From:	Tadhg O Keeffe
To:	Licensing Staff
Cc:	Colm Sheehan
Subject:	S0021-03 Port of Cork Company - EIS 9/12
Date:	Monday 2 December 2024 14:36:40
Attachments:	EIS - 9 - Vol III.pdf

Eve,

Further to the below please find the original EIS divided into individual attachments in file size less than 10MB as requested.

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APPENDIX 5.1 PLANNING HISTORY 2008 – 2013

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APPENDIX 5.1: PLANNING HISTORY 2008-2013

Introduction

Appendix 5.1 provides details of planning applications permitted or applied for within the past 5 years (2008-2013), to allow an assessment of potential cumulative impacts with the proposed port development. This assessment has focused on townlands within the vicinity of the port lands; falling within the boundary of lands zoned within Ringaskiddy; and townlands between the Ringaskiddy and the Shannonpark roundabout, as detailed on figure A.5.1.

There have been a total of 88 permitted or undecided planning applications within the past 5 years. Of these 30 related to one off housing, extensions or minor amendments to existing residential units. The remaining 58 applications fall within the following categories; Industrial; Institutional; Residential; Commercial; Infrastructural; and Amenity. Each category is discussed in turn.

Industrial:

There have been 33 industrial planning applications. Of these 16 related to ancillary works, such as extensions to car-parking; yard compounds etc; 7 were for minor extensions or alterations to existing facilities. The most significant application in relation to cumulative impacts relate to:-

- **Wind Turbines**: 3 Applications for wind turbines, resulting in permission for a total of 5 wind turbines in the vicinity.
- **Novartis**: Novartis has made a number of planning application for the extension of the production facilities at Barnahely, Ringaskiddy. The most recent 13/5727 was granted in November 2013. This application, which did not require an EIS, summarised the status existing and proposed facilities at the site. It noted that there is a total constructed area of 68,567 sq m; a further 6,165 sq m has now been permitted. In the environmental report accompanying the most recent application, Novartis noted that the projected increase in staff number at full operation would be 28; and that it was anticipated that the construction phase would last 15 months, with a peak of 110 construction staff and an average of 90.
- **DePuy (Ireland**): DePuy (Ireland) has made a number of planning applications for the extension of production facilities at their plant, at Loughbeg, Ringaskiddy. The combined impact of the applications amounted to an increase in production floor area of 3,756 sq m, but it was not envisaged that any additional employees would be required. The company's most recent application if for the development of associated car parking spaces (202), a decision on this application is pending.

Institutional

There have been 3 institutional planning applications within the past 5 years. Two of these related to temporary classrooms at Shanbally School.

University College Cork received permission for the development of a new Maritime Research and Testing Centre on lands adjacent to the National Marine College. This building (the Beaufort Building) is currently under construction.

Residential

There have been 6 residential applications (excluding single residential dwellings) in the area within the past 5 years. At Shanbally there have been 2 applications for the development of residential schemes (1 for 15 dwellings and 1 for 8 dwellings); also at Barnahely there have been 2 applications of the development of residential schemes (1 for 3 dwellings and 1 for 43 dwellings).

In addition to the applications for housing there has been 1 application to continue the use of demountable residential units at Ringport; and 1 application has been extended for the development of 23 student apartments at Loughbeg.

Commercial

There have been 4 commercial planning applications in the area within the past 5 years. Two applications related to the development of 10 warehousing units at Raffeen; 1 relates to a golf driving range at Raffeen and 2 relate to the storage of bulk goods at Ballybricken.

Infrastructural

There have been 7 planning applications in the area within the past 5 years for minor infrastructural works. Three relate to masts / antennae; 2 to community alarms; and 2 to electrical substations.

Anemity

There have been 3 amenity planning applications in the area within the past 5 years. One relates to the development of an all weather playing pitch linked to the National Maritime College. The other applications are:

- **Haulbowline Remediation**: Cork County Council has made a planning application for the remediation of contaminated lands at the east tip of Haulbowline Island and to develop a public park on the lands. A decision on the application is due in April 2014.
- **Community Playground**: Ringaskiddy and District Residents Association was granted permission in January 2014 for the development of a community playground at Loughbeg, on lands adjacent to the Port's proposed development.

List of Significant Planning Applications

Haulbowline:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
University College Cork	11/5487	Haulbowline Rd.(adjacent to NMCI)	Development of UCC Maritime Research& Testing Centre	Institutional	02/02/2012
Cork County Council	ABP MT0001	Haulbowline Island	Remediation of East Tip of Haulbowline Island	Amenity	Pending (decision due 24/4/14)

Ringaskiddy:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Cork Institute of Technology	11/5889	National Maritime College of Ireland	Construction all weather playing pitch	Amenity	30/11/2011

Loughbeg:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Depuy (Ireland) Limited	08/7927	Depuy Ltd. Loughbeg	Modification of extension to manufacturing facility	Industrial	09/10/2008
Pfizer Ireland Pharmaceuticals Drug Product Plant	08/8270	Pfizer Loghbeg	Extension to product facility	Industrial	30/10/2008
Depuy (Ireland) Ltd	09/7065	Depuy Ltd Loughbeg	Construction of biomass boiler facility	Industrial	10/12/2010
Depuy (Ireland) Ltd	10/5142	Depuy Ltd Loughbeg	New transformer building and ESB infrastructure	Industrial	03/08/2010
Depuy (Ireland)	10/5662	Depuy Ltd Loughbeg	Construction large extension product & plant area etc	Industrial	21/09/2010
Depuy (Ireland)	11/4944	Depuy Ltd Loughbeg	Erect two wind turbines and works	Industrial	29/11/2012 (appeal split decision)
Depuy (Ireland) Ltd	11/6485	Depuy Ltd Loughbeg	Retention of 70 car park spaces	Industrial	31/05/2012
Depuy (Ireland) Ltd	11/6484	Loughbeg	Permission to waive condition no. 5 of planning ref 06/8591	Industrial	31/05/2012
Depuy (Ireland) Ltd	11/6482	Loughbeg	Construction of small recycling facility	Industrial	28/02/2012
Depuy (Ireland)	11/6527	Depuy Ltd Loughbeg	Extension to waste storage compound	Industrial	29/02/2012

Loughbeg (continued):

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Depuy (Ireland) Ltd	11/6525	Depuy Ltd Loughbeg	Retention of part of inner service road	Industrial	31/05/2012
Depuy (Ireland) Ltd	11/6617	Loughbeg	Retention of single storey structure	Industrial	16/03/2012
Depuy (Ireland)	11/6669	Depuy Ltd Loughbeg	Construction of extension reconfiguration of car park	Industrial	29/03/2012
Fleming Developments(In Receivership)	12/5462(See 03/6582)	Ringport Business Park	Continuation of use of demountable residential units	Residential	28/09/2012
The Hammond Lane Metal Company Ltd	12/5863	Loughbeg	Demolition existing building, reconstruction & extension concrete yard, new admin building. Change of use of workshop	Industrial	28/03/2013
Maritime Halls Ltd	13/4983	Rose Lodge, Loughbeg	Demolition of no. 2 ruined dwelling houses & construction 23 no. student apartments	Residential	n/a (extension of duration)
Ringaskiddy and District Residents Association	13/6054	Loughbeg	Construction community children's playground	Institutional	n/a
Depuy (Ireland)	13/6262	Loughbeg	Construction security building & car park 202 spaces	Industrial	n/a

- A further 7 applications within Loughbeg related to minor extensions or alterations to existing residential properties.

Shanbally:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Ken Murphy	08/9156	Shanbally	Site development for 15 dwellings	Residential	06/05/2009
Eddie Hanley	09/6653	Shanbally	Construction of 8 dwellings	Residential	26/02/2010
Meteor Mobile Communications Ltd	09/6929	O'Briens Land	Erection of communication antennae etc.	Infrastructural	28/01/2010
The Board of Management Shanbally National School	11/5146	Shanbally	Erection of temporary classroom	Institutional	24/08/2011
The Board of Management Shanbally National School	12/6094	Shanbally	Erection of temporary prefabricated building	Institutional	27/02/2013

- A further 2 applications with Shanbally related to minor extensions to existing residential properties.

Raffeen:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
John & Hillary Loftus	08/4372	Raffeen Industrial Estate	Development of 10 warehouse units etc	Commercial	11/11/2008
ESB	09/4136	220kV Electrical Transformer Station Raffeen	Alterations to existing station	Infrastructure	09/04/2009
Fernhill Golf Club	11/5740	Fernhill, Raffeen	Construction of 8 bay driving range	Commercial	06/02/2012
John & Hillary Loftus	13/5833	Raffeen Industrial Estate, Raffeen	Develop 10 warehouse units etc	Commercial	n/a (extension of duration)

- A further 1 application with Raffeen was for the construction of a single house; 9 applications related to extensions / amendments to existing residential units; and 5 applications related to residential waste water systems.

Barnahely:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Port of Cork Company	08/4115	Barnahely	Subdivision existing office & change of use	Industrial	27/11/2008
Centocor Biologics (Ireland) Ltd	08/4863	Barnaheky	Construction boiler room & container storage space	Industrial	15/05/2008
William O'Brien	08/10019	Barnahely	3 no. dwelling houses & ancillary works	Residential	12/03/2009
Centocor Biologics Ireland	10/4237	Barnahely	Retention data collection mast	Infrastructural	23/04/2010
Janssen Biologics Ireland Ltd	11/4821	Barnahely, Ballybricken	Extension to car park	Industrial	18/07/2011
Janssen Biologics (Ireland) Ltd	11/4890	Barnahely	Completion of extensions (extension of duration)	Industrial	n/a
Novartis Ringaskiddy Limited	11/4946	Raheens, Barnahely	Erection of 2 wind turbines	Industrial	29/11/2012 (appeal split decision)
Janssen Biologics (Ireland)	11/4945	Barnahely	Erection 1 wind turbine	Industrial	29/11/2012 (on appeal)
Port of Cork Company	12/6528	Loughbeg, Baranhely	Erection of signage	Industrial	19/03/2013
William O'Brien	13/4049	Barnahely	Demolition existing dwelling & construction of 43 no. dwellings	Residential	n/a
Novartis Ringaskiddy Ltd	13/4764	Barnahely	10 year permission for construction small production facility	Industrial	12/07/2013
Port of Cork Company	13/5735	Barnahely	Construction of workshop	Industrial	20/11/2013
Novartis Ringaskiddy Limited	13/5759	Raheens/Barahely/Shanbally	Construction of extension	Industrial	26/11/2013
Janssen Biologics (Ireland)	13/6217	Barnahely	Single storey extension	Industrial	n/a

- A further 1 application within Raffeen related to the construction of a single residential unit; and 4 related to extensions / amendments to existing residential units.

Raheens:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Novartis Ringaskiddy Ltd	08/6844	Raheens	Extension to car park	Industrial	1/08/2008
Novartis Ringaskiddy Ltd	08/7340	Raheens	Retention of community sounder	Infrastructure	28/08/2008
Novartis Ringaskiddy Ltd	11/6053	Raheens Barnahely	Construction of extension	Industrial	23/12/2011
Novartis Ringaskiddy Ltd	13/5727	Raheens/Barnahely/Shanbally	3 storey extension	Industrial	20/11/2013
Novartis Ringaskiddy Limited	13/5759	Raheens/Barnahely/Shanbally	Construction of extension	Industrial	26/11/2013

- A further 2 application related extensions / amendments to existing residential units.

Ballintaggart:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Pfizer Ireland Pharmaceuticals	08/4083	Ballintaggart	Instalation community alert siren	Infrastructure	04/04/2008
Pfizer Ireland Pharmaceuticals	10/4483	Ballintaggart	Retention of 60m high steel mast	Infrastructure	28/05/2010
Pfizer Ireland Pharmaceuticals	12/5768	Ballintaggart/Ballybricken	Demolition of workshop & stores	Industrial	30/10/2012
Pfizer Ireland Pharmaceuticals	12/6573	Ballintaggart/ Ballybricken	Construction small scale production unit	Industrial	12/03/2013
BioMarin Manufacturing Ireland Ltd	13/5400	Ballintaggart/ Ballybricken	Construction electrical substation building	Infrastructure	16/10/2013
Pfizer Ireland Pharmaceuticals	13/6121	Ballintaggart/ Ballybricken	Construction of extension	Industrial	n/a

Ballybricken:

Applicant	Planning Ref:	Address	Description	Type of Development	Grant Date
Cemex Ireland Ltd	08/10021	Ballybricken (Deep Water Terminal)	Development of 2 silos, substation etc.	Commercial	23/04/2009
Arkady Feed Ltd	10/8815	Ballybricken	Construction of bulk grain store	Commercial	13/09/2011

APPENDIX 6.1 GAZETTEER OF ARCHAELOGICAL DATA RELEVANT TO RINGASKIDDY

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Appendix 6.1: Gazetteer of Archaeological data relevant to Ringaskiddy

Known information that occurs within the proposed development area is highlighted in blue,

National Museum of Ireland Topographical Files

There are no artefacts registered in the National Museum of Ireland's Topographic Files to the townlands that touch on the present developments areas, namely: Ballybricken; Barnahely; Ringaskiddy.

Department of Arts, Heritage, and Local Government, Sites and Monuments Record.

Locations in Irish National Grid. Descriptions based on record files.

Reference No.	Classification	Townland	Description	Easting	Northing	Distance to development
CO087-026	Lime Kiln	Monkstown		176270	65330	700m
CO087-048	Ringfort	Barnahely	Roughly circular area (45m E-W; 38m N-S) enclosed by earthen bank.	176920	63800	800m
CO087-049	Church	Ballybricken	Captain Hayes remembers the walls standing'. Site now occupied by Pfizer Chemicals.	177050	64490	220m
CO087-050001-2	Non antiquity	Barnahely	None	177180	64010	500m
CO087-051001-2	Graveyard	Barnahely	Rectangular graveyard (c.100m NE-SW; c. 30m NW-SE) enclosed by stone wall; still in use, many headstones, the earliest dating from 1720. Contained parish church of Barnahely, marked 'site of' on all editions of OS map; no visible trace of church.	177370	63900	500m
CO087-052001-2	Tower House	Barnahely	Overlooking Lough Beg and Cork Harbour. Complex of ruined buildings around courtyard which still functions as farmyard. Oldest structure near SW corner where 2-storey rectangular building (10.5m N-S; 6.6m E-W) appears to be remains tower house, showing much evidence of rebuilding. Built by de Cogan family, reputedly by Richard de Cogan, lord of the manorin 1536; de Cogans occupied site until 1642 when garrison surrendered to Lord Inchiquin. Also known as Castle Warren. Limited test excavation in 1999 did not reveal anything of interest, 99D079.	177380	63730	600m
CO087-053	Ringaskiddy		On highest point of Ringaskiddy promontory, overlooking	178710	63990	1km

Reference No.	Classification	Townland	Description	Easting	Northing	Distance to development
			Cork Harbour. Circular tower (diam. 15.5m E-W; 10.9m N-S; H 12.1m) with flattened profile to N and S; enclosed by dry fosse (Wth 4.6m; D 3.1m); within circular enclosure (diam. 100m) marked by ordnance stones. Built of coursed limestone ashlar. Largest of Cork Harbour Martellos; it was under construction 1813-15. Also registered in the NIAH as 20908747.			
CO087-054	Midden	Ringaskiddy	On beach at Curlane Bank. 10cm thick lens of material extended 30m along foreshore.	179063	63447	1.6km
CO087-059001-3	Martello Tower and Barracks	Haulbowline	Martello Tower and Barracks complex on high ground at N edge of Haulbowline Island, overlooking entrance to Upper harbour; formerly part of 'Ordnance Ground' (CO087-05902-), now occupied by Naval Service. Constructed 1813-15. Built of coursed limestone blocks. Restored wooden floor; tower is being converted into museum by Naval Service. Earlier reference to possible Viking occupation of the island, while the earliest known fortification here began in 1602. Also described in the Archaeological Inventory of Co. Cork. Vol. 2. (Power, 1994), entries 5881, 5865.	178880	65480	1.1km
CO087-061	Church, site of	Ballintaggart	The site of Rosbeg church was noted by Bishop Dive Downes in October 1700. The 1842 OS map shows a walled garden NW of Ballybricken House, but in Ballintaggart townland which may be the location referred to above. This is likely to be the site of the 'early Irish church and graveyard. Area now occupied by industrial complex; no visible surface trace.	176620	64760	500m
CO087-105	Magazine	Rocky Island	Built 1808-18 to stone gun powder for the naval base on Haulbowline. Also described in the Archaeological Inventory of Co. Cork. Vol. 2. (Power, 1994), entry 5873.	179248	64981	1.4 km
CO087-106	Enclosure	Ballintaggart	INV_NOTES Crop mark (CUCAP, AIE 62) shows bivallate circular enclosure (int. diam. c.54m; ext. diam. c. 75m).	176290	64470	800m
CO087-111	House, Prospect Villa	Ringaskiddy	House demolished in 1981. Old photograph shows house as 2-storey, weather slated with hipped roof; of late 18th century appearance. Entrance front of 6-bays; central round-headed door ope; classical surround with broken pediment. Remains of ornate gate lodge (overgrown) survive to S on either side of entrance gate; one storey, appears to be hexagonal in plan; built of cut stone.	177660	64320	200m
CO087-155	Enclosure	Barnahely	Complex of features comprising interlocking enclosures,	177605	63809	500m

Reference No.	Classification	Townland	Description	Easting	Northing	Distance to development
			identified in geophysical survey, possibly Bronze Age/Iron Age in date.			
CO087-161	Midden	Ringaskiddy	Not available	179370	63748	1.7km

National Inventory of Architectural Heritage.

Based on www.buildingsofireland.ie

Reference No.	Name	Description	Easting	Northing	Distance to development
20908747	Ringaskiddy	Martello tower, same as SMR CO087-053.	178880	65480	1.1km
20908747	Haulbowline	Martello tower, same as SMR CO087-059	178880	65480	1.1km
CO-87-W-774641	Barnahely	Prospect Villa was lived in by Lieutenant-Colonel Burke, and has since become the site of a modern factory. However a length of the boundary wall survives along its east side, where it forms one side of the R613 road. The wall is substantial in construction, measuring over 4m in height, and comprises of a mixture of dressed-, semi-dressed, and rough-cut stone of sandstone composition. A section has been removed from the northern end of the walls structure, approximately 10m+ section, as part of the development of the existing road network. Frequent repairs, both modern and old, are visible along its extent. The originally capping is obscured by heavy ivy growth. Impact: The boundary wall will be directly impacted in part. Mitigation: The area of impact will be recorded archaeologically in advance of its destruction, which will be monitored archaeologically.	177515 to 177420	64190 to 64037	Within, at tie-in of road network to N28/R613.

Department of the Environment, Heritage and Local Government, Historic Shipwreck Inventory.

The listing is restricted to those inventory entries that appear to be adjacent to or lie in the general vicinity of Ringaskiddy.

Locational data where available converted to Irish National Grid

Name	**Date of Loss**	**Location**	**Easting**	**Northing**	**Description**	**Distance to development**
Luvius	2/5 November 1845	Near Haulbowline	n/a	n/a	Ship en route to Cork from Cardiff which it collided with a steamer and sank. The crew was rescued.	Unknown but not less than 1.5km.

Maria	1900	Rocky Island	n/a	n/a	n/a	Unknown but Rocky Island is 1.5km E of main development, and c. 300m N of Paddy's Point
Shannon Lass	1 February 1935	Haulbowline wharf	n/a	n/a	Motor fishing boat sank at the wharf after collision with the SS Lisa at the piles	Unknown but not less than 1.5km.
Unknown	20 October 1898	Off Haulbowline	n/a	n/a	Wooden rowing boat collided with the launch *Cambridge* and was a total loss.	Unknown.

Department of the Environment, Heritage and Local Government, Licensed archaeological intervention.

Source: *Excavations Bulletin*, annual publication edited by Isabel Bennett and published on behalf of the DAHG by Wordwell, Bray, and partially available online at www.excavations.ie

Licence No.	Name	Description	Easting	Northing	Distance to development
96E086	Barnahely	Archaeological monitoring and trial excavation on the Merfin factory site observed a single small area of burning in an shallow fire-reddened pit, 75cm in diameter and filled with charcoal and ash. A millstone and two millstone fragments were also recovered, but nothing of archaeological significance was revealed.	177200	63700	*c.* 800m S of development.
99E0279	Barnahely	Castle Warren tower house, SMR CO87:5201, was subject to five test trenches in advance of a perimeter fence. No features of archaeological significance were observed.	177200	63700	*c.* 800m S of development.
01E552	Ringaskiddy	Archaeological trial excavation of a grassy mound revealed it to be of modern date and not of archaeological significance.	178710	63990	*c.* 900m S of development.
03E1158	Ringaskiddy	Monitoring was undertaken of marine dredging for the construction of a jetty and pontoon in connection with the National Maritime College Development. The area was excavated to an overall depth of ±4.183m, with a deeper area of 90m^2 excavated to ±6.1m. The excavated sediment was dark-grey silt, which became sandier in composition at its lower levels. Three non-archaeological timber fragments were recovered during the course of sieving. Two relatively modern glass bottles and a number of non-archaeological metal artefacts were also recovered. No archaeological features or artefacts were identified within the area of proposed development.	17896	64600	c. 400m E of development.

04E0774	Barnahely	Road realignment close to Castle Warren (Barnahely Castle) and Barnahely graveyard (SMR CO87:51). Test trenching revealed the greater part of a partially extant early 19th-century walled garden located to the west of Castle Warren; an isolated stake-hole and shallow pit of suspected prehistoric date; clusters of recent parallel furrows criss-crossing the study area, a single charcoal-flecked pit, and a stray find of medieval green-glazed pottery from the topsoil	177306	636940	*c.* 1.2km S of development.
04E1246	Barnahely	Test-trenching in advance of the construction of a road network and ancillary trenching on a land bank at Barnahely, Ringaskiddy did not uncover any archaeological feature or find	176290	64470	*c.* 1.6km W of development.
04E1441	Haulbowline	Archaeological monitoring of dredging activity within the naval based did not reveal any material of archaeological significance.	179000	65590	> 1km N of development.
04E1685	Barnahely	Test-trenches in the vicinity of a ringfort revealed the remains of a keyhole-shaped kiln, located c. 10m to the west of the ringfort, and a levelled fulacht fiadh, located c. 20m to the north-west of the ringfort. Both of these sites were recorded and left in situ.	176920	63800	1.5km W of development.
06D026	ADM jetty site and Oyster Bank site, Ringaskiddy	Marine geophysical survey conducted under license 05R133 as part of the Port of Cork's Strategic Development Plan identified 33 anomalies. Underwater inspection of the anomalies conducted under license 06D026 revealed no archaeologically significant material. Mitigation: Archaeological monitoring.	Various	Various	Within.
06D064	Ringaskiddy and Cork Harbour	Non-disturbance visual inspection was employed to assess the archaeological potential of the seabed along two cable-lay routes identified for the Aghada to Cuskinny Cable Lay Project. In addition, a number of side-scan sonar and magnetometer anomalies, located within the vicinity of each cable route, were investigated, and the shoreline at each location was inspected. No material/deposits of archaeological significance were observed exposed on the seabed as part of the survey. The seabed was largely clear of man-made surface debris, with only occasional fragments of metal being encountered (jetsam from fishing vessels).	185527 to 183140	675611 to 652600	4km E of ddevelopment.
06D072	Rocky Island, Ringaskiddy	Intertidal and metal-detector survey carried out on the north-western foreshore area of Rocky Island in Cork Harbour in advance of the proposed construction of an outfall pipe revealed no features or finds of archaeological significance.	17938	65100	1km E of development
06E0809	Rocky Island, Ringaskiddy	Disarticulated human remains were identified during the redevelopment of the magazine (CO87-105) as a crematorium. It is likely the remains pre-date construction of the magazine, which was built between 1808 and 1818.	179380	65100	1km E of development.
07E0711	Ringaskiddy	A programme of testing adjacent to the Pfizer facility on a circular crop-mark feature did not reveal anything of archaeological significance.	176050	65020	1km W of development

09D053	Ringaskiddy to Corkbeg	Underwater assessment of marine geophysical anomalies located along the proposed route of a 220kV submarine cable between Corkbeg Island and Ringaskiddy, Cork Harbour included examination of a new shipwreck location identified in the side-scan sonar data, at 180660E 63784N. Inspection suggests the wreckage is from a composite vessel of late 19th century date.	179315 to 182749	64226 to 63456	1km E of development.
12D016, 12R073	Barnahely	Non-disturbance intertidal and underwater assessment of the Ramp area in the East Basin, Monkstown creek, and the extension of the DWB in the West Basin, and the seabed at No. 2 Dolphin Ramps was conducted. The seabed is characterised by sand and silt which would provide a good holding content for buried material if it exists. No features or objects of archaeological significance were observed lying on the seabed surface or protruding from it. Mitigation: Archaeological monitoring.	Various	Various	Within.
12D034	Haulbowline	An archaeological study has included intertidal and sub-tidal assessment of the eastern tip of the island. The work has confirmed the survival of footings associated with a former stone-built causeway that connected Haulbowline with Spike Island.	179862	65170	1.5km E of development.
14D004, 14R003	Paddy's Point	Systematic intertidal and sub-tidal inspection and metal-detection was carried out and did not reveal material of archaeological significance. Mitigation: Subject to granting of permission, inspection of seabed area that lay outside the survey footprint but is now within the development area; Archaeological monitoring during construction activity.	179148	64678	Witihin

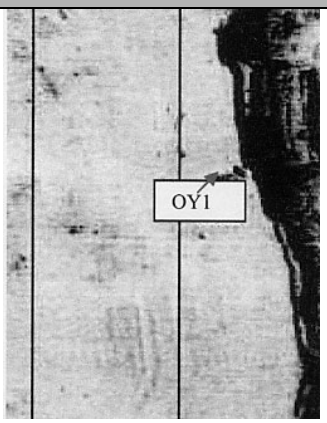
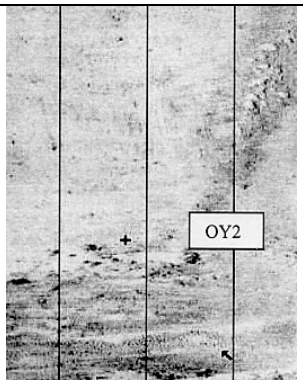
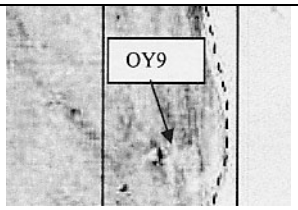
APPENDIX 6.2 DIVER TRUTHING OF MARINE GEOPHYSICAL ANOMALIES DETECTED ON OYSTER BANK AND AT THE ADM JETTY

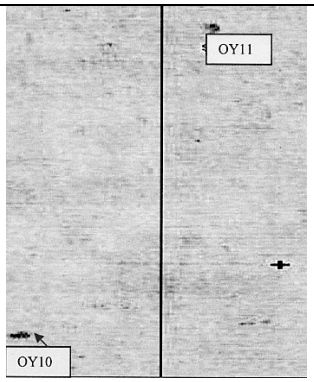
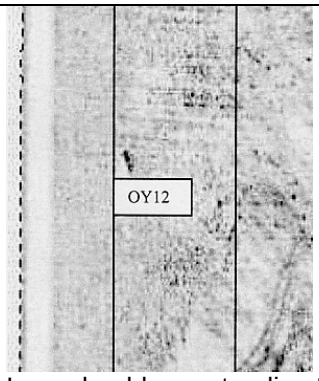
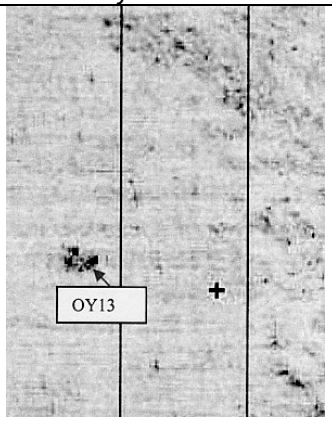
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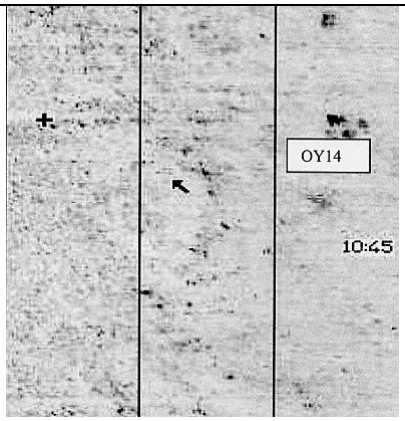
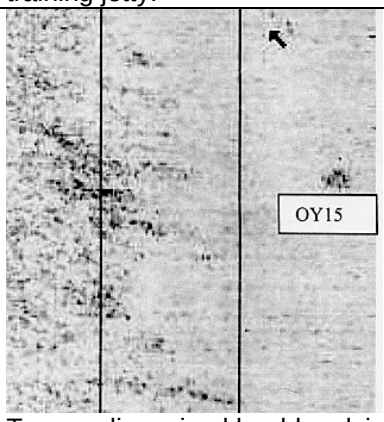
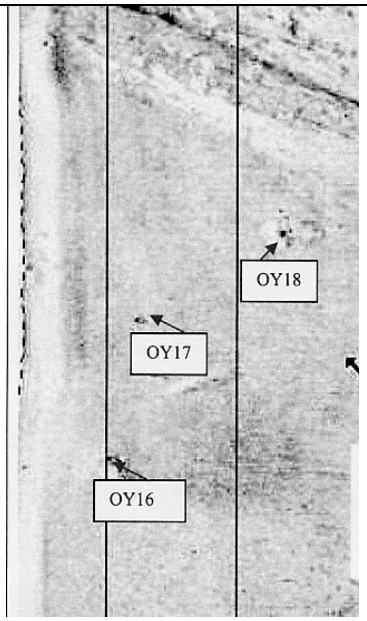
Appendix 6.2: Diver-truthing of Marine Geophysical Survey anomalies detected on Oyster Bank and at the ADM Jetty

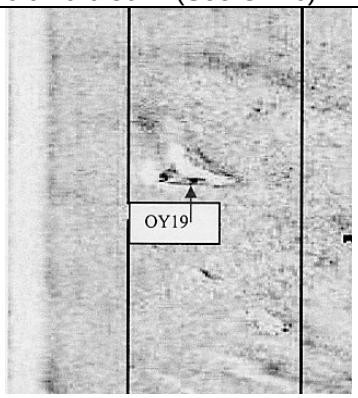
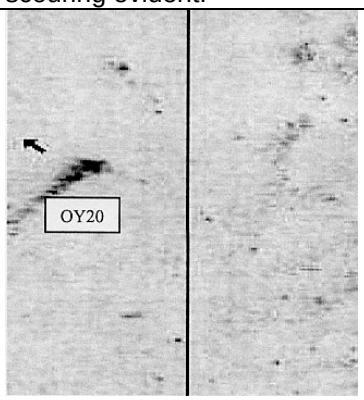
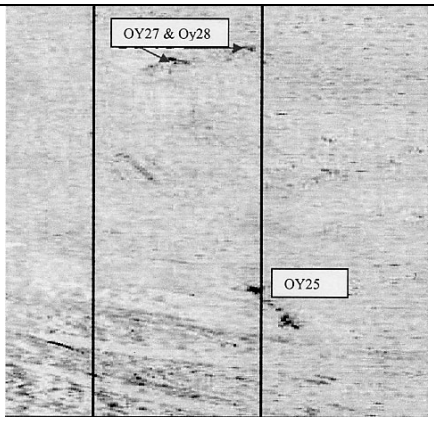
Refer to Figure 6.7 for the distribution of the anomalies
Coordinates in Irish National Grid and WGS84 Lat/Long.

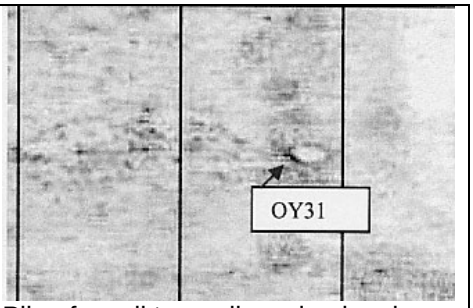
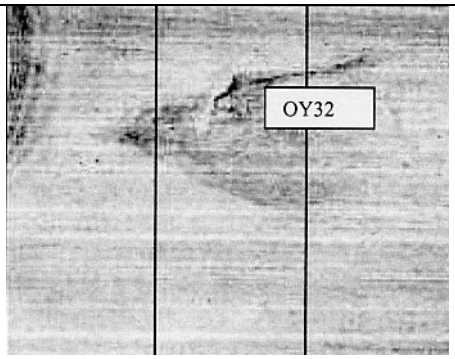
6.3.1 Oyster Bank

Target	Easting	Northing	Long (W) D-M-S:	Lat (N) D-M-S:	Image/ Diver Identification
OY1	178376	65157	8-18-51.976	51-50-19.826	 Half shell of life raft container lying on seabed.
OY2	17884	65122	8-18-25.438	51-50-18.764	 Linear ridge composed of gravel and small rocks with some marine growth. Sterile seabed surrounding feature.
OY9	178368	65134	8-18-52.389	51-50-19.081	 Small pile of rocks, upstanding c.0.30m from seabed.

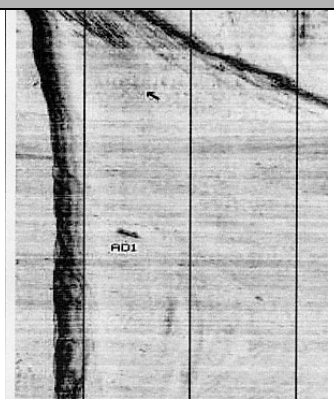
OY10	178785	64998	8-18-30.58	51-50-14.738	 No target visible. OY10 either buried by a shifting seabed or target represents portable object that has moved with the tide.
OY11	178725	65012	8-18-33.716	51-50-15.183	Wire rope hawser (¾ inch diameter). See OY10.
OY12	178742	65061	8-18-32.839	51-50-16.77	 Large boulder upstanding from the seabed by 0.30-0.40m.
OY13	178671	65007	8-18-36.535	51-50-15.013	 No target visible. Sterile sand/silt bottom visible surrounding target location.

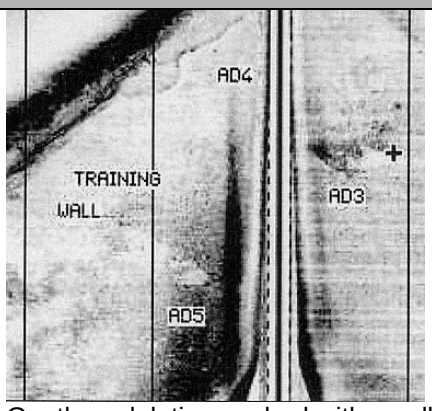
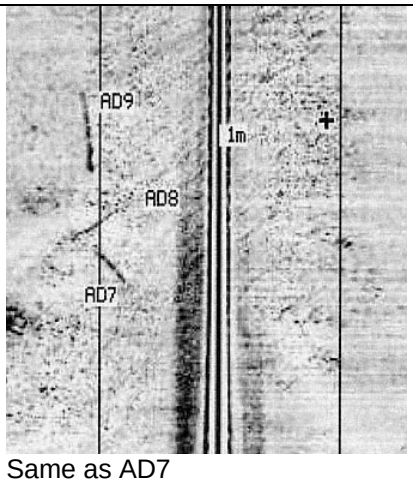
OY14	178630	64956	8-18-38.664	51-50-13.353	 Debris from construction of survival training jetty.
OY15	178916	64898	8-18-23.715	51-50-11.52	 Two medium sized boulders lying adjacent to each other; upstanding c.0.15m from seabed.
OY16	17177	6490	8-19-2.284	51-50-7.924	 Pile of hand sized rocks upstanding between 0.10 and 0.20m from seabed.
OY17	178200	64790	8-19-1.083	51-50-7.927	Large tyre lying approximately 2m from target OY18. Tyre upstanding from seabed by 0.30m (See OY16).

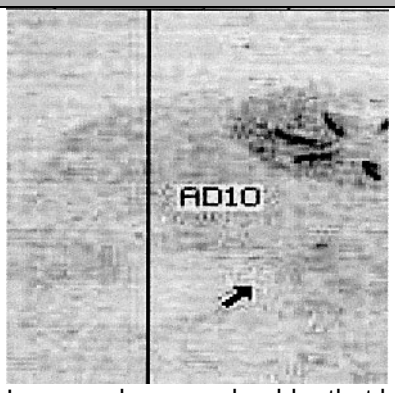
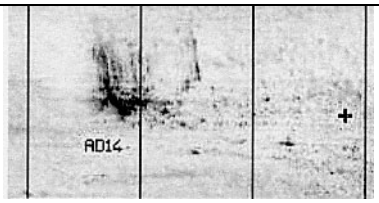
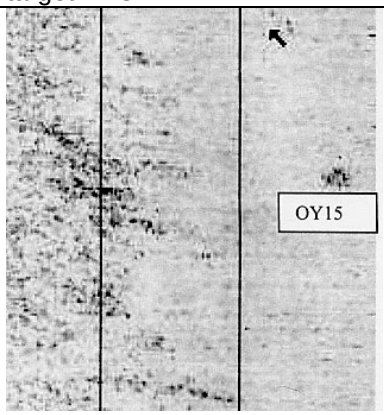
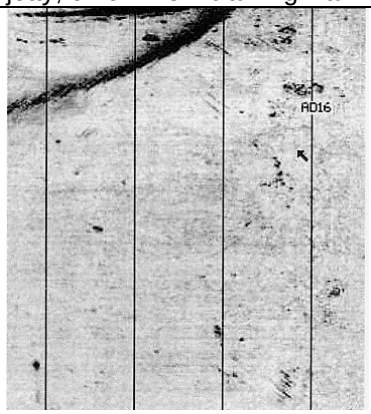
OY18	178215	64780	8-19-0.297	51-50-7.915	Large Tyre upstanding from seabed, c.0.20-0.30m (See OY16).
OY19	178346	64789	8-18-53.457	51-50-7.915	 Large rock armour boulder; some scouring evident.
OY20	178617	64846	8-18-39.317	51-50-9.797	 Debris from Training wall. Targets OY20-OY28 all located along the Low Water mark.
OY23	178259	64717	8-18-57.984	51-50-5.573	See OY20
OY24	178236	64707	8-18-59.182	51-50-5.246	See OY20
OY25	178219	64782	8-19-0.086	51-50-7.67	 Debris from Training wall. Targets OY20-OY28 all located along the Low Water mark.
OY26	178196	64723	8-19-1.274	51-50-5.758	See OY25
OY27	178156	64775	8-19-3.374	51-50-7.435	See OY25
OY28	178153	64780	8-19-3.532	51-50-7.596	See OY25

OY31	177854	65034	8-19-19.206	51-50-15.771	 Pile of small to medium sized rocks with scour hole to one side. Upstanding 0.10 from seabed and 0.40m from bottom of scour hole.
OY32	178351	65137	8-18-53.272	51-50-19.174	 A distinctive ridge of stones and gravel with marine growth attached. Dead mans fingers secured to some of the larger stones.

6.3.2 ADM Jetty

Target	Easting	Northing	Long (W) D-M-S:	Lat (N) D-M-S:	Image/ Diver Identification
AD1	177277	64939	8-19-49.326	51-5-12.618	 Linear deposit of rocks upstanding c.0.40m from seabed. Deposit measures 2.25m length x 0.50m width. Deposit located along base of 45º slope.

Target	Easting	Northing	Long (W) D-M-S:	Lat (N) D-M-S:	Image/ Diver Identification
AD3	177218	65247	8-19-52.48	51-50-22.573	 Gently undulating seabed with small ridge located above large hole measuring 2.5-3m in circumference and 1.5m in depth. Probably from dredging or prop-wash.
AD4	177266	65213	8-19-52.054	51-50-21.475	Gently undulating seabed with frequent plough marks; linear rake marks measuring 0.40m in width and 0.30m in depth.
AD5	177261	65254	8-19-50.233	51-50-22.515	Large, linear, dredge scar with newly exposed dredge face measuring 2.5m in height. Almost vertical in profile. Dredge-scar 2m+ in width.
AD7	177255	65125	8-19-50.518	51-50-18.631	Targets AD7-AD9 represent the mooring chain from Navigation buoy no. 2. These targets appear to have been pinged during different tidal states; when the mooring chain was leaning in different directions due to the tide (see image AD8)
AD8	177249	65111	8-19-50.827	51-50-18.177	 Same as AD7
AD9	177233	65105	8-19-51.602	51-50-17.981	Same as AD7

Target	Easting	Northing	Long (W) D-M-S:	Lat (N) D-M-S:	Image/ Diver Identification
AD10	177634	65150	8-19-30.729	51-50-19.495	 Large rock armour boulder that has fallen away from the training wall.
AD14	177220	65253	8-19-52.375	51-50-22.767	 Dredge scar/hole; may form part of target AD3.
AD15	177069	65180	8-20-0.244	51-50-20.283	 Rock amour spit located along side jetty, c.10m from training wall.
AD16	176981	65107	8-20-4.822	51-50-18.008	 Large rock armour boulder that has fallen away from the training wall.

APPENDIX 9.1 24-HOUR AMBIENT NOISE SURVEY RESULTS

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APPENDIX 9.1

24-HOUR AMBIENT NOISE SURVEY RESULTS

Location N1: Summary Results 5th – 6th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	17:48	45.9	47.6	36.4
	18:00	47.6	48.6	37.7
	19:00	48.6	49.2	36.6
	20:00	45.5	38.4	34.9
	21:00	45.3	46.0	34.7
	22:00	41.1	42.2	34.2
	23:00	39.6	40.0	35.6
	00:00	41.3	39.8	34.9
	01:00	39.1	38.2	33.6
	02:00	40.1	34.8	32.6
	03:00	43.5	42.6	37.3
	04:00	45.2	37.2	35.1
	05:00	48.9	55.2	36.6

Location N1: Summary Results 5th – 6th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	06:00	45.8	40.6	37.0
	07:00	50.2	45.4	38.9
	08:00	54.4	58.8	39.8
	09:00	53.2	57.2	39.6
	10:00	63.8	61.2	40.2
	11:00	63.9	61.0	40.3
	12:00	59.2	60.8	40.2
	13:00	51.3	53.8	38.4
	14:00	51.5	56.8	38.2
	15:00	51.0	56.8	39.1
	16:00	52.4	52.6	40.6
	17:00	54.8	59.8	37.2
Mean		54.8		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N2: Summary Results 4th – 5th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	16:31:52	38.2	37.0	34.2
	17:15:00	41.5	37.0	31.8
	18:15:00	38.1	43.2	29.4
	19:15:00	41.4	41.6	30.0
	20:15:00	42.1	43.8	29.8
	21:15:00	37.7	34.0	29.2
	22:15:00	33.5	34.8	29.2
	23:15:00	31.3	34.0	28.6
	00:15:00	34.3	31.6	28.6
	01:15:00	31.3	32.8	29.0
	02:15:00	31.5	34.2	27.4
	03:15:00	36.5	30.4	28.2
	04:15:00	34.2	35.4	29.6

Location N2: Summary Results 4th – 5th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	05:15:00	40.0	48.4	29.4
	06:15:00	38.3	41.2	29.8
	07:15:00	38.9	41.8	31.0
	08:15:00	43.1	45.4	37.4
	09:15:00	50.2	54.8	52.6
	10:15:00	46.8	49.4	38.8
	11:15:00	47.3	51.2	38.8
	12:15:00	45.9	53.2	37.6
	13:15:00	55.2	56.6	54.4
	14:15:00	55.9	58.2	51.0
	15:15:00	50.9	51.8	50.2
	16:15:00	46.6	46.0	34.8
Mean		47.0		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N3: Summary Results 5th – 6th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	18:05	53.8	53.0	30.6
	19:05	45.9	48.8	30.4
	20:05	45.9	45.6	29.0
	21:05	45.5	43.8	30.5
	22:05	45.1	49.2	41.9
	23:05	45.2	42.3	31.6
	00:05	38.0	35.3	32.2
	01:05	37.2	35.4	29.3
	02:05	37.9	31.5	29.6
	03:05	39.2	38.2	31.6
	04:05	37.1	37.3	32.0
	05:05	44.3	44.8	33.6
	06:05	41.1	39.0	31.2

Location N3: Summary Results 5th – 6th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	07:05	53.2	48.5	36.1
	08:05	55.8	59.3	38.6
	09:05	50.8	54.8	38.2
	10:05	49.7	51.6	34.5
	11:05	52.0	53.8	38.0
	12:05	52.9	56.6	39.8
	13:05	50.7	55.1	38.7
	14:05	51.0	54.8	38.6
	15:05	51.3	53.7	40.9
	16:05	51.1	53.5	38.2
	17:05	52.8	57.0	48.3
	18:05	55.8	64.3	47.5
Mean		50.4		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N4: Summary Results 9th – 10th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	11:00	54.3	56.7	45.1
	12:00	55.2	60.1	44.3
	13:00	54.8	59.7	41.3
	14:00	54.2	58.5	42.2
	15:00	55.9	53.8	40.1
	16:00	56.8	59.5	44.3
	17:00	59.3	64.0	43.7
	18:00	59.9	64.3	44.0
	19:00	57.4	66.1	41.8
	20:00	50.1	52.7	43.5
	21:00	49.9	50.5	40.1
	22:00	49.0	50.1	42.2
	23:00	46.7	48.7	40.8

Location N4: Summary Results 9th – 10th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	00:00	49.9	52.0	44.3
	01:00	45.2	43.7	36.7
	02:00	44.1	40.1	31.2
	03:00	45.5	37.6	30.7
	04:00	48.6	48.0	35.3
	05:00	47.6	40.8	32.0
	06:00	57.0	50.4	33.2
	07:00	60.3	65.5	42.9
	08:00	58.2	63.4	44.5
	09:00	54.2	59.3	41.9
	10:00	51.2	54.9	41.6
	11:00	51.2	52.0	41.4
Mean		55.0		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N5: Summary Results 5th – 6th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	18:46	59.3	61.2	46.0
	19:01	52.4	56.8	38.5
	20:01	48.1	53.1	33.2
	21:01	47.7	49.6	35.0
	22:01	44.8	46.8	32.6
	23:01	45.7	46.9	33.9
	00:01	44.0	46.8	29.2
	01:01	39.7	40.6	28.0
	02:01	40.4	38.3	32.3
	03:01	40.9	42.8	30.9
	04:01	41.1	34.4	32.7
	05:01	46.2	45.1	36.0
	06:01	51.5	45.5	40.3

Location N5: Summary Results 5th – 6th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	07:01	54.2	58.9	44.8
	08:01	54.5	57.4	47.0
	09:01	51.3	56.6	41.7
	10:01	50.8	54.7	42.7
	11:01	55.2	58.6	44.5
	12:01	53.1	54.9	46.5
	13:01	54.2	57.9	47.9
	14:01	54.4	56.6	47.7
	15:01	55.3	55.6	45.8
	16:01	55.1	58.2	45.9
	17:01	56.0	58.7	46.8
	18:01	56.4	65.3	47.3
Mean		52.9		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N6: Summary Results 9th – 10th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	10:42	53.3	56.1	47.4
	10:57	54.2	56.7	50.2
	11:57	55.8	58.1	51.6
	12:57	54.1	56.1	51.4
	13:57	55.3	56.5	52.2
	14:57	55.5	56.9	52.3
	15:57	57.7	58.0	53.5
	16:57	56.8	58.2	53.6
	17:57	56.0	57.8	52.7
	18:57	55.0	59.4	51.4
	19:57	54.1	55.9	50.7
	20:57	53.1	55.3	50.0
	21:57	52.9	55.6	50.0

Location N6: Summary Results 9th – 10th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	22:57	52.2	53.3	49.9
	23:57	52.6	54.0	50.6
	00:57	51.0	52.4	47.8
	01:57	42.2	42.4	37.3
	02:57	44.1	44.2	37.1
	03:57	44.0	48.6	38.4
	04:57	45.5	50.4	38.9
	05:57	51.3	50.8	42.3
	06:57	55.4	57.8	51.3
	07:57	55.5	57.0	52.1
	08:57	53.9	56.1	50.0
	09:57	53.8	56.7	49.6
Mean		53.9		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N7: Summary Results 3rd – 4th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	16:01	53.0	55.8	50.2
	17:00	44.2	44.8	41.6
	18:00	42.8	42.6	39.4
	19:00	42.0	43.0	39.6
	20:00	41.3	44.2	38.6
	21:00	42.6	42.0	38.0
	22:00	40.5	43.8	39.2
	23:00	41.2	41.2	37.6
	00:00	40.1	42.4	38.8
	01:00	39.0	41.0	37.0
	02:00	38.4	38.6	36.0
	03:00	40.5	39.4	36.8
	04:00	39.0	38.2	35.6

Location N7: Summary Results 3rd – 4th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	05:00	41.3	46.6	35.6
	06:00	43.7	42.8	36.8
	07:00	43.9	45.0	40.0
	08:00	48.2	50.0	42.2
	09:00	52.5	50.6	40.6
	10:00	53.4	47.4	39.2
	11:00	49.3	47.6	41.2
	12:00	48.1	50.0	42.6
	13:00	46.9	48.8	45.4
	14:00	49.0	53.8	48.0
	15:00	47.3	48.6	42.2
	16:00	42.8	44.0	40.8
Mean		47.0		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N8: Summary Results 9th – 10th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	12:26:10	46.9	46.0	41.4
	13:15:00	46.3	48.0	41.6
	14:15:00	44.8	47.8	42.0
	15:15:00	46.4	48.0	42.2
	16:15:00	46.1	48.6	43.6
	17:15:00	49.5	53.2	42.8
	18:15:00	48.1	50.6	43.4
	19:15:00	46.8	46.4	41.8
	20:15:00	49.6	54.2	45.0
	21:15:00	49.1	49.6	44.0
	22:15:00	51.1	53.8	47.2
	23:15:00	51.8	52.6	44.8
	00:15:00	55.2	57.6	50.4

Location N8: Summary Results 9th – 10th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	01:15:00	49.1	53.8	44.8
	02:15:00	41.6	43.8	37.2
	03:15:00	40.8	43.8	37.4
	04:15:00	45.5	46.4	38.2
	05:15:00	42.7	43.8	37.0
	06:15:00	42.3	40.2	37.0
	07:15:00	46.7	48.4	42.4
	08:15:00	45.8	47.0	43.8
	09:15:00	49.3	51.6	44.4
	10:15:00	48.4	51.2	44.6
	11:15:00	47.1	48.6	43.0
	12:15:00	48.9	52.2	44.8
Mean		48.4		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N9: Summary Results 11th – 12th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	13:58	55.7	59.0	43.0
	14:00	53.0	57.6	40.5
	15:00	55.1	57.4	41.1
	16:00	54.0	58.4	39.9
	17:00	54.3	58.0	39.9
	18:00	54.1	58.0	40.0
	19:00	54.0	57.6	38.3
	20:00	52.1	56.8	37.9
	21:00	51.4	56.0	36.1
	22:00	49.4	55.4	35.1
	23:00	49.1	47.0	34.0
	00:00	44.5	42.8	38.3
	01:00	44.3	43.0	40.3

