane Bog SAC (000641)	3.3km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150] Bog woodland [91D0]	Given the distance upstream from site, the lack of hydrological link and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N
River Shannon Callows SAC (000216)	ca. 3.5km	Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Lutra lutra</i> (Otter) [1355]			
Lisduff Fen SAC (002147)	4.1km	Annex I Habitats Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Alkaline fens [7230] <i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]	Option study area is hydrologically linked to this European site. However, given the distance upstream from site, and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N
Arragh More (Derrybreen) Bog SAC (002207)	5.3km	Annex I Habitats Degraded raised bogs still capable of natural regeneration [7120]	Given the distance upstream from site, the lack of hydrological link and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N
Redwood Bog SAC (002353)	ca.11.6km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Option study area is hydrologically linked to this European site. However, given the distance upstream from site, and the QI features it supports there is no potential for LSE.	Given the distance from site, the size of the abstraction and the QI features it supports there is no potential for LSE.	N

Table C7.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-23 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon) SPA (004058)	1.6km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, given the distance from site, and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N
Middle Shannon Callows SPA (004096)	2.7km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b breed non-b non-b non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
River Little Brosna Callows SPA (004086)	ca. 3.2km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056]	non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b			
Dovegrove Callows SPA (004137)	3.4km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	Option study area is hydrologically linked to this European site. - Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
All Saints Bog SPA (004103)	ca.5.7km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	Option study area is hydrologically linked to this European site. However, no potential impact pathway given distance from site.	No operational impacts are predicted.	N

Table C7.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-61 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lough Derg, North-east Shore SAC (002241)	<100m	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0]	Option study area is adjacent to this European site. - Physical loss of habitats/supporting habitat - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y

Table C7.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-61 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon)	<100m	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061]	breed non-b	Option study area is adjacent to this European site. - Disturbance	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
SPA (004058)		Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	non-b breed			

Table C7.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA7-14 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lough Derg, North-east Shore SAC (002241)	ca. 600m	Annex I Habitats Juniperus communis formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Taxus baccata woods of the British Isles [91J0]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes an increase in groundwater abstraction. - Changes in water table/ availability from abstraction - Habitat degradation – changes in water quality (hydrological changes)	Y

Table C7.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA7-14 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon) SPA (004058)	ca. 600m	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. - Disturbance	No operational impacts are predicted. Although there is a groundwater abstraction, this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

Note if option from Preferred Approach not listed below there were no European sites identified within the Zol of that option.

Table C8.1: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-09 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Ratty River Cave SAC (002316)	ca. 100m	<p>Annex I Habitats Caves not open to the public [8310]</p> <p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	<p>Option study area is adjacent to potential foraging and commuting habitat</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Potential loss of foraging and commuting habitat 	No operational impacts are predicted.	Y
Kilkishen House SAC (002319)	ca. 3.8km	<p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Danes Hole, Poulnalecka SAC (000030)	ca. 5km	<p>Annex I Habitats Caves not open to the public [8310] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>No potential impact pathway given distance from site and the QI features it supports. The SAC is upstream of the option study area.</p>	No operational impacts are predicted.	N
Lower River Shannon SAC (002165)	ca. 7km	<p>Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lutra lutra</i> (Otter) [1355]			

Table C8.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-09 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Shannon and River Fergus Estuaries SPA (004077)	ca. 8km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	breed non-b non-b non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance	No operational impacts are predicted.	Y