Location N9: Summary Results 11th – 12th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	02:00	42.8	41.4	38.6
	03:00	44.5	41.2	41.7
	04:00	47.5	44.2	43.6
	05:00	52.8	49.2	48.6
	06:00	56.2	49.4	50.9
	07:00	58.6	60.2	49.6
	08:00	60.0	64.4	50.3
	09:00	59.6	63.8	52.7
	10:00	58.3	62.0	51.1
	11:00	58.3	61.8	51.0
	12:00	57.7	62.0	49.7
	13:00	56.2	61.0	34.8
Mean		55.1		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N10:Summary Results 10th – 11th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	13:45	51.8	55.8	38.9
	14:45	52.2	56.5	39.4
	15:45	54.2	56.7	41.1
	16:45	53.2	57.7	43.8
	17:45	52.7	56.7	39.8
	18:45	52.8	57.3	39.5
	19:45	52.4	56.7	40.8
	20:45	51.0	56.1	37.0
	21:45	50.7	53.0	33.2
	22:45	48.3	50.8	30.1
	23:45	44.2	41.5	29.4
	00:45	42.1	36.4	31.7
	01:45	38.3	36.0	32.0

Location N10: Summary Results 10th – 11th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	02:45	38.9	44.9	31.2
	03:45	39.1	36.7	33.0
	04:45	39.2	40.7	31.8
	05:45	43.8	48.5	32.7
	06:45	46.8	51.2	34.8
	07:45	52.7	58.2	36.8
	08:45	53.5	58.4	39.0
	09:45	53.5	56.6	34.7
	10:45	53.1	57.9	41.4
	11:45	52.6	56.5	43.3
	12:45	54.2	57.2	39.1
	13:45	67.9	56.5	40.1
Mean		55.7		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N11: Summary Results 11th – 12th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	14:47	40.2	42.7	36.4
	15:47	42.3	44.8	35.1
	16:47	44.7	44.0	36.4
	17:47	52.3	43.9	37.5
	18:47	41.4	44.3	35.3
	19:47	59.4	42.7	34.5
	20:47	36.3	38.0	31.5
	21:47	44.8	53.2	29.0
	22:47	46.6	30.0	25.8
	23:47	51.0	32.9	27.3
	00:47	29.4	33.3	27.5
	01:47	31.1	32.2	30.3
	02:47	39.6	32.1	28.5

Location N11: Summary Results 11th – 12th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	03:47	38.7	37.0	34.3
	04:47	43.5	51.1	41.0
	05:47	49.7	50.2	43.5
	06:47	52.0	54.3	49.5
	07:47	47.9	50.4	46.8
	08:47	46.7	50.8	46.8
	09:47	51.4	54.4	46.6
	10:47	49.3	51.1	45.9
	11:47	47.4	49.8	45.4
	12:47	44.4	45.5	39.3
	13:47	49.1	42.6	35.4
	14:47	49.6	50.6	39.4
Mean		49.4		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N12:Summary Results 10th – 11th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	13:29	53.1	58.4	42.4
	14:00	54.5	59.2	41.0
	15:00	55.8	58.2	42.2
	16:00	55.1	58.4	44.4
	17:00	54.9	59.2	41.6
	18:00	54.3	59.0	41.8
	19:00	54.8	58.4	43.0
	20:00	52.9	57.8	41.0
	21:00	53.0	57.0	40.0
	22:00	50.3	54.0	38.6
	23:00	46.7	49.6	37.8
	00:00	44.4	45.8	36.8
	01:00	42.5	39.6	37.6

Location N12: Summary Results10th – 11th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	02:00	42.3	43.0	39.4
	03:00	41.8	40.8	37.6
	04:00	41.5	40.6	38.4
	05:00	45.0	42.2	38.4
	06:00	48.7	44.6	37.2
	07:00	55.0	59.0	38.6
	08:00	55.8	60.8	41.0
	09:00	55.7	60.2	40.4
	10:00	54.6	58.4	39.4
	11:00	53.5	57.2	41.0
	12:00	54.8	58.6	43.6
	13:00	53.3	58.6	40.4
Mean		52.9		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N13: Summary Results 10th – 11th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	14:09	51.8	55.4	44.1
	15:09	54.6	56.1	45.6
	16:09	51.9	55.2	45.4
	17:09	52.0	55.3	43.8
	18:09	50.8	54.5	43.7
	19:09	51.7	54.4	44.6
	20:09	50.3	52.5	43.7
	21:09	49.3	54.4	42.7
	22:09	47.2	53.1	39.8
	23:09	44.5	48.1	39.3
	00:09	41.9	43.2	38.2
	01:09	40.7	42.3	37.9
	02:09	42.4	44.3	38.0

Location N13: Summary Results 10th – 11th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	03:09	40.1	38.6	37.8
	04:09	39.0	38.5	37.8
	05:09	41.9	40.7	38.0
	06:09	47.2	45.9	38.3
	07:09	51.1	54.3	39.0
	08:09	52.7	57.3	41.1
	09:09	52.5	56.7	41.1
	10:09	52.4	55.0	47.1
	11:09	51.1	54.4	44.0
	12:09	51.5	54.1	46.3
	13:09	52.5	54.6	44.3
	14:09	54.3	58.0	46.6
Mean		50.5		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N14: Summary Results 11th – 12th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	14:42	55.7	59.7	41.1
	14:57	55.2	58.1	41.0
	15:57	61.0	61.3	45.3
	16:57	56.9	61.3	42.8
	17:57	55.4	59.3	41.4
	18:57	54.0	58.9	39.8
	19:57	53.7	58.5	39.7
	20:57	52.9	57.8	36.3
	21:57	50.5	56.1	35.5
	22:57	49.4	49.1	27.7
	23:57	46.6	42.4	31.3
	00:57	43.6	41.8	32.8
	01:57	42.8	37.9	32.9

Location N14: Summary Results 11th – 12th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	02:57	44.6	38.6	35.4
	03:57	43.8	39.0	38.0
	04:57	50.6	45.8	44.5
	05:57	55.3	46.9	47.3
	06:57	59.7	63.5	45.6
	07:57	60.3	65.0	47.7
	08:57	59.2	64.6	50.1
	09:57	58.2	62.8	47.5
	10:57	58.4	63.2	47.5
	11:57	57.8	62.7	45.6
	12:57	56.1	60.4	44.5
	13:57	55.6	59.1	47.8
Mean		56.0		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N15: Summary Results 30th – 31st July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	09:53	45.8	48.4	41.8
	10:00	47.3	44.6	40.7
	11:00	45.1	45.6	40.8
	12:00	44.6	45.4	41.3
	13:00	44.6	48.2	40.9
	14:00	45.9	49.6	42.7
	15:00	46.7	47.4	44.1
	16:00	47.1	47.0	44.2
	17:00	46.5	50.8	43.4
	18:00	47.6	53.2	41.0
	19:00	43.5	39.2	33.8
	20:00	46.5	47.0	42.3
	21:00	40.6	45.0	35.7

Location N15: Summary Results 30th – 31st July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	22:00	38.3	36.0	32.2
	23:00	35.9	38.8	33.5
	00:00	41.2	35.6	33.5
	01:00	38.5	40.2	36.6
	02:00	36.3	38.6	34.9
	03:00	43.6	42.6	41.9
	04:00	43.4	42.0	40.9
	05:00	48.5	46.6	43.8
	06:00	47.8	47.8	44.2
	07:00	48.5	48.6	46.8
	08:00	49.4	48.8	47.5
	09:00	47.5	48.4	33.8
Mean		45.7		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N16: Summary Results 16th – 17th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	09:55	52.6	56.1	43.3
	10:55	53.2	55.3	44.9
	11:55	52.4	55.7	43.1
	12:55	52.3	56.4	44.3
	13:55	53.1	55.8	44.4
	14:55	53.3	56.6	48.7
	15:55	53.0	56.1	45.2
	16:55	52.1	55.8	45.9
	17:55	51.7	56.0	42.6
	18:55	50.7	54.6	40.1
	19:55	49.4	54.4	40.2
	20:55	49.3	55.0	38.3
	21:55	45.8	50.3	31.9

Location N16: Summary Results 16th – 17th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	22:55	44.6	49.3	31.5
	23:55	42.2	42.4	30.3
	00:55	38.8	39.5	29.6
	01:55	37.7	34.2	31.1
	02:55	33.2	33.1	30.6
	03:55	34.9	33.3	29.1
	04:55	45.6	37.4	27.6
	05:55	45.3	41.7	29.0
	06:55	49.2	50.5	33.0
	07:55	51.0	56.7	38.8
	08:55	51.3	55.6	37.8
	09:55	50.1	54.6	38.8
Mean		50.1		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N17: Summary Results 27th - 28th January 2013 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	14:30	49.2	50.8	46.6
	15:30	49.6	48.8	45.5
	16:30	52.4	53.9	48.9
	17:30	52.3	53.2	48.2
	18:30	50.9	49.5	45.2
	19:30	48.9	48.0	44.3
	20:30	45.7	46.5	42.8
	21:30	42.3	41.3	39.2
	22:30	41.5	41.5	39.5
	23:30	41.0	40.9	39.1
	00:30	41.0	41.0	39.1
	01:30	41.8	41.9	39.2
	02:30	39.8	39.0	36.8

Location N17: Summary Results 27th - 28th January 2013 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	03:30	38.4	37.7	35.6
	04:30	37.6	37.3	35.1
	05:30	39.0	39.5	36.6
	06:30	44.0	45.2	41.6
	07:30	46.2	47.4	41.5
	08:30	46.2	46.9	42.8
	09:30	45.9	46.2	42.5
	10:30	49.3	49.5	43.5
	11:30	50.8	52.0	46.7
	12:30	50.0	50.4	46.8
	13:30	49.1	52.0	47.7
Mean		47.6		

Survey Details:
Survey Personnel: Ronan Murphy, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N18: Summary Results 16th – 17th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	10:44	49.1	51.3	46.4
	11:44	50.2	51.6	46.8
	12:44	47.3	47.8	43.3
	13:44	47.7	47.1	43.5
	14:44	49.4	53.2	48.7
	15:44	50.0	50.6	43.3
	16:44	49.7	52.2	46.5
	17:44	46.8	49.2	41.5
	18:44	45.1	47.9	41.6
	19:44	44.1	43.1	37.8
	20:44	61.4	45.0	38.5
	21:44	38.8	38.6	33.7
	22:44	35.0	37.9	33.5

Location N18: Summary Results 16th – 17th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	23:44	35.3	35.3	33.2
	00:44	39.4	35.4	32.6
	01:44	37.9	37.2	33.5
	02:44	42.2	36.9	33.9
	03:44	34.8	35.8	33.0
	04:44	32.7	32.8	29.9
	05:44	42.0	37.6	31.9
	06:44	38.0	42.9	34.8
	07:44	42.7	42.5	37.7
	08:44	41.9	42.6	38.1
	09:44	43.9	46.8	39.9
	10:44	45.8	46.3	40.2
Mean		49.5		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

Location N19: Summary Results 16th – 17th July 2012 (Sheet 1 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	10:34:04	53.0	55.4	47.6
	11:15:00	52.0	54.2	45.0
	12:15:00	51.7	56.0	44.2
	13:15:00	50.8	51.2	42.2
	14:15:00	52.7	56.0	45.6
	15:15:00	53.0	57.4	47.6
	16:15:00	53.0	56.2	46.0
	17:15:00	51.1	54.8	43.6
	18:15:00	52.6	55.6	43.6
	19:15:00	51.5	55.0	42.4
	20:15:00	50.4	54.6	40.4
	21:15:00	48.8	53.4	37.6
	22:15:00	45.9	47.4	35.4

Location N19: Summary Results 16th – 17th July 2012 (Sheet 2 of 2)

Monitoring Location	Time	Measured Noise Level dB(A)		
		$L_{Aeq, 1\text{-}hour}$	L_{A10}	L_{A90}
	23:15:00	45.7	45.4	32.6
	00:15:00	41.7	49.2	32.4
	01:15:00	41.1	39.0	32.2
	02:15:00	34.0	33.6	31.0
	03:15:00	34.0	34.8	32.2
	04:15:00	40.1	35.2	32.6
	05:15:00	40.4	35.2	31.2
	06:15:00	45.3	40.6	33.6
	07:15:00	47.5	47.8	36.8
	08:15:00	48.4	51.8	38.8
	09:15:00	50.0	53.6	39.4
	10:15:00	51.6	55.0	41.8
Mean		49.8		

Survey Details:
Survey Personnel: Darragh Kingston, RPS.
L_{Aeq} Time-averaged noise level.
L_{A90} Noise level exceeded for 90% of measurement period (steady underlying noise level).
L_{A10} Noise level exceeded for 10 % of measurement period.

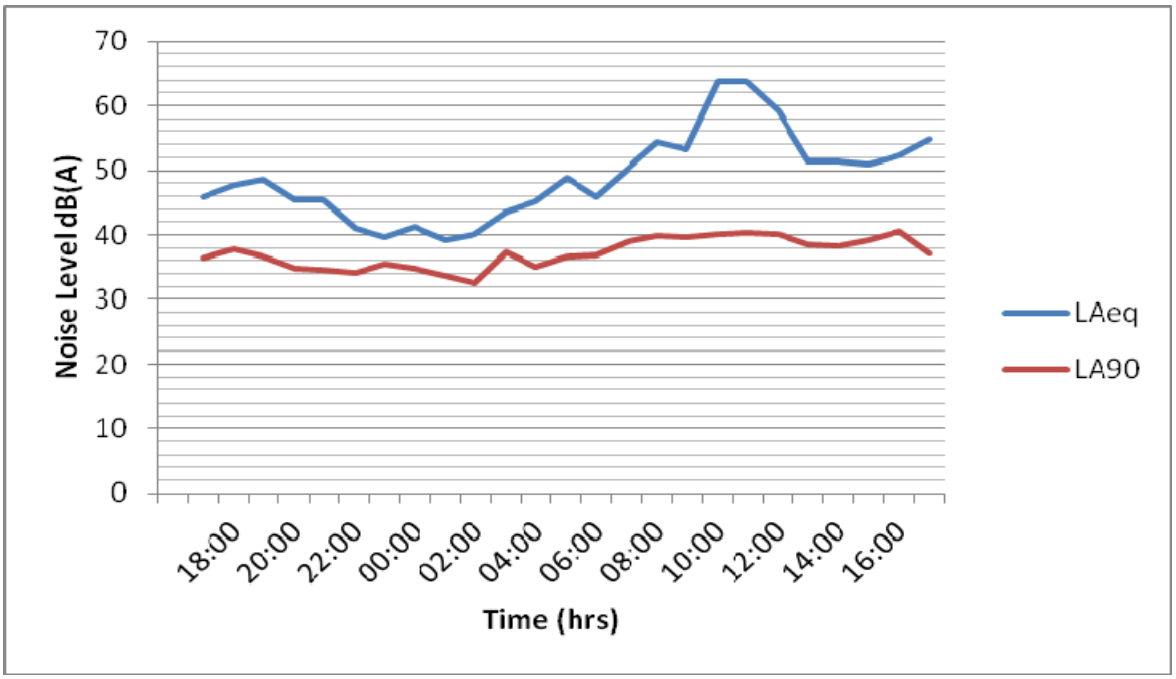
APPENDIX 9.2 GRAPHICAL SUMMARY OF 24HR AMBIENT NOISE SURVEY RESULTS

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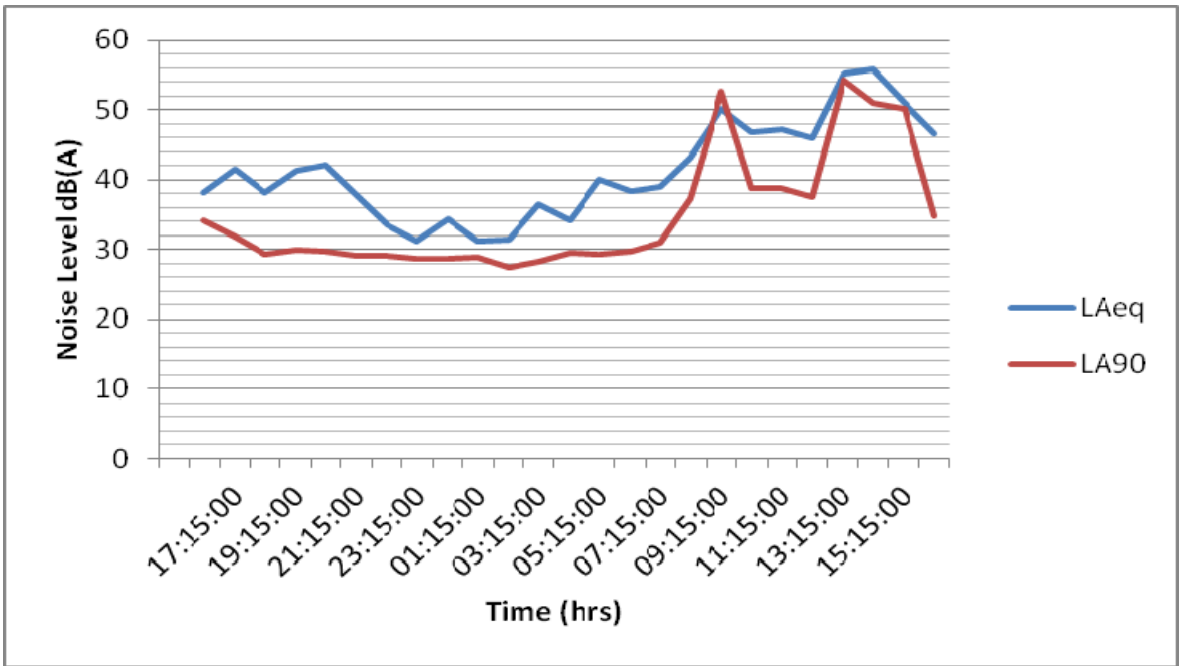
APPENDIX 9.2

GRAPHICAL SUMMARY OF 24-HOUR AMBIENT NOISE SURVEY RESULTS

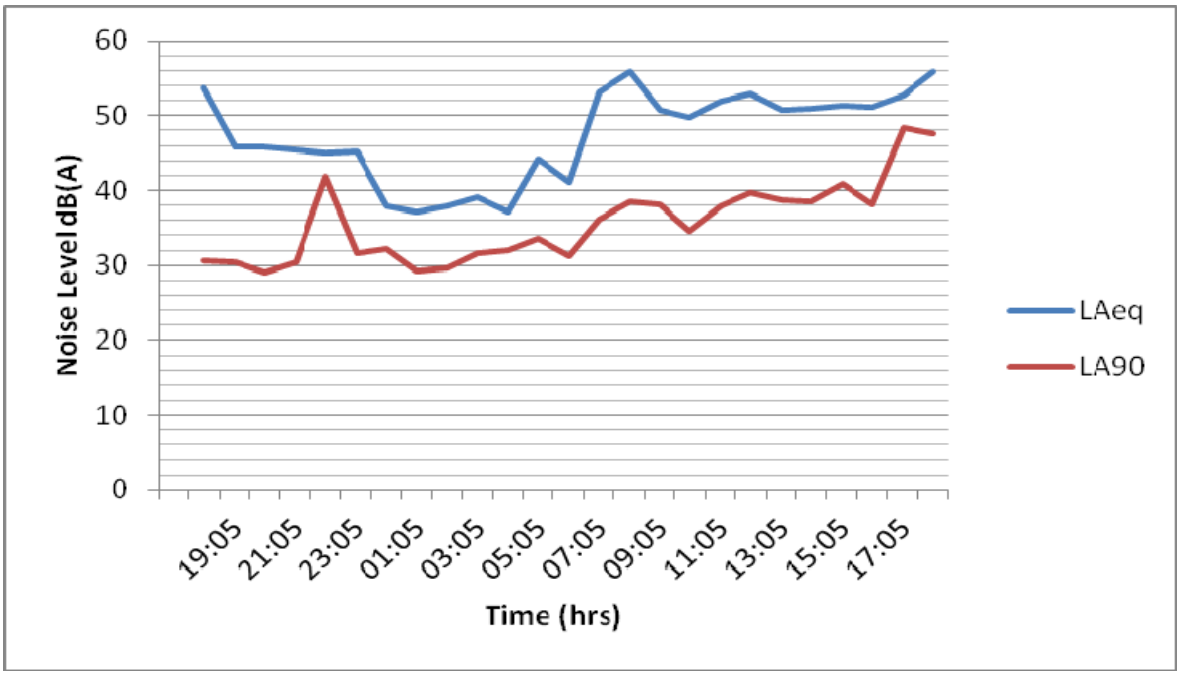
Graphical Summary of 24-hour Unattended Noise Measurements at Location N1



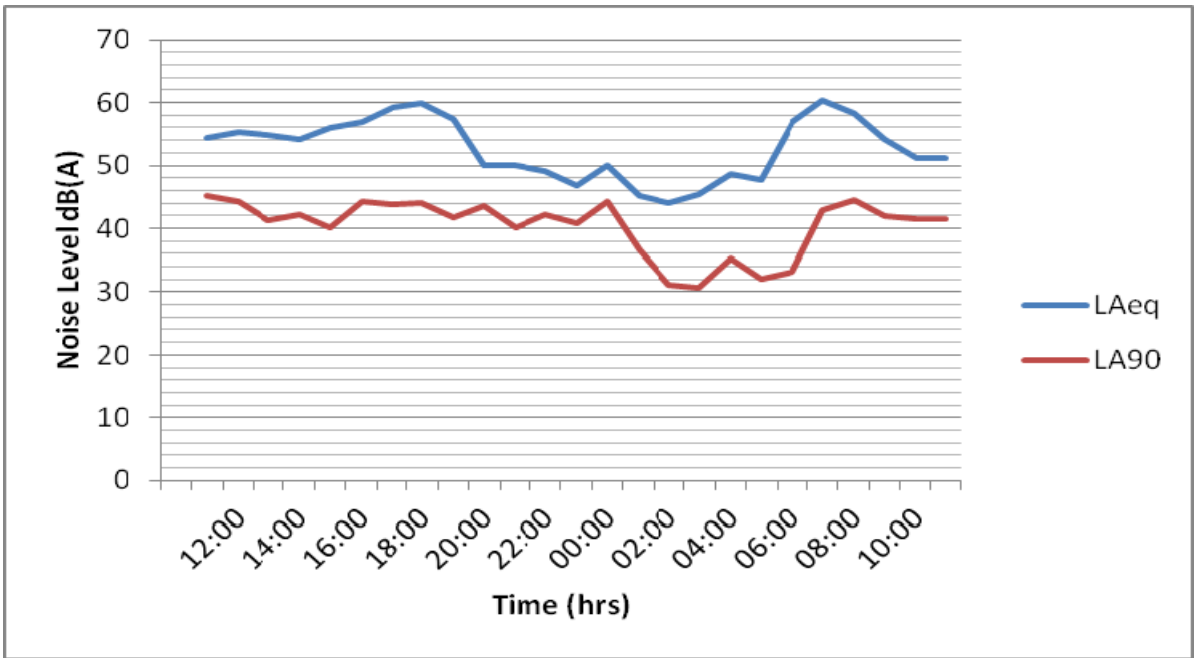
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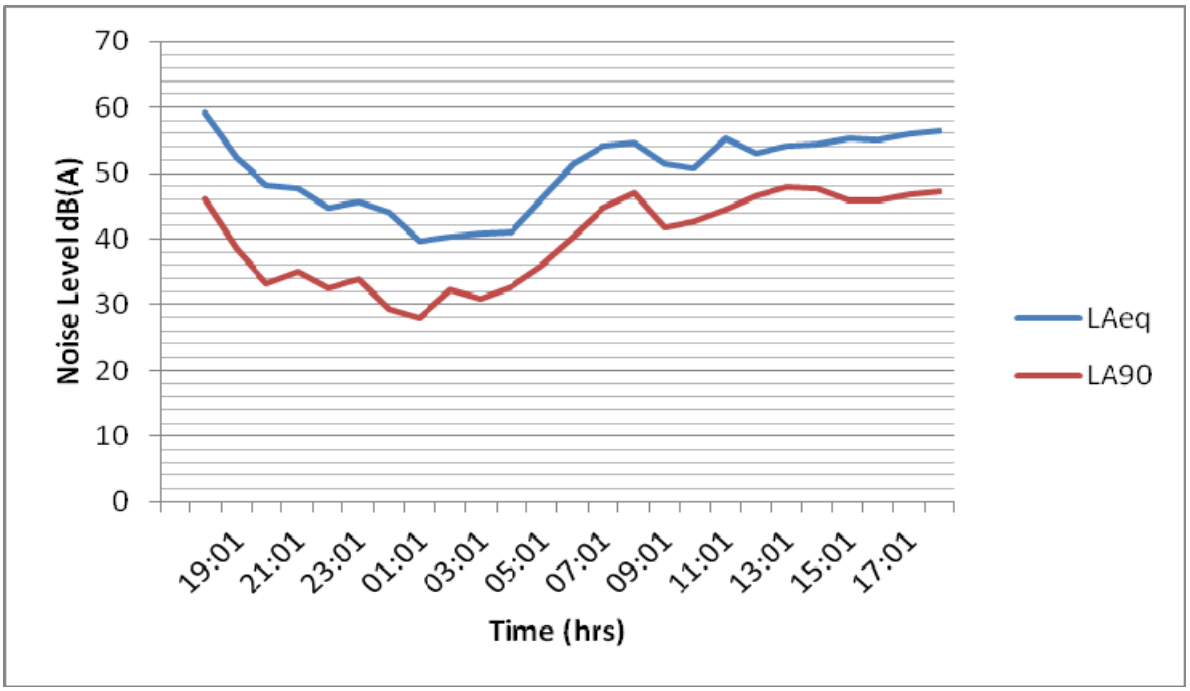
Graphical Summary of 24-hour Unattended Noise Measurements at Location N3



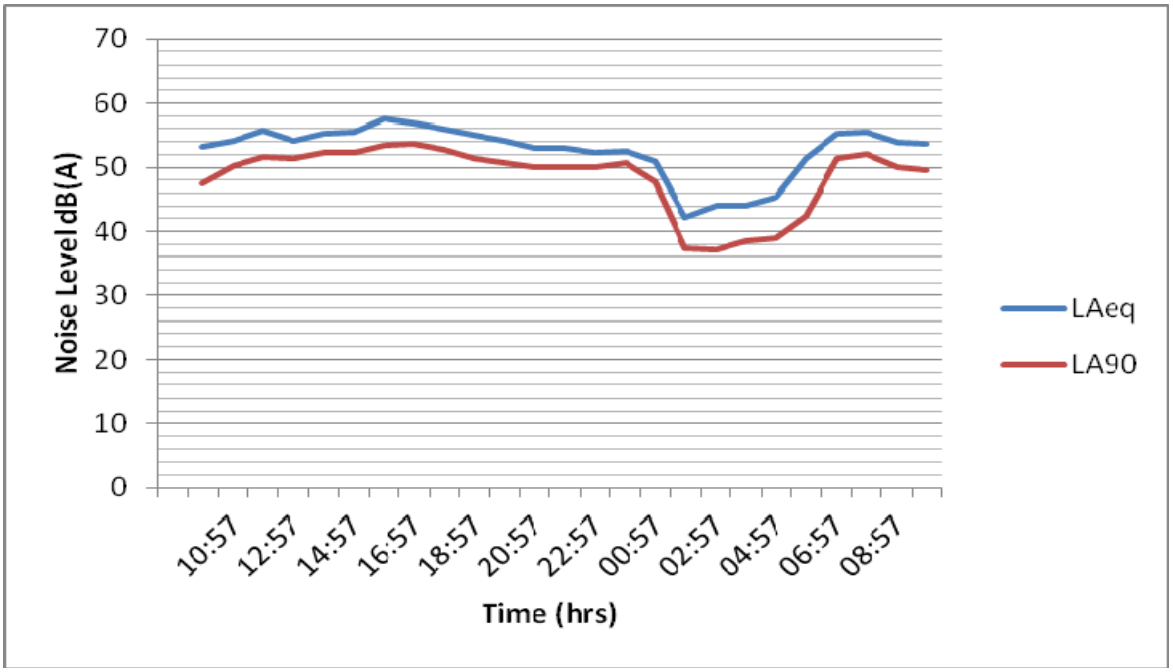
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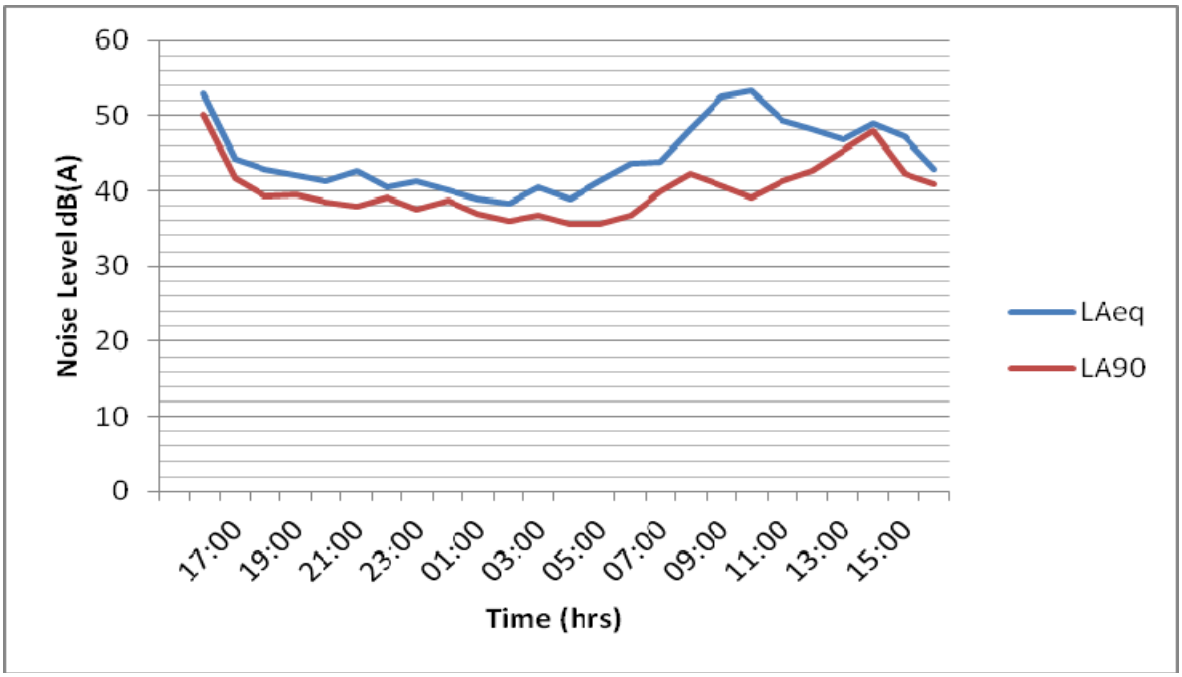
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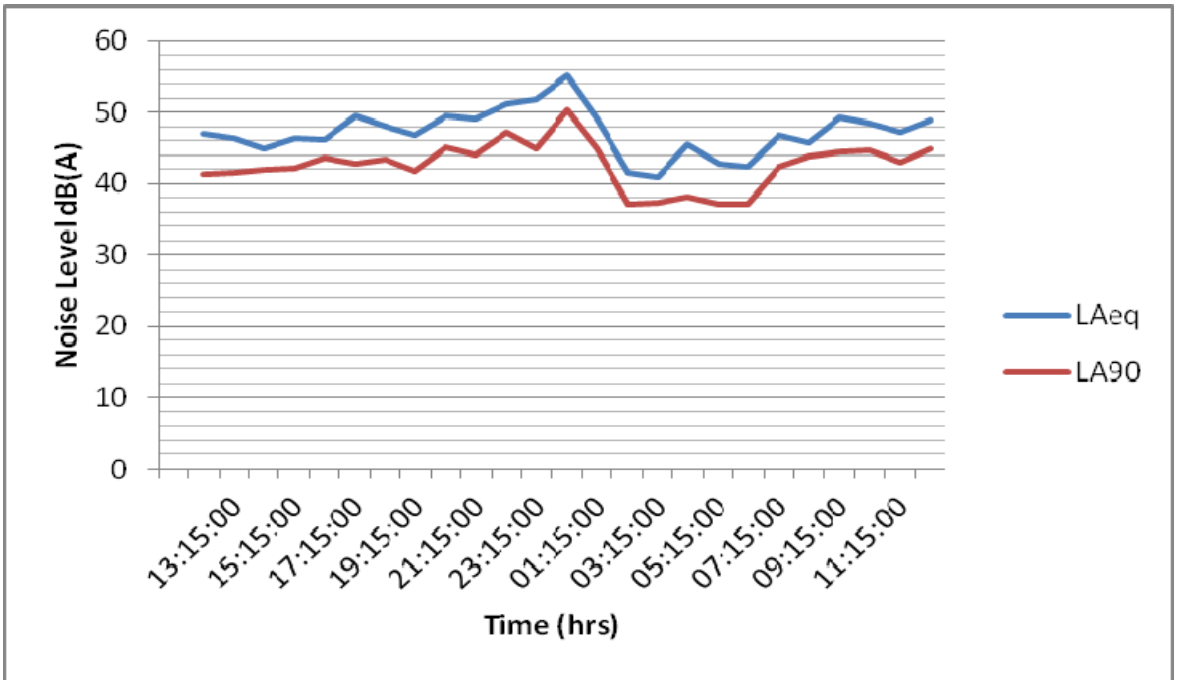
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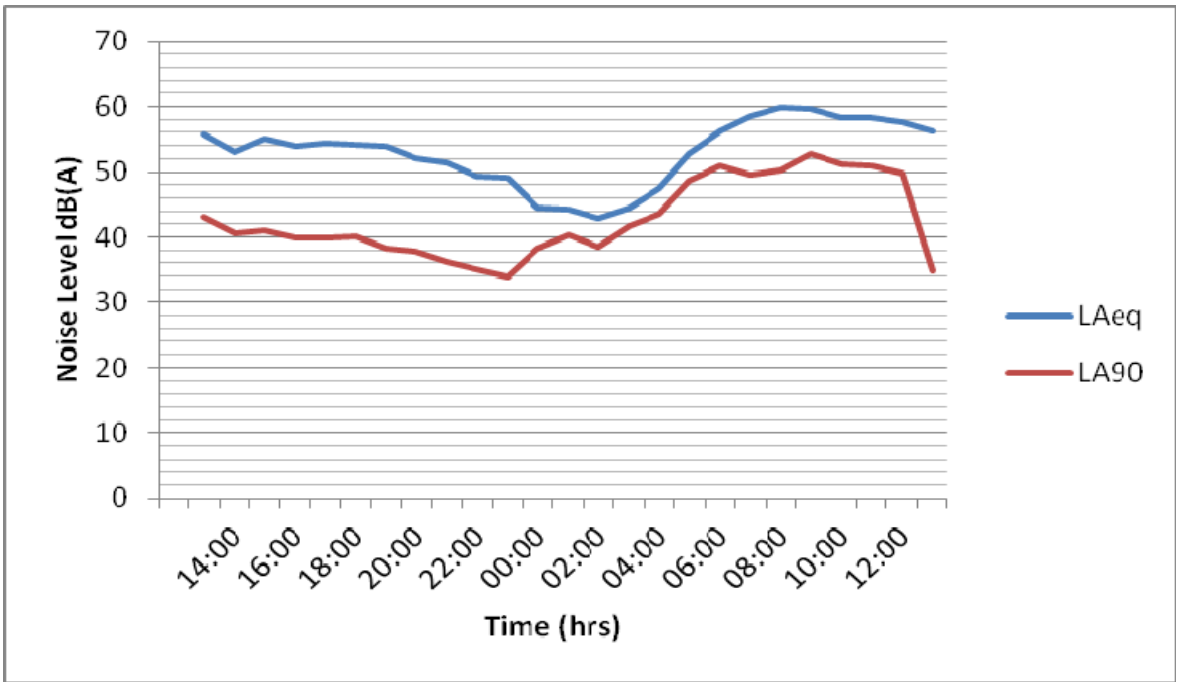
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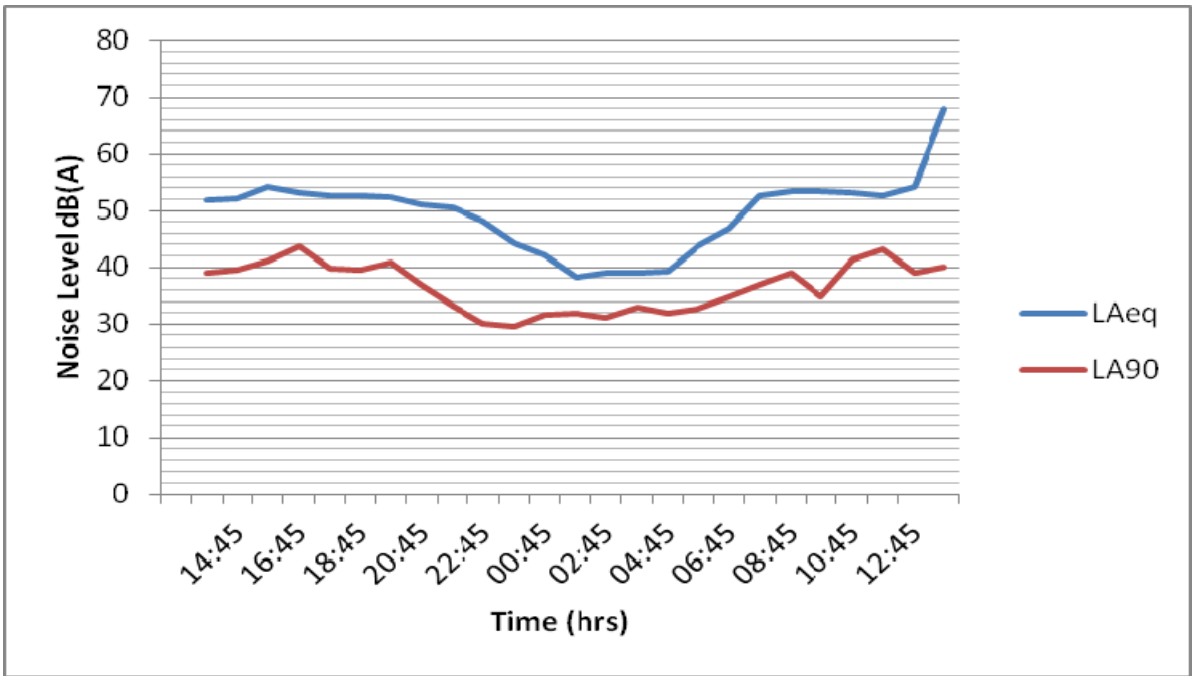
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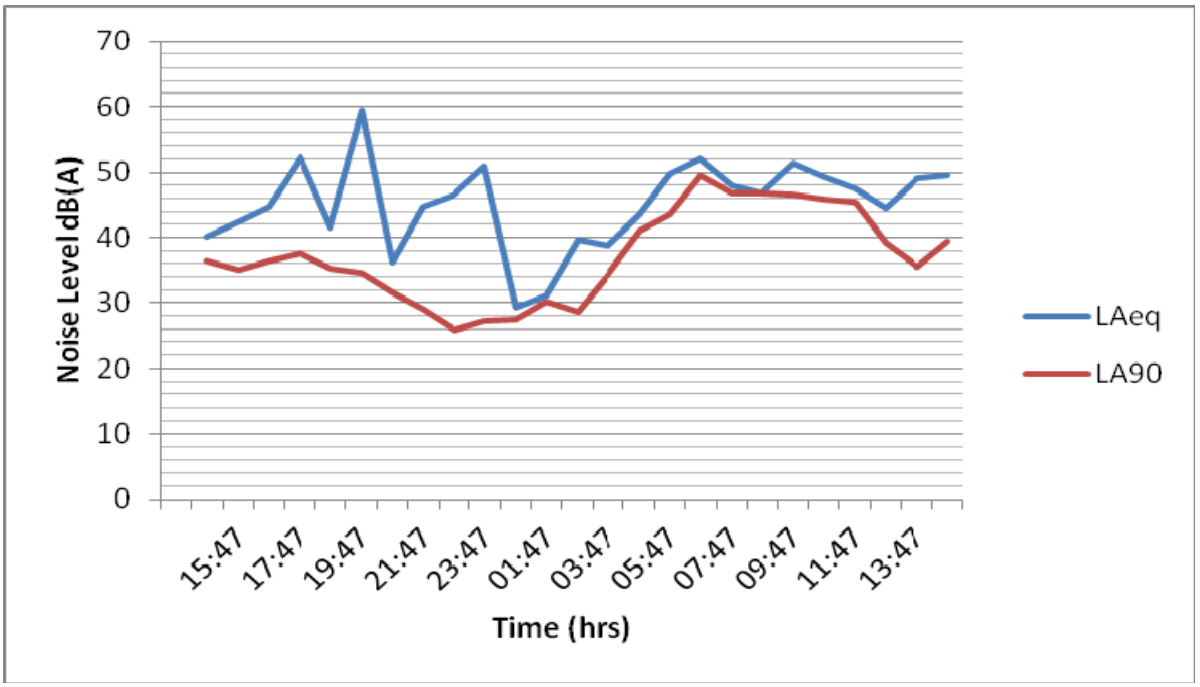
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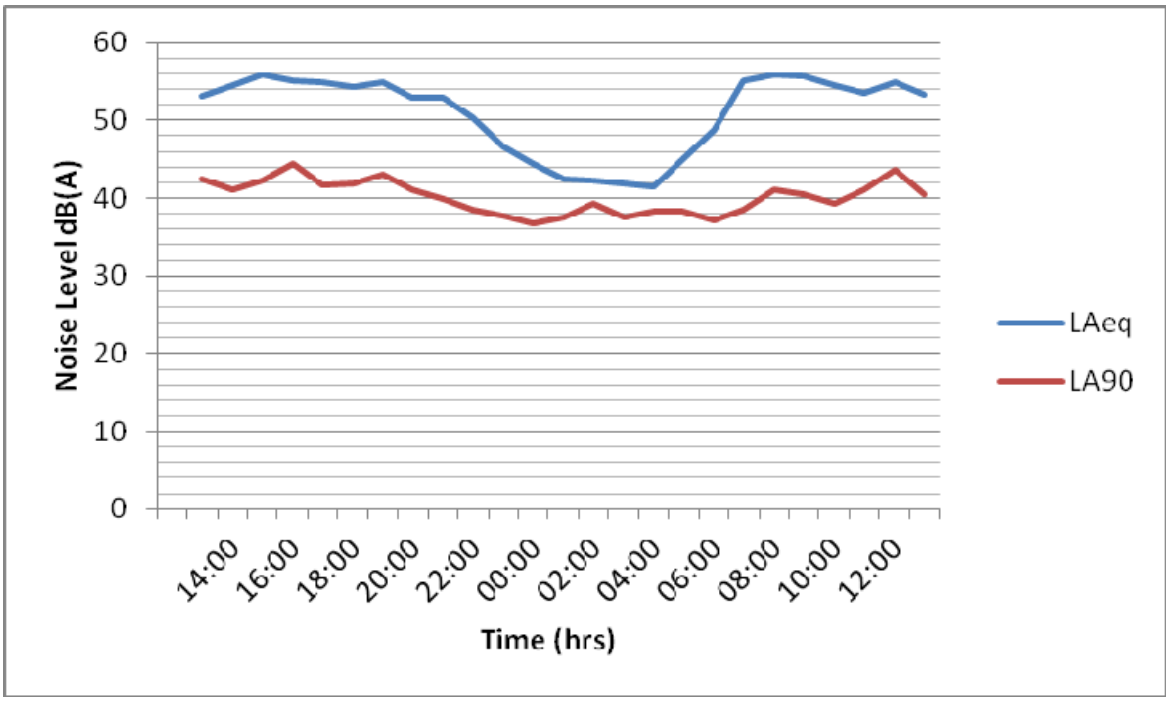
Graphical Summary of 24-hour Unattended Noise Measurements at Location N10



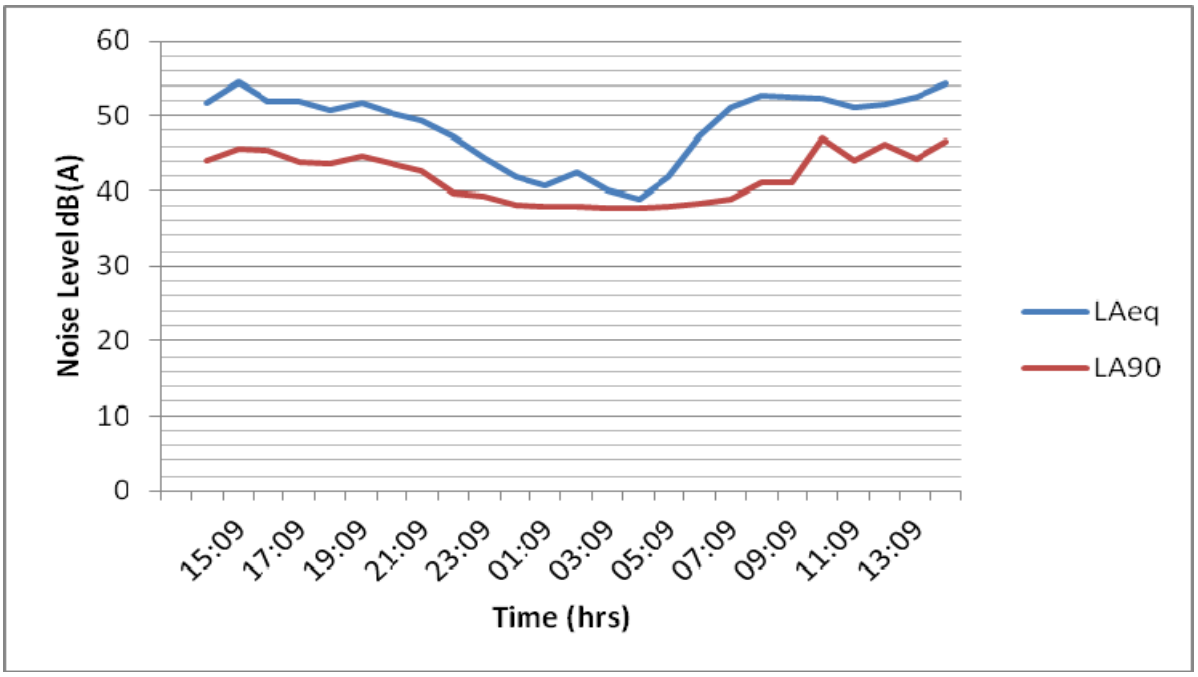
Graphical Summary of 24-hour Unattended Noise Measurements at Location N11



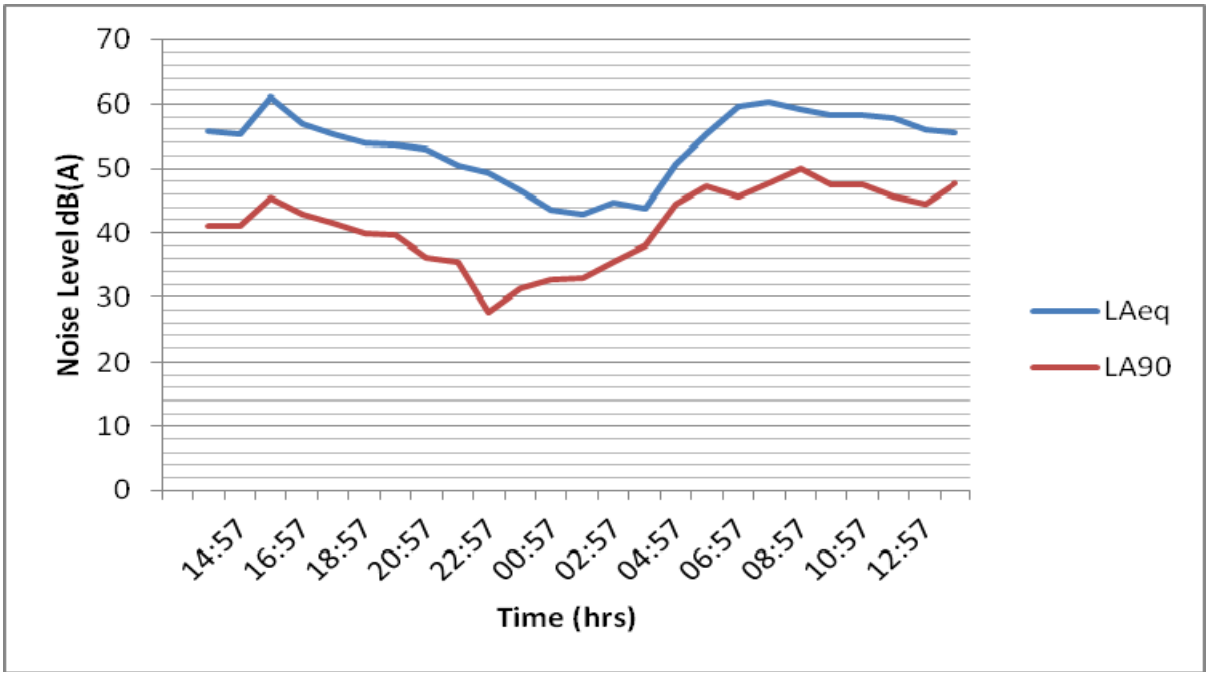
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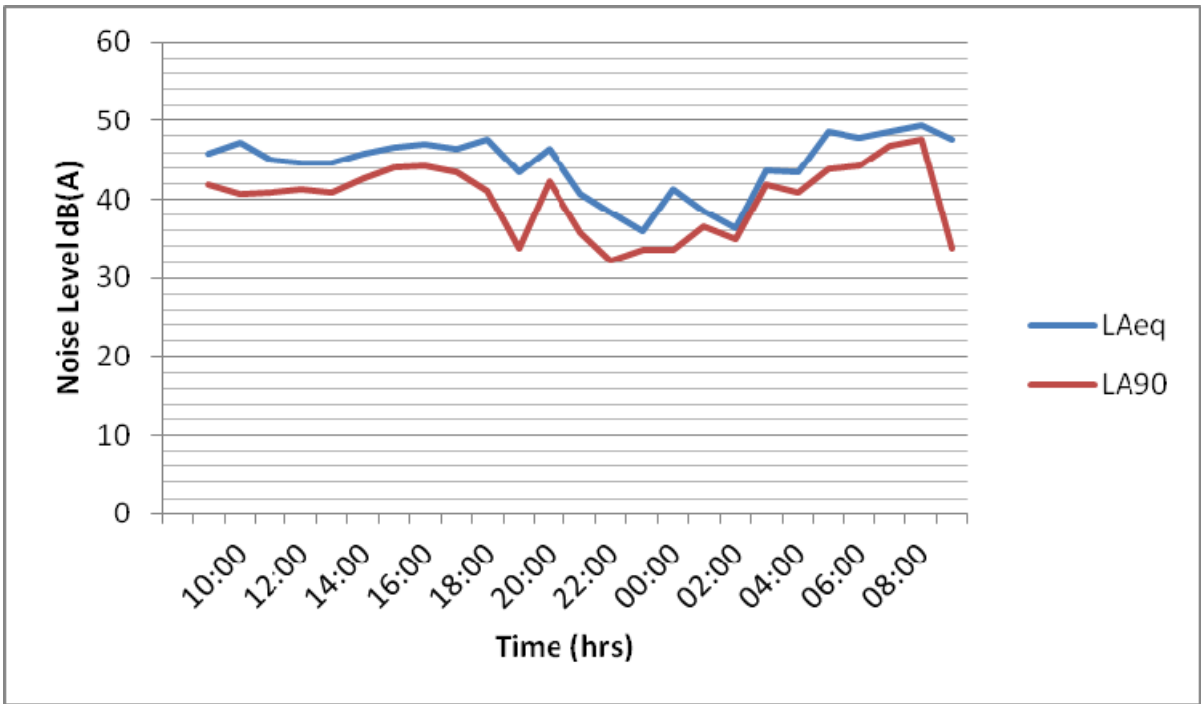
Graphical Summary of 24-hour Unattended Noise Measurements at Location N13



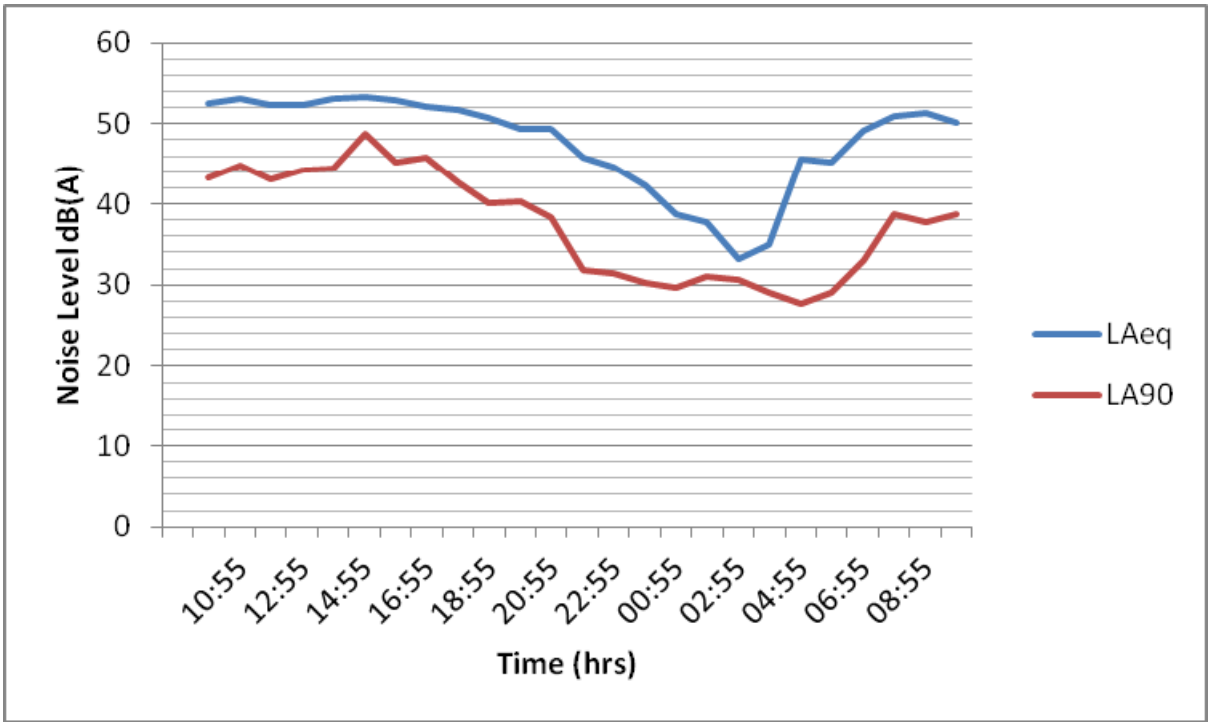
Graphical Summary of 24-hour Unattended Noise Measurements at Location N14



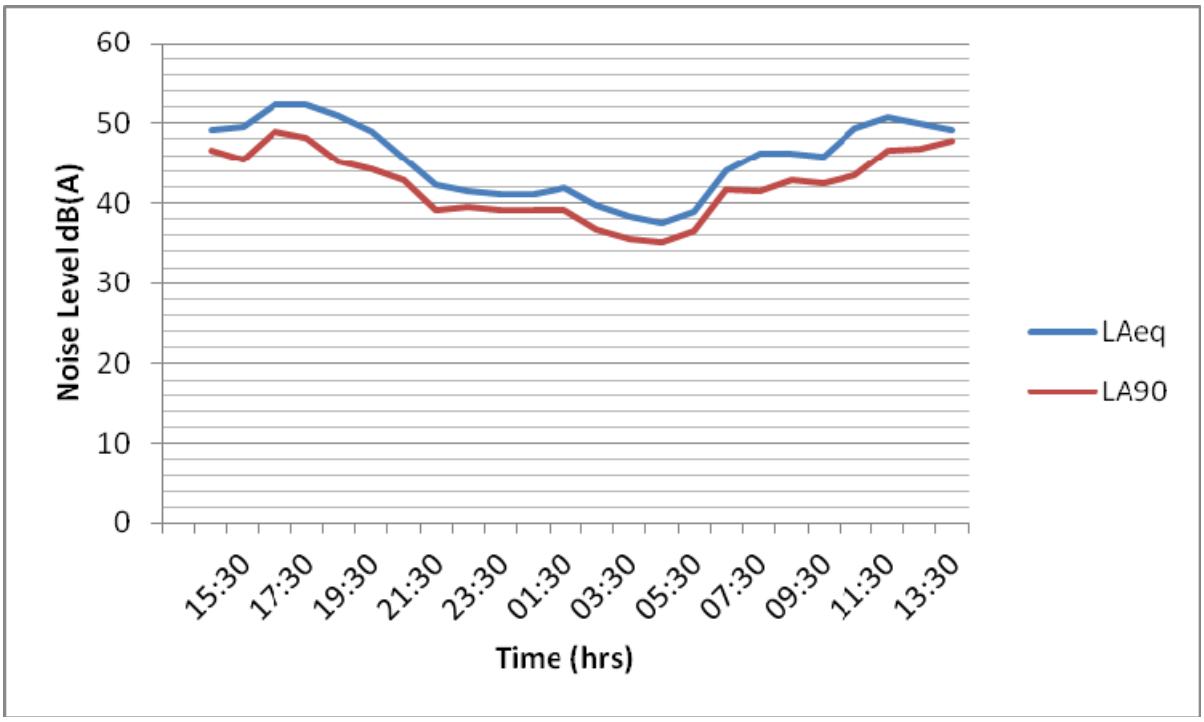
Graphical Summary of 24-hour Unattended Noise Measurements at Location N15



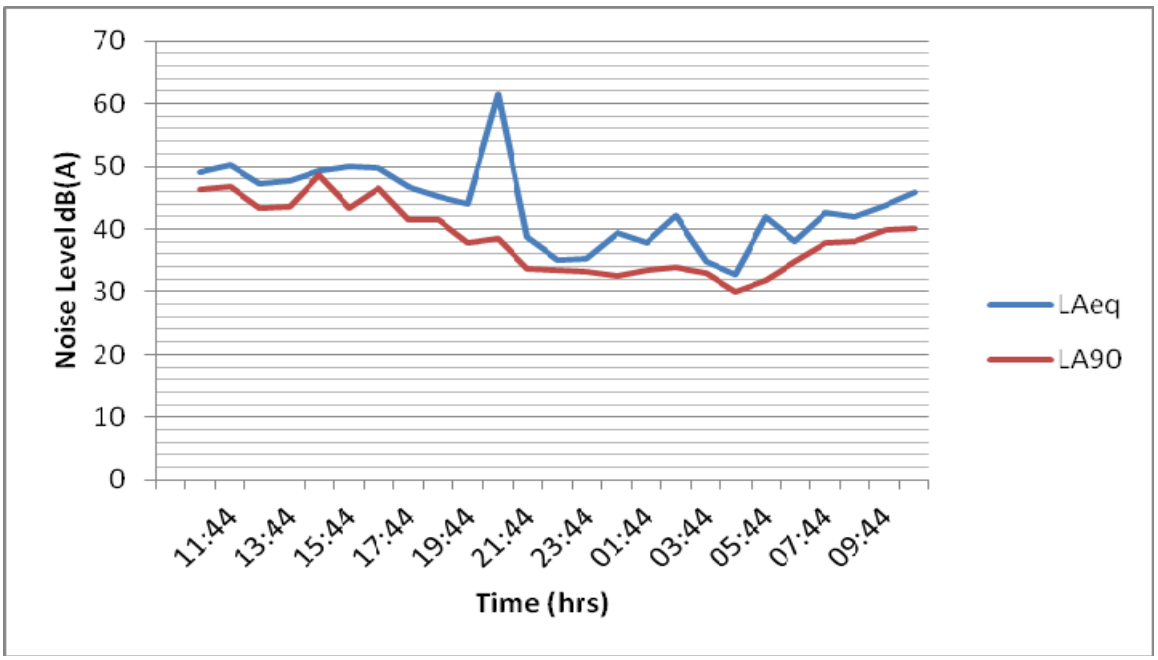
Graphical Summary of 24-hour Unattended Noise Measurements at Location N16



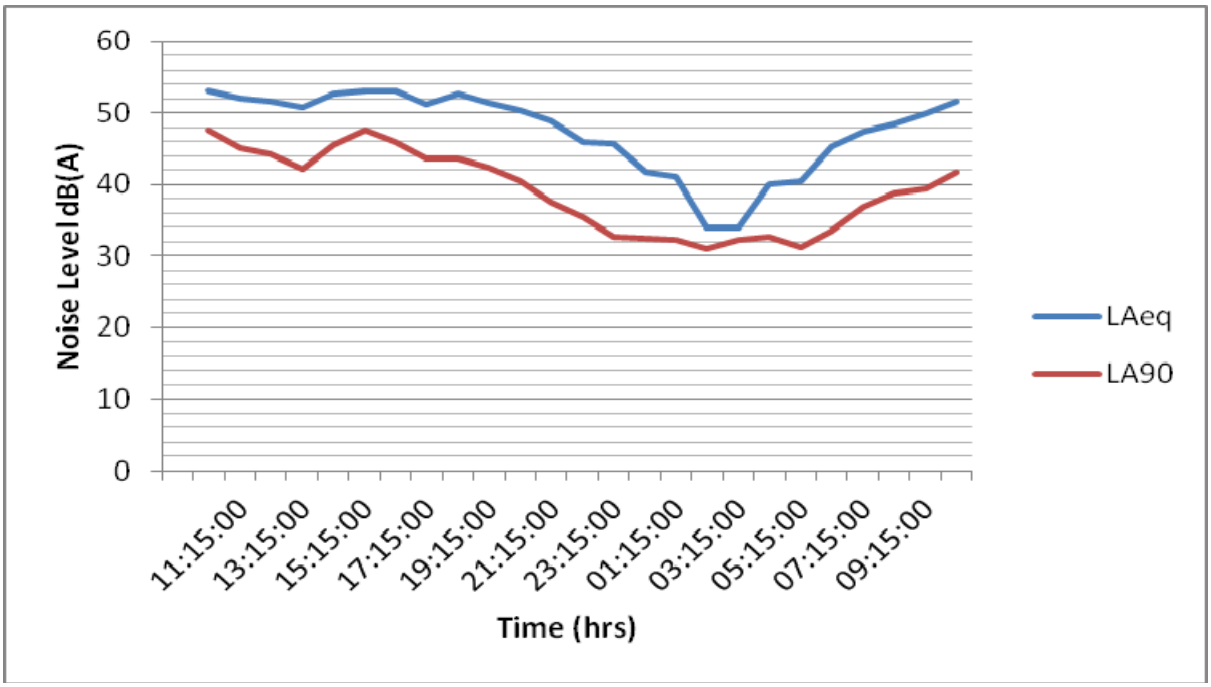
Graphical Summary of 24-hour Unattended Noise Measurements at Location N17



Graphical Summary of 24-hour Unattended Noise Measurements at Location N18



Graphical Summary of 24-hour Unattended Noise Measurements at Location N19



APPENDIX 9.3 SUMMARY OF ATTENDED SHORT-TERM BASELINE NOISE MONITORING SURVEYS

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APPENDIX 9.3

SUMMARY OF ATTENDED SHORT-TERM MEASUREMENTS

Attended Short-Term Measurements at Locations N1

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
06/07/12 Day	14:45	50.7	53.6	37.1	71.3	35.5	Dominant noise source was intermittent traffic passing within the naval base including mini bus and also cars entering and leaving the base. Noise from Naval Ship berthed at the quay (same as during the night) was influential source also. Some noise from birds in the area noted.
06/07/12 Day	15:36	49.9	53.8	38.6	68.9	36.7	Dominant source overall was traffic travelling to and from the base Wastewater tank pump was coming on and off during measurement also, same as during night-time surveys and was dominant when no traffic noise. Noise from ship berthed at quay was noted during their survey also.
06/07/12 Day	16:31	52.4	55.2	42.1	77.1	39.0	Dominant source was traffic entering and leaving the base same as earlier survey. Noise from inshore fishing boat passing up harbour Southside of bridge was influential also. Noise from ship berthed on north side of island still audible during this survey also. Occasional noise from birds in the area.
06/07/12 – 07/07/12	23:15	39.9	39.0	32.9	68.8	31.6	Dominant noise source initially sounded like an engine noise coming from area to the north possibly noise from a boat. Two cars passed during the survey. After 10 minutes noise from what sounded like a discharge of water from a pipe and subsequently noise from a pump or motor was dominant for a few minutes.
06/07/12 – 07/07/12 Night	00:20	36.5	37.6	35.0	46.7	33.5	Dominant noise source was pump in wastewater treatment tank which came on and off every few minutes. Engine noise from boat (possibly) tug on north-western jetty was notable source and was operating (i.e. engine running) throughout survey.
06/07/12 – 07/07/12 Night	01:24	35.1	35.8	34.1	49.0	32.4	Dominant source was pump coming on and going off same as earlier. Engine noise from boat/tug on jetty noted throughout this survey also.

Attended Short-Term Measurements at Locations N2

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
04/07/12 Day	17:21	34.8	36.7	31.3	50.3	29.4	Very quiet location and no significant noise sources evident during survey other than noise from birds in the area to west of monitoring position. Occasional cars on Haulbowline bridge but traffic on N28 not really noticeable (only slightly influential) No activities at Maritime College during survey.
04/07/12 Day	17:43	38.7	37.8	30.5	59.8	28.7	Noise sources same as during earlier survey. One car passed in yard near monitoring position during survey. Also plane passing at high altitude influential briefly.
04/07/12 Day	18:07	35.9	38.0	29.5	53.3	27.6	Noise sources similar to sources noted during previous surveys.
04/07/12 – 05/07/12 Night	21:20	33.8	36.3	30.1	53.9	28.3	Very quiet at this location again. Only notable noise source were birds in the area, some turbulence due to breezy conditions. Occasional cars passing on Haulbowline bridge. Background noise due to low level of noise from doors of plant room midway along western side of NMCI building.
04/07/12 – 05/07/12 Night	21:37	37.2	38.8	31.4	64.4	28.8	Noise levels same as above. Steady background noise from plant room but overall fairly quiet.
04/07/12 – 05/07/12 Night	21:54	42.5	42.5	31.7	60.5	29.2	Noise levels same as above. Slightly more breezy conditions. Plane flying overhead influential briefly. Additional noise from fan / generator? Influential for 4 minutes towards the end of survey.

Attended Short-Term Measurements at Locations N3

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
04/07/12 Day	14:05	52.0	55.6	42.4	66.6	37.6	Dominant noise source was traffic passing on N28. Steady background noise audible from machinery working in metal recycling site noted throughout. Occasional noise from birds in the area around the house.
04/07/12 Day	14:44	48.4	51.9	33.7	65.0	30.5	Dominant source was traffic passing on N28. Max. noise due to helicopter flying past to the south. Noise evident from Metal recyclers during earlier survey was not as noticeable during this survey (i.e. less activity). Noise from birds in the area was noted at times. Noise from activities in the car storage area and within large shed at the yard was also noted at times.
04/07/12 Day	16:54	49.2	53.2	33.0	68.2	29.3	Dominant source was traffic on N28. Noise from birds in the area was influential source also. Noise from car transporters trucks in car storage compound on other side of road was noted briefly.
04/07/12 – 05/07/12 Night	23:18	47.7	44.4	33.4	69.5	31.5	Dominant source was occasional passing traffic on M28. In absence of traffic buzzing electrical noise from street lamp at end of garden of property was dominant. Occasional banging noise in far distance to North / Northwest was noted twice during measurement also. Max noise due to cars passing relatively fast.
04/07/12 – 05/07/12 Night	23:35	37.0	36.4	32.4	69.0	30.2	Dominant noise source was buzzing on street lamp. Noise from birds noted at times. No cars passed on N28 during this survey. Distant bangs were noted around five times during this survey. Generally fairly quiet.
04/07/12 – 05/07/12 Night	23:52	40.0	44.2	32.7	57.3	30.8	Dominant noise source was buzzing on street lamp. Slight noise from breeze in trees. Occasional distant banging noise towards north / northeast. Low level of plant noise in distance towards south / southwest was audible but not significant.

Attended Short-Term Measurements at Locations N4

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
09/07/12 Day	13:50	53.8	56.8	40.7	75.0	38.1	Dominant source was traffic passing on hill near monitoring position. Max noise due to HGV passing up the hill. Traffic passing also but traffic on hill dominant. In absence of traffic noise from the Deepwater Berth (Cargo / Grain Ship being unloaded) and Grimaldi ship being unloaded also influential.
09/07/12 Day	14:34	55.0	59.3	41.8	70.7	37.6	Dominant source was traffic on hill and in village same as earlier survey. Very little noise from birds at this monitoring location, only occasional. Noise from Port activities noted during periods in absence of traffic noise. No significant noise sources from RingPort Industrial Estate other than traffic.
09/07/12 Day	15:20	56.0	59.4	41.7	73.7	39.2	Dominant source traffic same as other surveys. In absence of traffic for brief periods, noise from Port Operations was audible. Noise from birds in the area noted as contributory source but not significant. Max noise due to HGV travelling up the hill.
09/07/12 – 10/07/12 Night	01:32	46.5	47.6	40.2	64.9	37.1	Dominant source overall was engine noise from Grimaldi ship. Max noise was due to occasional traffic passing on road/hill adjacent to house. Noise from breeze/wind blowing in the trees near house was significant also.
09/07/12 – 10/07/12 Night	02:21	33.8	36.1	30.7	55.0	29.2	Dominant source was wind blowing in tree near monitoring position and occasional noise from birds towards the Port of Cork lands. Occasional traffic noise passing the village.
09/07/12 – 10/07/12 Night	03:12	43.4	38.2	30.5	69.7	28.6	Dominant source was engine noise from Cargo ship at deep water berth for first 10 minutes of survey. Then two cars passed on hill and these were dominant. Noises from birds near Port of Cork lands were influential also.

Attended Short-Term Measurements at Locations N5

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
06/07/12 Day	15:12	55.2	56.7	44.0	72.6	38.9	Dominant noise source was traffic both on the N28 and full adjacent to property. Possible low frequency tonal component. Container ship passing down the harbour and two tugs (Alex & Gerry O'Sullivan) were audible for a few minutes of the survey. Noise from birds in the area was noted also. Industrial noise that was audible last night was not noticeable due to the level of traffic noise.
06/07/12 Day	16:07	54.6	57.1	44.3	71.8	39.1	Dominant noise source was traffic both on the N28 and full adjacent to property. Noise from birds in the area was significant at times, more bird noise then earlier. Possible low frequency noise from ride-on lawnmower cutting grass at the end of the road during the survey also. Airplane passing overhead briefly. Max noise due to truck passing up hill, also car with boat on trailer passing.
06/07/12 Day	17:01	53.9	57.1	46.0	69.5	43.2	Dominant source was traffic on N28 and hill past house. Another truck passed up hill during this measurement also. Airplane flying overhead was influential briefly. Noise from birds in the area significant during this survey.
05/07/12 – 06/07/12 Night	23:52	40.6	40.5	34.4	60.2	32.2	Dominant noise source was occasional traffic on N28. Generally very quiet but low level of steady plant noise from Bio was audible and dominant noise when no traffic passing.
05/07/12 – 06/07/12 Night	00:52	43.8	41.9	27.5	65.6	25.9	Dominant noise source was occasional traffic same as earlier measurement. Max noise due to Jeep passing on road outside house / monitoring position. Background noise of plant noise became dominant when no traffic but generally very quiet during survey.
05/07/12 – 06/07/12 Night	01:52	39.5	36.4	28.8	61.6	27.3	Dominant source was occasional traffic similar to earlier measurements. Noise from birds around the Port area to the north was influential also. Steady plant noise from Bio noted throughout also.

Attended Short-Term Measurements at Locations N6

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
09/07/12 Day	14:11	54.3	56.1	51.8	61.5	49.5	Dominant noise source was a combination of traffic on the N28 at western side of Ringaskiddy and operations at the deep water berth. Grimaldi ship was being unloaded and also cargo ship with grain was being unloaded. Noise from birds in the area around the house was significant throughout the survey also.
09/07/12 Day	14:58	55.3	55.7	50.6	73.8	47.6	Dominant source was traffic on the N28. Traffic entering and leaving deep water berth was significant also. Grain/cargo ship and Grimaldi ship were still being unloaded – associated noise was significant also. Noise from birds was additional influential source noted throughout also. Dog barking influential briefly also.
09/07/12 Day	15:41	54.9	56.7	52.7	66.9	50.5	Dominant source was traffic on main road, similar to earlier surveys. Operations at deep-water berth, unloading cars from Grimaldi Ship were influential also. Almost constant noise from birds noted.
09/07/12 – 10/07/12 Night	01:08	49.9	51.8	46.6	60.9	43.6	Dominant source overall was engine noise from Grimaldi Ship Grande Ellade. Traffic noise passing through Ringaskiddy on occasional basis was dominant when present but ship was steady continuous. Noise from birds on water near mooring dolphins of ferry terminal was significant also.
09/07/12 – 10/07/12 Night	01:54	47.3	50.9	39.4	60.0	36.5	Dominant noise source for first approximately 8 minutes of survey was Grimaldi ship leaving Port and being assisted by tugboat. Possible low frequency tonal component due to the Grimaldi ship noise. Dominant source after ship was going was noise from birds near the ferry terminal and noise from other cargo ships. Road traffic was significant at times.
09/07/12 – 10/07/12 Night	03:35	43.6	46.7	36.1	60.3	33.8	Noise from birds on the water near ferry terminal was dominant source overall as birds were continuous noise during survey. Five cars passed through Ringaskiddy on overall during survey also. Background noises was audible during survey also but not clear whether engine noise from cargo ship at deep water berth or plant noise from Pfizer site.

Attended Short-Term Measurements at Locations N7

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
03/07/12 Day	16:12	56.6	59.3	53.8	62.7	51.9	Dominant source was Amorina Cargo ship preparing to leave quay of Deep Water berth and Gerry O'Sullivan and Alex Tug boats arriving to remove ship. Occasional noise from birds and trucks moving within the Port. Some noise from take farm area and warehouse near monitoring position also.
03/07/12 Day	16:38	47.0	48.8	43.2	63.0	41.2	Dominant noise source was a forklift loading timber onto Lorry at the other end of deep water berth. Noise from activity within the grain storage warehouse near monitoring position was significant at times. Noise was influential also.
03/07/12 Day	17:32	42.1	43.6	39.8	56.7	37.7	Dominant noise source overall was birds in the area and on the water. No trucks or other activity at the Port. Noise from the area to rear (South West) of tank farm, possibly plant noise at Pfizer was influential also. Also tannoy announcement at Pfizer. Sound of water tapping against supports of old ADM jetty was noted also.
03/07/12 – 04/07/12 Night	23:26	39.7	41.2	37.3	52.8	35.4	Dominant source was plant noise from Pfizer site. Noise from birds on the water in the area was other notable source. No activity at the deepwater berth during survey. Noise from reefer containers not audible due to plant noise.
03/07/12 – 04/07/12 Night	23:50	39.8	41.3	37.7	53.8	35.8	Noise sources were same as during measurement above Pfizer Plant noise dominant. Tannoy noise from Pfizer also noted very briefly at 23:58 Reefer containers generally screened by large grain warehouse building also.
03/07/12 – 04/07/12 Night	00:14	40.1	41.8	38.1	55.0	36.3	Dominant source was plant noise from Pfizer similar to other measurements. Slightly more noise from birds on the water during this survey.

Attended Short-Term Measurements at Locations N8

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
09/07/12 Day	12:31	43.4	45.2	40.8	60.4	38.4	Dominant source was breeze blowing in trees and bushes near monitoring point. Noise from water lapping on shore was significant also. Additional sources noted were birds in the area and traffic on the Monkstown road on opposite side of the Creek/Harbour. Airplane flow over during survey also.
09/07/12 Day	12:50	45.6	47.6	42.4	59.5	39.7	Dominant source was breeze similar to first survey. Breeze was blowing little stronger but tide was going out. Birds in the area and traffic noise on Monkstown Road significant also. Cargo ship and Grimaldi lines ship were berthed at the Deepwater Quay but were not really visible.
09/07/12 Day	13:10	47.2	50.5	41.4	59.2	38.6	Dominant source was breeze and birds in the area and on mid/foreshore near monitoring position. Tide now out further and more birds along shoreline near monitoring position. Traffic on Monkstown road influential also.
09/07/12 – 10/07/12 Night	23:42	53.2	55.3	47.4	69.1	43.2	Dominant source was wind blowing in trees in the area. Noise from wave's leaping on shore was influential also. Grimaldi Ship Grand Ellade and Cargo ship were still at Deepwater berth (Grimaldi ship being actively loaded but no noise audible from port (Northwest wind)
09/07/12 – 10/07/12 Night	00:02	53.1	55.6	48.4	64.9	44.7	Dominant source was wind blowing in trees. Noise from seabirds on the water and also on the far end of the breath water was significant also. Traffic on Monkstown road was clearly visible but not audible due to level of noise from wind blowing in the trees.
09/07/12 – 10/07/12 Night	00:24	54.4	57.0	49.5	65.4	46.0	Dominant source was wind blowing in trees, same as previous surveys. Noise from water washing against shore and noise from birds on the water were significant sources also. Again occasional traffic on Monkstown road was visible but not audible due to wind noise.

Attended Short-Term Measurements at Locations N9

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
11/07/12 Day	17:11	53.5	58.2	38.7	65.3	34.9	Dominant source was traffic passing on Monkstown road. Property has a clear view of Deep Water berth and cargo ship was being unloaded during survey but no noise was audible from Ringaskiddy. Noise from birds in the area around the house was influential at times. People in the house and children outside were influential briefly also. Plant noise from Pfizer was not audible during survey.
11/07/12 Day	13:55	55.4	60.2	44.3	71.5	41.2	Dominant source was traffic passing on Monkstown road during brief periods in absence of passing traffic , noise from operations at deep water berth were dominant. Grain was being unloaded from large cargo ship. Noise from birds in the area was also noted at times.
11/07/12 Day	14:32	54.1	57.9	45.4	72.2	42.1	Dominant source again was traffic on Monkstown road. Noise from Cargo ship being unloaded was noted during this survey also. Noise from van arriving at home next door to monitoring position and stationary for a few minutes with engine running influential for a few minutes. Tannoy announcement at Pfizer also noted briefly. Noise from birds influential at times.
11/07/12 – 12/07/12 Night	23:13	47.2	45.8	31.9	70.7	30.4	Dominant source overall was intermittent traffic passing on Monkstown road. Max noise due to passing motorbike. During periods in absence of traffic noise, plant noise from Pfizer was dominant noise source.
11/07/12 – 12/07/12 Night	00:31	42.6	40.8	36.4	64.8	34.8	Dominant noise source was intermittent traffic similar to first survey although frequency of traffic was less during first survey. Plant noise from Pfizer dominant during periods in absence of traffic noise.
11/07/12 – 12/07/12 Night	02:00	39.9	39.9	37.2	59.1	35.8	Dominant source overall was plant noise from Pfizer. Two cars passed on Monkstown road during survey – significant when passing but steady state noise from Pfizer dominant over full duration of survey.

Attended Short-Term Measurements at Locations N10

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
10/07/12 Day	15:26	54.2	56.1	40.4	74.5	37.0	Dominant source was traffic passing on Monkstown Road. Max noise due to passing JCB. Noise from birds in the area was influential also. Noise from children sailing in the area was noted too.
10/07/12 Day	16:34	52.2	56.4	40.8	68.3	37.2	Dominant noise source was traffic passing on Monkstown Road. Children were no longer sailing so there was no noise from them during this survey. Sound of breeze blowing in trees near monitoring position was influential at times. Occasional noise from birds in the area noted. No noise audible from Marco Polo ship or scrap metal cargo ship at the port.
10/07/12 Day	17:53	51.7	56.3	40.2	63.2	34.5	Dominant noise source was again traffic on Monkstown road. Noise from birds in the area, particularly to rear of house was significant source also. Smoke visible from funnel of Marco Polo ship but not audible (north-easterly breeze) Noise from breeze blowing in trees around property was additional noted source. Airplane flying overhead also.
10/07/12 – 11/07/12 Night	23:14	43.9	46.8	32.6	59.9	30.5	Dominant source was intermittent traffic passing on Monkstown road. Steady background noise was from Marco Polo ship which was just departing from deep water berth during survey. Plant noise from Pfizer site was audible too but not significant. Noise from ship leaving was dominant during periods without traffic.
10/07/12 – 11/07/12 Night	00:28	40.3	35.0	29.7	61.5	28.2	Dominant source overall was plant noise from Pfizer site. Only 3 cars passed during survey. Noise from birds in Monkstown Creek was noted as an influential source also. Traffic significant when passing but overall, the steady-state nature of plant noise made it dominant overall.
10/07/12 – 11/07/12 Night	01:43	35.1	34.1	30.8	56.0	29.0	Dominant source was plant noise from Pfizer. Only one car passed on Monkstown Road during survey. Very little noise from birds in Monkstown Creek. No breeze at all.

Attended Short-Term Measurements at Locations N11

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
11/07/12 Day	15:32	40.6	43.3	37.1	53.1	34.5	Dominant source generally was sound of breeze blowing in taller trees near the property. People on the golf course were a contributory noise source also. Not a lot of noise from birds in the area during the survey. No traffic passed within the demesne during the survey.
11/07/12 Day	16:25	40.3	42.4	35.9	57.3	32.9	Dominant source was a combination breeze blowing in taller trees near monitoring position and noise from birds in the area. Noise from a lawnmower towards the north was influential source also. People on the golf course were influential briefly and intermittently. No traffic passed within the demesne during this survey either.
11/07/12 Day	17:36	41.7	43.9	36.4	58.8	33.8	Dominant source generally was breeze blowing in trees in the area. Airplane flying overhead was influential briefly. People on the golf course to rear of property were influential again during this survey also. Sound of radio on within house was noted during this survey – had not been on or near the back door of the property during earlier surveys. Noise from birds influential at times. One car passed during the survey. Lawnmower towards the north was noted as contributory source also.
11/07/12 – 12/07/12 Night	23:29	28.8	30.3	25.7	45.2	24.5	No dominant source as such, very quiet location. Occasional sound of rustling leaves in hedge at boundary of property, slight breeze. Intermittent dog barking in distance to northeast. What sounded like a boiler coming on and off at nearby property twice during survey was noted also. Distant traffic noise audible to northeast but not significant.
11/07/12 – 12/07/12 Night	01:07	31.9	33.2	30.2	39.6	28.0	Dominant noise source generally was low level of plant noise from Pfizer. Noise from "bark/call" of fox in distance towards northeast was significant and dominant for approximately 5 minutes. Fox call also set off distant dog barking for a few minutes. Tannoy from Pfizer was audible also. Occasional noise from birds noted but not significant.
11/07/12 – 12/07/12 Night	02:36	30.6	31.7	29.2	41.2	27.7	Dominant noise source was plant noise from Pfizer. Distant traffic noise to northeast was again noted at times but was not significant. Again, very quiet conditions noted during this survey also. No breeze, hence no rustling foliage.

Attended Short-Term Measurements at Locations N12

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
10/07/12 Day	14:35	52.0	56.3	43.0	66.2	39.7	Dominant source was a lawnmower at a nearby house in the demesne. Traffic noise on Monkstown Road was significant source also. Noise from birds in the area was influential at times but was not significant. Noise from children out in sailing dinghies in the harbour was also noted.
10/07/12 Day	15:49	52.9	57.5	42.5	65.8	38.8	Dominant source was traffic on Monkstown Road. Noise from children sailing in area and on pontoon in water to southeast of property was significant source. Noise from ship passing in harbour was influential briefly also. Cargo ship (scrap metal) was being loaded at deepwater berth but no noise was audible. Marco Polo cruise ship berthed at DWB but not audible either.
10/07/12 Day	17:06	53.0	57.7	40.0	64.0	37.6	Dominant source was traffic on Monkstown Road. Noise from lawnmower was significant source also for around first five minutes but stopped thereafter. Noise from two boats near the Marina was noted also. Additional noise from birds in the area at times.
10/07/12 – 11/07/12 Night	00:01	43.8	45.0	35.6	61.0	34.3	Dominant source overall was intermittent traffic passing on Monkstown Road. Steady background noise audible from Pfizer (Plant noise). Sound of water flowing in drain a little to northeast of monitoring position was noted also. An Airplane flew overhead during survey also.
10/07/12 – 11/07/12 Night	01:16	44.1	39.2	35.8	69.9	34.7	Dominant source overall was plant noise from Pfizer. Steady noise from water flowing in drain was contributory source throughout survey also. Occasional traffic passing on Monkstown road significant at times but only a few vehicles passed during survey hence plant noise dominant overall. Occasional noise from birds in Monkstown creek road also.
10/07/12 – 11/07/12 Night	02:29	37.9	38.8	36.9	51.7	35.9	Dominant source during the survey was again plant noise from Pfizer. Steady noise from water flowing in stream also influential. No noise from traffic as no vehicles passed on Monkstown road during survey.

Attended Short-Term Measurements at Locations N13

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
10/07/12 Day	14:55	51.3	55.1	42.8	68.4	39.8	Dominant source was traffic passing through Monkstown. Max noise due to motorbike. Noise from people sailing near sand quay was influential in addition to flapping sails and tattling lanyards. Boat passing down harbour and airplane overhead were notable sources briefly. Only occasional noise from birds in the area.
10/07/12 Day	16:10	50.3	53.9	44.4	63.9	42.0	Dominant source was traffic passing on both main road in Monkstown village and road adjacent to Northern side of property boundary. Noise from children coming in from and going out sailing, flapping sails etc was also significant. Low level of noise from breeze blowing in trees in garden of property and water blowing in stream/drain was just about audible.
10/07/12 Day	17:28	51.8	54.8	44.1	69.8	41.0	Dominant source was traffic passing through Monkstown. Noise from people talking in the area around sand quay was influential for around five minutes during survey. Max noise due to HGV passing. Noise from birds in the area was influential also and rattling lanyards noted during this survey too in addition to breeze blowing in trees in garden of property.
10/07/12 – 11/07/12 Night	23:38	43.9	44.5	37.5	62.0	36.2	Dominant source overall was sound of water flowing in stream/drain along northern end of garden of property. Traffic when passing was dominant but very few cars passed during survey. Low level humming noise was audible from street lamp outside property but was not significant.
10/07/12 – 11/07/12 Night	00:51	41.0	42.1	36.8	61.4	35.6	Dominant source overall was water flowing in stream/drain again. Occasional traffic passed through Monkstown and was dominant briefly but noise from drain was constant noise during survey. Hammering/buzzing noise evident from street lamp during earlier survey was not buzzing at all during this survey.
10/07/12 – 11/07/12 Night	02:08	39.0	40.4	37.2	53.6	35.1	Dominant source overall again was water flowing in stream/drain along boundary of property. Only one car passed during survey. Teenagers began arriving and gathering at sand quay from around 2:15am (appeared to be arriving to prepare to go sailing). Noise from some of them talking was influential source also.

Attended Short-Term Measurements at Locations N14

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
11/07/12 Day	15:55	58.0	59.7	41.4	78.7	36.6	Dominant source was traffic passing on Monkstown road. Children playing in the garden were influential briefly. Children sailing in the harbour were noted also. Noise from the birds in the area influential at times. Rattling lanyards on yachts moored along the harbour near Monkstown was noted also.
11/07/12 Day	16:48	55.7	57.8	45.1	76.6	39.6	Dominant source was traffic passing on Monkstown road. Children were playing in garden during survey and were a contributory source also. Also lots of children passing on opposite side of road coming in from sailing. Very little noise from birds in the area during this survey.
11/07/12 Day	18:00	53.4	57.9	40.3	64.9	35.3	Dominant source was traffic on Monkstown Road, similar to earlier surveys. Noise from motorboats (four) passing up and down in the harbour was notable source also. Occasional noise from birds in the area. Some noise from children talking outside but not as much as when playing in the garden earlier.
11/07/12 – 12/07/12 Night	00:26	45.8	43.0	28.7	68.1	25.9	Dominant source was occasional passing cars through Monkstown. In absence of traffic low level of background noise associated with Pfizer Plant noise was just audible. Very calm conditions, hence no lapping water, rustling hedges or rattling lanyards etc.
11/07/12 – 12/07/12 Night	01:33	43.3	41.0	31.3	67.7	29.5	Dominant noise source overall was two chiller units on side of De Vesci Place (Monkstown Bay Sailing Club) House/Building Noise from three cars passing and a van in the car park nearby were significant briefly. Max noise due to vat in car park which left again after a few minutes. Pfizer plant noise audible too but chillers on side of Monkstown Sailing building more dominant.
11/07/12 – 12/07/12 Night	03:02	45.0	37.9	33.3	69.4	31.6	Dominant noise source was chillers/compressors on side of De Vesci Place house/building. Noise from two cars passing through Monkstown significant while present. Max noise due to one of the cars which passed quiet fast. Chillers stopped after 12minutes of survey. Plant noise from Pfizer's was noted as dominant source thereafter.

Attended Short-Term Measurements at Locations N15

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
30/07/12 Day	09:48	44.4	47.6	40.3	59.4	37.7	Dominant noise source overall was cranes unloading ship at deep water berth at Ringaskiddy. Noise from birds in the area around house was significant also. Boat passing in harbour influential briefly. Water flowing out from pier at Cork Dockyard notable but not significant. Occasional noise from machinery at Cork Dockyard dominant when working but only operating intermittent.
30/07/12 Day	10:11	42.9	44.8	40.6	54.3	38.8	Dominant noise source was a combination of cranes working at deep water berth at Ringaskiddy and on occasion, machinery working at Cork Dockyard. Tide was out during survey and noise from birds on the mud below property was influential at times. Activity at deep water berth at Ringaskiddy dominant overall. Water draining from pipe background noise.
30/07/12 Day	10:31	48.7	48.1	40.3	65.5	37.2	Dominant source was cranes working at deep water berth. Noise from tug passing in harbour significant source briefly. Jet passing overhead was also influential for a few minutes and was noted as a source of max noise level. Noise from birds significant at times during this survey also. Noise from work at Cork Dockyard dominant on occasion.
30/07/12 – 31/07/12 Night	23:21	35.0	36.3	33.0	50.8	31.1	Generally very quiet. Dominant noise source at times was traffic noise on road passing through Monkstown. Occasional noise from birds on the water noted. Low level of plant noise from Ringaskiddy direction was available (possibly Pfizer) but not significant. Distant traffic noise on Cobh road noted at times also.
30/07/12 – 31/07/12 Night	23:40	33.9	35.8	31.7	47.6	30.2	Dominant source generally was birds on the water. Very little traffic on Monkstown road during this survey. Airplane passing at high altitude noted briefly. Water draining from pipe in pier at Cork Dockyard influential throughout. Low level of plant noise audible towards Ringaskiddy.
30/07/12 – 31/07/12 Night	00:00	32.6	33.9	31.1	43.0	29.5	Very quiet location again. Dominant source was birds on the water. Sound of water flowing from drain pipe on pier of Cork Dockyard noted throughout this survey also. Occasional traffic in Monkstown. Low level of plant noise from Ringaskiddy direction audible.

Attended Short-Term Measurements at Locations N16

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
16/07/12 Day	11:38	51.6	55.3	43.7	64.9	40.7	Dominant noise source was traffic passing on main road. Max noise due to passing coach. Noise from men working in a house to southeast was noted intermittently. Steady noise from birds in the area was influential also. Noise from cranes at deep water berth was audible during brief periods in absence of traffic but was not significant. Sheltered location some noise at times from breeze in trees.
16/07/12 Day	13:04	51.8	55.8	43.3	62.6	39.3	Dominant source was traffic similar to earlier survey. Noise from breeze blowing in trees and birds in the area were significant at times. No noise from men working on house to southeast during this survey. Noise from Cranes at deep water berth only just audible during brief periods in absence of traffic and breeze (rustling leaves) noise.
16/07/12 Day	14:13	52.0	55.6	45.6	63.5	40.6	Dominant source was traffic. Noise from breeze blowing in trees was influential throughout and significant at times. Max noise due to passing motorbike. No noise from men working on house during survey either. Noise from cranes at deep water berth only just audible not significant, during brief periods in absence of traffic noise.
16/07/12 – 17/07/12 Night	00:11	40.8	42.0	29.7	58.4	27.7	Dominant noise source was intermittent traffic on main road generally very quiet location in absence of passing cars. No breeze so no turbulence or rustling foliage. No noise from birds in the area. Possible tonal noise from car beeping. Noise from what sounded like a ship passing down the harbour was noted for approximately 5 minutes during survey.
16/07/12 – 17/07/12 Night	01:20	39.2	37.0	29.6	58.5	28.2	Very quiet location. Dominant source was occasional passing cars on main road. Noise from birds in trees on opposite side of road noted at times. Low level of plant noise from Ringaskiddy just audible.
16/07/12 – 17/07/12 Night	02:32	32.6	33.8	29.4	48.7	27.2	Again very quiet location. Dominant noise source was noise from birds in trees on opposite side of the road. Occasional sound of breeze and rustling leaves in tall sycamore tree near monitoring position. Low level of plant noise audible from Ringaskiddy area (possibly plant noise from Pfizer site audible but not significant) Only one car passed during this survey. Tannoy announcement noted very briefly also.

Attended Short-Term Measurements at Locations N18

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
16/07/12 Day	11:13	49.3	51.0	47.3	58.1	45.4	Dominant noise source was two cranes unloading two separate grain cargo ships at deep water berth. Noise from breeze blowing in trees and flax tree of garden significant and dominant at times. Noise from birds and seagulls significant at times also. No traffic within estate during survey.
16/07/12 Day	12:26	45.9	47.6	43.6	56.0	41.0	Dominant source generally was Cranes unloading ships at deep water berth. No car passed during survey. Noise from birds in the area noted at times but not as significant as during earlier survey. Noise from breeze blowing in hedge influential during this survey again also,
16/07/12 Day	13:49	45.0	46.4	43.1	52.5	41.7	Dominant source was cranes unloading ships at deep water berth. Noise from plane flying overhead at high altitude influential briefly. Noise from flax leaves rustling in breeze influential also. Tannoy on ship at deep water berth noted on occasion during this survey. No traffic passed during the survey.
16/07/12 – 17/07/12 Night	23:45	35.2	35.5	32.6	61.6	31.2	General low level "plant noise" audible from Ringaskiddy direction. Possibly plant noise from Pfizer site. Did not appear to be any ships on berth at deep water berth. Noise from birds near house and foreshore was significant at times and gave rise to the max. level. No cars moving within estate during survey. Otherwise, quiet location.
16/07/12 – 17/07/12 Night	00:55	33.9	35.4	32.2	42.4	30.2	Plant noise from Ringaskiddy noted during this survey again also but noted as low-level noise. Occasional noise from birds near the water (time coming in) No other notable noise sources during the survey.
16/07/12 – 17/07/12 Night	02:06	34.2	35.5	32.6	40.3	31.1	Very quiet location again. Plant noise from Ringaskiddy noted as dominant noise source but still a low-level noise. Tannoy announcement noted very briefly also. Distant traffic also not significant. No noise from birds on/near the water noted during this survey.

Attended Short-Term Measurements at Locations N19

Monitoring Locations	Time	Measured Noise Level dB(A)					Comments
		$L_{Aeq,15mins}$	L_{A10}	L_{A90}	L_{AMax}	L_{AMin}	
16/07/12 Day	10:50	50.3	53.4	45.5	63.7	43.1	Dominant source was traffic on lower road overall. Noise from boats in the harbour was significant also. Naval boa (P41) berthed on quay on north side of Haulbowline with engine running was clearly audible. Sound of cranes unloading ship at deep water berth at Ringaskiddy was also noted. Turbulence due to breezy conditions influential throughout also.
16/07/12 Day	12:00	49.8	53.5	43.1	61.6	40.1	Dominant source again was traffic noise. Navy ship P41 no longer at Haulbowline. Noise from people in playground to south of property were influential at times. Breeze blowing in trees and hedges around garden was also influential sound of cranes at Haulbowline just audible at times in absence of traffic noise and when breeze calmed. Airplane flying overhead noted briefly also.
16/07/12 Day	13:27	50.0	52.7	42.1	67.3	39.1	Dominant source was traffic on lower road. Noise from people in the playground was influential also. Train passed towards Cobh at around 13:29. Noise from boats passing in harbour was noted at times also. Noise from breeze blowing in trees in the area dominant at times in absence of traffic for brief periods. Noise from cranes unloading ships at Ringaskiddy only just audible at times when no traffic noise and breeze was occasionally calm. Train passed towards Cork at around 13:38
16/07/12 – 17/07/12 Night	23:22	42.6	41.9	31.8	61.4	29.3	Dominant noise source was intermittent traffic on lower road. Occasional dog barking towards west was significant at times. Traffic passing on upper road was also influential. Noise from people walking and talking on lower road was noted for a few minutes. Noise from what sounded like a ship was noted to the east (ferry?) to Haulbowline.
16/07/12 – 17/07/12 Night	00:33	37.3	36.8	29.5	58.7	28.1	Very quiet during this survey. Ship had just passed down harbour at start of survey, hence was not significant. Only two cars passed during survey and very little noise from birds on the water. Low lever of plant noise from Ringaskiddy direction audible but not significant.

16/07/12 – 17/07/12 Night	01:41	37.5	41.5	33.9	52.4	32.1	Dominant noise source initially was a cargo ship passing up river/harbour for first approximately five minutes of survey. After ship had passed sound of wash against sea wall was influential but not significant. No traffic noise during this survey. Low level of plant noise audible from Ringaskiddy direction.

APPENDIX 10.1 METHODOLOGY, LEGISLATION & BACKGROUND INFORMATION

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Appendix 10.1 Methodology, Legislation & Background Information

Assessment Techniques/Methodology

Irish Ambient Air Standards

The relevant Irish ambient air standards have been adopted from the European Commission Directives 1996/62/EC, 1999/30/EC and 2000/69/EC and are cited as the Air Quality Standards Regulations, which came into force on 17th June 2002 (Irish Legislation S.I. No. 271 of 2002). In May 2008, these European Directives on air quality were replaced with a new Directive on ambient air quality and cleaner air for Europe (2008/50/EC). The Clean Air for Europe Directive (2008/50/EC) (now transposed into Irish Law) and the Fourth Daughter Directive (2004/107/EC) set limits and target values for ambient concentrations of air pollutants harmful to human health and the environment.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999. The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

The Air Quality Standards Regulations specify limit values in ambient air for sulphur dioxide (SO2), lead, benzene, particulate matter (PM_{10} and $PM_{2.5}$) and carbon monoxide (CO), nitrogen dioxide (NO_2) and oxides of nitrogen (NOx). These limits are for the protection of human health and are largely based on review of epidemiological studies on the health impacts of these pollutants.

Table A10.1 Air Quality Standards Regulations 2011

Pollutant	Criteria	Value
Nitrogen Dioxide	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$ NO_2
	Annual limit for protection of human health	40 $\mu g/m^3$ NO_2
	Annual limit for protection of vegetation	30 $\mu g/m^3$ NO + NO_2
Benzene	Annual limit for protection of human health	5 $\mu g/m^3$
Carbon Monoxide	Maximum daily 8-hour running mean	10 mg/m^3
Lead	Annual limit for protection of human health	0.5 $\mu g/m^3$
Sulphur dioxide	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 $\mu g/m^3$
	Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 $\mu g/m^3$
	Annual limit for protection of vegetation	20 $\mu g/m^3$
Particulate Matter PM_{10}	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 $\mu g/m^3$ PM_{10}
	Annual limit for protection of human health	40 $\mu g/m^3$ PM_{10}
Particulate Matter $PM_{2.5}$	Annual target value for the protection of human health	25 $\mu g/m^3$ $PM_{2.5}$

The limits presented in the EU Directives on Air Quality consider people with respiratory illness and the limits include a margin of tolerance for such conditions, as well as children and the elderly. The limits mimic those based on World Health Organisation (WHO) review of epidemiological studies on health impacts around the world. For example, oxides of nitrogen (NO, NO_2 and NOx) are known to affect the pulmonary function of the lungs in short term doses. Of all of the medical literature reviewed by the WHO, the lowest adverse affect of exposure was recorded at about 560ug/m3 which showed a reduced lung function in asthmatics. The WHO uses this lowest adverse impact and apply a margin of tolerance (usually 50%) to generate a limit of 200ug/m3 for 1-hour human exposure to oxides of nitrogen. This approach is then replicated for all pollutants.

The IAQM Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites document provides updated guidance on air quality monitoring in the vicinity of demolition and construction sites. It should be read and applied in conjunction with the Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance that was published by the IAQM in January 2012. Constructing buildings, roads and other infrastructure can have a substantial, temporary impact on local air quality. The most common of these impacts are augmented particulate matter (PM) concentrations and dust soiling. Depending on the possibility of dust effects occurring, monitoring may need to be undertaken during both demolition and construction activities to make sure that the applied mitigation measures are effectual in controlling dust emissions, and that there are no significant impacts on the surrounding environment.

The Local Air Quality Management Policy Guidance - LAQM.PGNI(09) (UK Guidance, no Irish equivalent) sets out those circumstances under which air quality may be a material issue for planning applications and provides guidance to planning authorities on making these decisions. *Section B3, Chapter 5 Page 24* sets outs guidance on the assessment of shipping.

Dust

There is no legislative limit for total suspended particles so the guidelines presented by the German Government TA Luft guidance are employed. Under this guidance the construction contractor would be required to maintain monthly dust levels below the guideline of 350mg/m2/day as an annual average at sensitive receptors. The EPA have adopted this standard for all licensable activities and the DoECLG Department of Environment, Community and Local Government have proposed its adoption by local authorities for planning applications with reference to quarries and aggregate extraction. The standard method of measurement of dust deposition is outlined in VDI 2119 – *Measurement of Particulate Precipitations. Determination of Dust Precipitation with collecting pots made of glass (Bergerhoff Method) or Plastic.* This standard measures total dust deposition i.e. all particle sizes, including soluble, insoluble and respirable (PM_{10}) dusts.

Climate

Ireland signed up to the Kyoto Protocol in March 1998, along with the other EU member states. The EU countries used a “burden sharing” approach to Kyoto and have agreed to cut greenhouse gas emissions as a whole by 8% in 2012 from the 1990 level with individual commitments set for each country. Ireland’s commitment under the Kyoto Protocol and this “burden sharing” is to reduce the main greenhouse gas (carbon dioxide) emissions to a 13% increase on 1990 levels in 2012. The actual situation in relation to compliance with the Kyoto protocol will not be apparent until after this five year period (2008-2012). As part of Ireland’s commitment to climate change the “National Climate Change Strategy” was published in 2000.