Table C8.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-01 (in conjunction with option SA8-172) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 200m	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	Option includes an increase in GW abstraction. Option study area overlies a karstic aquifer. - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>		- Water table/availability	
Ballyallia Lake SAC (000014)	1.3km	<p>Annex I Habitats Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]</p>	<p>Option study area is hydrologically linked to this European site. No potential impact pathway given the SAC is located upstream of the option study area.</p>	No operational impacts are predicted.	N
Toonagh Estate SAC (002247)	ca. 3.2km	<p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Pouladatig Cave SAC (000037)	ca. 4km	<p>Annex I Habitats Caves not open to the public [8310]</p> <p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Dromore Woods and Loughs SAC (000032)	ca. 4km	<p>Annex I Habitats Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Limestone pavements [8240]</p> <p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site. No potential impact pathway given the SAC is located upstream of the option study area.</p>	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Newhall and Edenvale Complex SAC (002091)	ca. 4.5km	<p>Annex I Habitats Caves not open to the public [8310]</p> <p>Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C8.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-01 (in conjunction with option SA8-172) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Ballyallia Lough SPA (004041)	1.3km	<p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Gadwall (<i>Anas strepera</i>) [A051]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Mallard (<i>Anas platyrhynchos</i>) [A053]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Coot (<i>Fulica atra</i>) [A125]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Wetland and Waterbirds [A999]</p>	non-b non-b non-b non-b non-b non-b non-b	<p>Option study area is hydrologically linked to this European site.</p> <p>No potential impact pathway given the SPA is located upstream of the option study area and the QI features it supports.</p>	No operational impacts are predicted.	N
River Shannon and River Fergus Estuaries SPA (004077)	ca. 5km	<p>Cormorant (<i>Phalacrocorax carbo</i>) [A017]</p> <p>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</p> <p>Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</p> <p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p> <p>Wigeon (<i>Anas penelope</i>) [A050]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Scaup (<i>Aythya marila</i>) [A062]</p> <p>Ringed Plover (<i>Charadrius hiaticula</i>) [A137]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Grey Plover (<i>Pluvialis squatarola</i>) [A141]</p> <p>Lapwing (<i>Vanellus vanellus</i>) [A142]</p> <p>Knot (<i>Calidris canutus</i>) [A143]</p> <p>Dunlin (<i>Calidris alpina</i>) [A149]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</p> <p>Curlew (<i>Numenius arquata</i>) [A160]</p> <p>Redshank (<i>Tringa totanus</i>) [A162]</p> <p>Greenshank (<i>Tringa nebularia</i>) [A164]</p>	breed non-b	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p> <p>- Disturbance</p>	No operational impacts are predicted.	Y

		Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b			
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Table C8.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-20a leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts. Note: No SACs within the ZoI for SA8-20a

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Aughty Mountains SPA (004168)	ca. 20m	Hen Harrier (<i>Circus cyaneus</i>) [A082] Merlin (<i>Falco columbarius</i>) [A098]	breed breed	- Disturbance	No operational impacts are predicted.	Y

Table C8.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-504 (31a) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	0km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106]</p>	<p>Option pipeline crosses this European site. Option includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option pipeline crosses this European site. Option includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (hydrological changes) - Water table/availability 	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]			
Glenomra Wood SAC (001013)	2.9km	Annex I Habitats Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C8.7: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-504 (31a) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Shannon and River Fergus Estuaries SPA (004077)	2.6km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	breed non-b	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance	No operational impacts are predicted.	Y

Table C8.8: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-22 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slieve Bernagh Bog SAC (002312)	ca.6.7km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Blanket bogs (* if active bog) [7130]	Option study area is hydrologically linked to this European site. However, the SAC is upstream of the option study area and also given distance from site there is no potential for LSE.	No operational impacts are predicted.	N
Lower River Shannon SAC (002165)	15km	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y

Table C8.9: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-22 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Aughty Mountains	ca. 250m	Hen Harrier (<i>Circus cyaneus</i>) [A082] Merlin (<i>Falco columbarius</i>) [A098]	breed breed	Option study area is hydrologically linked to this European site however the SPA is upstream of the option study area. - Disturbance	No operational impacts are predicted.	Y

SPA (004168)						
Lough Derg (Shannon) SPA (004058)	ca. 3km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, given distance from site and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C8.10: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-24 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca.14.5km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