Currently the transport sector in Ireland contributes over 18% of national carbon dioxide emissions. In the National Climate Change Strategy of 2000, the main approach for the reduction of transport carbon dioxide from the transport sector is through fuel efficiency measures, modal shift and demand management. In the subsequent “Review of the National Climate Change Strategy” published in 2006. These three main objectives were re-emphasised and among the policies and measures outlined within includes for the removal of bottlenecks and congestion in the road network to improve journey times, improve the efficiency of the network and reduce greenhouse gas emissions.

A Review of National Climate Policy was produced in November 2011, the report concluded that the Koyoto Protocol is being delivered through a range of national policies including fiscal methods and

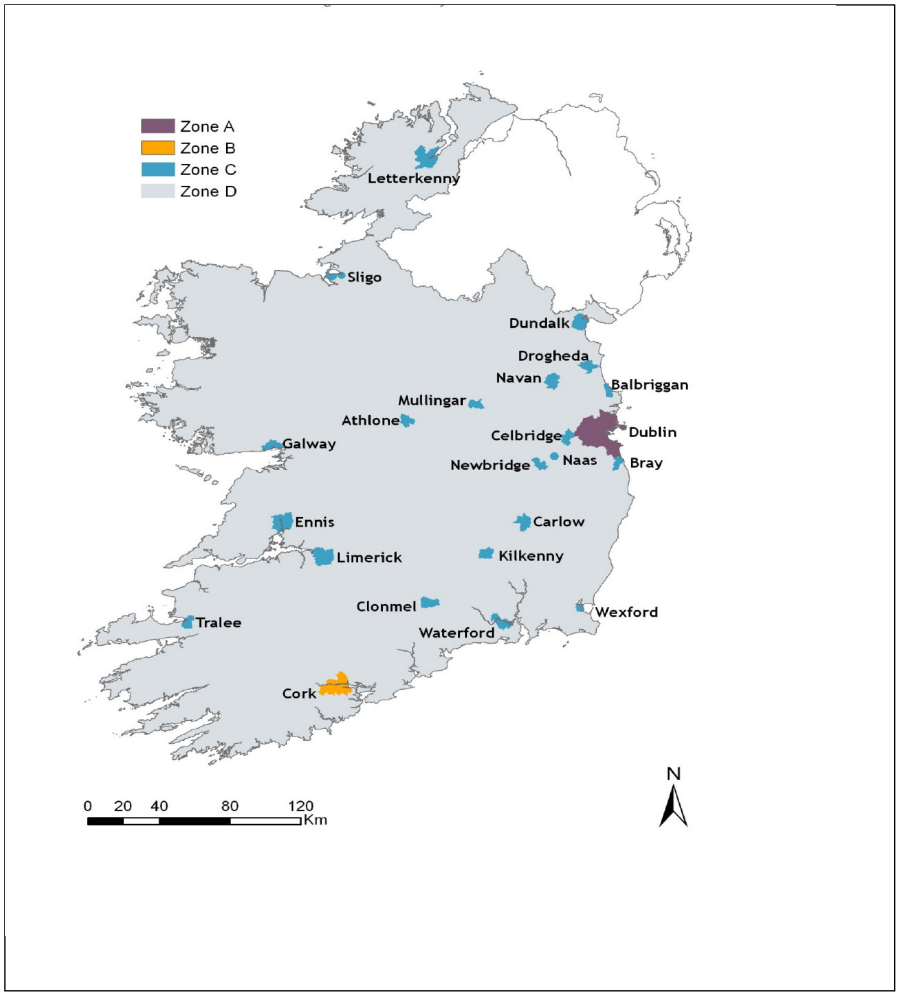
subsequent efficiency gains in the agricultural sector. The report does however highlight the major challenges ahead after 2012 with the potential need for much more stringent mitigation.

Baseline Conditions

EPA Air Quality Zones

The Air Framework Directive deals with each EU member state in terms of "Zones" and "Agglomerations". For Ireland, four zones are defined in the Air Quality Regulations (2011). The zones are defined according to pollution concentration levels:
Zone A: Dublin Conurbation,
Zone B: Cork Conurbation,
Zone C: Other cities and large towns comprising Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Letterkenny, Celbridge, Newbridge, Mullingar and Balbriggan,
Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.
The proposed development is located in Zone B (bordering Zone B & Zone C).
The Zones are shown in Figure 10.3 below.

Figure 10.3: The Air Framework Directive deals with each EU member state in terms of "Zones" and "Agglomerations".



For Ireland, four zones are defined in the Air Quality Regulations (2011), amended by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations (2009).

Cork County Council Monitoring Results

Cork County Council carried out ambient air quality monitoring at Old Station Road and Heatherton Park. The Old Station Road site is located on the South side of the river Lee near City Hall, about 500m from the Cork city centre. The site is operated by Cork City Council. Monitoring is done using continuous monitors for sulphur dioxide, nitrogen oxides, carbon monoxide and ozone. Continuous samples are also taken for particulates (PM_{10}), benzene and lead. For measurements recorded in 2012 at this site the NO_2 hourly limit of 200 ug m-3 is deemed breached if more than 18 exceedances have occurred. There has been 1 exceedance at this site to date in 2012. The SO2 hourly limit of 350 ug m-3 is deemed breached if more than 24 exceedances have occurred. There have been no exceedances at this site to date in 2012. The O_3 information threshold is 180 ug m-3. There have been no exceedances at this site to date in 2012. Particulate Matter is also recorded at this monitoring site. The measurement method measures both PM_{10} and $PM_{2.5}$. While sampling is continuous, weights are measured later; therefore the results are not available immediately. The PM_{10} daily limit of 50 ug m-3 is deemed breached if more than 35 exceedances have occurred. There have been 4 exceedances at this site to date in 2012. There is no daily limit for $PM_{2.5}$. The annual target value for $PM_{2.5}$ is 25 ug m-3.

An air quality assessment by the EPA was conducted at Monkstown, Cork Harbour from 31st August 2007 until 15th March 2008. During this measurement period; no limit values were exceeded. Concentrations of carbon monoxide, nitrogen dioxide, sulphur dioxide, benzene, and lead were all found to be below their respective lower assessment thresholds PM10 concentrations, however, exceeded the upper assessment threshold for this pollutant. Cork is situated within Zone B of the country. The following apply to the Cork area;

- Levels of PM10 will need to be monitored continuously
- Levels of SO2, CO, NO2, benzene and lead can be assessed using modelling or objective estimation techniques.

Ambient air quality can also be assessed using modelling or objective estimation techniques if levels of that particular pollutant in that zone are below the lower assessment threshold. Measurement and modelling are both required should levels exceed the lower assessment thresholds whilst continuous monitoring is required if levels exceed the upper assessment threshold.

A site at Heatherton Park in Cork City centre records data for PM_{10}, Heavy Metals and Benzo (a) Pyrene. The PM_{10} monitor is located in a suburban housing estate 1 mile south of the City Centre. It is operated by Cork City Council. The PM_{10} limit of 50 ug m^{-3} is deemed breached if more than 35 exceedances have occurred. There has been 2 exceedances to date at this site in 2013.

Four heavy metals measured as part of the PM_{10} sampling. Particulate filters are digested and analysed in the lab. The latest available results for Heavy Metals are:

Nickel
Average Concentration: 2.90 ng m^{-3}
Averaging Period: April 2012 - April 2013
This is below the lower assessment threshold of 10.0 ng m^{-3}

Arsenic
Average Concentration: 0.46 ng m^{-3}
Averaging Period: April 2012 - April 2013
This is below the lower assessment threshold of 2.4 ng m^{-3}

Cadmium
Average Concentration: 0.45 ng m^{-3}
Averaging Period: April 2012 - April 2013
This is below the lower assessment threshold of 2.0 ng m^{-3}

Lead
Average Concentration: 0.012 ug m^{-3}
Averaging Period: April 2012 - April 2013

This is below the lower assessment threshold of 0.25 ug m^{-3}

RPS Site Specific Monitoring Results

A total of 10 monitoring locations were selected in close proximity to the proposed development areas in order to ascertain baseline air quality. Benzene, NO_2 and SO_2 tubes were placed at each location to record each type of atmospheric pollutant evident at each site. The sample tubes were analysed for pollutants at a UKAS accredited laboratory (Gradko International, Hampshire) The locations of the monitoring tubes are shown in Figure 10.1. Monitoring took place over three months in May, June and July 2012.

The sources associated with individual volatile organic compounds (VOCs) tend to be dependent on the nature of industries in the sample region. **Benzene** and other aromatic compounds and alkanes are most likely derived from petrol driven vehicle exhausts. Benzene is a known carcinogen, poisonous by inhalation and a severe eye and moderate skin irritant. Due to the coastal nature of the site, levels are not likely to be at a concentration that would be in breach of any threshold level. In general, levels of Benzene are low in Ireland. Table A10.4 shows average Benzene concentrations as measured by passive tubes.

Table A10.4 Average Benzene Concentrations as measured by passive diffusion tubes

Location	Average Benzene (µg m3)
1	0.24
2	0.26
3	0.12
4	0.40
5	0.36
6	0.39
7	0.36
8	0.37
9	Tube missing on return
10	0.13
Limit Value	5 µg/m^3

The recorded data at all locations indicted measurements of Benzene below the limit value. The lowest value was found at the elevated location in Cobh and the highest was found at the car park location off the N28 road. The results are typical of an urban area with frequent heavy traffic volumes. The results are similar to the annual mean concentrations recorded by Cork County Council in 2006 at Old Station Road (0.5µg/m^3).

Nitrogen dioxide is classed as both a primary pollutant and a secondary pollutant. As a primary pollutant NO_2 is emitted from all combustion processes (such as a gas/oil fired boiler or a car engine). As a secondary pollutant NO_2 is derived from atmospheric reactions of pollutants that are themselves, derived mainly from traffic sources (e.g. volatile organic compounds). Secondary pollution is usually derived from regional sources and may be used as an indicator of general air quality in a region. Nitrogen Dioxide has been shown to reduce the pulmonary function of the lungs. Long-term exposure to high concentrations of NO_2 can cause a range of effects, primarily in the lungs, but also in the liver and blood. The Air Quality Limit Values for NO_2 is 40 µg/m3. Table A10.5 shows average Nitrogen Dioxide concentrations as measured by passive tubes.

Table A10.5 Average Nitrogen Dioxide Concentrations as measured by passive diffusion tubes

Location	Average NO2 (µg m3)
1	5.87
2	4.69
3	7.85
4	5.33
5	10.48
6	13.83

7	8.44
8	6.67
9	12.83
10	10.11
Limit Value	40 µg/m^3

The baseline monitoring results for NO_2 indicate that all areas are below the AQS annual limit value. The lowest levels are recorded at the rural cross roads southwest of Ringaskiddy and the highest value is recorded alongside the N28 road.

Sulphur dioxide is classed as a primary pollutant principally emitted from the combustion of fossil fuels (diesel, coal, oil, etc.). As a traffic based pollutant, SO_2 is mainly emitted from vehicles running on diesel fuel, which will include most light goods vehicles (LGVs) and heavy goods vehicles (HGVs). SO_2 emissions from domestic heating may be significant as SO_2 is a major constituent of sulphurous smog. However, in recent years the government has significantly reduced the importance of SO_2 as an air pollutant with the introduction of smokeless fuel. Consequently, concentrations of SO_2 in major urban areas are typically low and this is likely to decrease in future years with the broadening of the ban on non-smokeless fuels. Sulphur Dioxide is a known contributor to respiratory illness and respiratory symptoms. People with asthma are the most susceptible in the community to elevated SO_2 levels. The Air Quality Limit Values for SO_2 is 20 µg/m3 for annual mean. Table 10.4 shows average Sulphur Dioxide concentrations as measured by passive tubes.

Table A10.6 Average Sulphur Dioxide Concentrations as measured by passive diffusion tubes

Location	Average Sulphur Dioxide (µg m3)
1	1.73
2	2.03
3	2.15
4	1.91
5	2.43
6	2.8
7	2.24
8	2.24
9	2.06
10	3.38
Limit Value	20 µg/m^3

All sulphur dioxide levels recorded are below the limit value. Lower levels are found at location 1 in Haulbowline Island and highest levels are found in Cobh beside a main residential road. The higher results are most likely due to space heating devices and/or diesel vehicles. The results determined are typical of a suburban area and are generally lower than typical Zone B concentrations. Results indicate typical urban background concentration derived from diesel vehicles and domestic heating systems.

Air Quality in Ireland 2012 Key Indicators of Ambient Air Quality

The EPA produced a report in 2013 – "Air Quality in Ireland 2012 Key Indicators of Ambient Air Quality", which provides an overview of ambient air quality trends in Ireland in 2012 based on monitoring data from 28 stations in operation during the year. The air quality analysis presented in the report is based on concentration measurements of the following pollutants:

- Sulphur dioxide,
- Nitrogen dioxide and oxides of nitrogen,
- Particulate matter,
- Lead,
- Arsenic,
- Cadmium,

- Nickel,
- Mercury,
- Benzene,
- Carbon monoxide, and;
- Ozone.

The pollutants of most concern are fine particulate matter, expressed as PM10, nitrogen dioxide and, not the same extent although still a concern, ozone.

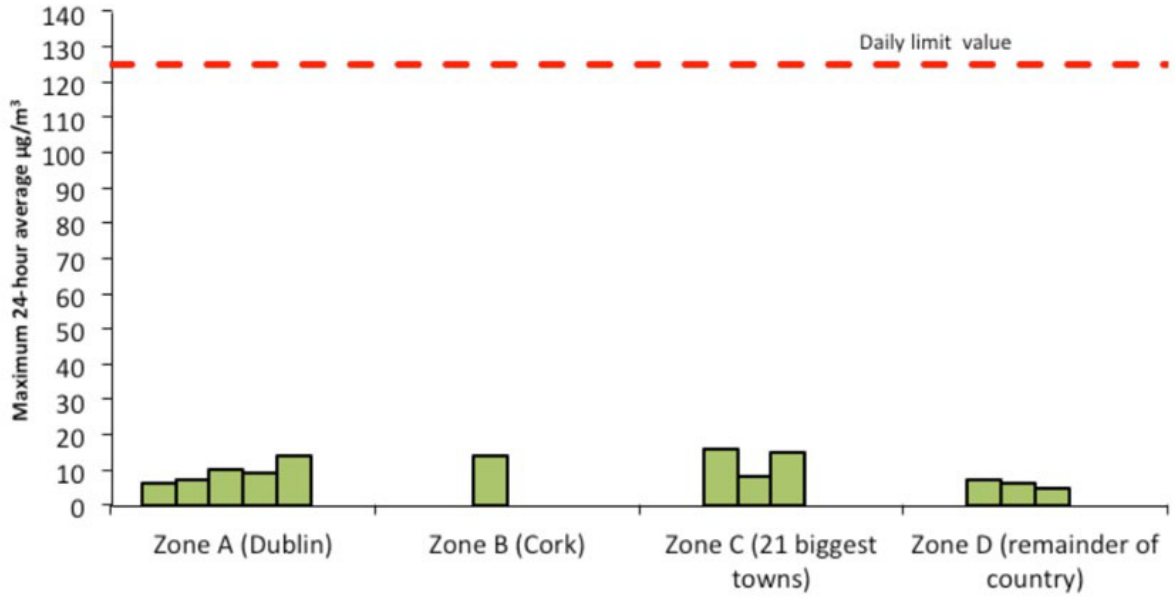
Sulphur Dioxide (SO_2)

2012 SO_2 Results: The results from the 12 monitoring stations indicate that concentrations in 2012 overall are very low when compared to the hourly and daily limits of 350 ug/m3 and 125 ug/m3 respectively as defined in Directive 1999/30/EC. No exceedences of the hourly limit were recorded in 2012.

Trends in SO_2 concentrations: Concentrations of SO_2 have fallen considerably since the early 1990s and are now at a consistent low level. The reduction is connected with a number of issues including the ban on bituminous coal (urban areas), a lower sulphur content of fuel, and changing from solid fossil fuel use to oil and gas. The use of coal as home heating fuel has increased due to financial implications of the global economic downturn. Levels of atmospheric pollution associated with the burning of coal for domestic heating may increase due to this reason.

Currently, levels of SO_2 in all zones across Ireland are below European threshold limits.

Figure 10.4 Daily Maximum Concentrations For SO2 At Individual Stations Across Ireland In 2012 (EPA, 2012)

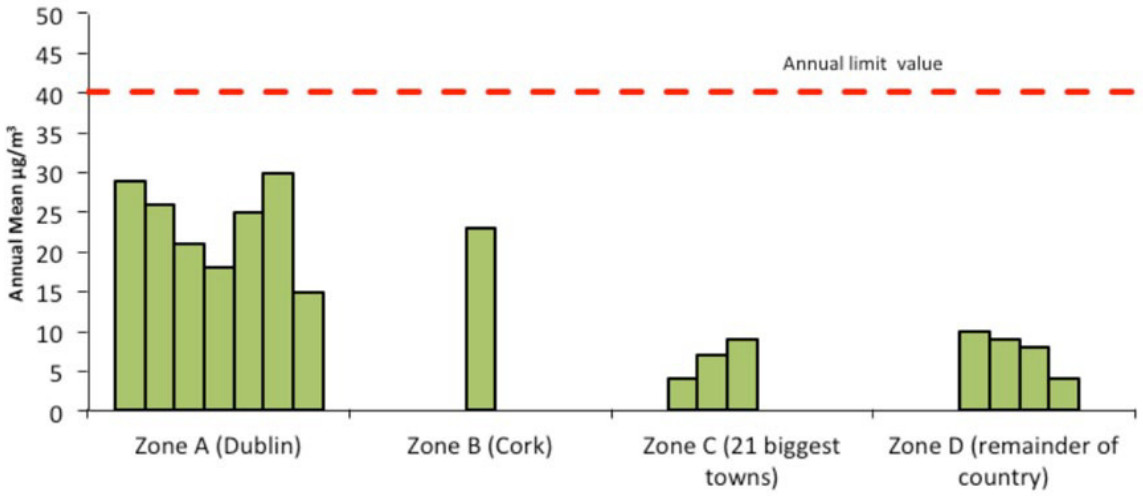


Nitrogen Dioxide (NO_2) and Oxides of Nitrogen (NOX)

2012 NO_2 Results: Annual NO_2 concentrations measured at suburban and rural sites are lower than those measured at urban stations. NO_2 concentrations were monitored at 15 locations across Ireland in 2012. NO_2 values for all monitoring sites in Ireland were below the annual limit value in 2012. The annual mean NOx for the protection of vegetation were recorded at rural locations and are well below the limit of 30ug/m3.

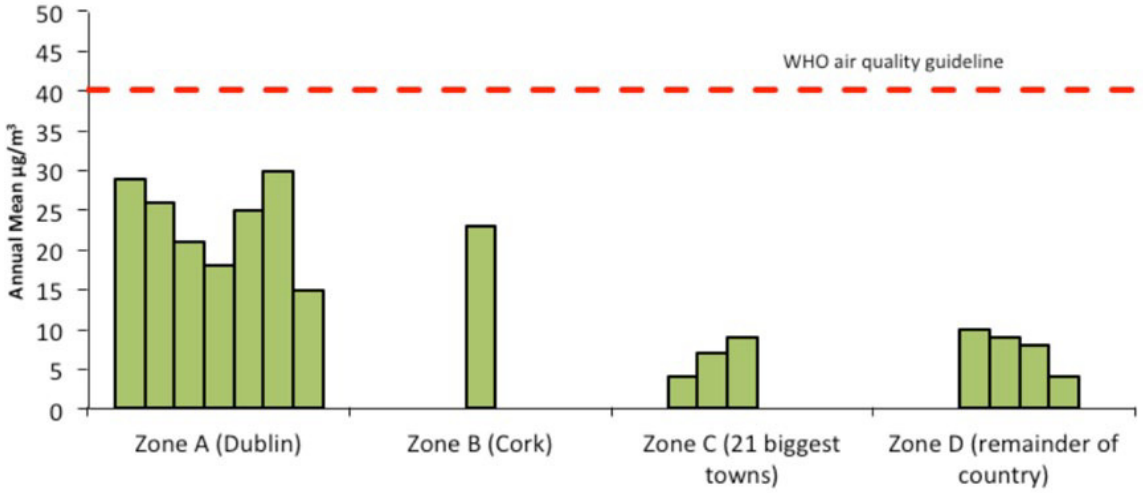
Trends in NO_2 concentrations: There is no distinctive fluctuation in levels of NO_2 concentrations in all Zones from 2002-2010. NO_2 levels across all zones of Ireland have remained relatively static since 2002, with signs of a slight increasing trend in the years 2008 - 2010.

Figure 10.5 Annual Mean NO2 Concentrations at Individual Stations Across Ireland in 2012 (EPA, 2012)



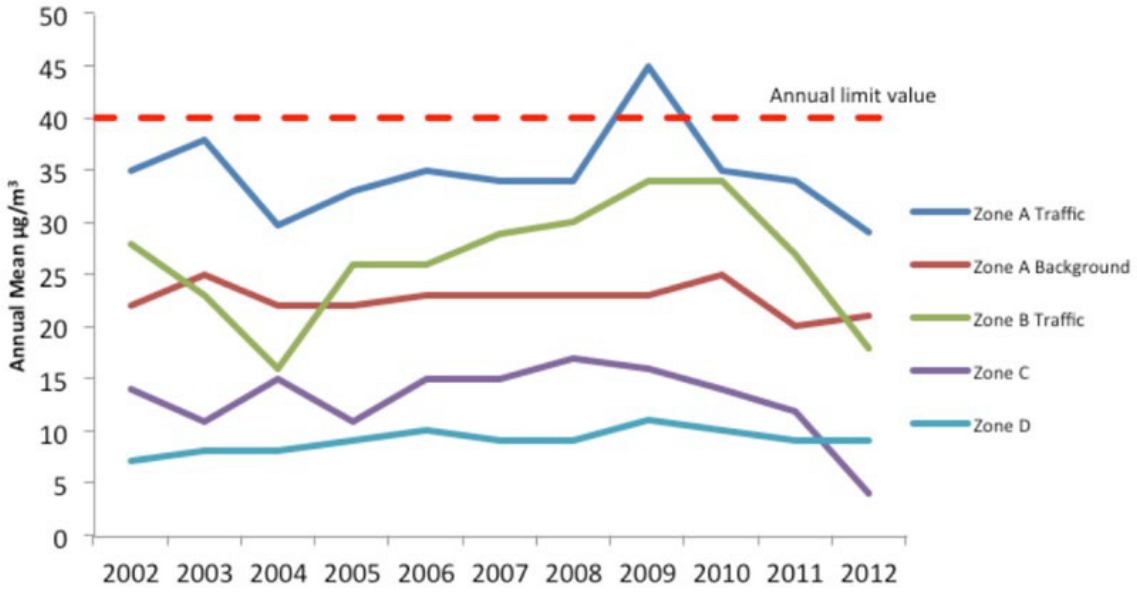
Identifiable from the graph above, Cork in Zone B is well within the Annual Limit Values for NO_2.

Figure 10.6 Annual Mean NO2 Concentrations at Individual Stations Across Ireland in 2012 with reference to WHO Air Quality Guidance Value (EPA, 2012)



Identifiable from the graph above, Cork in Zone B is well within the WHO Air Quality Guidance Value for NO_2.

Figure 10.7 Trend In NO2 Concentrations For Zones In Ireland 2002 - 2012 (EPA, 2012)

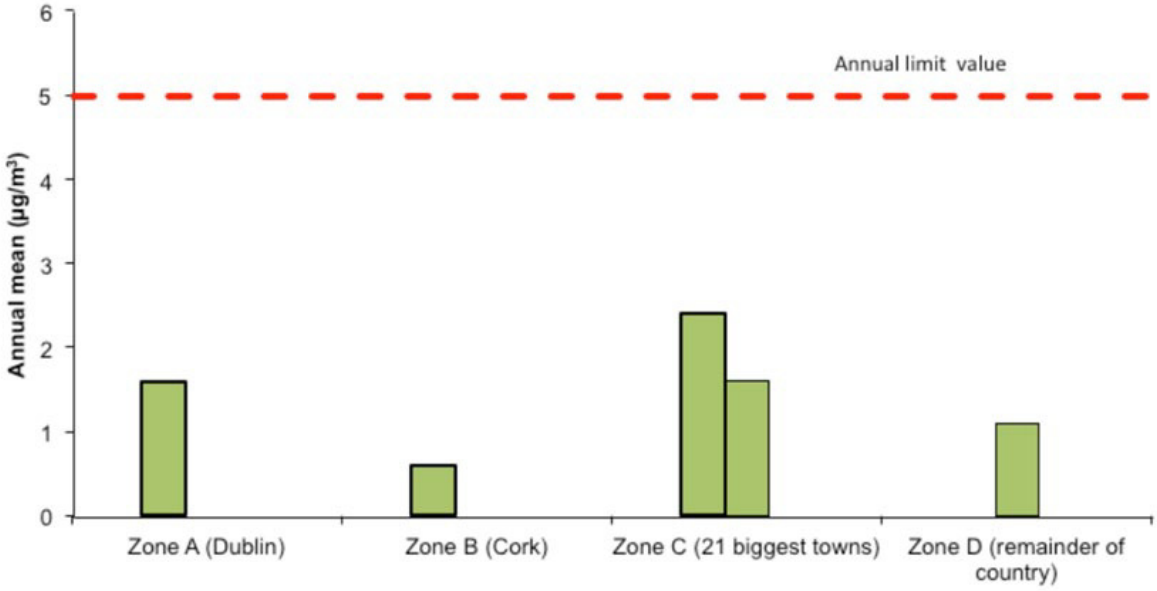


Significant drop offs in Zone B traffic annual mean concentrations can be located on the graph from 2010 - 2012. The only breach of the NO_2 Annual Limit Value was in 2009 fro Zone A Traffic.

Benzene & VOCs

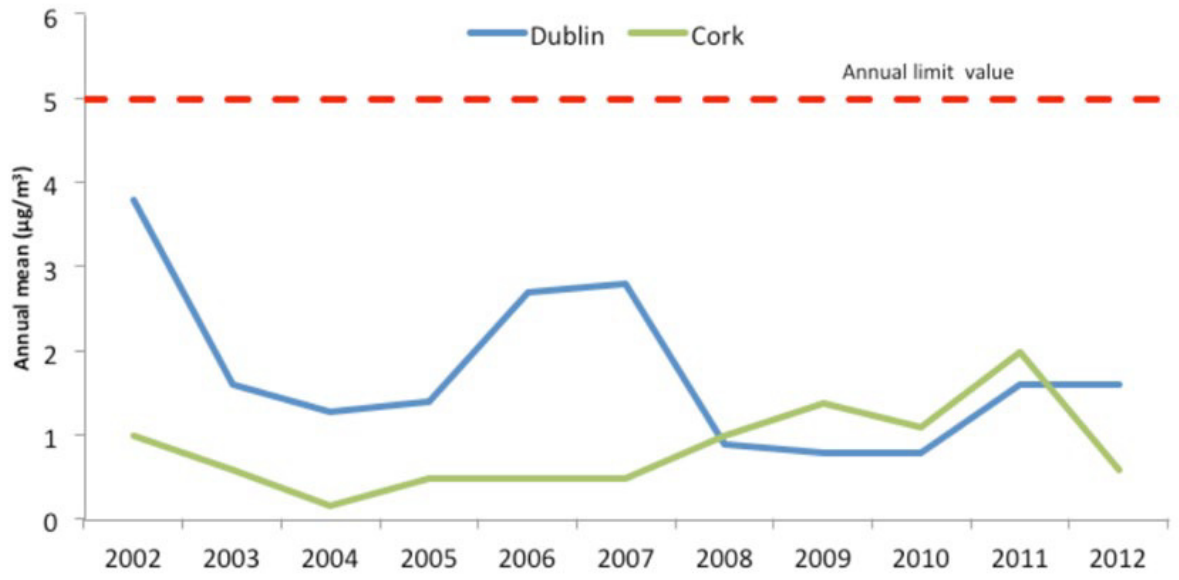
2011 benzene results: Benzene concentrations were measured at five locations in 2012. The annual mean limit of 5 µg/m3, which came into force in 2010, was not exceeded at any station.

Figure 10.8: Benzene concentrations for individual stations in Ireland in 2012 (EPA, 2012)



Trends in benzene concentrations: The levels recorded have decreased significantly since 2001 when the mean level recorded in Dublin was close to the 5 µg/m3 limit value. Current trends appear are identified to be stable and well below the limit values.

Figure 10.9 Annual Mean Concentrations Of Benzene In Cork And Dublin, 2002 - 2012 (EPA, 2012)

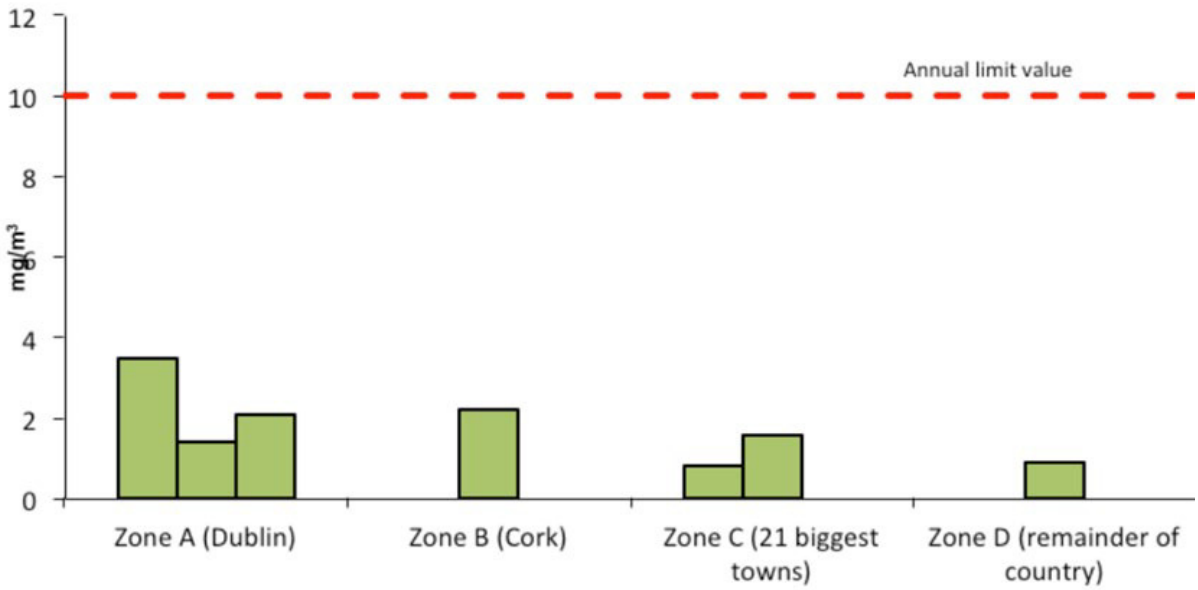


The trend lines in the above graphic indicate fluctuations in benzene levels in Dublin & Cork from 2002 - 2012 with an overall gradual reduction in levels. Levels in Cork briefly rise above recorded levels in Dublin for the 2008 - 2011 period.

Carbon Monoxide (CO)

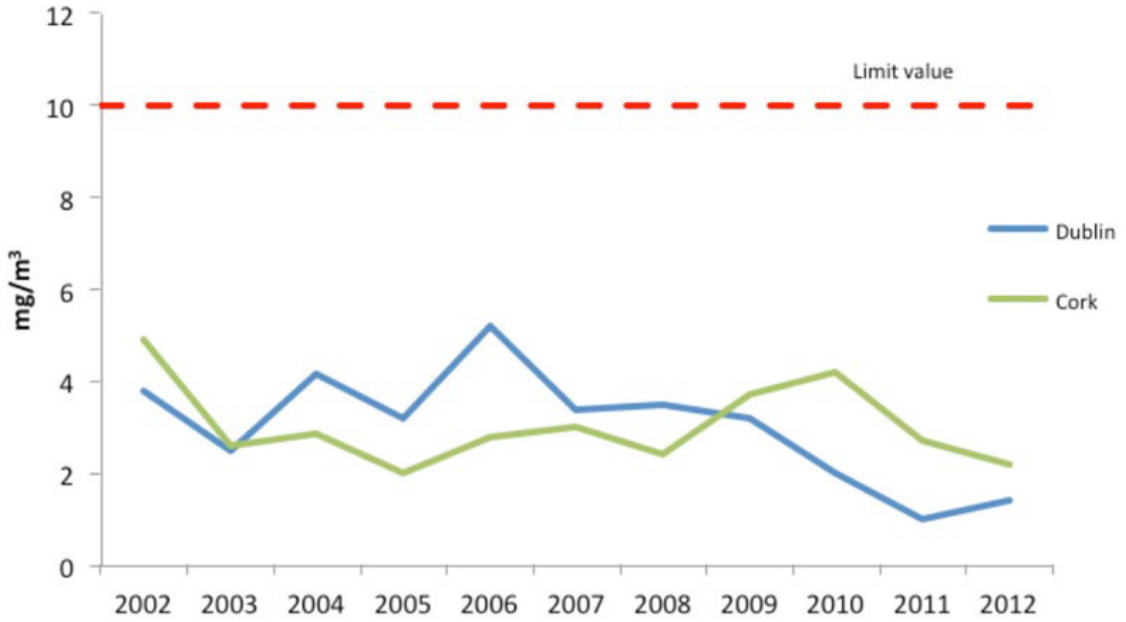
Carbon Monoxide Results: CO was monitored in 2012 at seven locations and revealed very similar levels of concentrations to previous years results and are below the limit value.

Figure 10.10: Max 8-hr mean CO Concentrations at individual stations in 2012 (EPA, 2012)



Trends in Carbon Monoxide: Levels of CO have remained consistently low in recent years and this is predicted to remain the case for the foreseeable future. All levels recorded in this since 2002 have remained below the limit value set out in the CAFE Directive and WHO guideline.

Figure 10.11: Maximum CO Concentrations In Cork And Dublin, 2002 - 2012 (EPA, 2012)

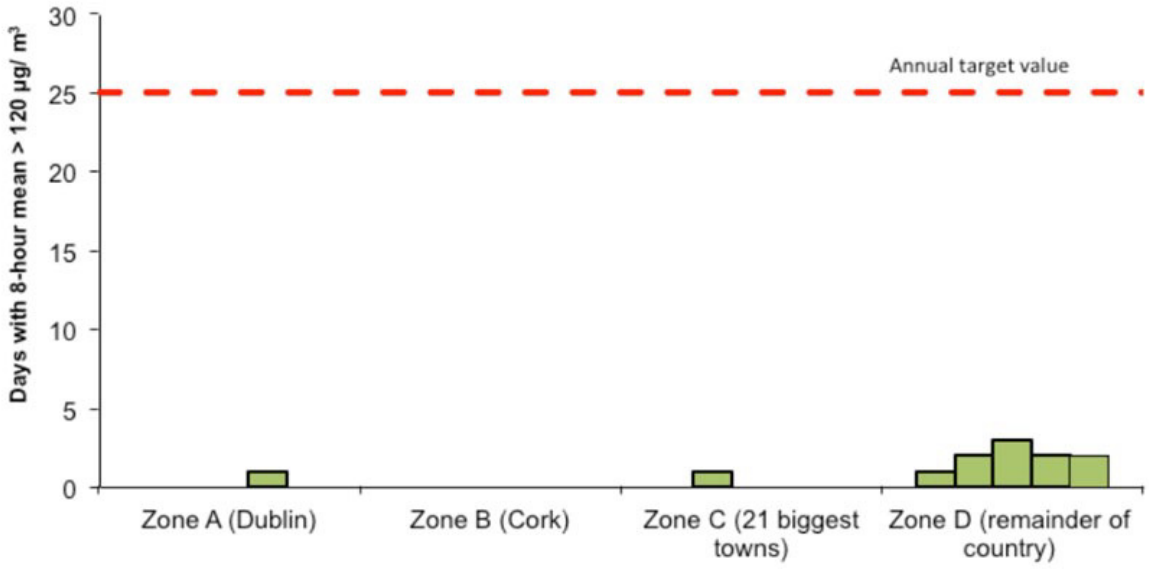


Visible fluctuations in Maximum CO concentrations are apparent in both Dublin & Cork. Again, Cork peaks slightly above Dublin for the years 2009 - 2012.

Ozone

2011 Ozone concentrations results: Ozone concentrations recorded in 2012 were below the EU limit value for human health. However ozone concentrations measured, exceeded the LTO for health at seven monitoring stations and were also above the WHO guideline value at ten monitoring stations.

Figure 10.12: Number of days with maximum 8-hr O3 concentrations > 120 µg/m3 at individual stations in 2011 (EPA, 2012)



Trends in Ozone concentrations: Results for Ozone levels have been identified as being higher along the western seaboard. Ozone concentrations, like NO_2 levels, are strongly influenced by weather

conditions; warm sunny weather coupled with stable anticyclones are likely to produce higher levels of Ozone. This can be due to local emissions or transboundary sources. Short acute ozone episodes whilst rare in Ireland have occurred and are more than likely to happen again.

Heavy Metals

Heavy Metals 2012 Results: Lead, arsenic, cadmium and nickel in PM_{10} were measured at five stations in 2012. All results were found to be significantly below their respective targets values.

Mercury was measured at one site in 2012 and deposition of lead, arsenic, cadmium and nickel were measured at three stations in 2012. There is no target value for mercury or metal deposition specified in Directive 2004/107/EC.

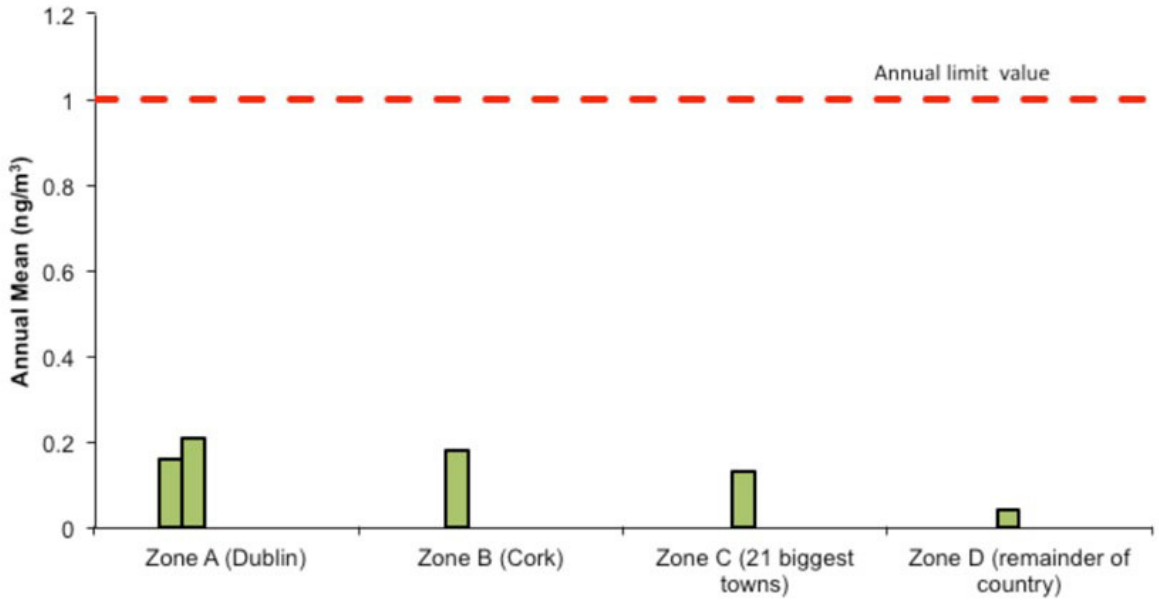
Trends in Heavy Metals: Lead has been measured in Ireland for a long time and recent trends in concentration levels are significantly lower recently than years before which has been largely contributed to the phasing out of leaded petrol. Levels of heavy metal concentrations are likely to be higher in regions with high industrial activity; Ireland has a relatively small heavy industry sector and as such concentration levels of heavy metals are predicted to remain low.

Polycyclic Aromatic Hydrocarbons (PAH)

PAH results: PAH was monitored at five stations across Ireland in 2012. Levels at all five of the sites were below the target value of 1 ng/m^3.

Trends in PAH: The 2012 monitoring results are only the third set of results obtained for PAH. Future concentrations of PAH in Ireland are going to depend upon usage of heating fuel for residential purposes. Wood and Biomass installations produce high levels of PAH in addition to coal whilst gas is recognised as a relatively clean alternative.

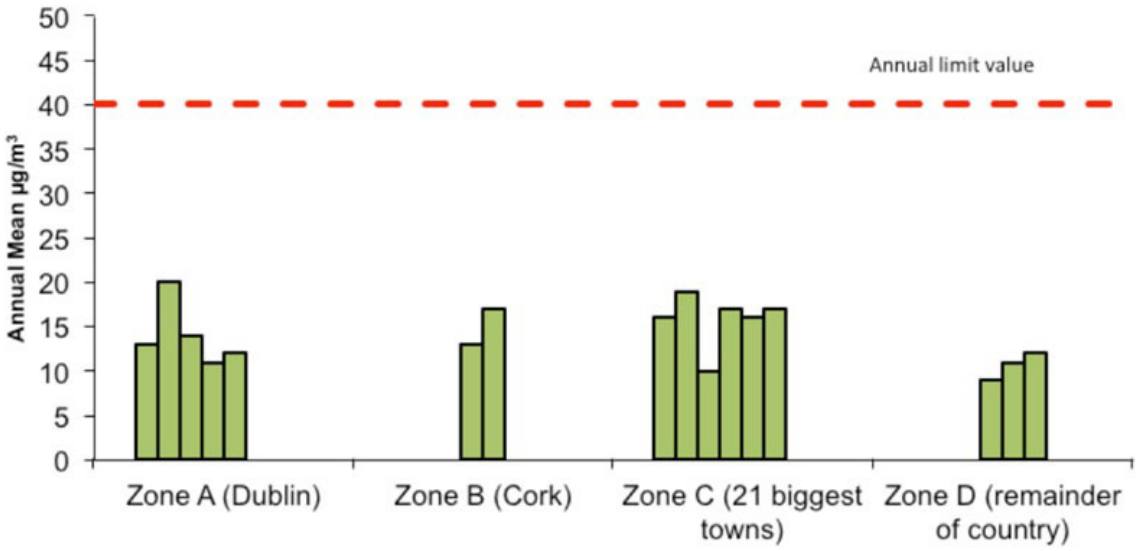
Figure 10.13 Annual Mean Values For PAH (B(a)P) At Individual Stations Across Ireland In 2012 (EPA, 2012)



Particulate Matter (PM10)

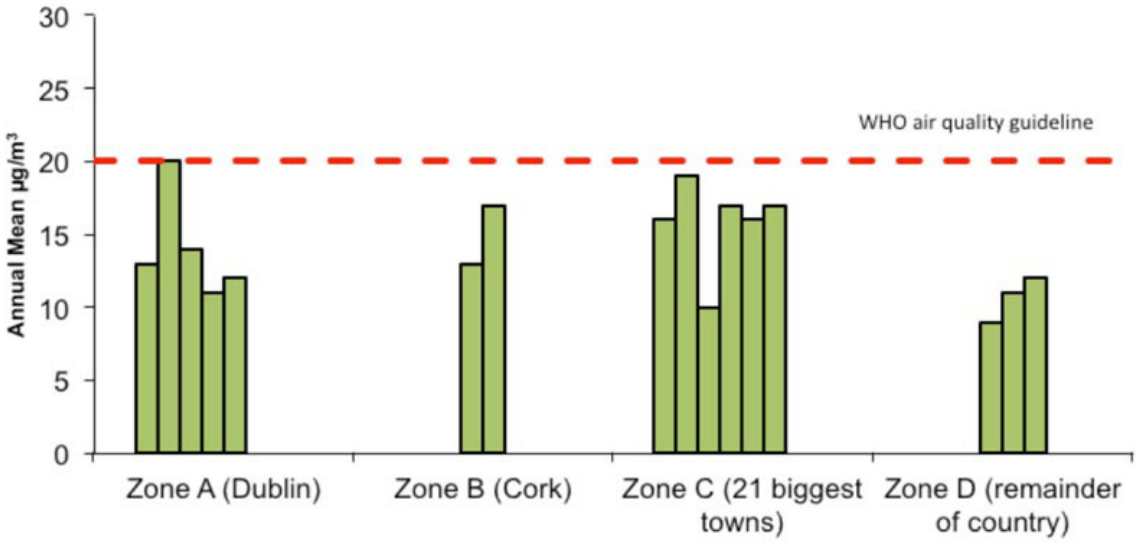
2012 PM_{10} Results: PM10 was monitored at 16 stations across Ireland in 2012. All stations were compliant with the 40 µg/m^3 limit value. Levels were highest at traffic-influenced sites in cities and in large Zone D towns due to burning of coal and other solid fuel in addition to emissions from traffic.

Figure 10.14 Annual Mean PM10 Concentrations At Individual Stations In 2012 (EPA, 2012)



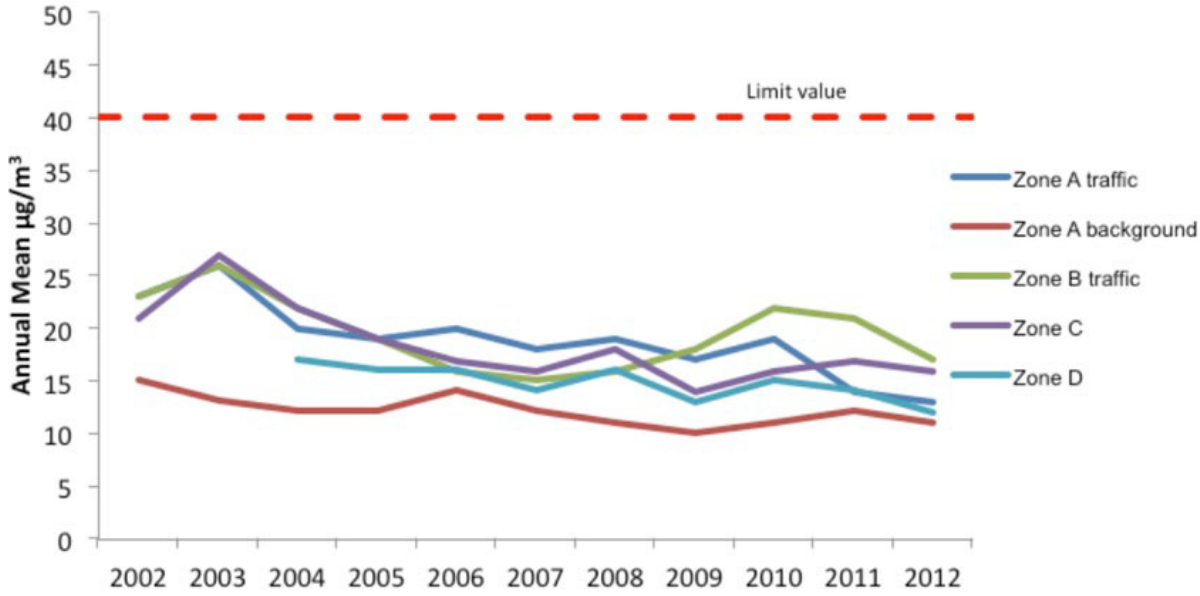
Levels of annual mean PM10 are significantly below Irish and EU recommended threshold levels across all zones in Ireland.

Figure 10.15 Annual Mean PM10 Concentrations At Individual Stations In 2012 With Reference To WHO Air Quality Guideline Value For PM10 (EPA, 2012)



Levels of annual mean PM10 are below WHO recommended threshold levels across all zones in Ireland with the exception of one station in Dublin - Zone A which just meets the threshold level.

Figure 10.16 Annual Mean PM10 Concentrations 2002-2012 (EPA, 2012)



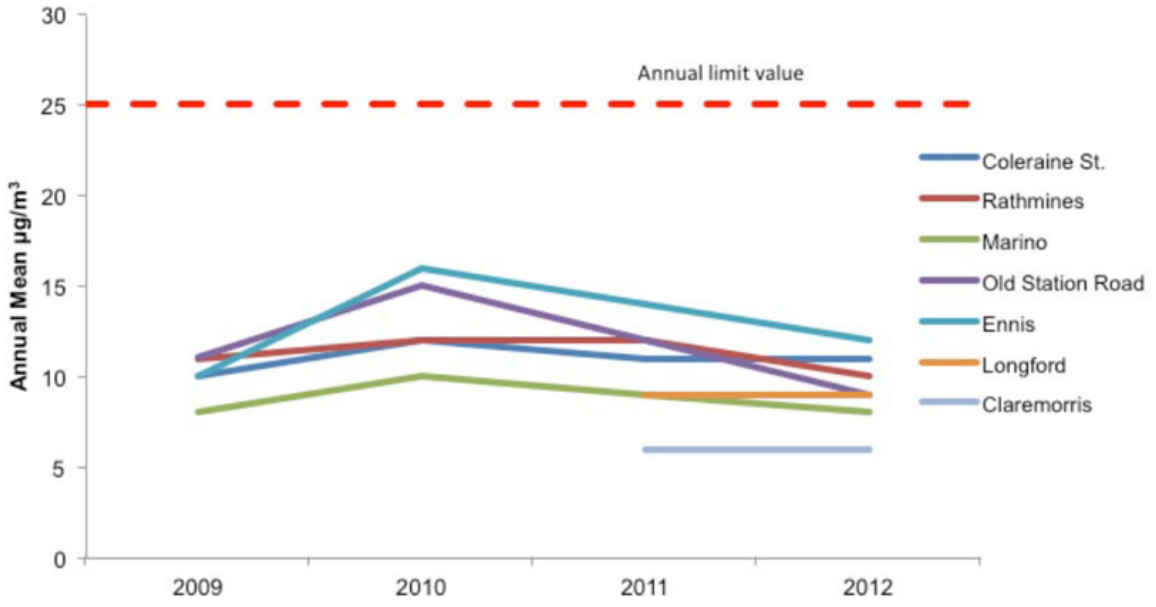
Trends in PM_{10} concentrations: There is a decreasing trend in Zones A, B & C. The reason for this may be associated with the decrease in emissions from traffic due to cleaner fuels and more efficient/cleaner traffic engines. Some areas within Zone D did not indicate an overall decrease possibly due to a greater variety of sources including residential fuel use, industry, and agriculture.

Currently, levels of PM_{10} in all zones across Ireland are below European threshold limits.

Particulate Matter (PM2.5)

2012 PM2.5 results: The CAFE directive introduced obligatory monitoring of OM2.5. Levels in Ireland are below both the stage one and stage two limit values of 25 & 20 µg/m^3.

Table 10.17 Annual Mean PM2.5 Concentrations 2009-2012 (EPA, 2012)



Trends in PM2.5: PM2.5 levels in Ireland are below the EU limit value, however, due to the calculation of the average exposure indicator (AEI) and the national exposure reduction target (NERT) Ireland is obliged to decrease its average PM2.5 concentrations by 10% by 2020.

Dust

Dust is a generic term used to describe a wide range of particulate materials that are generated from the disintegration of solids. Dust in the air is a natural occurrence. The action of wind moving across the ground will make small particles airborne if relevant conditions persist (i.e. dry ground, sufficient wind speed). Large emissions of dust occur naturally; such as wind-blown dust from a shoreline (sand). The anthropogenic sources of dust originate from earthworks, mineral extractions, cargo handling and road use.

The sizes of the particles are generally in the range 1-100 µm (1 µm = 1 micrometre = 10^{-6} metres). Particle size is important because it determines the settling velocity of the dust. In order to assess the potential for a dust nuisance problem to be caused during any potentially dust-generating activity, there is a need to consider both the likely particle size of the material and the effects of wind dispersion. Nuisance caused by the deposition of dust from excavation and loading is likely to be the most significant issue in relation to air quality impacts from the proposed development.

The environmental effects of particles depend on their deposition rate and their concentration in air. Deposition rate is expressed in terms of mass per unit area per unit time, e.g. $g.m^{-2}.month^{-1}$. Concentration is expressed in terms of mass per unit volume, e.g. $\mu g.m^{-3}$.

The effect of dust arising from on-site soil stripping & HGV movement is principally one of nuisance caused to the local community, although deposition on vegetation can disrupt sensitive plant communities if it occurs at a sufficient rate. Dust nuisance is experienced usually as a result of dust deposition upon clean surfaces such as windows, cars, furniture or laundry.

Guidance states that most non-toxic dusts will begin to be perceived as a nuisance when deposition reaches 200 $mg.m^{-2}.day^{-1}$. This figure is based on an annual deposition rate and represents the threshold for significant nuisance, although a range of criteria from 133 to 350 $mg.m^{-2}.day^{-1}$ is found in various examples from other countries. Examples of dust deposition standards are shown in Table A10.7:

Table A10.7: Examples of dust deposition standards

Country	Averaging period	mg m^{-2} day^{-1}
UK	Annual average	200
Germany	Annual average	200
Spain	Annual average	200
Finland	Annual average	333
Australia	Annual average – Loss of amenity first perceived	133
	– Unacceptable reduction in air quality	333
Canada	Annual average – Maximum desirable	200
	– Maximum acceptable	266
United States	Annual average	333

The level and distribution of dust emissions will vary according to factors such as type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression measures. It is therefore difficult to predict emissions and conventional modelling tools are of limited use.

The assessment of dust is normally confined to an evaluation of the likelihood that emissions may give rise to some perceptible nuisance. This is defined on the basis of the distance from site works of sensitive receptors such as residential properties. It is normally possible, by proper control, to ensure that dust deposition does not give rise to nuisance effects. It is common practice to use a distance of 100m as the radius within which impacts may occur. Figure 10.2 shows distance bandings and proximity of sensitive receptors. Routine dust control measures would normally ensure that the risk of

long-term impacts is insignificant but short-term events may occur, for example, technical failure or exceptional weather conditions.

With respect to emissions from traffic, construction of the project would generate vehicle movements on the local road network, which would include contractors' vehicles and Heavy Goods Vehicles (HGVs), diggers, and other diesel-powered vehicles. This would result in emissions of particulates and in addition to this ground surface & tyre interaction can create dust plumes.

As part of the Port Of Cork Environmental Management System dust monitoring was carried out at three site boundary locations as part of an on-going monitoring programme. Dust deposition was measured in accordance with VDI 2119: Measurement of Dust Using a Bergerhoff Dust Deposition Gauge. The gauges consist of a collecting jar positioned at 1.5m above ground level with a bird guard around the collecting jar. The gauges were erected to measure total dust for a period of one month. Three gauges were erected on the southern boundary of the site from 5th March 2013 to the 3rd April 2013. The monitoring results are presented in the Tables A10.8 & A10.9 below. Figure 10.1 shows the location of the dust monitoring gauges.

Table A10.8 Dust deposition monitoring results 5th March 2013 - 3rd April 2013

Reference	Total Dust (mg/m2/day)	Comment	Limit
1	84	No comment	350 mg/m2/day
2	70	No comment	
3	254	No comment	

Table A10.9 Dust deposition monitoring results 16th August 2013 - 13th September 2013

Reference	Total Dust (mg/m2/day)	Comment	Limit
1	55	No comment	350 mg/m2/day
2	27	No comment	
3	28	No comment	

All levels recorded are within the recommended limit for dust deposition of 350 mg/m2/day.

Odours

Odour is the attribute detectable by the nose on sniffing certain volatile substances. The characteristics of the odours substance make them perceptible to the human sense of smell. The term odour relates to the stimuli from a chemical compound that is made more volatile in the air. Odour is a person's perception of that sensation and an interpretation may be made what the odour means. Resulting from this assessment of an odour, it may be determined as being pleasant or unpleasant. The main issue with certain odours is its ability to cause a response in a person that they consider the odour objectionable or offensive.

Odours have important characteristics when examining the potential for environmental impact and undesirable effects on sensitive receptors. The bullet points below indicate the basic sensory properties of odour:

- Detection – Concentration of an odour when first detectable;
- Recognition – Human ability to differentiate between odours;
- Intensity – Perceived strength at differing concentrations;
- Hedonic Tone – Pleasantness/Offensiveness; and,
- Odour Quality – Association & Complexity.

The concentration at which an odour is just detectable to a "typical" human nose is referred to as the threshold concentration. This concept of a threshold concentration is the basis of olfactometry in which a quantitative sensory measurement is used to define the concentration of an odour. Standardised methods for measuring and reporting the concentration of an odour sample have been defined by a European standard (BSEN 13725:2003). The concentration at which an odour is detectable is defined as the detection threshold and has an odour concentration of 1 European odour unit per cubic metre (1 ou_E/m^3).

An odour at this strength would not normally be detectable outside the controlled laboratory environment. As an odour becomes more concentrated it becomes more apparent. At a concentration of 5 ou_E/m^3, this would be a faint odour and a concentration of 10 ou_E/m^3 would be a distinct odour.

Intensity of the odour is another important attribute. Intensity refers to the perceived strength of an odour. Low concentrations of some substances in a sample are capable of being perceived as having a high intensity even when close to threshold concentrations. An odour intensity scale is widely used to indicate strengths of odour ranging from 0 – No Odour to 6 – Extremely Strong Odour. The hedonic tone, the pleasantness or offensiveness, of the odour is important when analysing the potential for complaints. Odour quality, hedonic tone and concentration influence the potential for annoyance, although the response to a particular odour will alter depending on the individual.

Existing odours at the Port of Cork range from fish related odours, hydrocarbon related odours, and odours from bulk grains. Odour may also be an environmental concern during the operational phase due to fumes from construction traffic and potential odours emanating from disturbance to the harbour floor during construction dredging. Fugitive odour may originate from dredged material from the port during the construction phase, this material would then potentially be transported from the site by boat for disposal.

Climate

Macro-Climate of Ireland

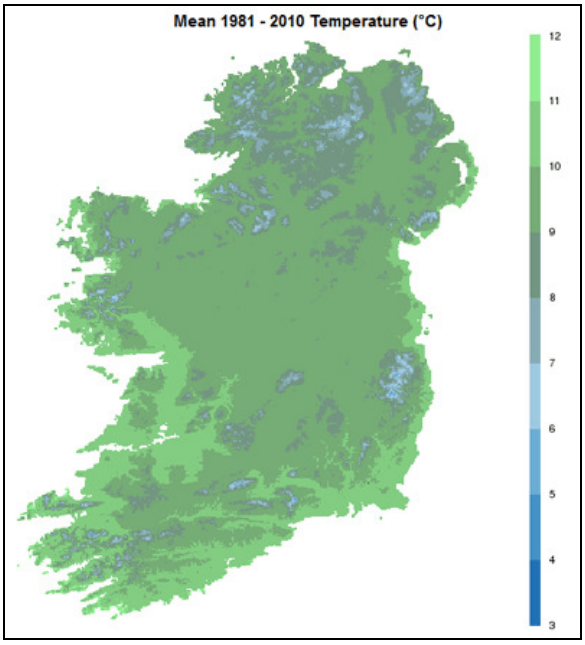
On a macro scale the dominant feature on Irelands climate is the Atlantic Ocean. Generally speaking, winters tend to be cool and windy, whilst summers are mostly mild and less windy. The Atlantic low-pressure systems are well established in December, and depressions tend to move quickly eastward in December and January, conveying strong winds with substantial frontal rainfall to Ireland. Occasionally, cold anticyclones over Europe extends its influence westwards to Ireland, giving dry cold periods lasting several days.

Approaching late June or early July the rise in pressure over Atlantic and an associated fall in pressure over Europe results in a general wind flow at the surface becoming westerly. This brings air with a long ocean track over Ireland, so that cloud cover, humidity and rainfall all increase. From mid July, clear nights tend to be accompanied by heavy dew. Warm air masses of high humidity and daytime heating sufficient to cause thunderstorms and may be a regular feature of mid to late summer weather. Towards the start of August there are infrequent incursions into the Atlantic of cold northerly air masses. These produce active depressions in late August and September. In September the humid air is readily influenced to increasing periods of cooling by night and fog is frequent around dawn in low-lying districts.

From late summer through Autumn there is a risk of former tropical depressions mixing in with the North Atlantic weather pattern depressions to produce severe storms. These are quite rare but are very significant weather events. (Met Eireann, 2014).

Air Temperature

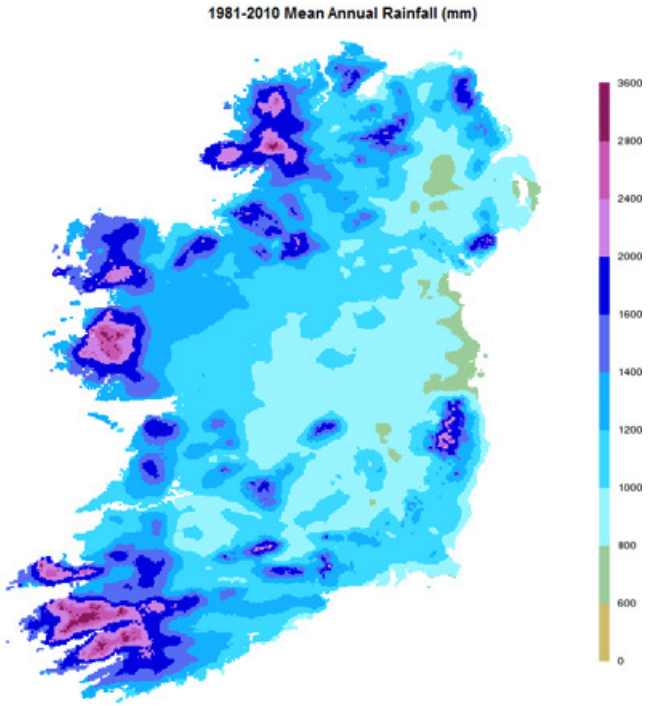
Figure 10.18 Mean 1981 - 2010 Temperature (°C) (Met Eireann 2014)



The above figure shows the mean air temperature at the study area. Coastal regions in general see less of a temperature range and air temperature for the mean period at the proposed development site is 11 - 12 °C.

Rainfall

Figure 10.19 Mean 1981 - 2010 Annual Rainfall (mm) (Met Eireann 2014)

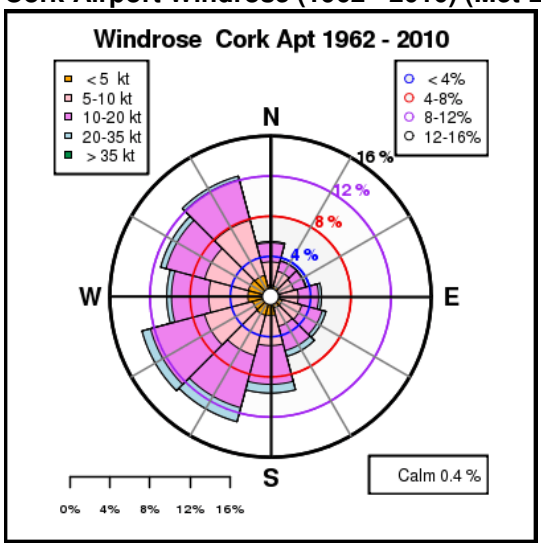


Most of the eastern half of the country gets between 750 and 1000 (mm) of rainfall in the year. Rainfall in the west generally averages between 1000 and 1400 mm. In many mountainous districts

rainfall exceeds 2000mm per year. The wettest months, in almost all areas are December and January. The proposed development area has an annul mean 1981 - 2010 of 1000 - 1200 mm.

Wind

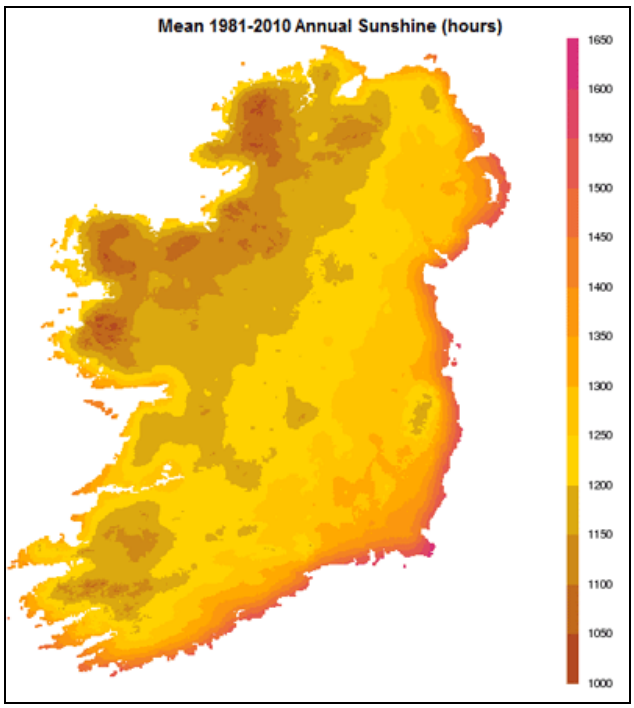
Figure 10.20 Cork Airport Windrose (1962 - 2010) (Met Eireann 2014)



Wind blows most frequently from the southwest and northwest for open sites while winds from the northeast or north occur least often. In January the southerly and south-easterly winds are more prominent than in July, which has a high frequency of westerly winds. Easterly winds occur most often between February and May and are commonly accompanied by dry weather. The dominant wind direction recorded for Cork Airport are south westerly.

Sunshine

Figure 10.21 Mean 1981 - 2010 Annual Sunshine (hours) (Met Eireann 2014)



Ireland usually gets between 1100 and 1600 hours of sunshine each year. The sunniest months are May & June. During May & June, sunshine duration averages between 5 and 6.5 hours per day over

most of the country. The extreme southeast receives the most sunshine, averaging over 7 hours a day in early summer. December is the dullest month, with an average daily sunshine ranging from about 1 hour in the north to almost 2 hours in the extreme southeast. Over the year as a whole, most areas get an average of between 3 1/4 and 3 3/4 hours of sunshine each day.

Micro-Climate of Ringaskiddy

The topography of the site is flat reaching sea level at the harbour's edge. Further inland to the southwest, beyond the N28 and Ringaskiddy village, the landscape becomes increasingly rural. The topography also rises steadily to a crest over 50m OD. The even and level nature of the proposed development site is contrasted by the steep, rising elevations of lands that surround the inner Cork Harbour at Ringaskiddy, Monkstown, Cobh, Western Great Island, Aghada, Whitegate, and Crosshaven.

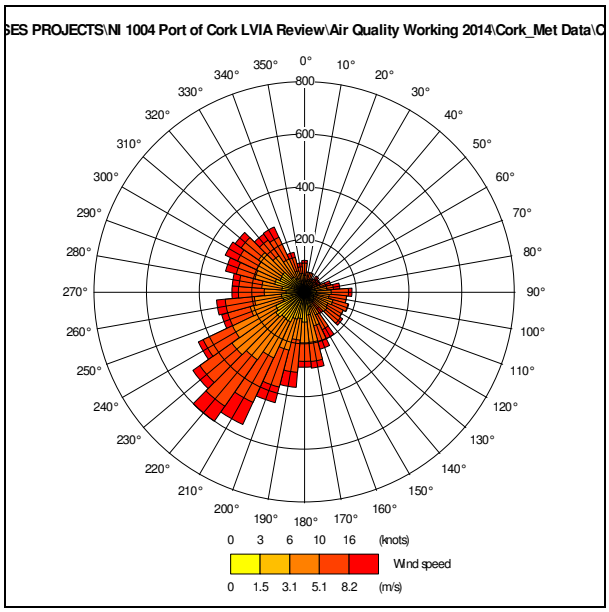
The Port of Cork at Ringaskiddy has a weather station that records detailed information every 30 minutes. The information recorded includes; date, time, Temperature, High Temperature, Low Temperature, Humidity, Dew Point, Wind Speed, Wind Direction, High Wind Speed, High Wind Direction, Wind Chill, Heat Index, Pressure, Rainfall and Rainfall Rate. All this data, most importantly wind speed and wind direction can lend to an understanding of fugitive dust behaviour and can aid in addressing potential dust dispersion episode on sensitive receptors on the peripheries of the working site.

APPENDIX 10.2 MODEL & CALCULATION INPUTS

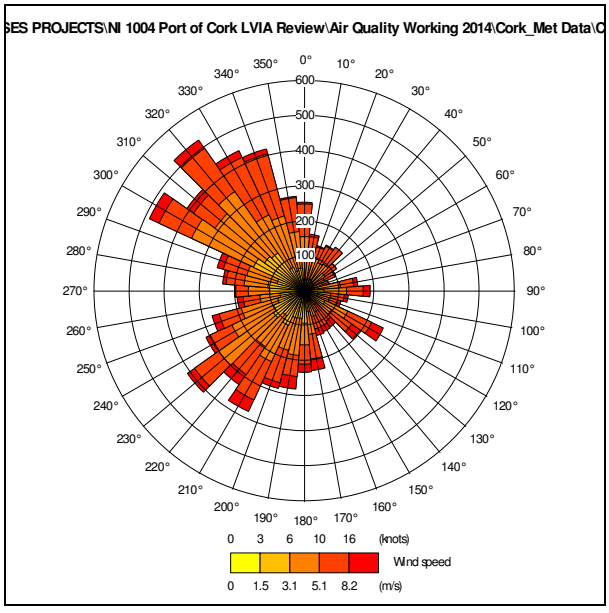
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Appendix 10.2 Model & Calculation Inputs

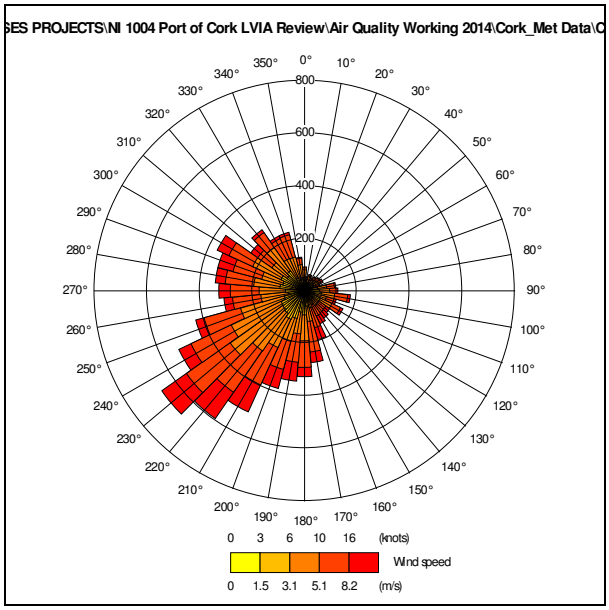
Met Data Used in ADMS CERC Roads 3.2 Dispersion Model



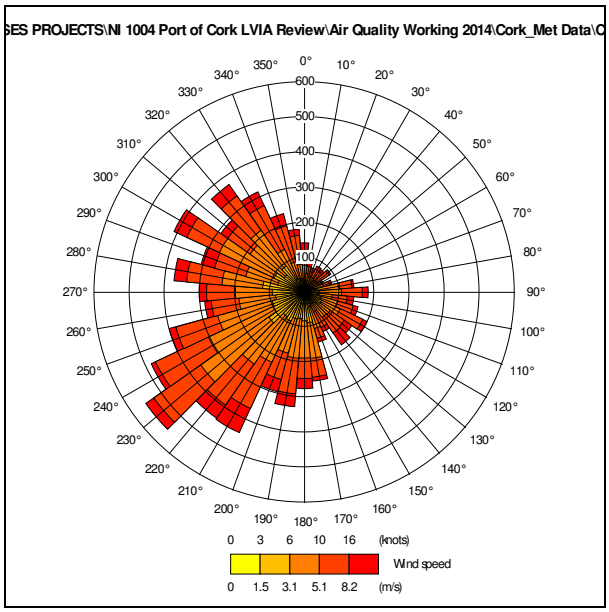
2009 Cork Airport Met Data Windrose



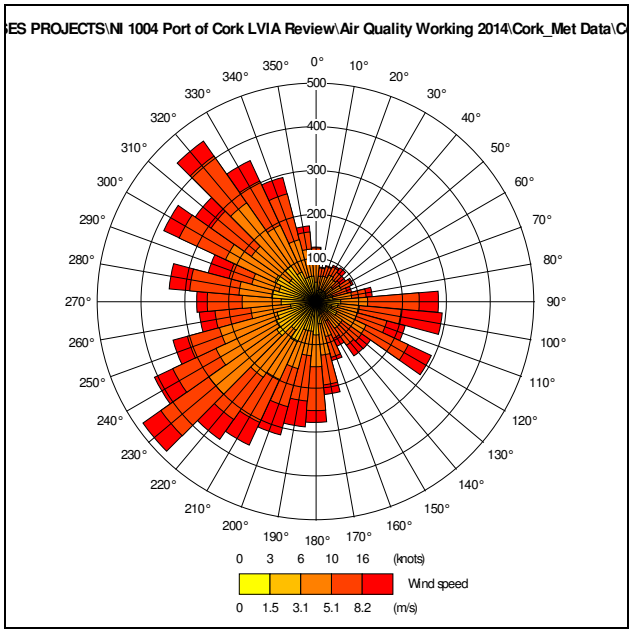
2010 Cork Airport Met Data Windrose



2011 Cork Airport Met Data Windrose



2012 Cork Airport Met Data Windrose



2013 Cork Airport Met Data Windrose

Representative Sensitive Receptors in ADMS CERC Roads 3.2 Dispersion Model

Ref	Location	X	Y	Z (Height m)
1	1.Ringaskiddy Main St	177675	64219	1.5
2	2.4 Riverview Ringaskiddy	177706	64219	1.5
3	3.Ringaskiddy Main St 2	177755	64221	1.5
4	4.Ringaskiddy Footpath	177832	64242	1.5
5	5.Ringaskiddy Main St 3	177852	64218	1.5
6	6.Ringaskiddy Main St 4	177864	64218	1.5
7	7.Ringaskiddy Main St 5	177970	64205	1.5
8	8.Ringaskiddy Main St 6	178192	64202	1.5
9	9.Ringaskiddy Main St 7	178253	64210	1.5
10	10.Marello Pk Ringaskiddy	178313	64199	1.5
11	11.Harbour 1 Ecological Designation	178010	64803	0
12	12.Harbour 2 Ecological Designation	177615	64791	0
13	13.Off Main N28	177611	64052	1.5
14	14.Layby N28	177327	64336	1.5
15	15.Shanbally Cross 1	175756	64457	1.5
16	16.Shanbally Cross 2	175715	64376	1.5
17	17.Shanbally Cross School	175670	64363	1.5
18	18.Shanbally Cross 3	175635	64439	1.5
19	19.Shanbally Cross 4	175608	64436	1.5
20	20.Shanbally Cross 5	175481	64392	1.5

Model Parameters in ADMS CERC Roads 3.2 Dispersion Model

1. Surface roughness of 0.5m for all scenarios.
2. Meteorological data from Cork Airport have been considered. Hourly sequential data have been used to predict dispersion. Years 2009, 2010, 2011, 2012, 2013.
3. Atmospheric chemistry, plume sedimentation, photo-lytic reactions, washout and other removal effects have been ignored.
4. Predictions have been made at 20 fixed point receptor locations. These receptor locations are shown in Figure 10.1.
5. Monin – Obukhov Length 30m (Mixed Urban & Industrial).
6. Surface Albedo 0.23.
7. Cumulative impacts have been taken into account with regard to traffic volumes and increases in levels associated with other future known proposed developments.
8. Dispersion Model Traffic Speeds are given below:

Links Modelled	Traffic Speed (Kilometres per hour) set in model	
	Cars and Non HGVs	HGVs
98 - Internal Road	10	10
10 - Ringaskiddy Main Street	20	15
59 - Road to Port Access	30	20
29 - R613	30	20
9 - N28 Main	50	40
8 - N28 East Shanbally	20	15
28 - Shanbally South Marian Terrace	20	15
65 - Shanbally Mews	20	15
7 - Shanbally West	20	15

Full traffic volumes details are in Chapter 8 Traffic and Transportation of this EIS.

Construction Phase Model Parameters in ADMS CERC Roads 3.2 Dispersion Model

Non exhaust particulate matter can include brake and tyre wear, road wear and resuspension. For construction sites, the road-wear/resuspension component can be particularly significant due to the unpaved 'roads'.

The emissions can be treated in different levels of complexity, depending on the site, a case of using the number of vehicles and the distance they travel together with appropriate emission factors to calculate an emission rate. There are a number of sources of emission factors for non-road particulates, including:

Brake and tyre wear emissions calculated using the Defra EFT:
http://laqm.defra.gov.uk/documents/EFT_Version_4_2_2.zip

Road wear and resuspension:
http://www.airquality.co.uk/reports/cat15/0706061626_Report3__Modelling_Development.pdf

There are emission factors for unpaved roads:
http://www.epa.gov/oms/ap42.htm

Brake Wear factor – 0.028
Tyre Wear factor – 0.017

Speed – 5kph for construction site only

The construction phase will have a slight additional impact to receptors during the actual construction period. Traffic flows incorporating HGVs were used in all model runs. This specific model run incorporated site activity and high 2017 background pollution concentrations to represent worst case. Mitigation measure are set out in the Chapter 10 of this EIS in relation to construction phase activity.

Emission factors for calculations of shipping emissions EMEP/EEA Emission Inventory Guidebook 2013, Section 1.A.3.d.i international water borne navigation - Tier 1 (Appendices in the following tables refer to appendices in Emissions Inventory Guidebook)

Tier 1 Default Emission Factors for ships using bunker fuel oil

Tier 1 default emission factors					
	Code	Name			
NFR Source Category	1.A.3.d.i	International navigation			
Fuel	Bunker Fuel Oil				
Not applicable	Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Heptabromo-biphenyl, Mirex,				
Not estimated	NH3, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total 4 PAHs				
Pollutant	Value	Unit	95% confidence interval		Reference
			Lower	Upper	
NOx	79.3	kg/tonne fuel	0	0	Entec (2007). See also note (2)
CO	7.4	kg/tonne fuel	0	0	Lloyd's Register (1995)
NMVOC	2.7	kg/tonne fuel	0	0	Entec (2007). See also note (2)
SOx	20	kg/tonne fuel	0	0	Note value of 20 should read
TSP	6.2	kg/tonne fuel	0	0	Entec (2007)
PM10	6.2	kg/tonne fuel	0	0	Entec (2007)
PM2.5	5.6	kg/tonne fuel	0	0	Entec (2007)
Pb	0.18	g/tonne fuel	0	0	average value
Cd	0.02	g/tonne fuel	0	0	average value
Hg	0.02	g/tonne fuel	0	0	average value
As	0.68	g/tonne fuel	0	0	average value
Cr	0.72	g/tonne fuel	0	0	average value
Cu	1.25	g/tonne fuel	0	0	average value
Ni	32	g/tonne fuel	0	0	average value
Se	0.21	g/tonne fuel	0	0	average value
Zn	1.2	g/tonne fuel	0	0	average value
PCB	0.57	mg/tonne fuel	0	0	Cooper (2005)
PCDD/F	0.47	ug I-TEQ/tonne fuel	0	0	Cooper (2005)
HCB	0.14	mg/tonne fuel	0	0	Cooper (2005)

Notes

1. S = percentage sulphur content in fuel; pre-2006: 2.7 % wt. [source: Lloyd's Register, 1995]. For European Union as specified in the Directive 2005/33/EC:
   a. 1.5 % wt. from 11 August 2006 for Baltic sea and from 11 August 2007 for the North Sea for all ships;
   b. 1.5 % wt. from 11 August 2006 in EU territorial seas, exclusive economic zones and pollution control zones by passenger ships operating on regular services to or from any Community port at least in respect of vessels flying their flag and vessels of all flags while in their ports;
   c. 0.1 % by wt. from 1 January 2010 for inland waterway vessels and ships at berth in Community ports.
2. Emission factors for NO_x and NMVOC are the 2000 values in cruise for medium speed engines (see Tier 2).
3. Reference: 'average value' is between Lloyd's Register (1995) and Cooper and Gustafsson (2004).
4. BC fraction of PM (f-BC) = 0.12. *Source: for further information see Appendix A*

Tier 1 Default Emission Factors for ships using diesel oil/marine gas oil

Tier 1 default emission factors					
	Code	Name			
NFR Source Category	1.A.3.d.i	International navigation			
Fuel	Marine diesel oil/marine gas oil (MDO/MGO)				
Not applicable	Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Heptabromo-biphenyl, Mirex,				
Not estimated	NH3, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total 4 PAHs				
Pollutant	Value	Unit	95% confidence interval		Reference
			Lower	Upper	
NOx	78.5	kg/tonne fuel	0	0	Entec (2007). See also note (2)
CO	7.4	kg/tonne fuel	0	0	Lloyd's Register (1995)
NMVOC	2.8	kg/tonne fuel	0	0	Entec (2007). See also note (2)
SOx	20	kg/tonne fuel	0	0	Note value of 20 should read
TSP	1.5	kg/tonne fuel	0	0	Entec (2007)
PM10	1.5	kg/tonne fuel	0	0	Entec (2007)
PM2.5	1.4	kg/tonne fuel	0	0	Entec (2007)
Pb	0.13	g/tonne fuel	0	0	average value
Cd	0.01	g/tonne fuel	0	0	average value
Hg	0.03	g/tonne fuel	0	0	average value
As	0.04	g/tonne fuel	0	0	average value
Cr	0.05	g/tonne fuel	0	0	average value
Cu	0.88	g/tonne fuel	0	0	average value
Ni	1	g/tonne fuel	0	0	average value
Se	0.1	g/tonne fuel	0	0	average value
Zn	1.2	g/tonne fuel	0	0	average value
PCB	0.038	mg/tonne fuel	0	0	Cooper (2005)
PCDD/F	0.13	ug I-TEQ/tonne	0	0	Cooper (2005)
HCB	0.08	mg/tonne fuel	0	0	Cooper (2005)

Notes

1. S = percentage sulphur content in fuel; pre-2000 fuels: 0.5 % wt. [source: Lloyd's Register, 1995]. For European Union as specified in the Directive 2005/33/EC:
   a. 0.2 % wt. from 1 July 2000 and 0.1 % wt. from 1 January 2008 for marine diesel oil/marine gas oil used by seagoing ships (except if used by ships crossing a frontier between a third country and a Member State);
   b. 0.1% wt. from 1 January 2010 for inland waterway vessels and ships at berth in Community ports.
2. Emission factor for NO_x and NMVOC are the 2000 values in cruise for medium speed engines (see Tier 2).
3. Reference: 'average value' is between Lloyd's Register (1995) and Cooper and Gustafsson (2004)
4. BC fraction of PM (f-BC) = 0.31. *Source: for further information see Appendix A*

Tier 1 Emission Factors for ships using gasoline

Tier 1 default emission factors					
	Code	Name			
NFR Source Category	1.A.3.d.ii	National navigation			
Fuel	Gasoline				
Not applicable	Aldrin, Chlordane, Chlordecone, Dieldrin, Endrin, Heptachlor, Heptabromo-biphenyl, Mirex, Toxaphene, HCH, DDT, PCB, HCB, PCP, SCCP				
Not estimated	NH3, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, PCDD/F, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total 4 PAHs				
Pollutant	Value	Unit	95% confidence interval		Reference
			Lower	Upper	
NOx	9.4	kg/tonne fuel	0	0	Winther & Nielsen (2006)
CO	573.9	kg/tonne fuel	0	0	Winther & Nielsen (2006)
NMVOC	181.5	kg/tonne fuel	0	0	Winther & Nielsen (2006)
SOx	20	kg/tonne fuel	0	0	Winther & Nielsen (2006)
TSP	9.5	kg/tonne fuel	0	0	Winther & Nielsen (2006)
PM10	9.5	kg/tonne fuel	0	0	Winther & Nielsen (2006)
PM2.5	9.5	kg/tonne fuel	0	0	Winther & Nielsen (2006)

Notes: The table contains averaged figures between 2-stroke and 4-stroke engines, assuming a share of 75% 2-stroke and 25% 4-stroke ones. If more detailed data are available the Tier 2 method should be used.
BC fraction of PM (f-BC) = 0.05. *Source: for further information see Appendix A*

APPENDIX 10.3 MODEL RESULTS & CALCULATIONS

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APPENDIX 10.3 MODEL RESULTS & CALCULATIONS

ADMS CERC ROADS 3.2 DETAILS DISPERSION MODEL

Table (i) Model Results – 2013 Model Calibration Annual Mean Nitrogen Dioxide (µg/m^3) {Threshold Level - 40 µg/m^3}

Ref	Location	Annual mean NO2 concentrations (µg/m^3) 2009 Met Data	Annual mean NO2 concentrations (µg/m^3) 2010 Met Data	Annual mean NO2 concentrations (µg/m^3) 2011 Met Data	Annual mean NO2 concentrations (µg/m^3) 2012 Met Data	Annual mean NO2 concentrations (µg/m^3) 2013 Met Data
1	Ringaskiddy Main Street	12.45	12.92	12.44	12.56	12.59
2	4 Riverview Ringaskiddy	12.29	12.74	12.29	12.39	12.43
3	Ringaskiddy Main Street 2	12.39	12.91	12.40	12.50	12.57
4	Ringaskiddy Footpath	16.55	15.38	16.31	16.23	15.68
5	Ringaskiddy Main Street 3	12.53	13.12	12.55	12.65	12.75
6	Ringaskiddy Main Street 4	12.61	13.22	12.63	12.73	12.83
7	Ringaskiddy Main Street 5	12.57	13.24	12.60	12.69	12.82
8	Ringaskiddy Main Street 6	13.64	14.55	13.67	13.85	13.94
9	Ringaskiddy Main Street 7	13.02	13.69	13.04	13.19	13.23
10	Marello Park Ringaskiddy	11.58	11.92	11.59	11.67	11.69
11	Harbour 1 - Ecological Designation	10.71	10.65	10.69	10.69	10.66
12	Harbour 2 - Ecological Designation	10.84	10.75	10.82	10.81	10.77
13	Off Main N28	11.02	11.21	11.00	11.05	11.07
14	Layby N28 (Calibration Point)	17.73	15.17	16.73	16.93	15.17
15	Shanbally Cross 1	20.25	18.14	19.82	19.48	18.68
16	Shanbally Cross 2	14.78	15.75	14.70	14.89	14.93
17	Shanbally Cross School	12.75	13.52	12.78	12.86	13.00
18	Shanbally Cross 3	20.30	18.41	19.91	19.58	18.92
19	Shanbally Cross 4	19.80	17.92	19.41	19.09	18.43
20	Shanbally Cross 5	19.22	21.28	19.30	19.72	19.86

The detailed dispersion model constructed for 2013 baseline using 2013 Met data predicted a level of 15.17 (µg/m^3) location 14. Comparing this to the actual monitored data of 13.83 (µg/m^3) it suggests that the model is accurate and only slightly over predicting.

Table (ii) Model Results – 2012 Base, 2018 Without & With, 2023 & 2033 Without (Do Minimum (DM)) & With (Do Something (DS)) - Predicted Annual Mean Nitrogen Dioxide (µg/m^3) {Threshold Level - 40 µg/m^3}

Ref	Location	Annual mean NO2 concentrations (µg/m^3) 2012 BASE	Annual mean NO2 concentrations (µg/m^3) 2018 WITHOUT (DM)	Annual mean NO2 concentrations (µg/m^3) 2018 WITH (DS)	Annual mean NO2 concentrations (µg/m^3) 2023 WITHOUT (DM)	Annual mean NO2 concentrations (µg/m^3) 2023 WITH (DS)	Annual mean NO2 concentrations (µg/m^3) 2033 WITHOUT (DM)	Annual mean NO2 concentrations (µg/m^3) 2033 WITH (DS)
1	Ringaskiddy Main Street	12.59	11.88	12.44	11.41	11.85	11.27	12.19
2	4 Riverview Ringaskiddy	12.43	11.83	12.50	11.37	11.89	11.23	12.32
3	Ringaskiddy Main Street 2	12.57	11.98	12.74	11.47	12.07	11.31	12.56
4	Ringaskiddy Footpath	15.68	14.42	16.06	13.10	14.43	12.68	15.50
5	Ringaskiddy Main Street 3	12.75	12.13	12.80	11.58	12.12	11.40	12.55
6	Ringaskiddy Main Street 4	12.83	12.19	12.84	11.62	12.15	11.44	12.56
7	Ringaskiddy Main Street 5	12.82	11.96	12.38	11.46	11.82	11.30	12.09
8	Ringaskiddy Main Street 6	13.94	12.51	12.67	11.83	12.02	11.63	12.11
9	Ringaskiddy Main Street 7	13.23	12.11	12.33	11.56	11.78	11.40	11.92
10	Marello Park Ringaskiddy	11.69	11.21	11.45	10.96	11.16	10.88	11.32
11	Harbour 1 - Ecological Designation	10.66	10.57	10.67	10.54	10.61	10.53	10.67
12	Harbour 2 - Ecological Designation	10.77	10.58	10.65	10.54	10.58	10.53	10.61
13	Off Main N28	11.07	10.73	10.82	10.65	10.71	10.63	10.74
14	Layby N28 (Calibration Point)	15.17	14.12	15.55	12.76	13.36	12.44	13.46
15	Shanbally Cross 1	18.68	15.00	16.95	13.40	14.52	12.99	15.06
16	Shanbally Cross 2	14.93	13.14	13.78	12.23	12.57	11.98	12.70
17	Shanbally Cross School	13.00	12.02	12.48	11.49	11.74	11.34	11.84
18	Shanbally Cross 3	18.92	15.87	17.78	13.97	15.07	13.48	15.55
19	Shanbally Cross 4	18.43	15.63	17.45	13.82	14.87	13.34	15.32
20	Shanbally Cross 5	19.86	16.66	18.85	14.50	15.75	13.91	16.29

ADMS CERC ROADS 3.2 DETAILS DISPERSION MODEL - CONTOURED PLOT NOx Baseline (2012)

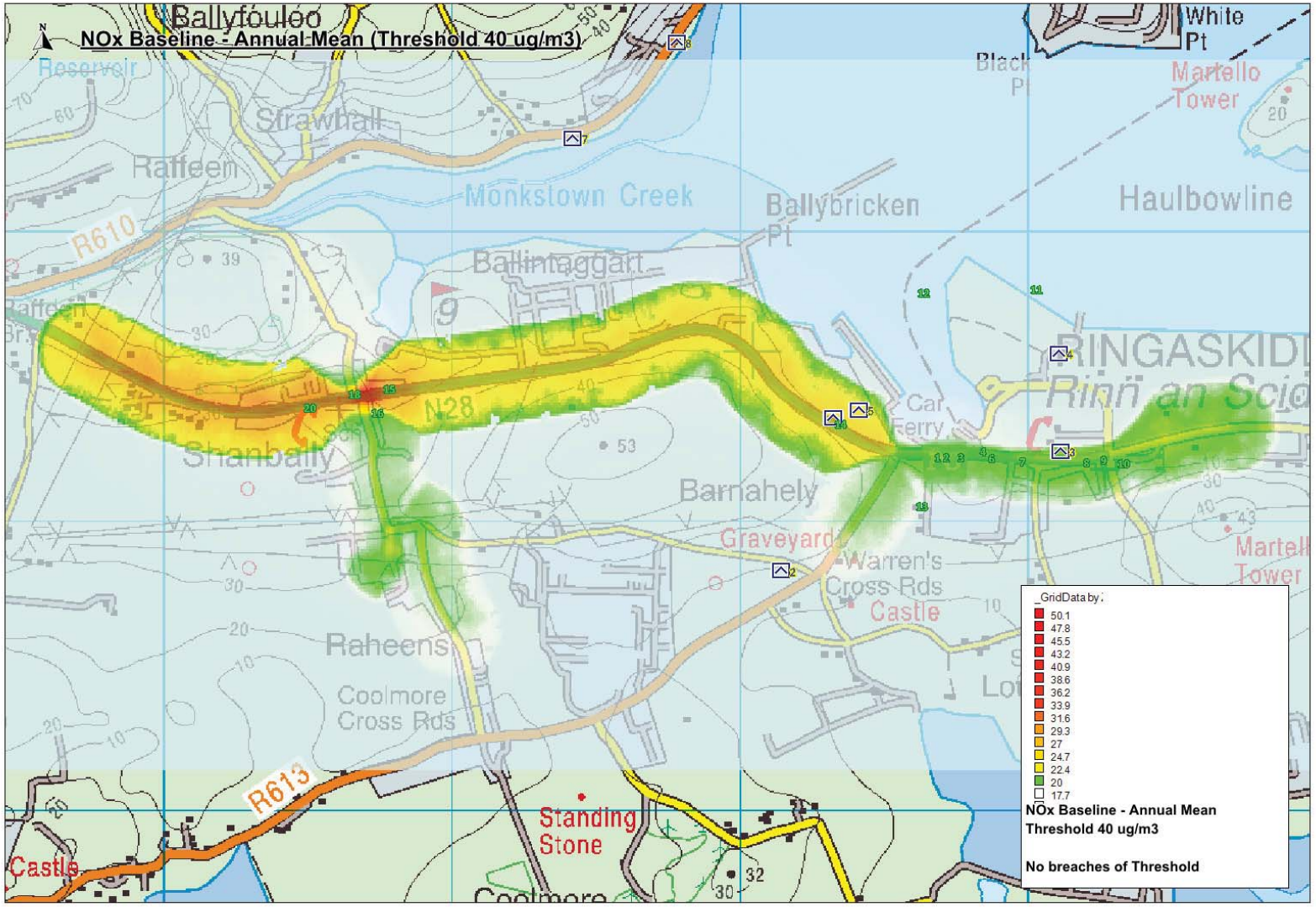


Table (iii) Model Results – Percentage Change in Annual Mean Nitrogen Dioxide for 2016 Without (DM) & With (DS) and 2023 & 2033 Without (DM) & With (DS)

Ref	Location	2016 PERCENTAGE CHANGE (%)	Magnitude of Change*	2023 PERCENTAGE CHANGE (%)	Magnitude of Change*	2031 PERCENTAGE CHANGE (%)	Magnitude of Change*
1	Ringaskiddy Main Street	4.71	Small	3.86	Small	8.16	Small
2	4 Riverview Ringaskiddy	5.66	Small	4.57	Small	9.71	Small
3	Ringaskiddy Main Street 2	6.34	Small	5.23	Small	11.05	Small
4	Ringaskiddy Footpath	11.37	Small	10.15	Small	22.24	Medium
5	Ringaskiddy Main Street 3	5.52	Small	4.66	Small	10.09	Small
6	Ringaskiddy Main Street 4	5.33	Small	4.56	Small	9.79	Small
7	Ringaskiddy Main Street 5	3.51	Small	3.14	Small	6.99	Small
8	Ringaskiddy Main Street 6	1.28	Imperceptible	1.61	Small	4.13	Small
9	Ringaskiddy Main Street 7	1.82	Imperceptible	1.90	Small	4.56	Small
10	Marello Park Ringaskiddy	2.14	Imperceptible	1.82	Small	4.04	Small
11	Harbour 1 - Ecological Designation	0.95	Imperceptible	0.66	Small	1.33	Small
12	Harbour 2 - Ecological Designation	0.66	Imperceptible	0.38	Small	0.76	Small
13	Off Main N28	0.84	Imperceptible	0.56	Small	1.03	Small
14	Layby N28 (Calibration Point)	10.13	Small	4.70	Small	8.20	Small
15	Shanbally Cross 1	13.00	Small	8.36	Small	15.94	Medium
16	Shanbally Cross 2	4.87	Small	2.78	Small	6.01	Small
17	Shanbally Cross School	3.83	Small	2.18	Small	4.41	Small
18	Shanbally Cross 3	12.04	Small	7.87	Small	15.36	Medium
19	Shanbally Cross 4	11.64	Small	7.60	Small	14.84	Small
20	Shanbally Cross 5	13.15	Medium	8.62	Small	17.11	Medium

All increase in terms of air quality are negligible.

**Taken from the NRA Guidelines for the treatment of air quality.*

Table (iv) Model Results – 2012 Base, 2018 Without (DM) & With (DS) and 2023 & 2033 Without (DM) & With (DS), Predicted 1 hour Mean Nitrogen Dioxide (µg/m^3) {Threshold Level - 200 µg/m^3}

Ref	Location	1-Hour mean NO2 concentrations (µg/m^3) 2012 BASE	1-Hour mean NO2 concentrations (µg/m^3) 2018 WITHOUT	1-Hour mean NO2 concentrations (µg/m^3) 2018 WITH	1-Hour mean NO2 concentrations (µg/m^3) 2023 WITHOUT	1-Hour mean NO2 concentrations (µg/m^3) 2023 WITH	1-Hour mean NO2 concentrations (µg/m^3) 2033 WITHOUT	1-Hour mean NO2 concentrations (µg/m^3) 2033 WITH
1	Ringaskiddy Main Street	26.72	20.30	25.10	18.47	22.84	15.99	24.76
2	4 Riverview Ringaskiddy	25.66	19.94	25.31	18.15	23.03	15.67	25.01
3	Ringaskiddy Main Street 2	25.84	20.73	27.32	18.86	24.86	16.09	26.30
4	Ringaskiddy Footpath	39.58	31.10	39.21	28.30	35.68	22.36	37.36
5	Ringaskiddy Main Street 3	26.59	21.69	27.39	19.74	24.92	16.64	25.96
6	Ringaskiddy Main Street 4	27.06	22.02	27.55	20.04	25.07	16.87	26.11
7	Ringaskiddy Main Street 5	26.60	20.77	24.63	18.90	22.41	16.17	23.26
8	Ringaskiddy Main Street 6	35.85	24.99	26.85	22.74	24.43	18.64	22.76
9	Ringaskiddy Main Street 7	31.76	22.53	24.53	20.50	22.32	17.25	21.92
10	Marello Park Ringaskiddy	21.55	16.92	19.09	15.40	17.37	14.03	18.53
11	Harbour 1 - Ecological Designation	12.60	11.44	12.81	10.41	11.66	11.01	13.21
12	Harbour 2 - Ecological Designation	13.46	11.77	12.39	10.71	11.27	11.19	12.29
13	Off Main N28	16.05	12.78	13.71	11.63	12.48	11.80	13.91
14	Layby N28 (Calibration Point)	64.59	28.88	35.89	26.28	32.66	20.38	25.15
15	Shanbally Cross 1	60.23	38.58	50.22	35.11	45.70	26.00	37.96
16	Shanbally Cross 2	42.88	29.17	35.67	26.54	32.46	20.94	27.76
17	Shanbally Cross School	35.15	24.61	29.51	22.40	26.85	18.34	23.58
18	Shanbally Cross 3	61.74	41.66	53.07	37.91	48.29	27.79	39.78
19	Shanbally Cross 4	57.41	39.78	50.08	36.20	45.57	26.71	37.61
20	Shanbally Cross 5	70.51	50.01	63.79	45.51	58.05	32.40	47.09

Dispersion models are inevitably poorer at predicting short-term peaks than they are at predicting annual mean concentrations and the process of model verification is extremely challenging. These predicted levels are representative concentrations at each sensitive receptor and are all below the relevant threshold levels.

Table (v) Model Results – 2012 Base, 2018 Without (DM) & With (DS) and 2023 & 2033 Without (DM) & With (DS), Predicted Annual Mean Particulate Matter (PM_{10}) (Threshold Level - 40 $\mu g/m^3$)

Ref	Location	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2012 BASE	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2018 WITHOUT	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2018 WITH	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2023 WITHOUT	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2023 WITH	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2033 WITHOUT	Annual mean PM_{10} concentrations ($\mu g/m^3$) 2033 WITH
1	Ringaskiddy Main Street	16.82	16.82	16.83	16.81	16.85	16.81	16.85
2	4 Riverview Ringaskiddy	16.82	16.81	16.83	16.80	16.85	16.80	16.85
3	Ringaskiddy Main Street 2	16.83	16.82	16.84	16.81	16.87	16.82	16.87
4	Ringaskiddy Footpath	17.04	17.02	17.06	17.00	17.11	17.01	17.11
5	Ringaskiddy Main Street 3	16.84	16.83	16.85	16.83	16.87	16.83	16.87
6	Ringaskiddy Main Street 4	16.85	16.84	16.85	16.83	16.88	16.83	16.88
7	Ringaskiddy Main Street 5	16.83	16.82	16.83	16.81	16.84	16.81	16.84
8	Ringaskiddy Main Street 6	16.90	16.87	16.87	16.86	16.88	16.86	16.88
9	Ringaskiddy Main Street 7	16.86	16.84	16.84	16.83	16.85	16.83	16.85
10	Marello Park Ringaskiddy	16.77	16.76	16.76	16.76	16.77	16.76	16.77
11	Harbour 1 - Ecological Designation	16.71	16.71	16.71	16.71	16.71	16.71	16.71
12	Harbour 2 - Ecological Designation	16.71	16.71	16.71	16.71	16.72	16.71	16.72
13	Off Main N28	16.72	16.72	16.73	16.72	16.73	16.72	16.73
14	Layby N28 (Calibration Point)	17.12	17.10	17.22	17.08	17.37	17.09	17.37
15	Shanbally Cross 1	17.07	17.00	17.07	16.98	17.15	16.98	17.15
16	Shanbally Cross 2	16.93	16.89	16.91	16.87	16.93	16.87	16.93
17	Shanbally Cross School	16.83	16.81	16.82	16.80	16.84	16.80	16.84
18	Shanbally Cross 3	17.12	17.07	17.13	17.03	17.20	17.04	17.20
19	Shanbally Cross 4	17.10	17.05	17.11	17.02	17.18	17.03	17.18
20	Shanbally Cross 5	17.18	17.12	17.19	17.08	17.27	17.09	17.27

Table (vi) Model Results – Percentage Change in Annual Mean Particulate Matter (PM_{10}) 2018 Without (DM) & With (DS) and 2023 & 2033 Without (DM) & With (DS).