Table C8.11: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-24 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Aughty Mountains SPA (004168)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082] Merlin (<i>Falco columbarius</i>) [A098]	breed breed	Option pipeline is within this European site. - Disturbance	No operational impacts are predicted.	Y
Lough Derg (Shannon) SPA (004058)	ca. 1.2km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, given distance from site and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C8.12: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-179 leading to potential LSEs. Note: No SPAs within the Zol for SA8-179

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Tory Hill SAC (000439)	ca. 8.5km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	Option study area is hydrologically linked to this European site. However, the SAC is upstream of the hydrological link to the option study area and also given the distance from site there is no potential for LSE.	No operational impacts are predicted.	N
Lower River Shannon SAC (002165)	ca. 15km	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Annex II species	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]			

Table C8.13: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-21 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Slieve Bernagh Bog SAC (002312)	ca 8.2km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Blanket bogs (* if active bog) [7130]	Option study area is hydrologically linked to this European site. However, the SAC is upstream of the option study area hydrological link and also given distance from site there is no potential for LSE.	No operational impacts are predicted.	N
Lower River Shannon SAC (002165)	20km	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]			

Table C8.14: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-21 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Aughty Mountains SPA (004168)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082] Merlin (<i>Falco columbarius</i>) [A098]	breed breed	Options study area is within this European site - Disturbance	No operational impacts are predicted.	Y

Table C8.15: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-120 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Loughatorick South Bog SAC (000308)	2.1km	Annex I Habitats Blanket bogs (* if active bog) [7130]	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Derrycrag Wood Nature Reserve SAC (000261)	ca. 3km	Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	No potential impact pathway given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

Table C8.16: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-120 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slieve Aughty Mountains SPA (004168)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082] Merlin (<i>Falco columbarius</i>) [A098]	breed breed	Option area is within this European site. - Disturbance	No operational impacts are predicted.	Y

Lough Derg (Shannon) SPA (004058)	ca. 5.2km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y
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Table C8.17: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-510 (17f, 84, 105, 192) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	0km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>This option includes an increase in abstraction from this European site. Option pipeline crosses this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes an increase in abstraction from this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (hydrological changes) - Water table/ Availability 	Y
Askeaton Fen Complex SAC (002279)	ca. 200m	<p>Annex I Habitats</p> <p>Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Curraghchase Woods SAC (000174)	ca. 2.3km	<p>Annex I Habitats</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0]</p>	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Annex II species <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]			
Tory Hill SAC (000439)	ca. 5.2km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C8.18: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-510 (17f, 84, 105, 192) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Shannon and River Fergus Estuaries SPA (004077)	0km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	breed non-b	Option pipeline runs adjacent to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance	No operational impacts are predicted.	Y
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount	ca.5.5km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Option study area is hydrologically linked to this European site. However, the SPA is upstream of the option study area so there is no potential for LSE.	No operational impacts are predicted.	N

Eagle SPA (004161)						
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Table C8.19: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-508 (199, 40, 138, 49) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	0km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option pipeline crosses this European site. Option includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option pipeline crosses this European site. Option includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (hydrological changes) - Water table/ Availability 	Y
Glenstal Wood SAC (001432)	ca. 600m	<p>Annex II species</p> <p><i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p>	No potential impact pathway. Although there is a hydrological link, given that the study area is downstream, the distance from site and the QI features it supports there is no potential for impact.	No operational impacts are predicted.	N

Table C8.20: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-508 (199, 40, 138, 49) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slievefelim to Silvermines Mountains SPA (004165)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	Breed	<p>Option study area is within this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

Table C8.21: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-51 leading to potential LSEs. Note: No SPAs within the Zol for SA8-51

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Tory Hill SAC (000439)	ca. 5km	<p>Annex I Habitats</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p> <p>Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210]</p> <p>Alkaline fens [7230]</p>	No potential impact pathway. Given distance from site and the QI features it supports.	<p>Option study area overlies a karst aquifer.</p> <ul style="list-style-type: none"> - Water table/ Availability - Habitat degradation – changes in water quality (hydrological changes) 	Y

Table C8.22: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-52 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Glen Bog SAC (001430)	ca. 3km	<p>Annex I Habitats</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p>	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted. Although there is a groundwater abstraction this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	N
Lower River Shannon SAC (002165)	ca. 20km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) 	No operational impacts are predicted. Although there is a groundwater abstraction this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>			

Table C8.23: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-52 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
River Shannon and River Fergus Estuaries SPA (004077)	23km	<p>Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162]</p>	<p>breed non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b</p>	<p>Option study area is hydrologically linked to this European site. However, given distance from site there is no potential for LSE.</p>	No operational impacts are predicted.	N

		Greenshank (<i>Tringa nebularia</i>) [A164] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b		
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Table C8.24: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-59 leading to potential LSEs. No SPAs within the Zol for SA8-59

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 27km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	<p>No operational impacts are predicted. Although there is a groundwater abstraction this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.</p>	Y

Table C8.25: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-516 (65 & 114) leading to potential LSEs. Note: No SPAs within the Zol for SA8-516

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Ballyhoura Mountains SAC (002036)	ca. 900m	<p>Annex I Habitats</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>European dry heaths [4030]</p> <p>Blanket bogs (* if active bog) [7130]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, given that the SAC is upstream from the site there is no potential for LSE</p>	No operational impacts are predicted.	N
Blackwater River (Cork/Waterford) SAC (002170)	ca. 7.2km	<p>Annex I Habitats</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p>Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Alosa fallax fallax</i> (Twaite Shad) [1103]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p> <p><i>Trichomanes speciosum</i> (Killarney Fern) [1421]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

Table C8.26: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-68 leading to potential LSEs. Note: No SPAs within the Zol for SA8-68

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 18km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritim</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]			

Table C8.27: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-98 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 3.3km	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritim</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>			

Table C8.28: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-98 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	<p>Option study area is within this European site.</p> <p>- Disturbance</p>	No operational impacts are predicted.	Y

Table C8.29: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-100 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 1.5km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p> <p>- Disturbance (including biological disturbance)</p>	No operational impacts are predicted. Although there is a groundwater abstraction this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>			

Table C8.30: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-100 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	1.2km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
River Shannon and River Fergus Estuaries SPA (004077)	ca. 1.5km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140]	breed non-b non-b non-b non-b non-b non-b non-b non-b non-b	- Disturbance	No operational impacts are predicted.	Y

	Grey Plover (<i>Pluvialis squatarola</i>) [A141]	non-b		
	Lapwing (<i>Vanellus vanellus</i>) [A142]	non-b		
	Knot (<i>Calidris canutus</i>) [A143]	non-b		
	Dunlin (<i>Calidris alpina</i>) [A149]	non-b		
	Black-tailed Godwit (<i>Limosa limosa</i>) [A156]	non-b		
	Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	non-b		
	Curlew (<i>Numenius arquata</i>) [A160]	non-b		
	Redshank (<i>Tringa totanus</i>) [A162]	non-b		
	Greenshank (<i>Tringa nebularia</i>) [A164]	non-b		
	Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	non-b		
	Wetland and Waterbirds [A999]	non-b		

Table C8.31: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-177 leading to potential LSEs. Note: No SPAs within the Zol for SA8-177

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 170m	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II Species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is adjacent to this European site and includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option study area is adjacent to this European site and includes an increase in SW abstraction.</p> <ul style="list-style-type: none"> - Water table/ Availability - Habitat degradation – changes in water quality (hydrological changes) 	Y
Tory Hill SAC (000439)	1.5km	<p>Annex I Habitats</p> <p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p> <p>Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]</p>	Given the distance from site and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		Alkaline fens [7230]			

Table C8.32: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-149 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 11km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted.	Y
Curraghchase Woods SAC (000174)	11.5km	<p>Annex I Habitats</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0]</p> <p>Annex II species</p> <p><i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	Although there is a hydrological link there is no potential impact pathway given that the river flow of the study area flows away from the European site, and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Tory Hill SAC (000439)	12km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C8.33: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-149 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	ca. 15km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Given the distance from site and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C8.34: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-145 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	ca. 15km	Annex I Habitats Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>			