Ref	Location	2018 PERCENTAGE CHANGE	Magnitude of Change*	2023 PERCENTAGE CHANGE	Magnitude of Change*	2033 PERCENTAGE CHANGE	Magnitude of Change*
1	Ringaskiddy Main Street	0.01	Negligible	0.03	Negligible	0.04	Negligible
2	4 Riverview Ringaskiddy	0.02	Negligible	0.05	Negligible	0.05	Negligible
3	Ringaskiddy Main Street 2	0.02	Negligible	0.04	Negligible	0.05	Negligible
4	Ringaskiddy Footpath	0.04	Negligible	0.04	Negligible	0.1	Negligible
5	Ringaskiddy Main Street 3	0.02	Negligible	0.04	Negligible	0.04	Negligible
6	Ringaskiddy Main Street 4	0.01	Negligible	0.05	Negligible	0.05	Negligible
7	Ringaskiddy Main Street 5	0.01	Negligible	0.03	Negligible	0.03	Negligible
8	Ringaskiddy Main Street 6	0.01	Negligible	0.02	Negligible	0.02	Negligible
9	Ringaskiddy Main Street 7	0.02	Negligible	0.02	Negligible	0.02	Negligible
10	Marello Park Ringaskiddy	0.02	Negligible	0.01	Negligible	0.01	Negligible
11	Harbour 1 - Ecological Designation	0.01	Negligible	0	Negligible	0	Negligible
12	Harbour 2 - Ecological Designation	0.01	Negligible	0.02	Negligible	0.01	Negligible
13	Off Main N28	0.01	Negligible	0.01	Negligible	0.01	Negligible
14	Layby N28 (Calibration Point)	0.12	Negligible	0.28	Negligible	0.28	Negligible
15	Shanbally Cross 1	0.07	Negligible	0.15	Negligible	0.17	Negligible
16	Shanbally Cross 2	0.02	Negligible	0.06	Negligible	0.06	Negligible
17	Shanbally Cross School	0.01	Negligible	0.04	Negligible	0.04	Negligible
18	Shanbally Cross 3	0.06	Negligible	0.14	Negligible	0.16	Negligible
19	Shanbally Cross 4	0.06	Negligible	0.11	Negligible	0.15	Negligible
20	Shanbally Cross 5	0.07	Negligible	0.18	Negligible	0.18	Negligible

All increase in terms of air quality are negligible.

**Taken from the NRA Guidelines for the treatment of air quality.*

Table (vii) Model Results – Percentage Change in 24 hour mean Particulate Matter (PM_{10}) 2018 Without (DM) & With (DS) and 2023 & 2033 Without (DM) & With (DS).

Ref	Location	2018 PERCENTAGE CHANGE	Magnitude of Change*	2023 PERCENTAGE CHANGE	Magnitude of Change*	2033 PERCENTAGE CHANGE	Magnitude of Change*
1	Ringaskiddy Main Street	0.01	Negligible	0.03	Negligible	0.04	Negligible
2	4 Riverview Ringaskiddy	0.02	Negligible	0.05	Negligible	0.05	Negligible
3	Ringaskiddy Main Street 2	0.02	Negligible	0.05	Negligible	0.05	Negligible
4	Ringaskiddy Footpath	0.04	Negligible	0.1	Negligible	0.1	Negligible
5	Ringaskiddy Main Street 3	0.02	Negligible	0.04	Negligible	0.04	Negligible
6	Ringaskiddy Main Street 4	0.01	Negligible	0.05	Negligible	0.05	Negligible
7	Ringaskiddy Main Street 5	0.01	Negligible	0.02	Negligible	0.03	Negligible
8	Ringaskiddy Main Street 6	0.01	Negligible	0.02	Negligible	0.02	Negligible
9	Ringaskiddy Main Street 7	0.02	Negligible	0.01	Negligible	0.02	Negligible
10	Marello Park Ringaskiddy	0.02	Negligible	0.01	Negligible	0.01	Negligible
11	Harbour 1 - Ecological Designation	0.01	Negligible	0	Negligible	0	Negligible
12	Harbour 2 - Ecological Designation	0.01	Negligible	0.01	Negligible	0.01	Negligible
13	Off Main N28	0.01	Negligible	0.01	Negligible	0.01	Negligible
14	Layby N28 (Calibration Point)	0.12	Negligible	0.25	Negligible	0.28	Negligible
15	Shanbally Cross 1	0.07	Negligible	0.14	Negligible	0.17	Negligible
16	Shanbally Cross 2	0.02	Negligible	0.04	Negligible	0.06	Negligible
17	Shanbally Cross School	0.01	Negligible	0.04	Negligible	0.04	Negligible
18	Shanbally Cross 3	0.06	Negligible	0.16	Negligible	0.16	Negligible
19	Shanbally Cross 4	0.06	Negligible	0.13	Negligible	0.15	Negligible
20	Shanbally Cross 5	0.07	Negligible	0.15	Negligible	0.18	Negligible

All increase in terms of air quality are negligible.

**Taken from the NRA Guidelines for the treatment of air quality.*

Table (viii) Model Results – 2012 Base, 2018 Without & With and 2033 Without & With - 24 hour Mean Particulate Matter (PM_{10}) Number of times a year 50 (µg/m^3) exceeded. (24-hour limit for protection of human health - not to be exceeded more than 35 times/year)

Ref	Location	No. of times a year 50 (µg/m^3) exceeded 2012 BASE	No. of times a year 50 (µg/m^3) exceeded 2018 WITHOUT	No. of times a year 50 (µg/m^3) exceeded 2018 WITH	No. of times a year 50 (µg/m^3) exceeded 2023 & 2033 WITHOUT	No. of times a year 50 (µg/m^3) exceeded 2023 & 2033 WITH
1	Ringaskiddy Main Street	1	1	1	1	1
2	4 Riverview Ringaskiddy	1	1	1	1	1
3	Ringaskiddy Main Street 2	1	1	1	1	1
4	Ringaskiddy Footpath	1	1	1	1	1
5	Ringaskiddy Main Street 3	1	1	1	1	1
6	Ringaskiddy Main Street 4	1	1	1	1	1
7	Ringaskiddy Main Street 5	1	1	1	1	1
8	Ringaskiddy Main Street 6	1	1	1	1	1
9	Ringaskiddy Main Street 7	1	1	1	1	1
10	Marello Park Ringaskiddy	1	1	1	1	1
11	Harbour 1 - Ecological Designation	1	1	1	1	1
12	Harbour 2 - Ecological Designation	1	1	1	1	1
13	Off Main N28	1	1	1	1	1
14	Layby N28 (Calibration Point)	1	1	1	1	1
15	Shanbally Cross 1	1	1	1	1	1
16	Shanbally Cross 2	1	1	1	1	1
17	Shanbally Cross School	1	1	1	1	1
18	Shanbally Cross 3	1	1	1	1	1
19	Shanbally Cross 4	1	1	1	1	1
20	Shanbally Cross 5	1	1	1	1	1

Dispersion models are inherently less accurate at predicting the number of exceedences of the 24-hour mean PM10 objective than for the annual mean objective. There are also occasions where current year monitoring data need to be adjusted forwards to a year in the future, taking into account the likely number of 24-hour exceedences of 50 µg/m3.A relationship between the annual mean and the number of 24-hour mean exceedences of has been devised. It is unchanged at the time of writing from that used in the previous guidance and takes the form:

No. 24-hour mean exceedences = -18.5 + 0.00145 x annual mean3 + (206/annual mean)

Table (ix) Model Results – 2012 Base, 2018 Without & With and 2033 Without & With - 8 Hours Rolling CO Matter (PM_{10}). {Threshold 10 mg/m^3)

Ref	Location	CO Maximum daily 8-hour running mean **2012 BASE**	CO Maximum daily 8-hour running mean **2018 WITHOUT**	CO Maximum daily 8-hour running mean **2018 WITH**	CO Maximum daily 8-hour running mean **2023 WITHOUT**	CO Maximum daily 8-hour running mean **2023 WITH**	CO Maximum daily 8-hour running mean **2033 WITHOUT**	CO Maximum daily 8-hour running mean **2033 WITH**
1	Ringaskiddy Main Street	1.03	1.03	1.03	1.03	1.03	1.03	1.04
2	4 Riverview Ringaskiddy	1.03	1.03	1.03	1.03	1.03	1.03	1.04
3	Ringaskiddy Main Street 2	1.04	1.03	1.04	1.03	1.04	1.03	1.05
4	Ringaskiddy Footpath	1.09	1.07	1.06	1.07	1.07	1.07	1.08
5	Ringaskiddy Main Street 3	1.04	1.03	1.04	1.03	1.04	1.04	1.05
6	Ringaskiddy Main Street 4	1.04	1.03	1.04	1.04	1.04	1.04	1.05
7	Ringaskiddy Main Street 5	1.04	1.03	1.03	1.03	1.03	1.03	1.04
8	Ringaskiddy Main Street 6	1.05	1.04	1.04	1.04	1.04	1.04	1.05
9	Ringaskiddy Main Street 7	1.04	1.03	1.03	1.03	1.04	1.04	1.04
10	Marello Park Ringaskiddy	1.02	1.02	1.02	1.02	1.02	1.02	1.02
11	Harbour 1 - Ecological Designation	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	Harbour 2 - Ecological Designation	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13	Off Main N28	1.01	1.01	1.01	1.01	1.01	1.01	1.01
14	Layby N28 (Calibration Point)	1.04	1.05	1.06	1.05	1.06	1.05	1.07
15	Shanbally Cross 1	1.09	1.09	1.09	1.09	1.09	1.09	1.11
16	Shanbally Cross 2	1.06	1.06	1.06	1.06	1.06	1.06	1.07
17	Shanbally Cross School	1.04	1.04	1.04	1.04	1.04	1.04	1.04
18	Shanbally Cross 3	1.10	1.11	1.11	1.11	1.11	1.11	1.12
19	Shanbally Cross 4	1.10	1.10	1.10	1.10	1.10	1.11	1.12
20	Shanbally Cross 5	1.11	1.12	1.12	1.12	1.12	1.13	1.14

All predicted increase are imperceptible and remain well below the CO 8 - hour Rolling Limit Value of 10 mg/m^3

DMRB SCREENING MODEL - REGIONAL ASSESSMENT ROADS - GREENHOUSE GASES (GHGs)

Table (x) Regional Assessment Results

Ref	Pollutant	2012 Baseline	2018 Without (DM)	2018 With (DS)	2023 Without (DM)	2023 With (DS)	2033 Without (DM)	2033 With (DS)
1	Carbon Monoxide (kg/year)	15,007	15,721	16,340	16,033	16,875	16,882	17,224
2	Total Hydrocarbons (kg/year)	2,099	2,188	2,269	2,237	2,348	2,359	2,425
3	Nitrogen Oxides (kg/year)	9,297	7,648	7,883	7,411	7,723	7,783	7,999
4	Particulate Matter (PM10) (kg/year)	257	212	219	212	221	225	232
5	Carbon Dioxide (tonnes/year)	1,003	1,039	1,072	1,051	1,097	1,111	1,139

Showing Results for DMRB Regional Assessment. All percentage changes are below 5% and based on Worst Case Traffic Levels.

Under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), Ireland's total emissions are limited to an average of 62.84 million tonnes of CO_2 equivalents per annum (13 per cent above the baseline estimate) in the period 2008-2012. The actual situation in relation to compliance with the Kyoto protocol will not be known until after this five year period. However,it can be estimated that after the first four years the level currently sits at a total of 1.9 million tonnes above the target when the impact of the EU Emissions Trading Scheme and Forest Sinks are taken into account. Agriculture is the largest source of emissions, representing 32 per cent of total national emissions in 2011. The energy industries represented 20.8 per cent of total national greenhouse gas emissions in 2011. The transport sector, responsible for 19.6 per cent of total national emissions. The industry and commercial sector is responsible for 14.3 per cent of total national emissions.

The six common greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro fluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

POTENTIAL OPERATIONAL IMPACTS - SHIPPING EMISSIONS (RINGASKIDDY HIGHER GROWTH)

Table (xi) 2012 Baseline Estimates

2012 BASELINE ESTIMATES			
Vessel Type	**Total NOx per annum (tonnes)**	**Total VOCs per annum (tonnes)**	**Total TSP per annum (tonnes)**
Ro-Ro	980	58	133
Lo-Lo	380	13	30
Bulk Liquid	400	12	28
Bulk Solid	300	12	28
Break Bulk	18	1	3
Cruise	30	2	3
Total	**2108**	**98**	**225**

Table (xii) 2033 Operational Estimates

2033 OPERATIONAL ESTMATES (WITH - Do Something)			
Vessel Type	**Total NOx per annum (tonnes)**	**Total VOCs per annum (tonnes)**	**Total TSP per annum (tonnes)**
Ro-Ro	2640	84	150
Lo-Lo	383	14	31
Bulk Liquid	416	14	31
Bulk Solid	380	17	38
Break Bulk	28	1	2
Cruise	32	2	3
Total	**3879**	**132**	**255**

Given the existing legal requirements around fuel and emissions for shipping, the extent of emissions are gradually reducing and will continue to reduce in future years. This increase is considered conservative as it does not factor in the Tier III emissions reductions or any other legislation implemented before 2033. This calculation does not incorporate benefits in savings made on road travel and reduction in trips up-river due to the existence of the redeveloped Ringaskiddy Port.

APPENDIX 13.1 SEDIMENT ANALYSIS REPORT

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Appendix 13.1 Sediment Analysis Report

Marine Institute Dredge Sampling Programme

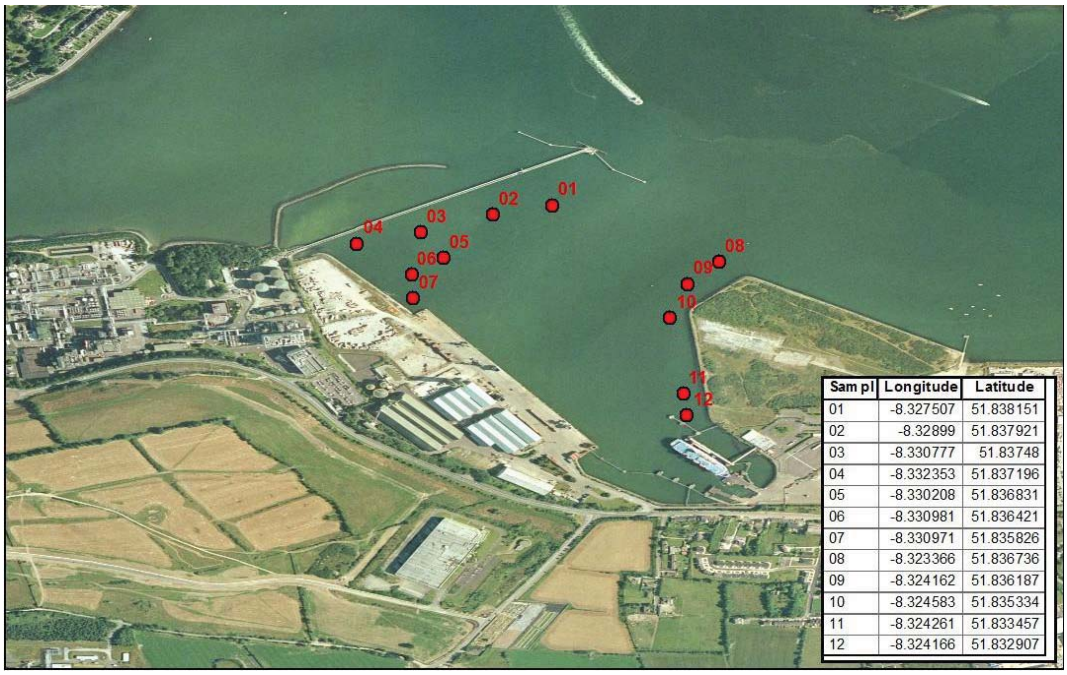
Sampling Programme

The Marine Institute (MI) were consulted in regards to the requirements for a dredge sampling programme both in terms of sample location and parameters for analysis. A Sampling Analysis Plan was provided by the Marine Institute which was issued as part of the tender specification documents to all interested parties for the *Grab Sampling & Contamination Testing* contract in order to ensure compliance with the MI requirements.

The MI advised on the particular substances which should be analysed for. They recommended substances that are considered of most concern for the marine environment, those which have combined properties of persistence, toxicity and liability to bio accumulate. Typically, the most important contaminants associated with dredged material include organotin compounds, heavy metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and oils (OSPAR, 2004).

Sample location and analysis

Twelve separate sample locations in and around the deepwater berth were selected for monitoring in consultation with Marine Institute Figure 1. Table 1 outlines the recommendations from the Marine Institute on the number of sites and the particular parameters which needed to be analysed for at each site.



Sam pl	Longitude	Latitude
01	-8.327507	51.838151
02	-8.32899	51.837921
03	-8.330777	51.83748
04	-8.332353	51.837196
05	-8.330208	51.836831
06	-8.330981	51.836421
07	-8.330971	51.835826
08	-8.323366	51.836736
09	-8.324162	51.836187
10	-8.324583	51.835334
11	-8.324261	51.833457
12	-8.324166	51.832907

Figure 1 Sediment Sample locations at Cork Harbour

Table 1 Recommendations from Marine Institute on particular parameters for each sample

Sample No.	Sample depth	Longitude (°W)*	Latitude (°N)*	Parameters for analysis
1	Surface	-8.32751	51.83815	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.
2	Surface	-8.32899	51.83792	1, 2, 3, 4a, 4b, 4c, 4d.
3	Surface	-8.33078	51.83748	1, 2, 3, 4a, 4b, 4c, 4d.
4	Surface	-8.33235	51.83720	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.
5	Surface	-8.33021	51.83683	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.
6	Surface	-8.33098	51.83642	1, 2, 3, 4a, 4b, 4c, 4d.
7	Surface	-8.33097	51.83583	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.
8	Surface	-8.32337	51.83674	1, 2, 3, 4a, 4b, 4c, 4d.
9	Surface	-8.32416	51.83619	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.
10	Surface	-8.32458	51.83533	1, 2, 3, 4a, 4b, 4c, 4d.
11	Surface	-8.32426	51.83346	1, 2, 3, 4a, 4b, 4c, 4d.
12	Surface	-8.32417	51.83291	1, 2, 3, 4a, 4b, 4c, 4d, 4e, 4f, 4g.

Parameter code*:*

1. Visual inspection, to include colour, texture, odour, presence of animals etc
2. Water content, density (taking into account sample collection and handling)
3. Granulometry including % gravel (> 2mm fraction), % sand (< 2mm fraction) and % mud (< 63μm fraction).
4. The following determinants in the sand-mud (< 2mm) fraction * :
   - a) total organic carbon
   - b) carbonate
   - c) mercury, arsenic, cadmium, copper, lead, zinc, chromium, nickel, lithium, aluminium.
   - d) organochlorines including □-HCH (Lindane), and PCBs (to be reported as the 7 individual CB congeners: 28, 52, 101, 118, 138, 153, 180).
   - e) total extractable hydrocarbons.
   - f) tributyltin (TBT) and dibutyltin (DBT)
   - g) Polycyclic aromatic hydrocarbons (PAH) - Acenaphthene, Acenaphthylene, Anthracene, Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (ghi) perylene, Benzo (k) fluoranthene, Chrysene, Dibenz (a,h) anthracene, Flourene, Fluoranthene, Indeno 1,2,3 – cd pyrene, Naphthalene, Phenanthrene, Pyrene.
   - h) Toxicity tests (Microtox or whole sediment bioassay) using appropriate representative aquatic species. (This requirement will depend on the results of the chemical analyses.)

As part of the sediment sampling plan plan the MI also recommended the following:

- Where the gravel fraction (> 2mm) constitutes a significant part of the total sediment, this should be taken into account in the calculation of the concentrations.
- Collection of sufficient samples to allow all the toxicity testing to be carried out on the material.
- Brief details of the methodologies should be supplied with the results. This should include sampling, sub sampling and analytical methods used for each determinant.
- Appropriate marine Certified References Materials (CRM) are to be analysed during each batch of analyses and the results to be reported along with sample results.

Minimum Detection Limits

The MI also outlined the required minimum detection limits for the various determinants. These are given in Table 2 below.

Table 2 Required Minimum Detection Limits for the various determinants

Contaminant	Concentration	Units (dry wt)
Mercury	0.05	mg kg^{-1}
Arsenic	1.0	mg kg^{-1}
Cadmium	0.1	mg kg^{-1}
Copper	5.0	mg kg^{-1}
Lead	5.0	mg kg^{-1}
Zinc	10	mg kg^{-1}
Chromium	5.0	mg kg^{-1}
Nickel	15	mg kg^{-1}
Total extractable hydrocarbons	10.0	mg kg^{-1}
TBT and DBT (not organotin)	0.01	mg kg^{-1}
PCB - individual congener	1.0	μg kg^{-1}
OCP - individual compound	1.0	μg kg^{-1}
PAH - individual compound	20	μg kg^{-1}

Reporting Format

The Marine Institute require that the reports be submitted in a pre supplied excel file which includes the following information:

- ⇒ Date of sampling
- ⇒ Location of samples e.g. ING or lat/long
- ⇒ Treatment of samples and indication of sub-sampling, compositing etc.

- ⇒ Tabulated geophysical and chemical test results
- ⇒ Completed excel spreadsheet for results
- ⇒ Summary method details
- ⇒ Method performance specifications: Limit of detection, Precision, Bias
- ⇒ Blanks and in-house references to be run with each sample batch, and reported with sample results.
- ⇒ Clear expression of units and indication of wet weight or dry weight basis
- ⇒ Appropriate marine Certified Reference Materials (CRM) to be run with each sample batch, and reported in full with sample results. The measured results as well as the certified results should be reported along with the sample results.
- ⇒ If determinant is not detected, report less than values, and indicate LoD/ LoQ used.
- ⇒ Other quality assurance information (e.g. accreditation status)

Certification and Quality Assurrance

The MI stated that the analysing laboratory should be experienced in analysing marine sediments, and should participate in recognised proficiency testing schemes. The laboratory should also have submitted a completed QA questionnaire to the MI in order to ensure that quality standards can be met. All of the Sampling Analysis Plan requirements were met by Aquatic Services Unit together with National Laboratory Service (NLS) whom were sub-contracted by Aquatic Services Unit.

Sediment Sampling Methodology

Aquatic Services Unit was appointed to carry out the sediment sampling and analysis in Ringaskiddy with sample collection carried out on 28 January 2014.

The taking of, recovery and submission of marine samples was carried out using the Port of Cork Company survey launch, at a suitable high tide to enable access to all the locations specified by the Marine Institute in Table 1.3.

Prior to the recovery exercise the launch was fitted with a differential Global Positioning System (GPS), positioned directly above the on board recovery point. The launch was then easily navigated to the various points as specified in Table 1.3. At each point a stainless steel grab was lowered onto the river bed. Once the grab made contact with the bed, the recovery line was tightened and the grab sealed the sample. The actual co-ordinated recovery position was then recorded and logged.

The grab was then recovered on board and the sample transferred to suitable prepared containers, sealed, annotated and packed in preparation for shipping. The grab was then cleaned prior to the taking of the next sample; this procedure was continued until a sample was recovered from all of the required locations. The samples were then couriered to the National Laboratory Service in the UK for analysis.

Guideline Values for the Assessment of Dredge Material

All samples which were analysed by the National Laboratory Service were compared against the proposed guidance values for sediment quality guidelines from the "*Guidelines for the Assessment of Dredge Material for Disposal in Irish Waters" (Marine Institute, 2006)*.

There are two sets of guidance values (upper and lower) used in these guidelines. According to the guidance the lower level values correspond to contaminant concentrations below which the sediment, if disposed of at sea, is assumed to have a physical impact only. The upper level guidance values are set at concentrations above which adverse effects might be expected.

Lower level guidance values represent concentrations that are either a) at the upper end of the no-effect range or, b) at background concentrations.

Upper level guidance values are set at the lower end of the known range of effective concentrations i.e. lowest concentrations shown to have adverse effects on marine organisms. The proposed parameter guidelines as given the guidance are listed in Table 3.

Table 3 Parameters and Proposed Guidelines for Sediment Quality

Parameters Units	**Units (dry wta)**	**Lower level**	**Upper Level [b]**
Arsenic	mg kg¹	9[c]	70*
Cadmium	mg kg¹	0.7	4.2
Chromium	mg kg¹	120	370
Copper	mg kg¹	40	110[d]
Lead	mg kg¹	60	218
Mercury	mg kg¹	0.2	0.7
Nickel	mg kg¹	21	60
Zinc	mg kg¹	160	410
Σ TBT & DBT	mg kg¹	0.1	0.5
γ – HCH (Lindane)	µg kg¹	0.1	0.5

Parameters Units	Units (dry wta)	Lower level	Upper Level [b]
HCB µg kg-1 0.3 1	µg kg¹	0.3	1
PCB (individual congeners of ICES 7)	µg kg¹	1	180
PCB (Σ ICES 7) µg kg-1 7 1260	µg kg¹	7	1260
PAH (Σ 16)	µg kg¹	4000	
Total extractable hydrcarbons	g kg¹	1	

a- total sediment <2mm

b- ERM (rounded up)

c- ERL (rounded up) – No background Irish data available

d PEL as ERM considered high

* In some locations natural levels of arsenic will exceed this value and in such instances this guidance value will not be appropriate

Sediment Sampling Results

The analysis of the samples was sub-contracted to National Laboratory Service (NLS) laboratories in the UK, and included the following determinants for each sample:

- Ecotoxicology (30 minute EC50)
- Carbon Content
- Gran Size fractions
- Hydrocarbons
- Metals
- PAHs
- TBT and DBT
- Dry Solids

The detailed results and analytical reports from NLS laboratories are outlined below with summary results discussed in Chapter 13 of the EIA. All sample results were below the upper level guideline concentration and, with the exception of all the nickel samples and two of the arsenic samples, were also below the lower level guideline.

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (dd mm.mmm)	Position Longitude (dd mm.mmm)	Sampling depth m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)	% Moisture
Site 1	Port of Cork	Ringaskiddy	28/01/2014	Ring S1	51d 50.283	-08d 19.643	8	20061567-1	Brown sandy mud dead shell present	37.8
Site 2	Port of Cork	Ringaskiddy	28/01/2014	Ring S2	51d 50.276	-08d 19.731	3	20061567-1	Brown sandy with shell, limited sample dur to substrate	44
Site 3	Port of Cork	Ringaskiddy	28/01/2014	Ring S3	51d 50.245	-08d 19.849	3	20061567-1	Black brown sandy mud	57
Site 4	Port of Cork	Ringaskiddy	28/01/2014	Ring S4	51d 50.223	-08d 19.904	4	20061567-1	Black brown sandy mud	57.9
Site 5	Port of Cork	Ringaskiddy	28/01/2014	Ring S5	51d 50.214	-08d 19.807	12	20061567-1	Brown sandy mud no signs of life	56.1
Site 6	Port of Cork	Ringaskiddy	28/01/2014	Ring S6	51d 50.196	-08 19.864	13	20061567-1	Brown muddy sand no casts	60.2
Site 7	Port of Cork	Ringaskiddy	28/01/2014	Ring S7	51d 50.197	-08d 19.885	12.5	20061567-1	Brown sandy mud no casts, moved station due to presence of tanker on quay.	62.4
Site 8	Port of Cork	Ringaskiddy	28/01/2014	Ring S8	51d 50.208	-08d 19.414	8	20061567-1	Brown sandy mud no casts	12.1
Site 9	Port of Cork	Ringaskiddy	28/01/2014	Ring S9	51d 50.168	-08d 19.457	7	20061567-1	Brown muddy sand no casts	62.7
Site 10	Port of Cork	Ringaskiddy	28/01/2014	Ring S10	51d 50.132	-08d 19.478	5	20061567-1	Brown muddy sand no casts	56.5
Site 11	Port of Cork	Ringaskiddy	28/01/2014	Ring S11	51d 50.023	-08d 19.476	5.5	20061567-1	Dark brown sandy mud strong sulfide smell	59.3
Site 12	Port of Cork	Ringaskiddy	28/01/2014	Ring S12	51d 49.977	-08d 19.465	7	20061567-1	Dark brown sandy mud strong sulfide smell	59.8

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Sample ID code	Particle size >2mm %	Particle size <2mm >63um %	Particle size <63um %	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Mn mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}	Al mg kg^{-1}
Site 1	0.4	67.6	32.1	1.5	0.0359	20.3	85	0.159	0.041	23.9	6.63	61.8		27.4	37.8	39600
Site 2	2.2	50.8	47.0	1.0		16.2	55.7	0.126	0.005	10.8	5.07	55.3		25.2	36	36800
Site 3	0.0	46.3	53.7	1.8		22.1	92.3	0.164	0.053	27.5	8.16	76.8		43.2	40.9	42300
Site 4	0.0	42.5	57.5	1.9	0.0984	25.9	99.9	0.174	0.056	30.7	8.07	94		51.4	43.8	44800
Site 5	0.0	55.5	44.5	1.8	0.057	24.9	96.4	0.152	0.058	30.2	9.39	81		43.2	46	44400
Site 6	0.0	43.7	56.3	1.8		27.3	97	0.141	0.045	30	9.04	82.1		41.5	48.7	46900
Site 7	0.0	46.2	53.8	2.1	0.0767	22.2	93.9	0.134	0.049	27.8	8.59	72.6		37.6	47	44900
Site 8	0.0	48.8	51.2	2.0		30.8	98.8	0.153	0.07	29.8	8.22	90.1		44.5	45.2	44400
Site 9	0.0	45.9	54.1	2.4	0.0534	23.1	95	0.144	0.052	27.7	8.06	73.4		37.5	43.6	41600
Site 10	0.0	39.6	60.4	1.6		28.7	105	0.339	0.083	32.4	7.96	94.2		51.9	45.8	44900
Site 11	0.0	54.8	45.2	1.94		30.4	103	0.183	0.069	31.2	8.44	96.7		51.1	46.5	44300
Site 12	1.6	49.9	48.5	1.96	0.0782	23.3	102	0.155	0.06	29.3	7.87	60.3		35	45.1	42200

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
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Sample ID code	DBT mg kg^{-1}	TBT mg kg^{-1}	Σ TBT + DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PCB Σ7 PCB ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}
Site 1	0.00852	0.0104	0.01892	<0.1	<0.1	0.16	0.24	0.24	0.36	0.2	<1.2	3.6	5.3	18.1
Site 2			0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7			
Site 3			0	0.2	<0.1	0.12	0.16	0.16	<0.1	0.2	<0.84			
Site 4	0.00654	0.00606	0.0126	0.2	<0.1	0.12	0.16	0.2	0.12	0.2	1	7.9	10.9	18.7
Site 5	<0.007	0.00588	<0.01288	0.16	<0.2	0.12	0.2	0.2	<0.1	0.2	<0.88	6.9	7.9	14
Site 6				0.16	0.16	0.12	0.2	0.2	<0.1	0.2	<1.04			
Site 7	<0.008	0.00348	<0.01148	0.16	<0.1	0.12	0.16	0.2	<0.1	0.2	<0.84	11.9	7.7	14.6
Site 8				0.12	<0.1	<0.1	0.12	<0.1	<0.1	0.12	<0.36			
Site 9	0.00402	0.0044	0.00842	0.28	<0.1	0.16	0.12	0.16	<0.1	<0.2	<0.72	12.3	13.6	30
Site 10				0.2	<0.1	0.12	0.12	<0.1	<0.1	0.16	<0.6			
Site 11				0.2	<0.1	0.16	0.16	0.2	<0.1	0.2	<0.92			
Site 12	0.00504	0.00473	0.00977	0.36	<0.1	0.16	0.16	<0.1	<0.1	0.24	<0.92	6.5	6.1	18

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Sheet 3. Results

Sample ID code	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
Site 1	50.7	49.2	59.8	34.6	27.4	49.8	7.1	<10	88.5	42.8
Site 2										
Site 3										
Site 4	56.2	57.1	88.3	50.1	32	64.2	5.8	21.4	103	64.6
Site 5	49.1	51.1	88.2	48.1	31.8	56.9	<5	17.5	84.5	64.4
Site 6										
Site 7	48.3	50	89.5	47.6	33.6	57.7	<5	15.2	89.8	66.9
Site 8										
Site 9	87.5	85.4	118	62.5	54	98.4	7.5	21.9	159	82.7
Site 10										
Site 11										
Site 12	56.2	63.2	90.4	56.4	41.8	63.4	10.5	11.4	107	72.7

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
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Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	PAH Σ 16 ug kg^{-1}	Aldrin ug kg^{-1}	DDE-pp ug kg^{-1}	DDT-op ug kg^{-1}	DDT-pp ug kg^{-1}	Dieldrin ug kg^{-1}	Endrin ug kg^{-1}	HCH-alpha ug kg^{-1}	HCH-beta ug kg^{-1}	HCH-delta ug kg^{-1}
Site 1	<30	44.3	77.6	<558.8	<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 2					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 3					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 4	33.6	65.5	89.3	768.6	<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 5	<30	61.3	72.9	<654.6	<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 6					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 7	49.7	61.6	73.6	<717.7	<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 8					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 9	62.1	87	129	1110.9	<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 10					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 11					<1	<2	<1	<2	<3	<2	<1	<1	<1
Site 12	35	57.8	89.4	787.8	<1	<2	<1	<2	<3	<2	<1	<1	<1

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Sample ID code	γ–HCH (Lindane) ug kg^{-1}	HCB ug kg^{-1}	Hexchloro butadiene ug/kg	Isodrin ug kg^{-1}	TDE ug kg^{-1}	Density(g/ml)	Carbonate(%)	TOC(%)	Notes / comments:
Site 1	<2	<1	<1	<2	<1	1.59	2.29	1.48	
Site 2	<2	<1	<1	<2	<1	1.51	2.42	0.98	
Site 3	<2	<1	<1	<2	<1	1.33	2.31	1.77	
Site 4	<2	<1	<1	<2	<1	1.37	2.69	1.89	
Site 5	<2	<1	<1	<2	<1	1.29	2.68	1.76	
Site 6	<2	<1	<1	<2	<1	1.33	2.76	1.75	
Site 7	<2	<1	<1	<2	<1	1.35	2.99	2.11	
Site 8	<2	<1	<1	<2	<1	1.14	3.03	1.95	
Site 9	<2	<1	<1	<2	<1	1.16	1.78	2.4	
Site 10	<2	<1	<1	<2	<1	1.33	2.58	1.57	
Site 11	<2	<1	<1	<2	<1	1.27	2.66	1.94	
Site 12	<2	<1	<1	<2	<1	1.33	2.36	1.96	

APPENDIX 13.2 WATER FRAMEWORK DIRECTIVE ASSESSMENT

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Appendix 13.2 Water Framework Directive Assessment

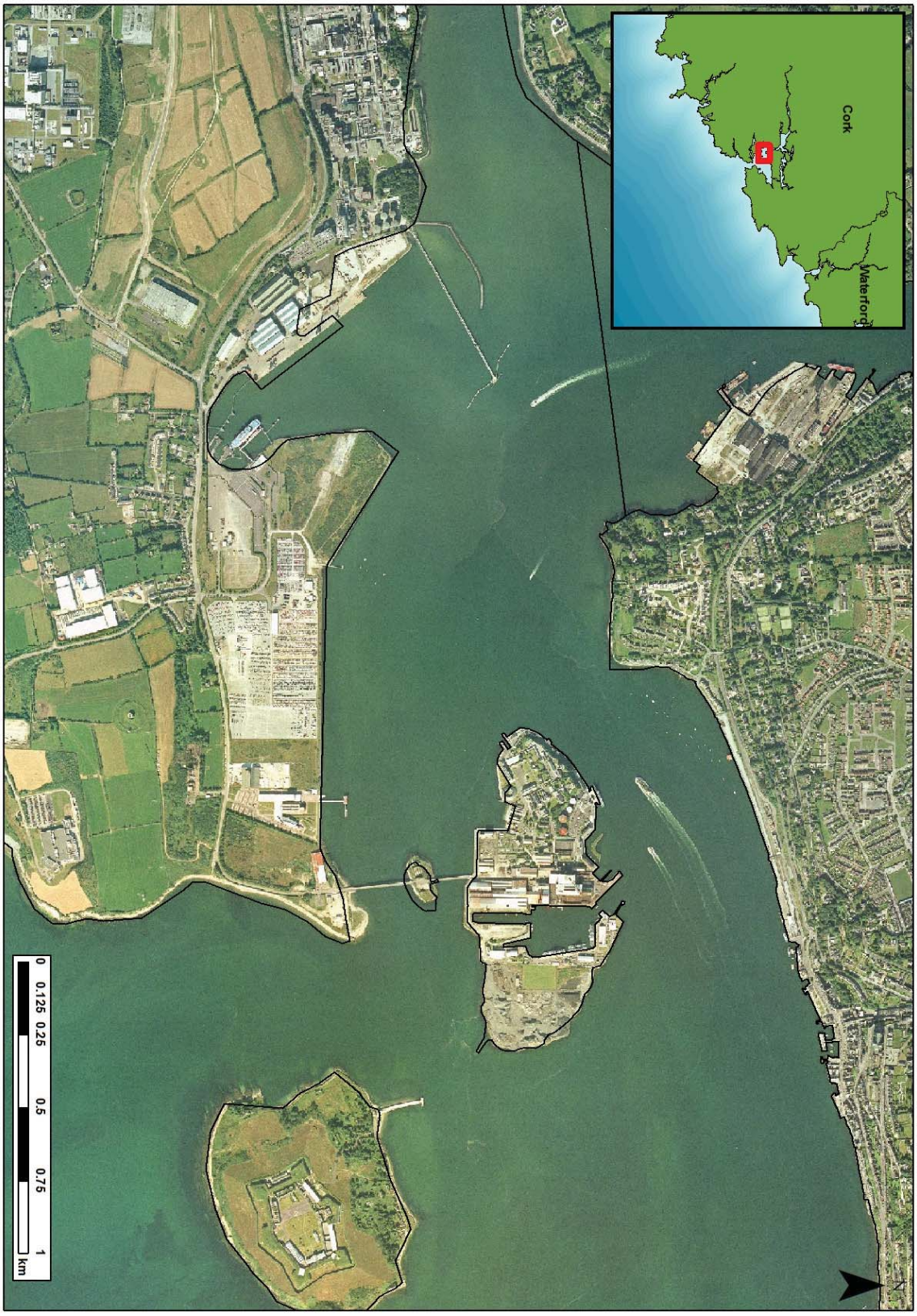
SCHEDULE A: Water Framework Directive (WFD) Assessment - Surface Water Impact Scoping

Project Component Data		
LOCATION	**Grid Reference**	177726, 064637
	Map Reference	50k raster – Tile OS1606
	Waterbody Name	Cork Harbour
	WFD Waterbody ID	SW_060_0000

WATER COURSE	**Designations (within 1 km of component)**	Cork harbour SPA
	WFD Status (Objective)	Moderate (Restore 2021)
	FFD Class. (Salmonid/Cyprinid)	N/A
	Abstractions in vicinity	Yes

	WFD Element	**Current Status**	**Assessed Post Works Status**
WFD ASSESSMENT	**Morphology**	Good	Good
	Specific Pollutants	Pass	Pass
	Protected Area	Less than good	Less than good
	Ecological Status	Moderate	Moderate
	Chemical Status	Fail	Fail (failure due to other monitoring stations in Cork Harbour, Ringaskiddy East monitoring station currently compliant)
	Phytoplankton	Good	Good
	Oxygen	Good	Good

AERIAL VIEW SITE PHOTOGRAPH



WFD ASSESSMENT	COMPONENT TYPE		Does the component comply with WFD Objectives 1, 2, 3 & 4?		
	Component ID:	Ringaskiddy_1	**No**		Do not proceed or complete Article 4.7 assessment.
	Component Type:	Multi-purpose berth	**Yes (Justification provided)**		Proceed if justification accepted
	Component Description,	*314m quay wall and deck*	**Yes, with mitigation**	**X**	Complete schedule B.
	Component ID:	Ringaskiddy_2	**No**		Do not proceed or complete Article 4.7 assessment.
	Component Type:	Container terminal	**Yes (Justification provided)**		Proceed if justification accepted
	Component Description,	*200m long berth*	**Yes, with mitigation**	**X**	Complete schedule B.
	Component ID:	Ringaskiddy_3	**No**		Do not proceed or complete Article 4.7 assessment.
	Component Type:	Deepwater Berth extension	**Yes (Justification provided)**		Proceed if justification accepted
	Component Description,	*182m extension to existing deepwater berth*	**Yes, with mitigation**	**X**	Complete schedule B.
	Component ID:	Ringaskiddy_4	**No**		Do not proceed or complete Article 4.7 assessment.
	Component Type:	Road improvements	**Yes (Justification provided)**		Proceed if justification accepted
	Component Description,	*Works to upgrade surfaces and access points*	**Yes, with mitigation**	**X**	Complete schedule B.
	Component ID:	Ringaskiddy_5	**No**		Do not proceed or complete Article 4.7 assessment.
	Component Type:	Paddy's Point Amenity area	**Yes (Justification provided)**		Proceed if justification accepted
	Component Description,	*Public slipway, landscaping and pedestrian routes*	**Yes, with mitigation**	**X**	Complete schedule B.

SCHEDULE B: Details of Mitigation Required to Comply with Water Framework Directive (WFD) Objectives

Scheme Component	Objective 1: To prevent deterioration in the ecological status/potential of the water body.	Objective 2: To prevent the introduction of impediments to the attainment of Good WFD status for the water body.	Objective 3: To ensure that the attainment of the WFD objectives for the water body are not compromised.	Objective 4: To ensure the achievement of the WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.
	Describe mitigation required to meet Objective 1:	**Describe mitigation required to meet Objective 2:**	**Describe mitigation required to meet Objective 3:**	**Describe mitigation required to meet Objective 4:**
Multi-purpose berth at Ringaskiddy East (Rinaskiddy_1)	Mitigation has already been undertaken during the design phase of the scheme to minimise the potential impact of the project on the water environment. Design of MPB has been undertaken to result in least possible loss of habitat on landward side of quay wall, and disruption to the coastal processes has been minimised. The reclamation for the MPB coincides with an already modified section of the coastline where historical land reclamation has already been undertaken and the coastal processes modelling has demonstrated that this will not have a significant impact on the morphological status. Mitigation to address the construction impact associated with suspended solids (particularly from dredging), oil, fuel, chemicals, concrete, will ensure that the biological and physico-chemical elements will not be impacted by the proposal.	Elevated DIN concentration and unfavourable conservation status for the Cork Harbour SPA are the key issues currently preventing Cork Harbour from reaching good ecological potential. Lead and TBT are the reasons for chemical status failures within Cork Harbour water body however Ringaskiddy East monitoring data is compliant with the TBT ecological quality objectives and therefore does not contribute to the failing chemical status. Furthermore TBT levels in the sediment analysed during the production of the EIS are all below the lower guideline levels for dredged sediment (Marine Institute 2006). The proposed development will not introduce impediments to achieving good ecological potential as the key failing elements of the ecological status are DIN and the SPA unfavourable conservation status.	The mitigation measures outlined in the EIS and referred to under objective 1 will ensure that the achievement of the objectives for the Cork Harbour Coastal Water Body will not be compromised. Sewage from the development will be generated from the maintenance building and the portacabin offices and will not represent a significant nutrient load to the Harbour. The sewage will be subject to appropriate treatment prior to discharge and will not prevent recovery from the high DIN levels currently experienced. The chemical pollution failure in Cork Harbour is due to lead pollution and TBT levels (Marine Institute, 2010). The main source of lead is from aerial deposition and existing port activities are unlikely to be a source of this pollution. TBT levels in Ringaskiddy Basin are within acceptable quality objectives and are recovering as reported by Marine Institute.	Mitigation measures implemented throughout the design, construction and operational phase of this project will ensure negligible residual impact from the proposal on this water body, and furthermore will prevent any knock-on detriment to the water bodies discharging to Cork Harbour.

Scheme Component	Objective 1: To prevent deterioration in the ecological status/potential of the water body.	Objective 2: To prevent the introduction of impediments to the attainment of Good WFD status for the water body.	Objective 3: To ensure that the attainment of the WFD objectives for the water body are not compromised.	Objective 4: To ensure the achievement of the WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.
	Describe mitigation required to meet Objective 1:	**Describe mitigation required to meet Objective 2:**	**Describe mitigation required to meet Objective 3:**	**Describe mitigation required to meet Objective 4:**
	Mitigation includes the employment of best practice techniques and adherence to Pollution Prevention Guidelines (PPGs), and CIRIA guidance on the control of water pollution on construction sites. The use of suction dredging where feasible was a mitigation measure recommended for Cork Harbour during the HMWB designation process. . In addition the HMWB designation process recommended the deepening of the channel at Ringaskiddy to minimise bed scouring impacts associated with large vessels. These mitigation measures have been included within the mitigation strategy for the proposed development where feasible. Mitigation to address operation impacts from maintenance, oil and chemical use and storage and discharges from vessels are detailed in the EIS and will ensure no deterioration in status.	The development will not increase the DIN levels as appropriate treatment of the sewage arising from the development will be undertaken either through connection to the proposed Lower Cork Harbour Main Drainage Scheme or dedicated package plant. In terms of the SPA the coastal modelling has demonstrated that suspended solids and deposition of sediment in Monkstown Creek are not considered to be significant and will not affect the conservation status of the SPA. On the basis of the minimal direct impact (through loss of habitat) and limited indirect impact (through negligible changes in the coastal process) the need for mitigation in terms of the morphology is not required and the development will not result in a deterioration in the morphological status of the Cork Harbour water body.	Other stations within the Cork Harbour water body are the cause of the chemical status failure. Given the phasing out of the use of TBT and the recovering status of the levels of TBT the existing Port activities in Ringaskiddy East are not a cause for the chemical status failures. The protected area objectives for the SPA and the designated shellfish areas in Cork Harbour will remain unaffected by the proposed works. This has been demonstrated through the coastal modelling which concludes that the deposition of sediment from the dredging will be negligible within he SPA and the concentrations of suspended solids will be at background levels in the shellfish areas during construction works. In addition the impact of the physical structures on the coastal processes and the marine morphology is negligible.	
Container terminal (Ringaskiddy_2)	See Ringaskiddy_1 component for mitigation measures which are applicable in this instance also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.

Scheme Component	Objective 1: To prevent deterioration in the ecological status/potential of the water body.	Objective 2: To prevent the introduction of impediments to the attainment of Good WFD status for the water body.	Objective 3: To ensure that the attainment of the WFD objectives for the water body are not compromised.	Objective 4: To ensure the achievement of the WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.
	Describe mitigation required to meet Objective 1:	**Describe mitigation required to meet Objective 2:**	**Describe mitigation required to meet Objective 3:**	**Describe mitigation required to meet Objective 4:**
Deepwater Berth (DWB) extension (Ringaskiddy_3)	See Ringaskiddy_1 component for mitigation measures which are applicable in this instance also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.
Road Improvements (Ringaskiddy_4)	Mitigation to address the construction impact associated with the construction of the new roads including suspended solids, oil, fuel, chemicals, concrete, as detailed in the EIS will ensure that the biological and physico-chemical elements will not be impacted by the proposal. Operational road drainage from the new internal roads will be treated through an oil and sediment interceptor prior to discharge to Cork Harbour. This represents an improvement when compared to the existing situation.	Mitigation to address the construction impact associated with the construction of the new roads including suspended solids, oil, fuel, chemicals, concrete, as detailed in the EIS will ensure that the biological and physico-chemical elements will not be impacted by the proposal.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.
Amenity Area at Paddy's Point (Ringaskiddy_5)	See Ringaskiddy_1 component for mitigation measures which are applicable in this instance also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.	See Ringaskiddy_1 component for mitigation measures which are applicable to this objective also.

APPENDIX 14.1 SHORE ANGLING IN CORK HARBOUR

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Appendix 14.1 Shore Angling in Cork Harbour

This information is based on an telephone Interview with Micheal Hennessey IFI (Sea Angling Officer for the South & South West) Feb 8th 2014-02-08. See Figure A1 below for the locations of the marks mentioned in the text.

Mark Number (see Map below for positions)

1 Ram Point Strand - Bass with lures (in fact, all out the harbour seaward of this point in the direction of Kinsale is good bass territory.

2 Camden shore- Summer Mackerel, Dabs, occ. ray (maybe Blondes at night) winter, cod, and whiting.

3 Crosshaven – Owenaboy Estuary Mullet mainly, occ bass and flounder

4 Lough Beg Point (point opposite # on the map) Bass & Mullett (May-October)

5 Golden Rock – no good

6 Paddy's Point Bass, Flounder and Thornbacks – Fished from the Ringaskiddy end on the harbour side, where there's a small beach. Fished the last 3 hrs of the ebb and 1st 3 hrs of the flood tides. At this time the fish are active and they are not so spread out and therefore more easily caught. At low tide the fish tend to be concentrated in the centre of the channels and be less active but as the tide rise they start to hunt again and this is the best time to catch them; too close to high tide they are too spread out to be able to get them. (Bass May- October – Harvest ban 15th of May to 15th of June in case pregnant females are taken).

7 No fishing

8 Monkstown Pier Cod, Whiting- Winter, Mackerel- Summer

9 Monkstown Wall Summer: Mackerel, winter: dabs, conger, Cod, whiting (winter = October to February)

10 11 & 12 Conger, 3-bearded rockling (close in by rocks and quays) cod, whiting, dogfish, dab (winter) farther off, mackerel – summer.

13 Small bay east of Cobh (farther east from the Pilot Station which cannot be accessed any more. Mullet, Bass, Flounder (the latter from March to November – they go to sea to spawn in November and the spent females return in March). They are usually left to fatten up till later in the season when they tend to be more targeted. They are sometimes retained for the pan and tend to taste better after being left in the fridge for a day.

14 East Ferry Mouth: Thornback ray, Bass and flounder.

15 Browns Island (North Channel) Mullet (in particular), flounder, small bass and occasional thornback.

Back of Fota: Mullet at high water

Blackrock; Mullet, occ seatrout, flounder

16 East Ferry _ Gold Point : Bass, seatrout occ flounder

17 Lower Aghada: Mullet, bass, flounder, occ seatrout

18 Whitegate Bay: Golden grey mullet, Thick-lipped, Bass, Flounder, gilt-head bream

19 Corkbeg Strand: Dabs, dogfish, ray, occ bass

20 & 21 Carlisle Pier Winter codling, summer dabs, thornback, occ bass.