Table C8.35: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-145 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slievefelim to Silvermines Mountains SPA (004165)	10km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Given the distance from site and the QI features it supports there is no potential for LSE.	No operational impacts are predicted.	N

Table C8.36: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-523 (163 & 166) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	1.4km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p>	<p>Increase GW abstraction, upgrade WTP and pump, new mains.</p> <p>Option study area is hydrologically linked to this European site.</p> <p>- Habitat degradation – changes in water quality (pollution)</p>	No operational impacts are predicted. Although there is a groundwater abstraction this European site is not within the zone of contribution (ZOC). Therefore, given the distance from the site and the QI features it supports there is no potential for LSE.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>			
Lower River Suir SAC (002137)	940m	<p>Annex I habitats Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Taxus baccata</i> woods of the British Isles [91J0]</p> <p>Annex II species <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twait Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y

Table C8.37: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-523 (163 & 166) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slievefelim to Silvermines Mountains SPA (004165)	0km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	<p>Option study area is within this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Disturbance 	No operational impacts are predicted.	Y

Table C8.38: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA8-512 (27 & 118) leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	0km	<p>Annex I Habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110]</p> <p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Coastal lagoons [1150]</p> <p>Large shallow inlets and bays [1160]</p> <p>Reefs [1170]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]</p> <p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p> <p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p> <p><i>Lampetra fluviatilis</i> (River Lamprey) [1099]</p> <p><i>Salmo salar</i> (Salmon) [1106]</p> <p><i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>New WTP, pumps and mains. Option pipeline crosses this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Slieve Bernagh Bog	3.1km	<p>Annex I Habitats</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>European dry heaths [4030]</p>	No impacts are predicted due to the distance from the works, the QIs present, and a lack of hydrological link.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
SAC (002312)		Blanket bogs (* if active bog) [7130]			

Table C8.39: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPAs) with option SA8-512 (27 & 118) leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Lough Derg (Shannon) SPA (004058)	1.6km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, no impacts are predicted due to the distance from the works, and due to the European site being upstream of the works.	No operational impacts are predicted.	N
Slievefelim to Silvermines Mountains SPA (004165)	5.9km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Option study area is hydrologically linked to this European site. However, no impacts are predicted due to the distance from the works, and due to the European site being upstream of the works.	No operational impacts are predicted.	N