22 Carlisle Head (SW tip) Bass (lots), Pollack, mackerel in the summer

23 Whitebay: Bass, flounder, plaice, dab, dogfish, rays.

24 Canavan's Point (we called this Weavers Point as kids) Bass, wrasse, Pollack, mackerel

25 Roches Point - Wrasse, conger, bass, Pollack, mackerel

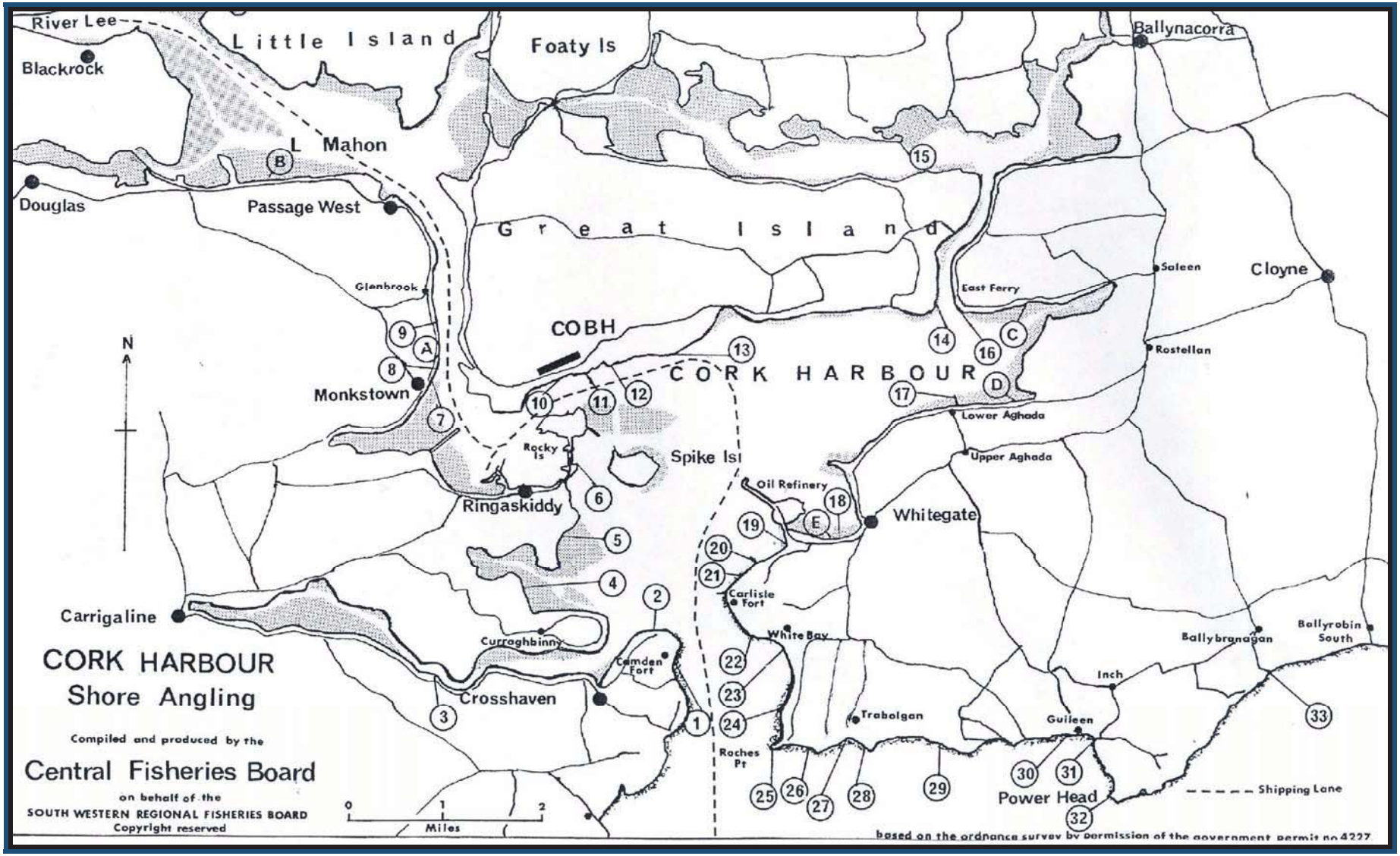


Figure A1 Map of Cork Harbour showing locations of angling marks referred to in the text (14.2.3.5) Vol I

APPENDIX 15.1 NATURA IMPACT STATEMENT

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Port of Cork

Ringaskiddy Port Redevelopment

Natura Impact Statement

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The sole responsibility of this publication lies with the author. The European Union is not responsible for any use that may be made of the information contained therein.

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1.0 INTRODUCTION

This report has been prepared by RPS on behalf of the Port of Cork (POC). The purpose of the report is to document the assessment that POC has undertaken to determine the potential effects that the redevelopment of Ringaskiddy Port may have on the Qualifying Interests of European Sites within the zone of influence of the project.

The report is supported by field surveys, numerical modelling and literature review compiled during the preparation of an Environmental Impact Statement associated with the Ringaskiddy Port Redevelopment planning application to An Bord Pleanála as Strategic Infrastructure. The assessment has been informed by close consultation with National Parks and Wildlife Service (NPWS) between May 2011 and April 2014.

1.1 REGULATORY CONTEXT

The European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna, better known as "The Habitats Directive", provides the framework for legal protection of habitats and species of European importance. Articles (3) to (9) provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. This network of sites designated for nature conservation are comprised of Special Areas of Conservation (SACs) as designated under the EU Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC) (better known as "The Birds Directive").

Article 6 sets out provisions which govern the conservation and management of European Sites (Natura 2000 sites). Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European Sites. Article 6(3) establishes the requirement for Appropriate Assessment (AA):

> "*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public"*

Applications for Strategic Infrastructure made to An Bord Pleanála under section 37E of the Planning and Development Act, 2000, as amended must be accompanied by a Natura Impact Statement where applicable as required under Part XAB of the Planning and Development Act, 2000 as amended. This report is a Natura Impact Statement prepared by Port of Cork Company to accompany the Ringaskiddy Port Redevelopment applications for Strategic Infrastructure.

1.2 GUIDANCE FOLLOWED IN THE PREPARATION OF THIS STATEMENT

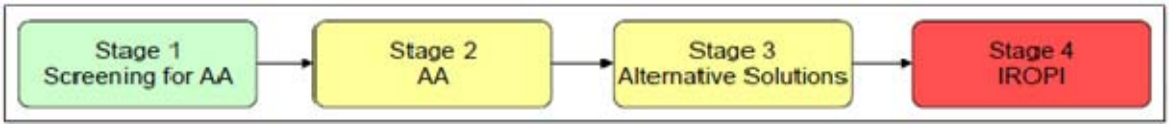
Appropriate Assessment Guidelines for Planning Authorities were published by the Department of the Environment Heritage and Local Government in February 2010 (DoEHLG, 2010). In addition to the advice available from the Department, the European Commission has published a number of documents which provide significant guidance on the requirements of Appropriate Assessment, including, *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, (EC, 2001), which sets out the principles of how to approach decision making during the process and these have been followed as closely as possible.

The assessment is prepared having due regard to the following guidelines:

- European Commission, 2000a. Communication from the Commission on the Precautionary Principle., Office for Official Publications of the European Communities, Luxembourg (EC, 2000a);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg (EC, 2000b);
- European Commission, 2001. Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- European Commission. 2006. Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg (EC, 2006);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission; (EC, 2007);
- Estuaries and Coastal Zones within the Context of the Birds and Habitats Directives - Technical Supporting Document on their Dual Roles as Natura 2000 Sites and as Waterways and Locations for Ports. European Commission (EC, 2009);
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, Dublin (DEHLG, 2010a);
- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on *Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities* (DEHLG, 2010b);
- Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging. European Commission (EC, 2011a);
- European Commission Staff Working Document 'Integrating biodiversity and nature protection into port development' (EC, 2011b);
- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013); and
- Applications for approval for Local Authority Developments made to An Bord Pleanála under 177AE of the Planning and Development Act, 2000, as amended (Appropriate Assessment): Guidelines for Local Authorities. An Bord Pleanála, Dublin (ABP, 2013).

Based on these guidelines, the assessment process is a four-staged approach. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

The four stages are summarised diagrammatically below. Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of the Article 6(3) Assessment or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).



2.0 SCREENING FOR APPROPRIATE ASSESSMENT

Screening determines whether appropriate assessment is necessary by examining:

1 Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of a Natura 2000 site; and

2 Whether the project will have a potentially significant effect on a Natura 2000 site, either alone or in combination with other projects or plans, in view of the site's conservation objectives.

Screening involves the following:

- Description of plan or project;
- Identification of relevant Natura 2000 sites, and compilation of information on their qualifying interests and conservation objectives;
- Assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary; and
- A Screening Statement with conclusions.

The assessment of likely significant effects is based on the likelihood and significance of any effects from the Ringaskiddy Port Redevelopment works on each of the Qualifying Interests of the European Sites being considered. In this context the likelihood depends on whether there is the opportunity and pathway for an effect to occur. If the predicted effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 (AA).

Clearly a key variable that will determine whether or not a particular European Site is likely to be affected by the proposed works is its physical distance from the project site, and it will generally, but not necessarily, be the case that the greater the distance the smaller the possibility of impacts. The Guidelines for Planning Authorities (DEHLG, 2010) recommend that the AA process should include the following European Sites –

- Any European Sites within or adjacent to the plan or project area; or
- Any European Sites within the likely zone of impact of the plan or project.

A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson *et. al.*, 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.

2.1 EUROPEN SITES INCLUDED IN THE SCREENING ASSESSMENT

Two European Sites are located within 15km of Ringaskiddy Port as described in Table 1 and illustrated in Figure 1.

Table 1: European Sites located within 15km Buffer zone

Code	Site	Distance
SPA Code 004030	Cork Harbour SPA	Monkstown Creek component of SPA is 60m NW of proposed works
SAC Code 001058	Great Island Channel SAC	4.8km to the north of Ringaskiddy Port

The proposed works are located 60m from Cork Harbour SPA by straight line distance. Great Island Channel SAC is 5.0km upstream (4.8km by straight line distance) of Ringaskiddy Port (at Marino Point).

Details in relation to the qualifying features of the Cork Harbour SPA and Great Island Channel SAC are described in Tables 2 and 3 respectively. The information contained in these tables is based on publicly available data on these European Sites, sourced from NPWS. This information is further supplemented for Great Island Channel SAC by the findings in Ireland's Article 17 Report to the European Commissions '*The Status of EU Protected Habitats and Species in Ireland*' (NPWS, 2013) as presented in Table 4. As of April 2014, site specific Conservation Objectives and Conservation Management Plans for these two European Sites were not yet available (NPWS, *pers.comm*).

In the absence of site specific management and objectives, the Conservation Objectives for the Great Channel Island SAC and the Cork Harbour SPA which are available for public viewing on the NPWS website were used. Coupled with this the NPWS Natura 2000 Standard Data Forms were also utilised all of which can be found in Appendix 1.

2.1.1 Cork Harbour SPA (Site Code 004030)

The site has twenty-four features of interest[1]:

Table 2: Cork Harbour SPA Qualifying Features

Cork Harbour SPA [IE0004030] SCIs		**Season**	**Qualifying Population[1]**
[A004]	Little Grebe Tachybaptus ruficollis	Wintering	68 individuals
[A005]	Great Crested Grebe *Podiceps cristatus*	Wintering	218 individuals
[A017]	Cormorant *Phalacrocorax carbo*	Wintering	620 individuals
[A028]	Grey Heron *Ardea cinerea*	Wintering	47 individuals
[A048]	Shelduck *Tadorna tadorna*	Wintering	1426 individuals
[A050]	Wigeon *Anas penelope*	Wintering	1750 individuals
[A052]	Teal *Anas crecca*	Wintering	807 individuals
[A056]	Pintail *Anas acuta*	Wintering	84 individuals
[A065]	Shoveler *Anas cylpeata*	Wintering	135 individuals
[A069]	Red-breasted Merganser *Mergus serrator*	Wintering	90 individuals
[A130]	Oystercatcher *Haematopus ostralegus*	Wintering	791 individuals
[A140]*	Golden Plover *Pluvialis apricaria*	Wintering	805 individuals
[A141]	Grey Plover *Pluvialis squatarola*	Wintering	66 individuals
[A142]	Lapwing *Vanellus vanellus*	Wintering	3614 individuals
[A149]	Dunlin *Calidris alpine*	Wintering	4936 individuals
[A156]	Black-tailed Godwit *Limosa limosa*	Wintering	412 individuals
[A157]*	Bar-tailed Godwit *Limosa lapponica*	Wintering	45 individuals
[A160]	Curlew *Numenius arquata*	Wintering	1345 individuals
[A162]	Redshank *Tringa totanus*	Wintering	1614 individuals
[A179]	Black-headed Gull *Larus ridibundus*	Wintering	948 individuals
[A182]	Common Gull *Larus canus*	Wintering	2630 individuals
[A183]	Lesser Black-backed Gull *Larus fuscus*	Wintering	261 individuals
[A193]*	Common Tern *Sterna hirundo*	Breeding	69 pairs
[A999]	Wetlands & Waterbirds		

Key to Table
[1]As obtained from Standard Natura Data Form.
*Species listed on Annex I of The Birds Directive.

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owennacurra. The SPA site comprises most of the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas River Estuary, inner Lough

[1] *NPWS (2011) Conservation objectives for Cork Harbour SPA [004030]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.*

Mahon, Monkstown Creek, Lough Beg, the Owenboy River Estuary, Whitegate Bay and the Rostellan and Poulnabibe inlets.

2.1.2 Great Island Channel SAC (Site Code 001058)

The site has four Features of Interest[2] as noted in Table 3.

Table 3: Features of Interest within the Great Island Channel SAC

Code	Feature
[1130]	Estuaries
[1140]	Mudflats and sandflats not covered by seawater at low tide
[1320]	Spartina swards (Spartinion maritimae)
[1330]	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

2.2 DESCRIPTION OF THE PROJECT

The proposed redevelopment works comprise the following main construction elements as illustrated in Figure 2.

2.2.1 Ringaskiddy East (Container Berths and Multi-purpose Berth (CB/MPB)

- A new 314m Container Berth 1/ Multipurpose Berth that will be capable of accommodating vessels carrying a range of different cargoes including containers, freight and general cargoes
- An additional 200m Container Berth 2
- Surfacing of existing port lands to provide operational areas
- Dredging of the seabed to a level of -13.0 m Chart Datum (CD)
- Demolition of existing link-span
- Installation of link-span comprising a floating pontoon and access bridge
- Installation of container handling cranes and terminal transport equipment
- Maintenance building, administrative buildings and entrance kiosks
- Ancillary car parking, lighting and fencing

2.2.2 Ringaskiddy West (Deepwater Berth Extension)

- A new 182m extension to the existing Deepwater Berth (DWB) which will comprise a filled quay structure extending no further seaward than the edge of the existing DWB
- Dredging works to varying levels to facilitate navigational access to the new facilities
- Lighting

2.2.3 Road Improvements

- Improvements to the external road entrance into the Ringaskiddy Deepwater Terminal and to Ringaskiddy West
- Improvements to the internal link road between Ringaskiddy East and Ringaskiddy West
- Road improvement works within the existing harbour lands at Ringaskiddy East
- Improvements to internal road network at Ringaskiddy East to facilitate future access to the N28
- Lighting and fencing

[2] *NPWS (2011) Conservation objectives for Great Island Channel SAC [001058]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.*

2.2.4 Paddy's Point Amenity Area

- Construction of a new public pier, slipway and boarding platform;
- New planting and landscaping to provide public amenity area.
- Boat storage, lighting and fencing

2.2.5 Phased Implementation

The various elements of infrastructure proposed may be implemented in a single construction or alternatively they may be implemented in a number of phases as a result of trade demands, port operational requirements and funding.

It is anticipated that a phased implementation is likely to comprise three main elements as listed below.

Phase 1 – Ringaskiddy East comprising;

(a) Improvements to existing port entrance adjacent to existing DWB entrance
(b) Pier, slipway and amenity area at Paddy's Point
(c) Elements of internal road improvements to facilitate access to Ringaskiddy East
(d) Construction of the CB/MPB and associated container storage and handling areas
(e) Additional Internal Roads to facilitate connection to new N28, when constructed, at eastern end of port complex / Ringaskiddy Village

Phase 2 – Ringaskiddy West comprising;

the extension to the existing DWB

Phase 3 – Ringaskiddy East comprising;

additional quay wall and floating linkspan to accommodate RoRo traffic at the CB/MPB.

This facility will not be brought into commission for accompanied RoRo freight traffic until the new N28 is in place and operational.

2.2.6 Construction Activities

The construction of the proposed works may be undertaken in a number of phases. It is estimated that the construction period for Ringaskiddy East will be approximately 2 years.

Construction of the DWB extension at Ringaskiddy West is anticipated to require approximately 11 months. It is not anticipated that this element will be constructed concurrently with Ringaskiddy East.

Temporary Site Compound
An area will be required for the establishment of the Contractor's site compound. The site compound will be used for the Contractor's site office accommodation and facilities and will include an area for temporary storage of construction materials.

Site Access
Existing port operations will continue as normal during the construction period.

Suitable traffic management and other systems will be put in place as required to minimise disruption to existing activities during the construction period. These will include:

- Upgrade of the existing DWB entrance prior to major construction works being undertaken.
- Segregation of entrances
- Suitable restrictions on timing of deliveries to avoid peak traffic periods
- Preparation of a detailed traffic management plan for the construction phase

Site Safety
The works will be subject to the Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations, 2013. All aspects of design construction will be

reviewed with regard to health and safety and a risk assessment will be carried out. A project supervisor (design phase) will be appointed to produce a pre-tender Health and Safety Plan for the project. The principal contractor will be responsible for the control and co-ordination of health and safety during the works and will be appointed as the project supervisor (construction stage).

Waste Disposal
Contractors working on site during the works will be responsible for the collection, control and disposal of all wastes generated by the works.

2.2.7 Operational Activities

Maintenance
When construction work has been completed, the quays and revetments will require little by way of maintenance.

Although some siltation may occur in the new dredged areas the water depth is such that this is unlikely to cause any significant problem in the short term. Any maintenance dredging which may be required in the longer term will be carried out as part of the Port of Cork's regular maintenance dredging programme. The material generated would likely be disposed of at sea at a licensed disposal site agreed in accordance with Port of Cork's maintenance dredging licence.

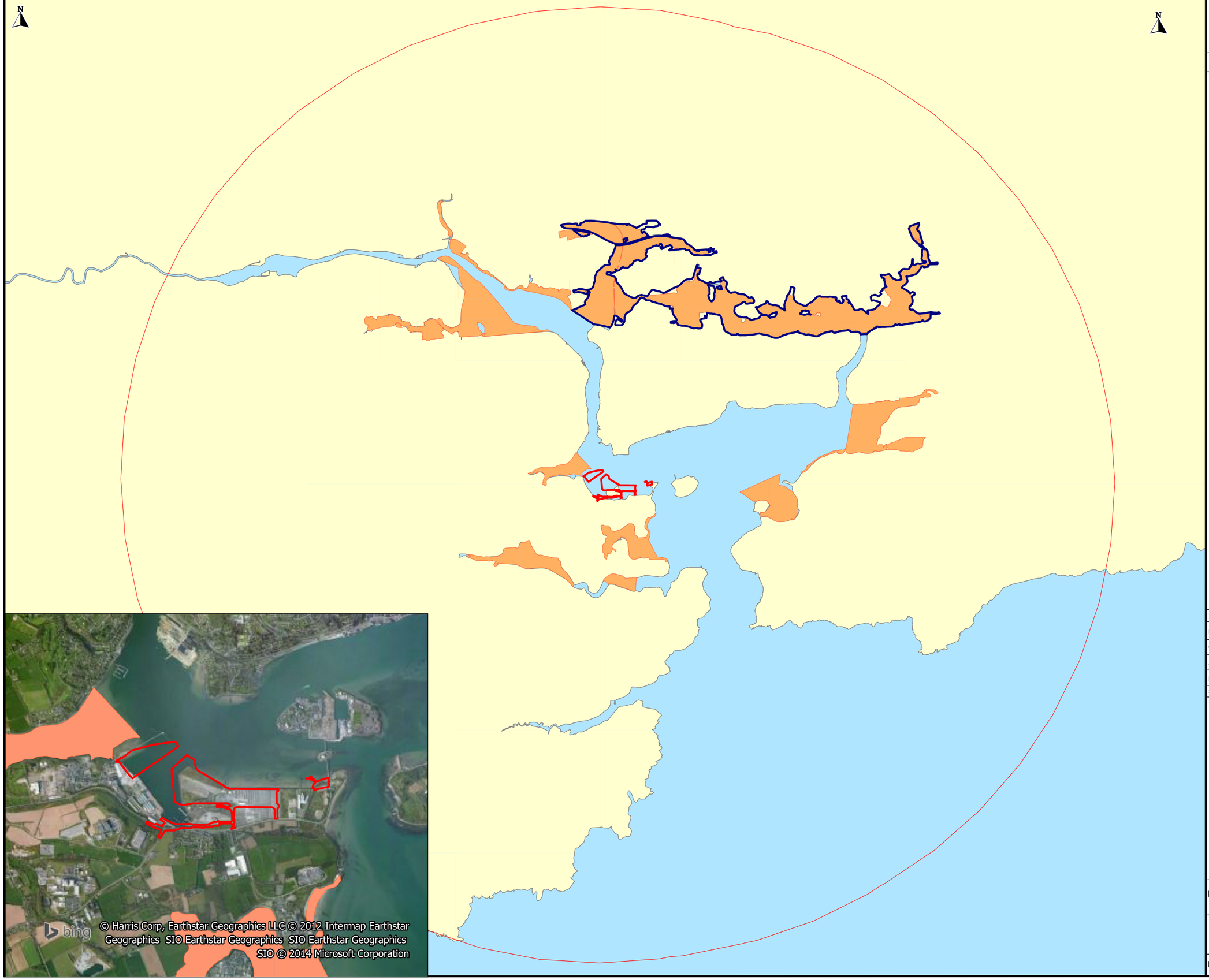
Pollution Control
Surface water from the main quay and working areas will be collected by a system of drainage channels and gullies. The surface water will be discharged to sea via oil and sludge interceptors to ensure that no pollution is released into the harbour or surrounding waters.

Sewage disposal from the proposed buildings will be by connection to the proposed Lower Harbour Drainage Scheme, or if this is not in place by package treatment works and discharge to a soakaway system.

Waste Disposal from Vessels
Port of Cork operates an Environmental Management System (EMS) which includes procedures for the disposal of waste from berthed vessels.

All waste to be disposed of from berthed vessels will be handled and disposed by a licensed waste disposal contractor. Waste awaiting disposal will not be permitted to be stored on the quayside.

Discharges from vessels to the harbour waters will not be permitted.



Note:
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LEGEND

- Ringaskiddy Port Redevelopment (and 15km buffer)
- Cork Harbour SPA
- Great Island Channel SAC

Issue Details

Drawn:	SL	**Project No.**	NI 1004
Chkd:	JMC	**File Ref.**	N/A
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Date:	April 2014	**Drawing No.**	Figure 1
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Project: *Ringaskiddy Port Redevelopment Natura Impact Statement*

Title: ***European Sites within 15km of Ringaskiddy Port Redevelopment***

Figure Number: **1**

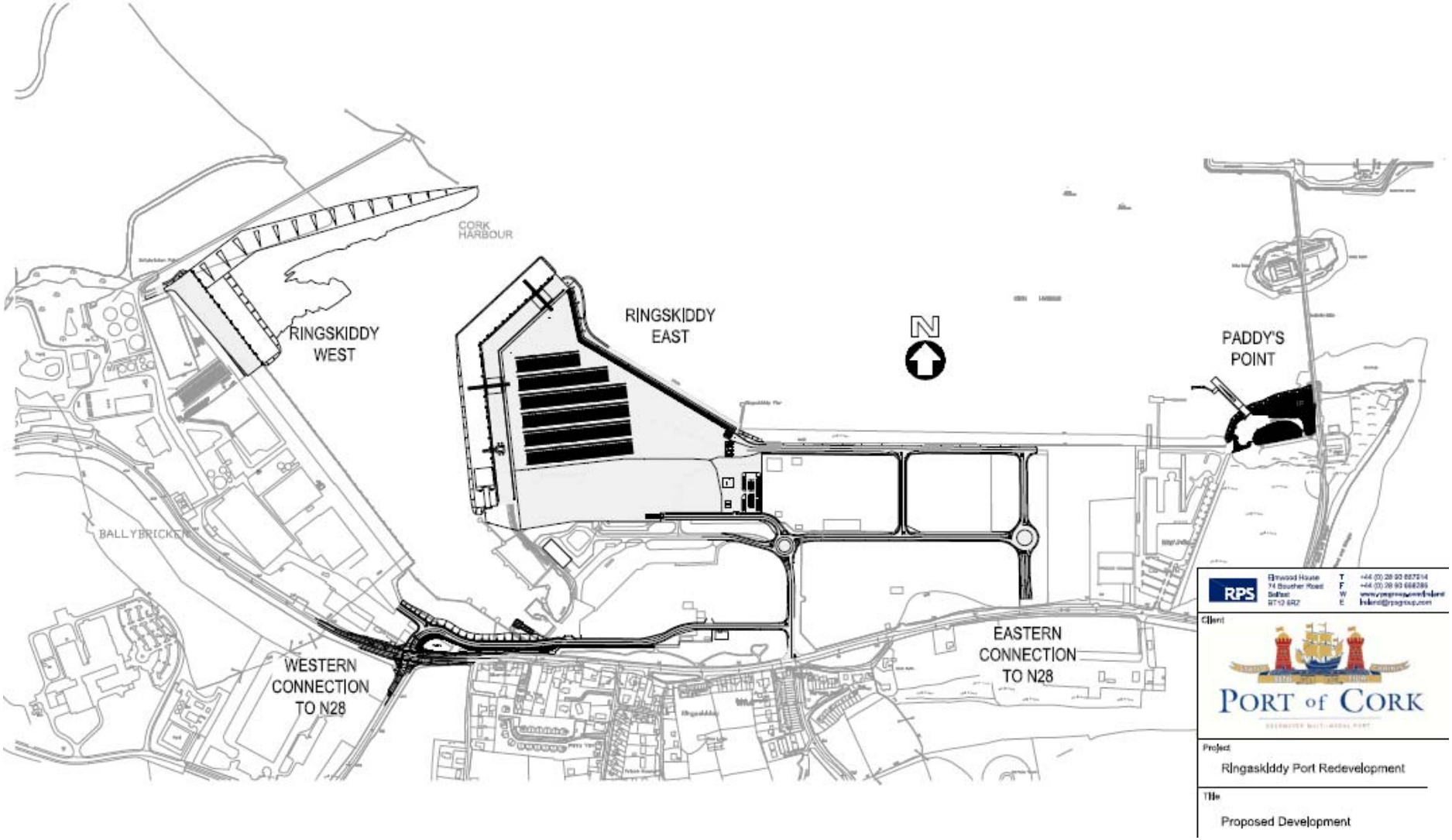


Figure 2: Extent of the proposed Ringaskiddy Port Redevelopment

Table 4: Conservation Status, Sensitivity and Threats to SAC and SPA Qualifying Interests screened in this assessment

Qualifying Interest	Site Sensitivity	Conservation Status, Trend in Conservation Status[3]	Threats[4]
Little Grebe Great Crested Grebe Cormorant Grey Heron Shelduck Wigeon Teal Pintail Shoveler Red-breasted Merganser Oystercatcher Golden Plover Grey Plover Lapwing Dunlin Black-tailed Godwit Bar-tailed Godwit Curlew Redshank Black-headed Gull Common Gull Lesser Black-backed Gull Common Tern Wetlands & Waterbirds	Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.	The favourable conservation status of a species is achieved when: • population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and • the natural range of the species is neither being reduced nor is likely to be reduced for the • foreseeable future, and • there is, and will probably continue to be, a sufficiently large habitat to maintain its • populations on a long term basis.	Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat.
Estuaries	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Sensitive to changes in salinity and tidal regime as well as coastal development	Inadequate Improving (+)	Pollution to surface waters (limnic & terrestrial, marine & brackish); nautical sports Fishing and harvesting aquatic resources; estuarine and coastal dredging; other outdoor sports and leisure activities; bottom culture suspension culture; piers

[3] http://www.npws.ie/en/PublicationsLiterature/ConservationStatusReport/
[4] http://www.npws.ie/publications/euconservationstatus/

Qualifying Interest	Site Sensitivity	Conservation Status, Trend in Conservation Status[3]	Threats[4]
			/ tourist harbours or recreational piers; slipways
Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Sensitive to changes in salinity and tidal regime as well as coastal development.	Inadequate Improving (+)	Pollution to surface waters (limnic & terrestrial, marine & brackish); Fishing and harvesting aquatic resources; Bottom culture; Hand collection; Estuarine and coastal dredging; Nautical sports; Other outdoor sports and leisure activities
Spartina swards (Spartinion maritimae)	Marine water dependent. Medium sensitivity to hydrological changes. As Spartina is considered to be an invasive species in Ireland, it is assessed in a different way to other habitats. Increases in the area and extent of Spartina swards are actually considered to be unfavourable and as future expansion is considered likely, the overall conservation status of this habitat is rated as poor.	Poor	
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Sensitive to changes in salinity and tidal regime as well as overgrazing, erosion and accretion	Inadequate Stable (=)	Climate Change; Intensive cattle grazing; intensive sheep grazing; paths, tracks, cycling tracks; disposal of household / recreational facility waste; disposal of industrial waste reclamation of land from sea, estuary or marsh; polderisation; Modification of hydrographic functioning, general; Erosion; invasive non-native species

2.3 SCREENING ASSESSMENT

The purpose of this Screening Assessment is to examine the possibility that the proposed works, either individually or in combination with other plans and projects, may result in significance negative effects of on the Conservations Objectives and the integrity of the European Sites discussed previously.

If there is deemed to be potential for significant effects or if this is considered to be a possibility or is uncertain, then the AA process must either proceed to Stage 2 (Appropriate Assessment).

2.3.1 Consideration of Significance

In terms of significance, NPWS Guidance uses the EC definition "any element of a plan or project that has the potential to affect the conservation objectives of a Natura 2000 site, including its structure and function, should be considered significant (EC, 2006)".

In order to assess the likely impacts, and ascertain whether or not a significant impact on the integrity of the European Sites being screened is likely to occur as a result of the proposed development, it is necessary to consider what constitutes the integrity of a site as referred to in Article 6 (3) of the Habitats Directive. European Commission guidance (EC, 2000b) gives clear guidance on this matter, and states that "*The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives*."

2.3.2 Potential Impacts on Great Island Channel SAC

It is considered that there are three mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

- Smothering of habitats within the SAC by hydrological linkage as a result of deposition of increased suspended sediments arising from dredging operations associated with the proposed works;
- Deterioration of habitats within the SAC by hydrological linkage as a result of pollution incidences arising from construction or operation of the proposed works; and
- Introduction of invasive plant species to Ringaskiddy Port, which could result in their spread to locations within the SAC.

No direct habitat loss or habitat disturbance is predicted 5km up the Cork Harbour main channel (River Lee) from Ringaskiddy Port as a result of the proposed works.

2.3.3 Potential Impacts on Cork Harbour SPA

It is considered that there are five mechanisms by which an adverse effect on the Conservation Objectives of the SPA might potentially occur during construction activity, as follows:

- Smothering of habitats within the SPA by hydrological linkage as a result of deposition of increased suspended sediments arising from dredging operations associated with the proposed works;
- Deterioration of habitats within the SPA by hydrological linkage as a result of pollution incidences arising from construction or operation of the proposed works.
- Long term deterioration of habitats within the SPA as a result of the new built elements within Ringaskiddy Port altering the natural coastal processes and extant sediment transport regime in the area;
- Direct noise and visual disturbance; and
- Unintentional installation of additional perches for predators.

2.3.4 Screening Matrix

Tables 5 and 6 provide a summary of the likely effects of the proposed development on the European Sites identified in Table 1. These effects are predicted having applied the precautionary approach set out in Commission Guidance and as required by the Court of Justice of the European Union in C-127/02 (Waddenzee).

Table 5: Screening Matrix of potential effects of the Port redevelopment on European Sites

Site Code	Site Name	Qualifying Interests	Description of potential effect	Predicted Magnitude of Effect
001058	Great Island Channel SAC	• Estuaries • Mudflats and sandflats not covered by seawater at low tide • Spartina swards (Spartinion maritimae) • Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1) Pollution incident may result in deterioration of habitats within the SAC by hydrological linkage arising from construction or operation of the proposed works. 2) Suspended sediment transported by dredge plume may result in habitat smothering within the SAC by hydrological linkage arising from construction or operation of the proposed works. 3) Introduction of invasive plant species to Ringaskiddy Port, which could result in their spread to locations within the SAC.	1) Risk of a pollution incident affecting the SAC is very low as the site is 5km up the channel. The predicted magnitude of effect is non-significant. 2) Risk of elevated suspended sediment reaching the SAC is low, but this prediction lacks certainty as Cork Harbour is a complex system. A hydrodynamic model is required to establish the degree of risk to the SAC. 3) Port of Cork has strict controls of discharges and waste from vessels, in accordance with Ballast Water Management (BWM) Convention, with ballast water exchange only occurring mid ocean. The predicted magnitude of effect is non-significant.
004030	Cork Harbour SPA	• 22 species of overwintering birds • 1 species of breeding bird • Wetlands & Waterbirds	1) Smothering of habitats within the SPA by hydrological linkage as a result of deposition of increased suspended sediments arising from dredging operations associated with the proposed works. 2) Deterioration of habitats within the SPA by hydrological linkage as a result of pollution incidences arising from construction or operation of the proposed works. 3) Long term deterioration of habitats within the SPA as a result of the new built elements within Ringaskiddy Port altering the natural coastal processes and extant sediment transport regime in the area.	1) Risk of elevated suspended sediment reaching the SPA is uncertain. A hydrodynamic model required to establish degree of risk. 2) Seabed in Ringaskiddy Basin may contain contaminants currently trapped in the silt which dredging may release into the water column. Linked with (1) above, seabed sampling is required to identify the magnitude of this risk. The risk of polluting substances entering Cork Harbour during construction of the new marine infrastructure is low as the project requires adherence to stringent pollution prevention measures (e.g. CIRIA Technical Guidance C532 / C648). 3) Risk of long term alteration in the natural coastal processes and extant sediment transport regime is uncertain. A hydrodynamic model is required to establish the degree of risk to the SPA.

Site Code	Site Name	Qualifying Interests	Description of potential effect	Predicted Magnitude of Effect
			4) Direct noise and visual disturbance.	4) The risk of direct noise and visual disturbance is high, as the project requires a two year construction programme for Ringaskiddy East and almost 1 year to construct Ringaskiddy West. The latter component is located 60m from the SPA at its nearest point. SPA high tide roosts are close to the proposed works. A breeding Common Tern Colony is located 25m of the proposed works, albeit outside of the SPA. An evaluation of avifauna at Ringaskiddy Port is required to add more certainty to the degree of risk.
			5) Unintentional installation of additional perches for predators.	5) New development to include tall structures (quayside cranes and lighting columns) may introduce more opportunities for predator (raptor or large gull) perching posts. This can lead to an increased perceived risk of predation by nesting terns and wintering waders. An evaluation of avifauna at Ringaskiddy Port is required to add more certainty to the degree of risk.

Table 6: Summary Table of potential direct, indirect and secondary effects of the Port redevelopment on European Sites

Site Name	Direct Impacts	Indirect/ Secondary	Resource Requirements (Drinking Water Abstraction Etc.)	Emissions (Disposal to Land, Water or Air)	Excavation Requirements	Transportation Requirements	Duration of Construction, Operation, Decommissioning
Great Island Channel SAC	No direct loss or impact on qualifying habitats	Potential effects of pollution or contaminat release	No requirement, and no impact on qualifying habitats	Potential effects of suspended sediment depositing in SAC	No requirement, and no impact on qualifying habitats	No requirement, and no impact on qualifying habitats	No impact on qualifying habitats
Cork Harbour SPA	Noise and Visual disturbance	Potential effects of pollution or contaminat release	No requirement, and no impact on qualifying species	Potential effects of suspended sediment depositing in SPA	No requirement, and no impact on qualifying species	No requirement, and no impact on qualifying species	Potential disturbance effects on qualifying species

2.4 IN COMBINATION WITH OTHER PLANS AND PROJECTS

Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are considered. On this basis, other plan and projects were assessed for their potential to have in-combination effects with the Ringaskiddy Port Redevelopment.

2.4.1 Carrigaline Electoral Area Local Area Plan 2011

The Plan provides the planning policy and zoning objectives for Ringaskiddy, with a aim to reaffirm its strategic industrial and port related roles and seek to promote its potential for large scale stand alone industry, which are in line with the strategic objectives for the settlement. The majority of land around Ringaskiddy is zoned for industrial use, although the village core is zoned for town centre / neighbourhood uses and there is some provision made for open space and amenity use. The Natura Impact Report associated with the Plan was reviewed, which took into consideration the development also provided for in the Midleton, Blarney and Bandon Electoral Area Local Area Plans 2011 and the Cork City Development Plan 2009-2015.

2.4.2 IMERC Masterplan

A Masterplan for the Irish Maritime and Energy Resource Cluster (IMERC) adjacent to the National Maritime College of Ireland (NMCI) aims to deliver research and enterprise campus in Ringaskiddy, Cork. The Beaufort Laboratory is currently under construction by UCC. It is proposed to expand the campus and to develop a marine and energy cluster focussing on research, development, commercialisation and innovation. CIT / UCC intend to prepare a masterplan for the layout and design of this future campus development. No significant negative effects upon Cork Harbour SPA are predicted as part of the assessment associated with that application.

2.4.3 Spike Island Masterplan

The Spike Island Masterplan envisages use of Spike Island for public events, concerts etc. In the long-term it is hoped that the island could attract 300,000 visitors per annum. The Masterplan also identifies the subject site at Haulbowline as a possible future ferry access point. Fáilte Ireland has allocated funding for the progression of Spike Island Masterplan, as announced on 23rd October 2013. At the time of writing this EIS, it is expected that the funding will be used for the creation of 3 interpretive centres on Spike Island along with the improvement of marine access facilities to the Island. It is expected that these facilities will be completed in 2015.

2.4.4 Port of Cork Maintenance Dredging

Port of Cork submitted an application to the EPA in February 2014 for a maintenance dredging programme. That application was accompanied by a Natura Impact Statement (NIS) which was reviewed as part of this analysis. The dredging campaign extends from the City Quays and Tivoli Docks in Cork City, out to Roche's Point. Coastal hydrodynamic modelling was undertaken as part of that assessment to help determine the spread of the dredge plume. The NIS concluded that all of the potential impacts identified will be avoided, and that the proposed maintenance dredging would not have a significant negative impact on either European Site being considered here.

2.4.5 Monkstown Marina

Proposals for a new marina at Monkstown were submitted for planning permission and that application included a NIS. The marina comprises car-parking, retail, office and landscaping, with a requirement to dredge part of the seabed in the shallower parts of the marina and in a band paralleling the shore to enable safe access by craft during all states of the tide. The NIS concluded that the marina at Monkstown will not result in the loss of any feeding areas or roosting sites for wintering waterfowl or waders and consequently no impact on the qualifying interests for Cork Harbour SPA.

2.4.6 East Tip Remediation Project, Haulbowline Island

The primary objective of this project is to remediate the East Tip thereby ensuring that potential risks to humans and the wider environment are minimised. It is proposed the waste at the site will be

contained by constructing an engineered capping system on top of the waste and a perimeter engineered structure around the waste body. The project additionally seeks to widen the access road and construct a slipway and floating pontoon. A NIS was prepared for this application. That assessment concluded after screening that two potential pathways of effect upon the qualifying interests of Cork Harbour SPA remained, and Stage 2 assessment was undertaken. It concluded that there was no potential for significant negative impacts upon the integrity of Cork Harbour SPA arising either alone or in combination with any other plans or proposals, from the proposed East Tip Remediation Project at Haulbowline Island.

2.4.7 Hammond Lane Metal Company

Planning permission was granted in 2012 for demolition, new build, upgraded facilities, new processing plant etc at the Hammond Lane Metal Company located adjacent to the N28 opposite the proposed eastern entrance to Port lands at Ringaskiddy. The ecological impact assessment prepared for this project was reviewed. No significant negative impacts upon the integrity of Cork Harbour SPA were predicted.

2.4.8 Cork Lower Harbour Energy Group

Five large single turbines being developed by the Cork Lower Harbour Energy Group have been given planning permission. Three had been erected by April 2014. The structures are being developed on existing industrial zones land within the facilities of a group of healthcare manufacturing sites in the Ringaskiddy and Currrabinny areas. The EIA and NIS documents prepared for these turbine applications were reviewed which included an assessment on avifauna. That analysis concluded that there would be no displacement of any species which is a qualifying interest of the SPA, and no significant impact on the integrity of Cork Harbour SPA was predicted.

2.5 CONSLUSIONS OF SCREENING ASSESSMENT

The Screening Assessment was completed in compliance with the relevant European Commission and national guidelines. The potential impacts during the construction and operation of the associated activities with the Ringaskiddy Port Redevelopment have been considered in the context of the European Sites potentially affected, their Qualifying Interests and conservation objectives. From the findings of the Screening exercise, it is concluded that the proposed project (as described in Section 2.2;

- Is not directly connected with or necessary to the management of any Natura 2000 site; and
- Has the *potential* to give rise to significant adverse effects on the qualifying interests of Great Island Channel and Cork Harbour SPA;

Therefore adopting the precautionary approach, in line with current guidance, a Stage 2 Appropriate Assessment of the proposal is required, and is contained in the next section of this report.

3.0 APPROPRIATE ASSESSMENT

This stage of the assessment process comprises a comprehensive impact assessment arising from the conclusions of the Screening assessment as set out in section 2, which could not rule out the potential for certain significant effects on both Great Island Channel SAC and Cork Harbour SPA.

The preparation of this assessment has progressed in tandem with preparation of an EIS for the project. The Appropriate Assessment has been informed by surveys and specialist analysis commissioned as part of the EIS. Appendix 3 of this NIS contains a schedule of environmental commitments included in the EIS associated with this project. Together, the proposed design of the project components and construction methods (outlined in Appendix 2) and the proposed mitigation (Appendix 3) collectively form the proposed redevelopment.

Specialist reports relied on in this assessment which are located at Volume I of the EIS include the following-

- Noise and Vibration impact assessment presented in EIS Chapter 9
- Air Quality and Climate impact assessment presented in EIS Chapter 10
- Coastal processes including a flow regime, sediment transport and water quality modelling assessment presented in EIS Chapter 12
- Water Quality assessment presented in EIS Chapter 13
- Marine Ecology assessment of habitats and species including marine mammals presented in EIS Chapter 14
- Ornithological impact assessment presented in EIS Chapter 15.

Key qualifying features for each European Site under consideration are detailed in the Screening Assessment. Those effects which were not ruled out at Stage 1 as described in Table 5 are taken forward to Stage 2.

3.1 POTENTIAL SIGNIFICANT EFFECTS

The risk of deterioration of habitats within the Cork Harbour SPA and the Great Island Channel SAC by hydrological linkage arising from a pollution incident related to construction or operation of the proposed works has been further informed by the coastal process, water quality, marine ecology and ornithological assessment in the EIS and is discussed here in more detail.

The potential risk of elevated suspended sediments being transported by a dredge plume to Cork Harbour SPA and the Great Island Channel SAC and settling there resulting in smothering of SPA or SAC habitats has been considered by the coastal process, water quality, marine ecology and ornithological assessments in the EIS and is discussed here in more detail.

The potential risk of long term deterioration of habitats within the SPA as a result of the new built elements within Ringaskiddy Port altering the natural coastal processes and extant sediment transport regime in the area has been considered by the coastal process and ornithological assessments in the EIS and is discussed here in more detail.

The potential risk of direct noise and visual disturbance and the risk of increased predation has been considered by the ornithological assessment as informed by the noise assessment in the EIS and is discussed here in more detail.

3.2 SPECIALIST ASSESSMENTS

3.2.1 Coastal Processes Assessment

The modelling of the coastal processes was undertaken using RPS coupled tide, wave and sediment transport Mike21 flexible mesh model of the Cork Estuary. The modelling was divided into the two main areas of flow regime and sediment transport. The coastal process models were set up and calibrated for the existing Port layout to provide a baseline for comparison with the proposed

redevelopment once constructed. The models were also used to quantify the impact of the proposed development during the construction phase due to dredging.

The model of the estuary extends from Cork City to Roberts Cove in the south and has detailed regions in the vicinity of the redevelopment and also in locations with rapidly varying water depth. This meant the model was entirely adequate for the simulation of the coastal processes and the dredging activity associated with the proposed redevelopment in Ringaskiddy Basin.

The model simulations were undertaken for the existing Ringaskiddy Port layout and then re-run for the Port with the proposed redevelopment. Any changes in the coastal process regime were identified and quantified in order that the extent and nature of the impact of the proposed redevelopment could be clearly identified. The models were verified by comparison of tidal height across the model domain with tide gauge network data and by comparison with recorded current meter readings collected specifically for the EIS by Irish Hydrodata.

The changes in flows are limited to the vicinity of the redevelopment with reduced peak currents in the lee of the structures with localised increases where the flow is redirected further offshore around the structures. The velocities experienced are within the range of those currently seen but are relocated due to the construction. For locations within the main channels surrounding the redevelopment there is no discernible difference in tidal currents.

The average, or residual, tidal currents were also assessed to establish the impacts on sediment transport. In the wider domain the form of the sediment transport processes remain the same with circulatory currents within Ringaskiddy and easterly transport along the port. At Paddy's Point, where a new pier and slipway is proposed, the accretion which is currently experienced to the east of the existing Ringaskiddy Pier is expected to increase marginally. The reduced currents will allow easier access to the amenities site and as a result sediment transport will be reduced either side of the proposed slipway.

There will be very little change in current beyond the development and therefore sediment transport will remain unchanged. The only localised changes are in the immediate vicinity of the pier and slipway at Paddy's Point and maintenance dredging within Ringaskiddy would remain at the current scale and frequency.

Sediment modelling was carried out relating to the dredging plumes and subsequent sedimentation during the capital dredging proposed. The ecology team highlighted the sensitivity of the Monkstown Creek area being part of Cork Harbour SPA. The dredging operations were simulated using the numerical model and implementing the dredging techniques proposed, i.e. the use of a trailing hopper suction dredger at the western site and a backhoe method at the eastern site. The modelling was carried out the over the period required to expedite the dredging and included the appropriate sediment releases into the water column in accordance with each dredging means. The sediment was modelled using the grading and settling characteristics of samples collected at each of the dredging sites.

The results of the dredging simulations showed that beyond the immediate vicinity of the operations the resulting sedimentation depths are a fraction of a millimetre, which would not be discernable. The largest proportion of the sediment, mainly sand and coarser material, will be deposited at the dredge site itself and be removed by successive dredging operations. The finer material remains in suspension for longer and is dispersed more widely through the area, however subsequent deposition depths are insubstantial.

As expected the largest suspended sediment concentrations are within the redevelopment site itself as this is where that material is released. The sheltered nature of the site and the presence of the breakwater reduces the excursion into Monkstown Creek and the River Lee. Suspended solids concentration below 20mg/l would have little significance given the background suspended levels which are known to exist, particularly in relation to silt carried into the Estuary. These levels are not expected to be reached at the Great Island Channel SAC.

The suspended sediment concentration will vary over the course of the dredging operations depending on tidal levels, flows and due to the operations themselves. The Monkstown Creek site

experiences maximum values of around 400mg/l but these do not persist for the entire tidal cycle or across the extent of the inlet. Similarly the other sites in the main channel vary; with those north of the dredging experiencing the lowest concentration. The highest concentrations are to the east of the redevelopment – this is in the direction which the residual currents indicated sediment transport would occur. Even at this location, the peak concentrations do not persist for large parts of the tidal cycle.

Examination of the planning history shows that there are only two proposed activities which are not land based. The Monkstown marina consists of floating berths and breakwaters located on the western shore at Monkstown. Modelling of the coastal processes has been undertaken for this development as part of a request for further information by the planning authority. The modelling showed that there would be no effect on the coastal processes with no change in tidal levels and the effect on the tidal currents restricted to the project area with changes of not greater than 0.04m/s. Thus this development will not have a cumulative effect with the proposed Ringaskiddy Redevelopment. Similarly the remedial work proposed at the eastern end of Haulbowline Island will not have a cumulative effect. While the Haulbowline Island scheme will require some dredging activity at this site, the works proposed will mainly be carried out behind retaining structures to reduce the impact within the estuary and therefore the anticipated footprint of these activities will not encroach on the proposed redevelopment even if they are undertaken coincidently.

In summary, a modelling programme was undertaken to evaluate both the construction and operational phases of the proposed redevelopment at Ringaskiddy; this included tide and sediment transport modelling. The impact of the proposed redevelopment was quantified in terms of the changes in current regime for both the proposed redevelopments at Ringaskiddy and the additional slipway at Paddy's Point. The proposed construction will not impact on tidal current regime beyond the immediate vicinity of the redevelopment. A minor increase in maintenance dredging will be required at Paddy's Point but the general sediment transport regime will remain unchanged.

Sediment plume and deposition modelling was undertaken for dredging during the construction phase of the Ringaskiddy East and West sites showing minimum levels of deposition outside the immediate vicinity of the dredging envelope. Suspended sediment levels associated with the dredging programme showed that the turbidity levels would be increased within the local area but peaks would only persist for short periods of the tide.

There are two proposed marine projects adjacent to the Ringaskiddy redevelopment which have been considered in respect of cumulative impacts. There is a proposed marina at Monkstown which has been shown to have no significant impact on the coastal processes and there is a remedial operation planned for the eastern end of Haulbowline Island. The impact from both projects is not anticipated to cause a cumulative effect in conjunction with the proposed redevelopment.

3.2.2 Water Quality Assessment

An analysis of water quality was undertaken, and an assessment if water quality parameters in accordance with the Water Framework Directive was made. Twelve sample locations in the vicinity of the proposed dredging locations for the project were selected for monitoring in consultation with Marine Institute.

Suspended Sediments

The construction works associated with the proposed redevelopment involve temporary working areas and access to the intertidal area by heavy plant and machinery, impact piling, infilling and physical disturbance to an area within the intertidal area. This will result in a temporary increase in suspended sediment levels and the potential to damage the marine environment. The works involved in the construction of the new Container Berth / Multi-purpose Berth (CB/MPB) and the extension to the existing Deepwater Berth (DWB) will also require dredging works to varying levels in order to facilitate navigational access to the new facilities; which will result in a temporary increase in levels of suspended sediment. Whilst rock material recovered from the proposed dredging works at Ringaskiddy East will be re-used as much as possible for the construction works it is envisaged that there will be the need for imported fill material to be sourced locally to complete the infilling within the port redevelopment. Importation of fill material containing fines has the potential to result in an increase in the suspended solids in the immediate vicinity of the works.

The impact of ongoing maintenance dredging activities associated with the existing Port is one of the reasons for the designation of Cork Harbour coastal water body as a 'heavily modified water body'.

The sediment sampling programme and analysis established that the baseline sediment quality within the Ringaskiddy Port is largely in compliance with the lower level guideline concentrations for all parameters with the exception of nickel which has been attributed to natural background concentrations. The dredging activities will not therefore result in the release of contaminated sediments into the water column.

Chapter 12 in Volume I of the EIS provides an assessment of the impact of the proposal on coastal processes (as summarised previously in section 3.2.1) and includes sediment plume and deposition modelling undertaken for dredging during the construction phase of the DWB and CB/MPB. The modelling has been based on the assumption that either a trailing hopper suction dredger (THSD) or a combination of THSD and backhoe dredger will be employed for the dredging operations. The most likely scenario is the use of a THSD at the western site and a backhoe method at the eastern site as these suit the composition of the material to be removed and the works being undertaken. The modelled dredging applied a spill rate of 2% at each site, with the source being locating at the dredging head or bucket adjacent to the bed to replicate the sediment which is mobilised during operations. A further 2% was released within the water column in accordance with dredging techniques anticipated to be used in the eastern site. This sediment was released throughout the water column as the spill occurs as the backhoe bucket is lifted through the water.

The sediment plume and deposition modelling undertaken for dredging of Ringaskiddy East and West shows the deposition depths are a fraction of a millimetre, which would not be discernable from background levels but have been included on the figures to demonstrate the maximum excursion from the site.

Suspended sediment levels associated with the dredging programme showed that the levels would be increased within the local area but peaks would only persist for short periods of the tide. Time series of the dredging operations at four locations presented in Chapter 12 of the EIS indicate suspended sediment concentration will vary greatly over the course of the dredging operations depending on tidal levels, flows and due to the operations themselves. The concentrations are largest within the redevelopment site itself as this is where that material is released, however the sheltered nature of the site and the presence of the breakwater reduces the excursion into Monkstown Creek and the River Lee.

Given the presence of designated Shellfish Areas in Cork Harbour and the guideline standards required for suspended solids in shellfish waters, it is evaluated that elevated suspended solids would have the potential for significant impacts. However Chapter 12 of the EIS, which has fully considered the mitigation measures proposed for the dredging (i.e. the use of a trailing hopper suction dredger where possible on the western dredge site and no barge overspill permitted), has demonstrated that the dispersion of sediment in the vicinity of the works will not affect the shellfish designations in Cork Harbour, with concentrations in the vicinity of the shellfish areas at acceptable levels above background concentrations. Water quality monitoring will be undertaken in real time to ensure suspended solid limits as required by schedules of the Quality of Shellfish Waters Regulations, 2006 (S.I. No. 268 of 2006).