Table C9.1: Source-Pathway-Receptor Analysis – potential impact pathways connecting European Sites (SACs) with options SA9-84 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Lower River Shannon SAC (002165)	0km	<p>Annex I habitats</p> <p>Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] Degraded raised bogs still capable of natural regeneration [7120] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]</p> <p>Annex II species</p> <p><i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) [1349] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option includes a new surface water abstraction from this European site. Option study area is within this European site. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Physical loss of habitats/supporting habitat - Mortality - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	<p>Option includes a new surface water abstraction from this European site. Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Changes in water table/availability - Habitat degradation – changes in water quality (hydrological changes) 	Y
Lisduff Fen SAC (002147)	500m	<p>Annex I Habitats</p> <p>Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Alkaline fens [7230]</p> <p>Annex II species</p> <p><i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
Clonaslee Eskers and Derry Bog SAC (000859)	1km	<p>Annex I Habitats</p> <p>Alkaline fens [7230]</p> <p>Annex II species</p> <p><i>Vertigo geyeri</i> (Geyer's Whorl Snail) [1013]</p>	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Island Fen SAC (002236)	1.3km	Annex I Habitats <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] Alkaline fens [7230]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Sharavogue Bog SAC (000585)	1.4km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Scohaboy (Sopwell) Bog SAC (002206)	1.7km	Annex I Habitats Degraded raised bogs still capable of natural regeneration [7120]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
The Long Derries, Edenderry SAC (000925)	1.9km	Annex I Habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Silvermines Mountains West SAC (002258)	2.1km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]	Option study area is hydrologically linked to this European site. However, given that the site is upstream from the option study area there is no potential for LSE	No operational impacts are predicted.	N
River Barrow and River Nore SAC (002162)	2.6km	Annex I Habitats Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] European dry heaths [4030] <i>Hydrophilous</i> tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096]	Option study area is hydrologically linked to this European site. -Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
		<i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaité Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] <i>Trichomanes speciosum</i> (Killarney Fern) [1421] <i>Margaritifera durrovensis</i> (Nore Pearl Mussel) [1990]			
Lough Derg North-East Shore SAC (002241)	3.6km	Annex I Habitats Juniperus communis formations on heaths or calcareous grasslands [5130] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] Taxus <i>baccata</i> woods of the British Isles [91J0]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Ballynafagh Lake SAC (001387)	4.7km	Annex I Habitats Alkaline fens [7230] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Charleville Wood SAC (000571)	5.1km	Annex I Habitats Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Annex II species <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Keeper Hill SAC (001197)	5.1km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs (* if active bog) [7130]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Ballynafagh Bog SAC (000391)	5.4km	Annex I Habitats Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Slieve Bloom Mountains SAC (000412)	5.8km	Annex I Habitats Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] Blanket bogs (* if active bog) [7130] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	No potential impact pathway. Given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Rye Water Valley/Carton SAC (001398)	ca. 7km	<p>Annex I Habitats Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</p> <p>Annex II species <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
River Boyne and River Blackwater SAC (002299)	13km	<p>Annex I Habitats Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
River Shannon Callows SAC (000216)	14.8km	<p>Annex I Habitats Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510] Limestone pavements [8240] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</p> <p>Annex II species <i>Lutra lutra</i> (Otter) [1355]</p>	<p>Option study area is hydrologically linked to this European site.</p> <ul style="list-style-type: none"> - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance) 	No operational impacts are predicted.	Y
South Dublin Bay SAC (000210)	18km	<p>Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N
North Dublin Bay SAC (000206)	22km	<p>Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190]</p> <p>Annex II species <i>Petalophyllum ralfsii</i> (Petalwort) [1395]</p>	<p>Option study area is hydrologically linked to this European site.</p> <p>However, impacts are unlikely given distance from site and the QI features it supports.</p>	No operational impacts are predicted.	N

Table C9.2: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPA) with options SA9-84 to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Slievefelim to Silvermines Mountains SPA (004165)	1.5 km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Habitats impacted by the option study area are unlikely to be suitable to support hen harrier.	No operational impacts are predicted.	N
Slieve Bloom Mountains SPA (004160)	3.3km	Hen Harrier (<i>Circus cyaneus</i>) [A082]	breed	Habitats impacted by the option study area are unlikely to be suitable to support hen harrier.	No operational impacts are predicted.	N
Lough Derg (Shannon) SPA (004058)	3.4km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Tufted Duck (<i>Aythya fuligula</i>) [A061] Goldeneye (<i>Bucephala clangula</i>) [A067] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999]	breed non-b non-b breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Dovegrove Callows SPA (004137)	7km	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
River Little Brosna Callows SPA (004086)	10km	Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
River Shannon and River Fergus Estuaries SPA (004077)	ca. 18km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Scaup (<i>Aythya marila</i>) [A062] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140]	breed non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b			

Table C9.3: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with option SA9-87 leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
North Dublin Bay SAC (000206)	5m	Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] Annex II species <i>Petalophyllum ralfsii</i> (Petalwort) [1395]	No potential impact pathway as the watermain is within the road and is not hydrologically linked.	No operational impacts are predicted.	N
South Dublin Bay SAC (000210)	30m	Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]	A new watermain is location 30m from this SAC. However, no potential impact pathway as the watermain is within the existing road and is not hydrologically linked.	No operational impacts are predicted.	N
Baldoyle Bay SAC (000199)	65m	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Howth Head SAC (000202)	155m	Annex I Habitats Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	No potential impact pathway as the watermain is within the current footprint of the road and is not hydrologically linked.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Malahide Estuary SAC (000205)	380m	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution) - Disturbance (including biological disturbance)	No operational impacts are predicted.	Y
Ballyman Glen SAC (000713)	450m	Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Alkaline fens [7230]	Option study area is hydrologically linked to this European site. However, impacts are not predicted given that the SAC is upstream of the site and the QI features it supports.	No operational impacts are predicted.	N
Rogerstown Estuary SAC (000208)	700m	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No potential impact pathway as no hydrological link to this site.	No operational impacts are predicted.	N
Carriggower Bog SAC (000716)	2.5km	Transition mires and quaking bogs [7140]	Option study area is hydrologically linked to this European site. However, impacts are not predicted given that the SAC is upstream of the site and the QI features it supports.	No operational impacts are predicted.	N
Knocksink Wood SAC (000725)	2.6km	Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Bray Head SAC (000714)	2.8km	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
The Murrough Wetlands SAC (002249)	5km	Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210] Alkaline fens [7230]	Option study area is hydrologically linked to this European site. - Habitat degradation – changes in water quality (pollution)	No operational impacts are predicted.	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Glenasmole Valley SAC (001209)	5.9km	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]	Option study area is hydrologically linked to this European site. However, impacts are not predicted given that the SAC is upstream of the site and the QI features it supports.	No operational impacts are predicted.	N

Table C9.4: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPA) with option SA9-87 leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
North Bull Island SPA (004006)	5m	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A13] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds.	No operational impacts are predicted.	Y
South Dublin Bay and River Tolka Estuary SPA (004024)	30m	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b passage breed	- Disturbance: there is potential for disturbance to QI birds.	No operational impacts are predicted.	Y

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Arctic Tern (<i>Sterna paradisaea</i>) [A194] Wetland and Waterbirds [A999]	passage			
Baldoyle Bay SPA (004016)	340m	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds.	No operational impacts are predicted.	Y
Malahide Estuary SPA (004025)	380m	Great Crested Grebe (<i>Podiceps cristatus</i>) [A005] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Pintail (<i>Anas acuta</i>) [A054] Goldeneye (<i>Bucephala clangula</i>) [A067] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds.	No operational impacts are predicted.	Y
Howth Head Coast SPA (004113)	445m	Kittiwake (<i>Rissa tridactyla</i>) [A188]	breed	No impacts predicted	No operational impacts are predicted.	N
Rogerstown Estuary SPA (004015)	700m	Greylag Goose (<i>Anser anser</i>) [A043] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
The Murrough SPA (004186)	700m	Red-throated Diver (<i>Gavia stellata</i>) [A001] Greylag Goose (<i>Anser anser</i>) [A043] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]	non-b non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of	No operational impacts are predicted.	Y

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
		Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Herring Gull (<i>Larus argentatus</i>) [A184] Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b breed	the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).		
Wicklow Head SPA (004127)	1.5km	Kittiwake (<i>Rissa tridactyla</i>) [A188]	breed	No impacts predicted	No operational impacts are predicted.	N
Rockabill SPA (004014)	4km	Purple Sandpiper (<i>Calidris maritima</i>) [A148] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194]	non-b breed breed breed	No impacts predicted	No operational impacts are predicted.	N
Wicklow Mountains SPA (004040)	ca. 5.8km	Merlin (<i>Falco columbarius</i>) [A098] Peregrine (<i>Falco peregrinus</i>) [A103]	breed breed	No impacts predicted	No operational impacts are predicted.	N
Skerries Islands SPA (004122)	14km	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Shag (<i>Phalacrocorax aristotelis</i>) [A018] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Purple Sandpiper (<i>Calidris maritima</i>) [A148] Turnstone (<i>Arenaria interpres</i>) [A169] Herring Gull (<i>Larus argentatus</i>) [A184]	breed breed non-b non-b non-b non-b	No impacts predicted	No operational impacts are predicted.	N

Table C9.5: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SACs) with options SA9-28 and SA9-46 combined leading to potential LSEs.

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Rye Water Valley/Cartron SAC (001398)	ca. 200m	<u>Annex I Habitats</u> Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] <u>Annex II species</u> <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given that the SAC is upstream of the site and the QI features it supports.	Option study area is hydrologically linked to this European site. Although this European site is upstream and not within the zone of contribution (ZOC) more information required on abstraction regime. Therefore, there is potential for impacts as described below. - Water table/availability - Habitat degradation – changes in water quality (hydrological changes)	Y

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Red Bog, Kildare SAC (000210)	ca. 4km	<u>Annex I Habitats</u> Transition mires and quaking bogs [7140]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
Wicklow Mountains SAC (002122)	ca. 8.5km	<u>Annex I Habitats</u> Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Alpine and Boreal heaths [4060] Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] Blanket bogs (* if active bog) [7130] Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] Calcareous rocky slopes with <i>chasmophytic</i> vegetation [8210] Siliceous rocky slopes with <i>chasmophytic</i> vegetation [8220] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] <u>Annex II species</u> <i>Lutra lutra</i> (Otter) [1355]	No potential impact pathway. Given distance from site, lack of hydrological link and the QI features it supports.	No operational impacts are predicted.	N
North Dublin Bay SAC (000206)	ca. 11.8km	<u>Annex I Habitats</u> Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] <u>Annex II species</u> <i>Petalophyllum ralfsii</i> (Petalwort) [1395]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
South Dublin Bay SAC (000210)	ca. 17km	<u>Annex I Habitats</u> Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

European Sites	Distance from Option Study Area (Km)	Qualifying Interests	Potential Impact Pathway		Potential for LSEs
			Construction	Operation	
Rockabill to Dalkey Island SAC (003000)	ca. 20km	Annex I Habitats Reefs [1170] Annex II species <i>Phocoena phocoena</i> (Harbour Porpoise) [1351]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N
Howth Head SAC (000202)	ca. 21km	Annex I Habitats Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N

Table C9.6: Source-Pathway- Receptor Analysis – potential impact pathways connecting European Sites (SPA) with options SA9-28 and SA9-46 combined leading to potential LSEs. Unless otherwise stated impacts are considered direct impacts.

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
Poulaphouca Reservoir SPA (004063)	ca. 1.3km	Greylag Goose (<i>Anser anser</i>) [A043] Lesser Black-backed Gull (<i>Larus fuscus</i>) [A183]	non-b non-b	- Disturbance: there is potential for disturbance to QI birds using habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it (e.g. grassland, arable farmland).	No operational impacts are predicted.	Y
Wicklow Mountains SPA (004040)	ca. 8.5km	Merlin (<i>Falco columbarius</i>) [A098] Peregrine (<i>Falco peregrinus</i>) [A103]	breed breed	No potential impact pathway given distance from site and the QI features it supports.	No operational impacts are predicted.	N
North Bull Island SPA (004006)	ca. 14km	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A13] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b	Option study area is hydrologically linked to this European site. However, impacts due to a pollution event are unlikely given distance from site and the QI features it supports. Habitats impacted by the project are unlikely to support QI species given the distance from this European site.	No operational impacts are predicted.	N

European Sites	Distance from Proposed Study Area (Km)	Qualifying Interests	Breeding (Breed)/ Non-breeding (Non-b)	Potential Impact Pathway		Potential for LSEs
				Construction	Operation	
South Dublin Bay and River Tolka Estuary SPA (004024)	ca. 17km	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Wetland and Waterbirds [A999]	non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b non-b passage breed passage	Option study area is hydrologically linked to this European site. However, impacts due to a pollution event are unlikely given distance from site and the QI features it supports. Habitats impacted by the project are unlikely to support QI species given the distance from this European site.	No operational impacts are predicted.	N
Howth Head Coast SPA (004113)	ca. 21km	Kittiwake (<i>Rissa tridactyla</i>) [A188]	breed	Option study area is hydrologically linked to this European site. However, impacts are unlikely given distance from site and the QI features it supports.	No operational impacts are predicted.	N