The impact associated with suspended solids is considered to be negligible due to the temporary nature of the impact, the fact that peaks would only persist for short periods of the tide and the concentrations in the sensitive protected areas are predicted to be within acceptable levels above background.

Oil and Chemicals

The proposed construction works will involve the use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals in close proximity to Cork Harbour. During construction phase there is the potential for accidental spillage or release of construction materials (e.g. diesel, oil, chemicals) directly into Cork Harbour. It is also possible that residual contaminants post-construction may be mobilised by surface run-off and washed into the harbour. With the mitigation proposed, the risk of accidental spillage of oil and chemicals is low and the potential impact is considered to be negligible.

Cement and Concrete
For the construction of the new quay walls, concrete deck elements of the container terminal area and slipway and pier at Paddy's Point it is possible that concrete could be released into the aquatic environment. Fresh concrete and cement is highly alkaline and therefore will affect water quality if washed into Cork Harbour. With mitigation measures proposed in relation to the use of chemical admixtures and pre cast concrete units for underwater elements of the construction, the impact is considered to be small adverse and with a significance rating of moderate over the short term. The extent of the impact is localised given the sheltered nature of the Ringaskiddy Basin where the residual current is circulatory in nature.

3.2.3 Marine Ecology Assessment

Benthic communities
Sampling was undertaken within the inner Ringaskiddy Basin and along the area of the proposed redevelopment at Paddy's Point to make an assessment of potential impacts from the proposed development in each area. These surveys included an intertidal walkover at Ringaskiddy Basin and Paddy's Point and subtidal video and benthic assessments at Paddy's Point and the Ringaskiddy Basin.

The communities identified within the Ringaskiddy Basin are also common in Irish waters and common throughout Cork Harbour. The subtidal consists of infralittoral sandy muds with kelp communities present adjacent to the hard benthos along the eastern part of the Ringaskiddy Basin. The hard benthos present along the eastern side of the basin consists of communities typical of sheltered estuarine and marine shores. An intertidal mussel bank is located beneath the existing ADM Jetty.

A number of habitats were identified along the intertidal sections of Paddy's Point. These include a small, barren shingle beach immediately adjacent to the roadway near Haulbowline Bridge. The hard benthos in the area consists of habitats typical of sheltered marine shores. A large mussel bank is present along the lower intertidal and subtidal stretches at Paddy's Point. Shallow sub-tidal soft sediment communities consist of infralittoral muddy sands.

The impacts associated with the proposed development will result in the permanent loss of approximately 3 hectares of intertidal and subtidal communities within the Ringaskiddy Basin. These communities are common throughout Cork Harbour and as such, this impact is considered minor negative overall. The dredging of approximately 8.5 hectares of soft sediment within the Ringaskiddy Basin will result in the temporary loss of the benthic communities within the immediate dredge footprint. Due to the nature of the benthic communities identified in the area, recovery to pre-dredge levels is expected within 2 years. Some deposition has been identified for Monkstown Creek, however the levels expected are very small (<0.1mm deposition thickness), and as such no impact is anticipated for the benthic communities present. No impacts are expected on the SPA or SAC sites within Cork Harbour as a result of the dredging activities in Ringaskiddy.

Fisheries, Pinnipeds and Cetaceans
Cork Harbour is the site of a diverse range of resident and migrant estuarine and marine species, numerically dominated by a small range of species both benthic, demersal and pelagic, which are typical for coastal and estuarine sites around Ireland. Prominent species include sprat, gobies, mullet, flounder, plaice, sand smelt, pipefish, cod and five-bearded rockling wrasse etc. The harbour is the site of a flourishing draft net fishery for salmon and also hosts a small inshore commercial fleet targeting a range of fish and crustacean species including green, brown and velvet crab, shrimp, lobster cod, flatfish etc. Within the Ringaskiddy Basin trawling revealed a fish community typical mainly of a soft bottom environment dominated by juvenile flatfish, especially plaice, with gobies also frequent. Mobile invertebrates included green crab, swimming crabs, brown shrimp, and palaemon shrimp among others.

The loss of approximately 3 hectares of subtidal and intertidal habitat will result in a negligible adverse impact on wild fish populations. Migrating salmon smolts will not delay on their outward migration to sea and research by the Marine Institute in Clew Bay has shown that smolts travel at speeds of 1.5km per hour on their way through Clew Bay to the open ocean. Given these additional factors it can be

concluded that it is very unlikely that any salmon smolts migrating through Cork Harbour will be adversely impacted by the pile driving operation in Ringaskiddy.

Cetaceans, in particular harbour porpoise and bottlenose dolphin, as well as harbour seals and grey seals, temporarily using the area will potentially be exposed to the noise produced by pile driving and dredging. Based on existing information and the results of a site visit and survey, it is concluded that the probability of significant numbers of cetaceans using the waters of Ringaskiddy basin is low, however there is a higher probability of individual seals (grey and harbour seals) occasionally using the basin waters. NPWS Guidance on minimising risk to marine mammals from pile driving and dredging operations will be complied with, to include the use of a fully qualified and experienced marine mammal observer (MMO).

3.2.4 Ornithological Assessment

The nature of the proposed redevelopment has the potential to impact upon ornithological interests, both directly and indirectly, during construction and operation. The main potential impacts fall into the following broad categories:

- **Habitat and Food Resource Loss**
  - Direct habitat and food resource loss;
  - Indirect habitat and food resource loss;
  - Decrease in water clarity due to the suspension of sediments inhabiting foraging activity.
- **Disturbance**
  - Direct noise and visual disturbance.
- **Predation Risk**
  - Unintentional installation of additional perches for predators;
- **Pollution Risk**
  - Direct pollution impacts;
  - Indirect pollution impacts as a result of food resource depletion.

3.2.4.1 Construction Stage

There will be no direct land take from within any statutory designated site for nature conservation. The proposed redevelopment footprint is located approx 60m from Cork Harbour SPA at its nearest point, being the base of the ADM Training Wall where it meets the ADM Jetty. The main Training Wall arm is 125m northwest of the proposed DWB extension footprint.

There is potential for the release of oils and chemicals into Cork Harbour during construction, which may impact upon the water environment and subsequently on Cork Harbour SPA via the direct fatalities of waterbirds, the degradation of foraging wetland habitats and a reduction in foraging potential for waterbirds. Potential impacts on water quality are detailed within Chapter 12 (EIS Volume I) and the residual impact is classed of negligible adverse significance.

No significant elevation of suspended solids is predicted to occur during dredging activities associated with the proposed development, to a degree which may inhibit waterbird foraging activities. The inhibition of foraging activities may result from the smothering of intertidal habitats; reduction in the availability of bird food resources; or a decrease in water clarity. Rock Dredging will be required to facilitate the construction of the Container Berth / Multi-purpose Berth (CB/MPB) in order to achieve the required dredge levels. Rock will be extracted by a combination of ripping, drilling and blasting. Chapter 13 of EIS Volume I concludes there will be no significant permanent impact on water quality and Chapter 14 of EIS Volume I concludes no significant permanent impact on benthos or fisheries, with only temporary sediment smothering and avoidance of fish species within the immediate vicinity of the dredge footprint. Suspended sediments in the water column will be localised, be quickly dispersed and have no long-term impact on water quality or clarity.

Direct Habitat Loss

With the exception of Common Terns, a SCI of Cork Harbour SPA, the proposed redevelopment footprint supports a breeding bird assemblage typical of a lowland landscape, with no breeding species of high or very high ecological value recorded during baseline surveys (EIS Volume III a -

Appendix 15.4). Overall the permanent loss of the highly modified semi-natural habitats within the development footprint is predicted to be of negligible adverse significance.

Breeding Common Tern is an SCI of Cork Harbour SPA and is therefore of Very High Ecological Value with between 45-50 pairs (~65-72% of the SPA qualifying population) of birds nesting on the mooring dolphins within the Deepwater Port. The mooring dolphins will not be lost or structurally affected as a result of the proposed redevelopment. The proposed new road to access Ringaskiddy East will be located 25m from the most eastern dolphin at its nearest point.

The intertidal habitats to be lost permanently as a result of the DWB extension are considered to be of relatively little importance to wetland birds. During the wintering period, at high tide, small numbers of Cormorants, Gulls and Shelduck were typically recorded using the reclamation area within Count Section 1 during the wintering season (EIS Volume III a - Appendix 15.5). No important high tide roosts were located within the existing rock armouring within the Ringaskiddy Basin, likely due to the existing high level of disturbance along the DWB quay wall and use of the shoreline for amenity within Ringaskiddy East. Favoured Common Tern feeding areas within the sub-tidal areas of Count Area B (refer EIS Volume II - Figure 15.3c), were typically concentrated around the mooring dolphins and the main navigation channel (EIS Volume III a - Appendix 15.6). Based on observations in 2011, 2012, and 2013 it is considered that Common Tern foraging activity within Cork Harbour is widespread and a large proportion of activity occurs beyond the intertidal and marine areas adjacent to the proposed redevelopment footprint.

At low tidal conditions the footprint of the DWB extension is of some local importance to a small number of waterbirds namely Dunlin, Lapwing, Oystercatcher, Shelduck and Black-headed Gulls, which are SCIs of Cork Harbour SPA. The soft sediment habitat (LS.LMus.MEst) and mussel bank (LS.LBR.LMus.Myt.Mu) recorded within the DWB extension footprint are likely to be of value to waterbird species, which primarily feed on polychaetes, oligochaetes and mussels, due to their dominance within the substrate (Chapter 14). Such species include the SCIs recorded during wintering wetland bird surveys, albeit in relatively negligible numbers (EIS Volume III a - Appendix 15.5). The existing level of disturbance and limited exposure of the inter-tidal habitat during low tide is likely to be a factor already inhibiting any significant use by foraging waders. The overall direct and permanent loss of inter-tidal habitats as a result of the DWB extension and associated dredging is considered to be of negligible magnitude and subsequently of minor adverse significance due to the habitats extensive nature of the intertidal habitats within Cork Harbour and the small numbers of birds which use the area.

Chapter 14 of EIS Volume I concludes that the direct loss of soft sediment intertidal and subtidal habitats within the footprints of the DWB extension and CB/MPB construction will result in a negligible adverse impact in terms of the loss in fisheries habitat. As outlined in that Chapter, the soft sediment habitats to be lost are used principally by gobies, juvenile flat fish, crab and shrimp species, all potential prey items of Common Terns. Chapter 14 concluded that such fish populations will be unaffected in the long term by the relatively small changes in the context of Cork Harbour. Flat fish are also a dominant prey species taken by Cormorant however, Cormorant foraging activity within the intertidal and marine habitats adjacent to the proposed development footprint was minimal (EIS Volume III a - Appendix 15.5).

During both high and low tide conditions the portion of Count Area 16 (refer EIS Volume II, Figure 15.3b) and Count Area F (refer EIS Volume II, Figure 15.3c) to be permanently lost as a result of the new slipway and amenity area creation at Paddy's Point is of limited importance to wintering waterbirds and foraging terns. Only small numbers of Oystercatchers, Herring Gulls were regularly recorded foraging and/or roosting within the intertidal zone. Aside from the extensive mussel bed habitat (LS.LBR.LMus.Myt), the intertidal shoreline supports little sediment infauna (Chapter 14), and therefore provides little foraging potential for waterbirds besides Oystercatcher and opportunistic scavengers such as Herring Gull. The overall direct and permanent loss of intertidal and sub-tidal habitats as a result of the slipway and amenity area at Paddy’s Point is therefore considered to be of negligible magnitude and subsequently of minor adverse significance.

Chapter 14 of the EIS outlines that the temporary disturbance of sub-tidal habitats during dredging activities is likely to have a localised and temporary impact on fisheries within the Ringaskiddy Basin. Disturbed habitats will be quickly recolonised following dredging.

Indirect habitat loss and deterioration - Suspended Sediments
Chapter 13 of the EIS concludes that impacts on water quality as a result of sediment loading in the construction phase will be localised and short-lived. The waters within the Ringaskiddy Basin are also subject to a high degree of shipping activity frequently disturbing benthic sediments and Port of Cork operate a periodic maintenance dredging campaign under license which does not allow dredging between May and August because of the commercial salmon draft-netting season.

No significant mass movement of suspended sediments into Monkstown Creek is predicted during dredging activities. Any potential impact of increased sediment loading is predicted to be restricted to the immediate vicinity of the reclamation areas and dredging footprint. The predicted impact is of temporary minor adverse significance.

Disturbance
The extent to which wetland birds are affected by sources of noise and visual disturbance has been the subject of much research and monitoring. This is due to the potential long-term effects on populations caused by the inhibition of foraging and roosting behaviour, leading to decreases in body condition, reductions in reproductive success and individual survival. The magnitude and predictability of impacts as a result of disturbance ranges between species, seasons, weather, source and duration of disturbance, degree of previous exposure of the individuals to disturbance and the occurrence of additional disturbances. Most disturbances to wetland birds result in an interruption to normal activity and the displacement of birds over variable distances, often into sub-optimal habitats. This can be critical during severe winters and can lead to a reduction in the carrying capacities of important wintering wetland sites. However, in general studies show that most bird species have the ability to habituate to regular and continual sources of noise and visual disturbances providing there is no large 'startling' component (e.g. Smit & Visser, 1993, Hockin *et al*., 1992; Cutts & Allen, 1999; ABP Research, 2001; Burton et al., 2002; Nairn, 2005; Phalan & Nairn, 2007; IECS, 2007; Cutts *et al*., 2009 & 2013).

The construction phase of proposed redevelopment is outlined in Chapter 3 of the EIS and presented here as Appendix 2 of the NIS. The construction duration for Ringaskiddy East is 24 months; and 11 months for Ringaskiddy West. It is not anticipated that Ringaskiddy East and Ringaskiddy West will run either concurrently or immediately consecutively - i.e. there is likely to be some period of time from completion of Ringaskiddy East and commencement of Ringaskiddy West.

In isolation, Ringaskiddy East construction is not predicted to result in a significant elevation of noise and visual disturbance within close proximity to the mooring dolphins, above what is already experienced. The noise expert has confirmed to the ecology team that worst case scenario noise levels during construction of Ringaskiddy East will be in the region of 55db in the vicinity of the mooring dolphins. It is evident that the Common Tern sub-colony atop the mooring dolphins is highly tolerant of the existing level of noise disturbance arising from the activities within the Ringaskiddy Basin, including startling events, which typically result in the most significant sources to waterbirds (Cutts *et al*., 2013). Background construction noise in isolation is therefore unlikely to result in a loss of attractiveness of the mooring dolphins, should works be undertaken during the breeding season. Terns are highly likely to habituate to new sources of background noise disturbance.

It is considered that the increased visual presence of machinery and workmen within proximity of the mooring dolphins during improvements to the existing port entrance during construction may potentially result in a loss of attractiveness of the mooring dolphins as a nesting site. Construction works associated with the remaining elements of Ringaskiddy East including the CB/MPB are considered to be sufficiently screened from the mooring dolphins by existing infrastructure e.g. the existing ferry terminal and passenger gangway, which lies to the north east of the mooring dolphins restricting views into Ringaskiddy East.

Site clearance activities to facilitate improvements to the existing port entrance to the south east of the mooring dolphins, will result in the loss of the existing screening in place along the shoreline perimeter of the Port adjacent to the mooring dolphins. This will lead to increased visibility of existing activities within the Port from the mooring dolphins and also act in combination with the presence of construction plant and workmen on the adjacent shoreline during works required for road widening in this area. Where construction in the vicinity of the mooring dolphins occurs during the breeding

season, it is predicted that this will result in a potentially significant source of disturbance to nesting terns, due to the increased and sustained perceived risk of predation by the colony. If this were to occur, it may hinder colony establishment or result in egg/chick abandonment. Improvements to the existing port entrance therefore has the potential to negatively impact on the productivity of the sub-colony, particularly if the most intrusive works are commenced or undertaken during the breeding season unmitigated. Mitigation is proposed and the predicted effect is temporary minor adverse.

No significant disturbance impact on wintering wetland birds is predicted during construction of Ringaskiddy East even if works are undertaken between the months of September to March. In general construction works associated with Ringaskiddy East are not predicted to be audible or visible to the point of significant disturbance within Monkstown Creek, largely due to screening from the Training Wall and attenuation with distance. Monkstown Creek is located 700m from the Ringaskiddy East development footprint at its nearest point. Similarly background construction works are not predicted to be visible or audible to the point of significant disturbance from the stone breakwater, due to screening from the ADM Jetty and attenuation with distance. A generic threshold response to a visual disturbance of c.300m to waterbird roost sites, has been derived around the approach distance for sensitive species including Shelduck (Cutts *et al*., 2013). The use of Ringaskiddy West for roosting by overwintering gulls including Black-headed and Lesser Black-backed Gull, SCIs of Cork Harbour SPA, is sporadic and gulls are generally highly tolerant of human disturbance, with the ability to switch to alternative roost sites. The impact on roosting gulls is therefore of temporary minor adverse significance.

The ADM Jetty is considered a roost site for Cormorants and gulls all-year round. Wintering Cormorants, Black-headed and Lesser-black Backed Gulls are SCIs of Cork Harbour SPA and therefore any loss of attractiveness of this roost site as a result of disturbance during construction is potentially a significant negative effect. However, following disturbance during construction of a grain shed located at the edge of the existing DWB in 2013, at the ADM Jetty in 2014 as observed by the authors, birds continued to arrive at the Monkstown Creek roost and pre-roost sites on the stone breakwater as normal. It is therefore unlikely that a significant negative effect would result.

The terminal end of the eastern arm of the ADM Jetty is located 260m from the Ringaskiddy East development footprint, and it is unlikely that construction works would result in any significant loss of attractiveness of the ADM Jetty as a roosting site for Cormorants if undertaken during the wintering season.

Birds are predicted to habituate to background construction works over time and are able to displace onto adjacent roosting structures on the ADM Jetty and the ADM training wall. The Gulls and Cormorants which choose to roost on the terminal arms of the ADM Jetty are also evidently habituated to audible and visual disturbance activities within Ringaskiddy West and also to the movement of both large and small vessels along the navigational channel. Dredging associated with the redevelopment has also been considered, and any potential impact to roosting cormorants will be temporary; the birds are expected to habituate to the new level of noise and visual disturbance. The impact on wintering birds during construction of Ringaskiddy East is therefore assessed as being of Minor Adverse Significance.

Construction works at Paddy's Point is anticipated to last 6 months and is unlikely to have a significant disturbance impact on foraging and roosting waterbirds, even if undertaken during the wintering season. This area was of little importance to foraging and roosting wetland birds, with only small numbers of Oystercatcher and Gulls regularly using the intertidal zone during the wintering season. Negligible numbers of Great Crested Grebe, Great Northern Diver, Cormorant and Shag were recorded foraging within the marine areas in the vicinity of the development footprint. Similarly the marine areas were little used by foraging terns. The accessible shoreline at Paddy's Point either side of the Haulbowline Bridge is already subject to moderate disturbance, primarily from dog walkers, bait diggers and winklers throughout the year, which may be preventing any significant waterbird use however, the habitats present are unfavourable to most waterbids. During the 2013 wintering wetland bird survey effort, construction works associated with the IMERC/Beaufort Building access road, which included piling, had no discernable impact on the use of the shoreline by foraging Oystercatcher and Herring Gull. It is expected that wetland birds continuing to use the marine areas within the vicinity of the development footprint and intertidal zone to the east of the Haulbowline Bridge. Construction activities will largely be screened from the more extensive intertidal shoreline to the east of the

Haulbowline Bridge, where waterbird foraging activity was higher. In the absence of mitigation the potential disturbance impact on waterbirds during construction of the pier and slipway at Paddy's Point is predicted to be of Minor Adverse Significance.

Construction works associated with Ringaskiddy West are considered to have potential to result in a significant disturbance impact to wintering waterbirds, if undertaken during the wintering and passage season without mitigation due to its proximity to key foraging and roosting areas. It is proposed that Ringaskiddy West will be undertaken in isolation from Ringaskiddy East. As such construction works are not anticipated to act in combination.

Elevated noise levels during Ringaskiddy West construction activities, when modelled under a worst case scenario, will be below existing ambient noise levels in the vicinity of the Strand Road (R610) along the northern boundary of Monkstown Creek as detailed in Chapter 9 of EIS Volume I. Having consulted with the noise expert, resultant noise levels within Monkstown Creek are also predicted to largely fall within the existing ambient noise levels during Ringaskiddy West construction. Noise levels will attenuate with the natural screening effect of the ADM Jetty and Training Wall between the DWB and SPA. Current sources of noise disturbance within with vicinity of Monkstown Creek, largely arise from the flow of traffic along the Strand Road and activities from within the Ringaskiddy DWB and Pfizer complex.

Noise levels of 70dB and above are regularly cited within the literature as being the threshold beyond which disturbance to estuarine bird species can be predicted to occur (ABP Research, 2001; Cutts *et al*., 2009 & 2013). However, the greatest levels of disturbance response typically occur when the difference between ambient noise levels and peak noise levels is greatest, and when combined with visual human presence (Burton *et al*., 2002; Cutts *et al*., 2009 & 2013). For example an isolated sudden or startling sound will generally create more of a disturbance response than a constant noise regardless of the actual noise level, e.g. an unexpected drop of scaffolding at 65dB will likely cause a greater disturbance reaction than ongoing vibration piling at 80dB (Cutts *et al*., 2013). Monkstown Creek is already subject to regular startling sounds, such as loud tannoy announcements from the Pfizer complex, crane warning sirens at the existing DWB and bangs from container onloading/offloading. The construction works associated with Ringaskiddy West will be temporary in nature. Piling is not a constant noise source throughout the working day. It is intermittent.

Whilst construction works will introduce a new low level of background noise disturbance to Monkstown Creek, the Training Wall and ADM Jetty, it is very likely that habituation of waterbirds to general background construction noise will occur rapidly.

Observations of the night-time Cormorant tree-roost in Monkstown Creek during the 2011/2012 winter period, whilst a large grain storage warehouse was being constructed within the western corner of the DWB, showed that the loud pounding and hammering audible from the Strand Road, had no impact on the use of the tree-roost, with birds continuing to use Roost Area A closest to the Ringaskiddy West redevelopment footprint (refer to Volume II, Figure 15.3d) as usual. Whilst construction activities will be restricted to normal working hours there may be some use of temporary lighting, construction noise levels beyond 50-100m of the development site (i.e. within key foraging and roosting areas) are not expected to be elevated beyond 70dB, even during a worst case scenario. No significant disturbance response is predicted.

Observations of disturbance impacts to waterbirds within Monkstown Creek during the 2013/14 wintering wetland bird survey indicate that audible disturbances, including startling tannoy announcements from the working Port and Pfizer Compound trigger no response. Construction works are not expected to be audible or visible to the point of significant disturbance to the Deepwater Port Common Tern sub-colony, and no significant impact as a result of direct disturbance during the construction of Ringaskiddy West is therefore predicted even if carried out during the months of May to August inclusive.

In contrast, visual disturbances in isolation e.g. dog walkers or bait diggers along the intertidal zone of Count Area 7 (refer Volume II, Figure 15.3b) do result in a high disturbance response. It is predicted that the presence of operatives on the existing DWB quay wall, intertidal flats, ADM Jetty and Training Wall will result in a disturbance response from waterbirds using key foraging and roosting sites until the birds to some degree habituate to predictable movements of humans. The impact is however

assessed as being potentially of minor adverse significance as visual disturbance will largely be restricted to Count Area 1 and the receptor(s) being those birds roosting on the most southerly portions of the Training Wall.

The ADM Jetty, although of a piled nature, will provide some degree of natural screening from the construction works. Grey Herons, an SCI of Cork Harbour which are typically present within these parts in the greatest number frequently roost along the southern shoreline of Monkstown Creek and may therefore be easily displaced to alternative roosting locations during the temporary construction works. Mitigation is proposed to visually screen the DWB extension construction from the roost sites.

Whilst the Gulls and Cormorants that choose to roost on the eastern arm of the ADM Jetty are clearly habituated to the passing of both small and large vessels within the main navigational channel, the dredging associated with Ringaskiddy West has potential to result in a disturbance impact to roosting birds in this location due to the prolonged and lingering nature of dredging vessels - where workmen will be clearly visible. This impact is potentially of minor adverse significance, affecting only a small number of birds roosting at high-tide if undertaken during the more sensitive wintering season. Mitigation is not required.

Increased Predation Risk
The use of temporary lighting columns and construction plant (i.e. cranes) during construction has the potential to introduce new opportunities for birds of prey or large gulls to perch in close proximity to the mooring dolphins within the Deepwater Port. This may lead to an increase in the perceived predation risk to nesting terns and wintering waders. This impact is predicted to be temporary and negligible given the continued use of construction plant, which is likely to deter perching birds. The potential impact is considered to be of minor adverse significance.

Pollution
Potential pollution impacts on Marine Ecology and Water Quality are detailed within Chapters 13 and 14 of EIS Volume I respectively. Significant pollution is not predicted as a result of the works. It is considered very improbable as best practice mitigation to protect the water environment as outlined in Chapters 13 and 14 will be adhered to and appropriate and fully screened fill materials will be selected for Ringaskiddy East and West. The displacement of contaminants during dredging and seabed sleech release is also considered negligible. Pollution impacts resulting in direct bird fatalities or changes to bird food resources are considered to be non-significant.

3.2.4.2 Operational Stage

The proposed redevelopment has the potential to impact on the natural coastal processes, existing sediment transport regime and water quality within Cork Harbour. This in turn may potentially impact on wetland bird habitat quality in the long-term. Of most significance would be any alteration to the existing sediment transport regime or water quality, which may result in the smothering or changes to the composition and abundance of waterbird food resources. Chapter 12 of EIS Volume I predicts that the proposed redevelopment will not significantly alter the existing sediment transport or hydrodynamic regime away from the immediate vicinity of the project footprint. Chapter 14 of EIS Volume I concludes that this will result in no impact within Monkstown Creek as no mass movement of sediment to these areas or significant alteration of sediment grain size composition is predicted on this area that is a critical intertidal foraging area for wetland birds. There may however, be some small but localised impacts to subtidal communities immediately beyond the footprints of the DWB extension and CB/MPB. Chapter 14 of EIS Volume I concludes that this would have no detrimental impact on the current abundance of potential benthos, fish or crustacean waterbird prey items within the water column in this locality or within the wider Cork Harbour.

Overall the potential impact on waterbird food resources as a result of altered sediment regimes is predicted to be negligible and restricted to the subtidal area in the immediate vicinity of the project footprint. No discernible impact upon intertidal commutinites within the SPA boundary within Monkstown Creek is predicted.

Disturbance
There are several sources of noise and visual disturbance associated with the operational phase of the proposed redevelopment. The resultant traffic using the proposed new access to Ringaskiddy East

has the potential to cause disturbance to the Common Tern colony nesting on the mooring dolphins. This impact is potentially of significance if it were to result in the abandonment of the sub-colony site.

The proposed internal road will bring freight traffic to a distance of 25m from the mooring dolphins. It is however evident that the terns are already habituated to extraordinarily high levels of anthropogenic disturbance, including the current passing of freight traffic within 30m of the nearest mooring dolphin. It is predicted that because the dolphins are not directly affected and that a screen is being provided along the adjacent shoreline, the closer passing of traffic will not result in the loss of the attractiveness of the mooring dolphins as a nesting location.

Increased Predation Risk
The presence of new and permanent lighting columns has the potential to introduce new opportunities for birds of prey to perch in close proximity to the mooring dolphins or overlooking Monkstown Creek. This has the potential to increase the perceived predation risk to nesting terns and wintering waders in the long term. The general arrangement drawings and lighting plans which are contained in the planning drawings associated with this application were fully reviewed. This impact is predicted to be non-significant as observations over the three years of survey effort has revealed no sustained or significant predation occurring as a result of existing quayside cranes or lighting columns being used as predator perching posts.

Indirect Habitat Loss
The proposed development has the potential to impact on the natural coastal processes, existing sediment transport regime and water quality within Cork Harbour. This in turn may potentially impact on waterbird foraging habitat quality in the long term. Of most significance is any alteration to the existing sediment transport regime or water quality, which may result in the smothering or changes to the composition and abundance of bird food resources.

Chapter 12 of EIS Volume I predicts that the proposed redevelopment will not significantly alter the existing sediment transport or hydrodynamic regime away from the immediate vicinity of the DWB or CB/MPB. Chapter 14 concludes that this will result in no significant impact on any intertidal communities, as no mass movement of sediment to key intertidal foraging habitats within Monkstown Creek, resulting in the alteration of sediment composition is predicted. No significant detrimental impact on the current abundance of potential benthos prey within the intertidal foraging area is therefore predicted. Similarly, availability of fish prey for Common Terns and other piscivorous birds including Cormorant will not be significantly impacted.

3.3 MITIGATION PROPOSED FOR THE PROTECTION OF THE EUROPEAN SITES

A schedule of environmental commitments has been presented to An Bord Pleanála as part of the EIS associated with this application, and is contained within Appendix 3 of this NIS. Many of those environmental commitments provide protection to the coastal areas at Ringaskiddy, and the constituent habitats and species of the SPA, and they are listed below.

- A suitably Qualified Ecological Clerk of Works will be appointed prior to the commencement of any works to ensure the mitigation listed within the EIS is implemented in the manner for which it is intended and to act as a liaison between Port of Cork and NPWS.

- A protocol for regular communication with statutory agencies such as National Parks and Wildlife Service (NPWS) and Cork County Council and other third parties shall be established to ensure all pollution incidents or potential incidents are reported in an efficient and timely manner.

- Management and auditing procedures, including tool box talks to all personnel, shall be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions.

- Construction works at the shoreline will be restricted to daytime hours in order to allow otters and other wildlife to forage at dusk, through the night and at dawn.

- Light spill will be minimised during construction and operation through the use of directional lighting and by minimising lighting requirements.
- Vegetation clearance will be undertaken outside of the breeding bird season i.e. it will not take place between 1st March to 31st August.
- Dredging will not be undertaken between May and August.
- A 4m visual screen will be constructed as part of the works along the northern perimeter of the internal road at the location shown in Planning Drawing 0474-PL-0802. This screen will include predator perching post deterrents.
- The construction of the internal road between the existing security hut and the existing RoRo ramp will not take place between April and August inclusive unless the visual screen is in place before construction works commence.
- Construction of the DWB extension shall be screened from the ADM training wall and ADM Jetty.
- Vehicles will not be allowed traverse the mussel bank during construction.
- Refuelling of plant will be undertaken away from the intertidal area to minimise the effects of possible fuel spillage.
- Standing machinery will be placed on drip trays to avoid spillages.
- No overflow from the dredger shall be permitted during dredging.
- The proposed redevelopment will connect to the new Cork Lower Harbour Main Drainage Scheme and therefore will receive appropriate treatment prior to discharge to coastal waters.
- All surface drainage waters, including road drainage, will be presumed to be contaminated and will be routed through highway quality oil interceptors and sediment traps prior to discharge into the sea.
- Water quality monitoring will be carried out by the main contractor with continuous in-situ monitoring carried out in advance of the works to establish a water quality baseline and during the dredging activities to ensure effective response to any incidents that may impact on water quality at sensitive sites.
- Existing and proposed surface water drainage and discharge points shall be mapped on a site plan which shall also include the location of existing and proposed measures such as monitoring points, sediment traps, settlement lagoon and oil interceptors.
- An appropriate dredging regime will be implemented with due regard to best practice and emission limit values for suspended solids; it is proposed that a trailing hopper suction dredger is used in Ringaskiddy West and a backhoe dredger will be employed for the dredging operations in Ringaskiddy East as these suit the composition of the material to be removed. Dredge material will be transported in closed systems to prevent overspill.
- Contractors shall implement best practice and relevant guidance to ensure silt laden or contaminated surface run-off from the entire construction site; i.e. the Container Berth / Multi-purpose Berth, Deepwater Berth, road upgrades, site compound and Paddy's Point slipway and amenity area, does not discharge directly to the Harbour.
- Imported fill material required to complete the infilling behind the quay walls will be clean graded stone sourced from local quarries.
- Concrete use and production shall adhere to control measures outlined in PPG 6 Working at demolition & construction sites (Environment Agency, 2012).

- For the sections of concrete that are under water, pre-cast units shall be used for construction. Where the use of pre-cast units is not possible, where *in situ* stitching is required or where concrete is to be placed under water or in tidal conditions, specific fast-setting mix is required to limit segregation and washout of fine material / cement.

- In relation to fuel and chemical storage the control measures outlined in PPG 26 "*Safe storage – drums and intermediate bulk containers"* (Environment Agency, 2011a) shall be implemented. The safe operation of refuelling activities shall be in accordance with PPG 7 *"Safe Storage – The safe operation of refuelling facilities"* (Environment Agency, 2011b).

- With regard to potential oil spills during dredging operations, an emergency spill kit and oil spill containment equipment will be held on board by the dredging operator;

- A contingency plan for the works shall be prepared in accordance with *PPG 21 Pollution Incident Response Planning* (Environment Agency, 2009). The Plan shall also detail the procedures to be followed if there is a breach in any licence conditions or a non compliance.

- Operations shall be undertaken in cognisance of the existing Port of Cork Oil Spill Contingency Plan.

- The following shall be adhered to with respect to vessels at berth or travelling through the Port of Cork:
  - Bilge water shall be treated in accordance with Marpol standards;
  - De-ballasting shall be undertaken offshore in accordance with International Maritime Organisation guidelines;
  - Vessels shall be equipped with oil-water separation systems in accordance with Marpol requirements;
  - Spills on deck shall be contained and controlled using absorbing materials;
  - Vessels without sewage treatment systems shall have suitable holding tanks and will bring waste onshore for treatment by licensed contractors;
  - Chemicals shall be stored appropriately in suitably bunded areas and with material safety data sheets.

3.4 IN COMBINATION WITH OTHER PLANS AND PROJECTS

The plans and projects listed in Section 2.4 are not considered likely to act in combination with the proposed Ringaskiddy port Redevelopment to give rise to negative effects that have the potential to affect the conservation objectives of a the European Sites considered here, including their structure and function.

4.0 CONCLUSION OF ASSESSMENT

This Natura Impact Statement has considered the potential for significant impacts arising from the proposed Ringaskiddy Port Redevelopment that would have the potential to affect any Natura 2000 site; with regard to their qualifying interests and conservation objectives.

The proposed redevelopment does not lie within any Natura 2000 designation; however, the redevelopment is located 60m from the ADM Training Wall forming the boundary of Monkstown Creek being part of Cork Harbour SPA, and Great Island Channel SAC is located 4.8km to north of Ringaskiddy.

Potential effects and their pathways have been identified and described. An assessment has been made on the potential for direct, indirect and cumulative impacts affecting the European Sites. The assessment undertaken in this NIS has been informed by specialist reports contained in an associated EIS with reference to the ecological communities and habitats potentially affected by the proposal, in order to provide a scientific basis for evaluations.

Measures for impact reduction have been incorporated into the proposed project for the avoidance and reduction of adverse effects on the qualifying interests and conservation objectives of the designated Natura 2000 sites within the study area. When these measures have been taken into consideration the proposal will not result in direct, indirect or cumulative impacts which would have the potential to adversely affect the qualifying interests / special conservation interests of the Natura 2000 sites within the study area with regard to the range, population densities or conservation status of the habitats and species for which these sites are designated (i.e. conservation objectives).

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and / or population of species for which the site is or will be classified'. It is therefore concluded, beyond reasonable scientific doubt, that the proposed project will not give rise to significant impacts, either individually or in combination with other plans and projects, affecting the integrity of any designated site within the Natura 2000 network.

As confirmed in the checklist in Table 7, significant negative effects on any of the conservation objectives of the European Sites under consideration are not predicted. It is concluded that the proposals will not have a significant negative impact on any Natura 2000 site.

This assessment has therefore stopped at Stage 2 Appropriate Assessment and there should be no further requirement for Stage 3 (*Assessment of Alternative Solutions*) or Stage 4 (*Assessment Where Adverse Impacts Remain*) of the appropriate assessment process.

Table 7: Integrity of the site in Relation to Residual Impacts

Does the project have the potential to:	Yes/No	Details
Cause delays in progress towards achieving the conservation objectives of the site?	No	No significant residual negative impacts
Interrupt progress towards achieving the conservation objectives of the site?	No	No significant residual negative impacts
Disrupt those factors that help to maintain the favourable conditions of the site?	No	No significant residual negative impacts
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	No significant residual negative impacts
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a	No	No significant residual negative impacts
Change the dynamics of the relationships (between, for example, water with flora and fauna) that define the structure and/or function of the site?	No	No significant residual negative impacts
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	No significant residual negative impacts
Reduce the area of the key habitats?	No	No significant residual negative impacts
Reduce the population of the key species?	No	No significant residual negative impacts
Change the balance between key species?	No	No significant residual negative impacts
Reduce diversity of the site?	No	No significant residual negative impacts
Result in disturbance that could affect population size or density or the balance between key species?	No	No significant residual negative impacts
Result in habitat fragmentation?	No	No significant residual negative impacts
Result in loss or reduction of key features (e.g. inter-tidal/tidal feeding areas, alteration to tidal regime, etc.)	No	No significant residual negative impacts

APPENDIX 1: NATURA 2000 INFORMATION

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE	*1.2. SITE CODE*	*1.3. COMPILATION DATE*	*1.4. UPDATE*
J	IE0004030	200311	

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0001058

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of Arts, Heritage, Gaeltacht and the Islands. 51 St. Stephen's Green, Dublin 2, Ireland

1.7. SITE NAME:

Cork Harbour SPA

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI:	*DATE CONFIRMED AS SCI:*

DATE SITE CLASSIFIED AS SPA:	*DATE SITE DESIGNATED AS SAC:*
199411	

2. SITE LOCATION

2.1. SITE CENTRE LOCATION

LONGITUDE	LATITUDE
W 8 19 0	51 53 0

W/E (Greenwich)

2.2. AREA (HA):

2587.25

2.3. SITE LENGTH (KM):

2.4. ALTITUDE (M):

MINIMUM	MAXIMUM	MEAN
-5	5	-1

2.5. ADMINISTRATIVE REGION:

NUTS CODE	REGION NAME	% COVER
IE025	South-West (IRL)	2
Marine area not covered by a NUTS-region		9

2.6. BIOGEOGRAPHIC REGION:

Alpine	Atlantic	Boreal	Continental	Macaronesian	Mediterranean
☐	☑	☐	☐	☐	☐

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	GLOBAL ASSESSMENT

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION			SITE ASSESSMENT			
		Resident	Migratory		Population	Conservation	Isolation	
			Breed	Winter	Stage				
A140	Pluvialis apricaria			805 i		C	B	C	
A157	Limosa lapponica			45 i		C	B	C	
A038	Cygnus cygnus			10 i		C	C	C	
A151	Philomachus pugnax			1-5 i	5-10 i	C	B	C	
A193	Sterna hirundo		69 p			B	B	C	A

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION			SITE ASSESSMENT			
		Resident	Migratory		Population	Conservation	Isolation	
			Breed	Winter	Stage				
A005	Podiceps cristatus			218 i		B	A	C	A
A017	Phalacrocorax carbo			620 i		B	A	C	A
A048	Tadorna tadorna			1426 i		B	A	C	A
A050	Anas penelope			1750 i		C	A	C	
A052	Anas crecca			807 i		C	A	C	
A054	Anas acuta			84 i		B	A	C	A
A056	Anas clypeata			135 i		B	A	C	A
A069	Mergus serrator			90 i		B	A	C	
A130	Haematopus ostralegus			791 i		C	A	C	
A141	Pluvialis squatarola			66 i		C	A	C	
A142	Vanellus vanellus			3614 i		C	A	C	
A149	Calidris alpina			4936 i		B	A	C	A
A156	Limosa limosa			412 i		B	A	C	
A160	Numenius arquata			1345 i		B	A	C	
A162	Tringa totanus			1614 i		B	A	C	A
A164	Tringa nebularia			36 i		C	A	C	
A169	Arenaria interpres			99 i		C	A	C	
A179	Larus ridibundus			948 i		C	A	C	
A182	Larus canus			2630 i		B	A	C	A
A051	Anas strepera			15 i		C	B	C	
A053	Anas platyrhynchos			456 i		C	A	C	
A059	Aythya ferina			145 i		C	B	C	
A061	Aythya fuligula			97 i		C	B	C	
A067	Bucephala clangula			15 i		C	B	C	
A125	Fulica atra			77 i		C	B	C	

A137	Charadrius hiaticula	51 i		C	B	C		
A143	Calidris canutus	31 i		C	B	C		
A183	Larus fuscus	261 i		B	A	C	A	
A161	Tringa erythropus	1-3 i	1-5 i	C	B	C		
A165	Tringa ochropus	1-3 i	1-5 i	C	B	C		

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

GROUP	SCIENTIFIC NAME	POPULATION	MOTIVATION
B M A R F I P			
B	Tachybaptus ruficollis	68 i	**C**
B	Ardea cinerea	47 i	**C**
B	Cygnus olor	39 i	**C**

(B = Birds, M = Mammals, A = Amphibians, R = Reptiles, F = Fish, I = Invertebrates, P = Plants)

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

Habitat classes	% cover
Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	94
Salt marshes, Salt pastures, Salt steppes	1
Shingle, Sea cliffs, Islets	1
Inland water bodies (Standing water, Running water)	1
Bogs, Marshes, Water fringed vegetation, Fens	1
Humid grassland, Mesophile grassland	1
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	1
Total habitat cover	**100 %**

Other site characteristics

Cork Harbour is a large, sheltered bay system, with several river estuaries - principally those of the Rivers Lee, Douglas, Owenboy and Owenacurra. The site comprises the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy Estuary, Whitegate Bay and the Rostellan inlet. Owing to the sheltered conditions, the intertidal flats are often muddy in character. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Otherwise, birds roost on stony shorelines and in some areas fields adjacent to the shore. Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre.

4.2. OUALITY AND IMPORTANCE:

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. It supports an internationally important population of Tringa totanus. A further 15 species have populations of national importance, with particularly notable numbers of Tadorna tadorna (9.6% of national total), Anas clypeata (4.5% of total), Anas acuta (4.2% of total) and Phalacrocorax carbo (4.1% of total) occurring. It has regionally important populations of Pluvialis apricaria and Limosa lapponica. Passage waders are regular, including Philomachus pugnax and Tringa erythropus. It is an important site for gulls in winter and autumn, especially Larus canus and Larus fuscus. The site provides both feeding and roosting areas for the waterfowl species. The quality of most of the estuarine habitats is good. The wintering birds have been well-monitored since the 1970s. The site has a breeding colony of Sterna hirundo which is of national importance. The colony is monitored annually and the chicks ringed.

4.3. VULNERABILITY

There are no serious imminent threats to the wintering birds. Though the intertidal areas receive polluted water, there are no apparent significant impacts on the associated flora and fauna. Oil pollution from shipping in Cork Harbour is a general threat. Aquaculture occurs though it is not known if this has significant impacts on the birds. Recreational activities are high in some areas, including jet skiing which causes disturbance to roosting birds. Extensive areas of estuarine habitat has been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State: Department of Communications, Marine and Natural Resources

Private: multiple

4.6. DOCUMENTATION

Colhoun, K. (2001). I-WeBS Report 1998-99. BirdWatch Ireland, Dublin.

Curtis, T.G.F. and Sheehy Skeffington, M.J. (1998). The salt marshes of Ireland: an inventory and account of their geographical variation. Biology and Environment, Proceedings of the Royal Irish Academy 98B: 87-104.

Hannon, C. (1997). The 1995 All-Ireland Tern Survey. BirdWatch Ireland Conservation Report No. 97/1.

Hannon, C., Berrow, S.D. and Newton S.F. (1997). The status and distribution of breeding Sandwich Sterna sandvicensis, Roseate S. dougallii, Common S. hirundo, Arctic S. paradisaea and Little Terns S. albifrons in Ireland in 1995. Irish Birds 6: 1-22.

Hunt, J., Derwin, J., Coveney, J. and Newton, S. (2000). Republic of Ireland. Pp. 365-416 in Heath, M.F. and Evans, M.I. (eds). Important Bird Areas in Europe: Priority Sites for Conservation 1: Northern Europe. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 8).

Hutchinson, C.D. and O'Halloran, J. (1984). The waterfowl of Cork Harbour. Irish Birds 2: 445-456.

Irish Wetland Birds Survey (I-WeBS) Database, 1994/95-2000/01. BirdWatch Ireland, Dublin.

McGarrigle, M.L., Bowman, J.J., Clabby, K.J., Lucey, J., Cunningham, P., MacCarthaigh, M., Keegan, M., Cantrell, B., Lehane, M., Clenaghan, C. and Toner, P.F. (2002). Water Quality in Ireland 1998-2000. Environmental Protection Agency, Wexford.

Merne, O.J. (1989). Important bird areas in the Republic of Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds). Important Bird Areas in Europe. ICBP Technical Publication No. 9. Cambridge.

O'Donoghue, P.D. and O'Halloran, J. (1994). The behaviour of a wintering flock of whooper swans Cygnus cygnus at Rostellan Lake, Cork. Biology and Environment, Proceedings of the Royal Irish Academy 94B: 109-118.

Sheppard, R. (1993). Ireland's Wetland Wealth. IWC, Dublin.

Smiddy, P., O'Halloran, J., Coveney, J.A., Leonard, P.G. and Shorten, M. (1995). Winter waterfowl populations of Cork Harbour: an update. Irish Birds 5: 285-294.

Wilson, J., O'Mahony, B. and Smiddy, P. (2000). Common Terns Sterna hirundo breeding in Cork Harbour. Irish Birds 6: 597-599.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

CODE	% COVER
IE05	10

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

TYPE CODE	SITE NAME	OVERLAP TYPE	% COVER
IE05	Douglas Estuary Wildfowl Sanctuary	+	10

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

CORINE SITE CODE	OVERLAP TYPE	% COVER
800000079		

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

CODE	INTENSITY	% OF SITE	INFLUENCE
200	**A** B C	1	+ **0** -
622	A **B** C	10	+ 0 **-**
701	A **B** C	50	+ 0 **-**
210	A B **C**	5	+ **0** -
220	A **B** C	10	+ **0** -
520	A **B** C	10	+ **0** -
621	A **B** C	20	+ **0** -
626	A **B** C	20	+ 0 **-**

IMPACTS AND ACTIVITIES AROUND the site

CODE	INTENSITY	INFLUENCE
400	**A** B C	+ 0 **-**
410	**A** B C	+ 0 **-**
403	A B **C**	+ **0** -
120	A **B** C	+ 0 **-**
502	**A** B C	+ 0 **-**
504	**A** B C	+ 0 **-**

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

The National Parks and Wildlife Service is responsible for managing the Douglas Estuary as a Wildfowl Sanctuary.

SITE MANAGEMENT AND PLANS

A Conservation Plan for the management of this site is in preparation.

7. MAPS OF THE SITE

- Physical map

- Aerial photograph(s) included:

8. SLIDES

Conservation Objectives for Cork Harbour SPA [004030]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

◆ *Tachybaptus ruficollis*	[wintering]
◆ *Podiceps cristatus*	[wintering]
◆ *Phalacrocorax carbo*	[wintering]
◆ *Ardea cinerea*	[wintering]
◆ *Tadorna tadorna*	[wintering]
◆ *Anas penelope*	[wintering]
◆ *Anas crecca*	[wintering]
◆ *Anas acuta*	[wintering]
◆ *Anas clypeata*	[wintering]
◆ *Mergus serrator*	[wintering]
◆ *Haematopus ostralegus*	[wintering]
◆ *Pluvialis apricaria*	[wintering]
◆ *Pluvialis squatarola*	[wintering]
◆ *Vanellus vanellus*	[wintering]
◆ *Calidris alpina*	[wintering]

Citation:

NPWS (2011) Conservation objectives for Cork Harbour SPA [004030]. Generic Version 4.0. Department of Arts, Heritage & the Gaeltacht.

- *Limosa limosa* [wintering]
- *Limosa lapponica* [wintering]
- *Numenius arquata* [wintering]
- *Tringa totanus* [wintering]
- *Chroicocephalus ridibundus* [wintering]
- *Larus canus* [wintering]
- *Larus fuscus* [wintering]
- *Sterna hirundo* [breeding]
- Wetlands []

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)

FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)

AND

FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. SITE IDENTIFICATION

1.1. TYPE	*1.2. SITE CODE*	*1.3. COMPILATION DATE*	*1.4. UPDATE*
K	IE0001058	200001	

1.5. RELATION WITH OTHER NATURA 2000 SITES:

NATURA 2000 SITE CODES

IE0002267

1.6. RESPONDENT(S):

National Parks & Wildlife Service of the Department of the Environment, Heritage and Local Government. 7 Ely Place, Dublin 2, Ireland.

1.7. SITE NAME:

Great Island Channel

1.8. SITE INDICATION AND DESIGNATION/CLASSIFICATION DATES:

DATE SITE PROPOSED AS ELIGIBLE AS SCI:	*DATE CONFIRMED AS SCI:*
200001	
DATE SITE CLASSIFIED AS SPA:	*DATE SITE DESIGNATED AS SAC:*

2. SITE LOCATION

2.1. SITE CENTRE LOCATION

LONGITUDE	LATITUDE
W 8 11 10	51 53 38

W/E (Greenwich)

2.2. AREA (HA):

1443.21

2.3. SITE LENGTH (KM):

2.4. ALTITUDE (M):

MINIMUM	MAXIMUM	MEAN
0	15	2

2.5. ADMINISTRATIVE REGION:

NUTS CODE	REGION NAME	% COVER
IE025	South-West (IRL)	12
Marine area not covered by a NUTS-region		8

2.6. BIOGEOGRAPHIC REGION:

Alpine	Atlantic	Boreal	Continental	Macaronesian	Mediterranean
☐	☑	☐	☐	☐	☐

3. ECOLOGICAL INFORMATION

3.1. HABITAT types present on the site and assessment for them:

ANNEX I HABITAT TYPES:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	GLOBAL ASSESSMENT
1140	62	**B**	**B**	**B**	**B**
1130	20	**D**			
1320	10	**D**			
1330	2	**B**	**C**	**B**	**B**

3.2. SPECIES

covered by Article 4 of Directive 79/409/EEC

and

listed in Annex II of Directive 92/43/EEC

and

site assessment for them

3.2.a. BIRDS listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
A140	Pluvialis apricaria			2250 i		**C**	**B**	**C**	
A157	Limosa lapponica			215 i		**C**	**B**	**C**	

3.2.b. Regularly occuring Migratory Birds not listed on Annex I of Council directive 79/409/EEC

CODE	NAME	POPULATION				SITE ASSESSMENT			
		Resident	Migratory			Population	Conservation	Isolation	
			Breed	Winter	Stage				
A017	Phalacrocorax carbo			317 i		**B**	**A**	**C**	
A048	Tadorna tadorna			1105 i		**B**	**A**	**C**	**A**
A050	Anas penelope			1178 i		**C**	**A**	**C**	
A052	Anas crecca			554 i		**C**	**A**	**C**	
A053	Anas platyrhynchos			237 i		**C**	**B**	**C**	
A054	Anas acuta			22 i		**C**	**B**	**C**	
A056	Anas clypeata			35 i		**C**	**B**	**C**	
A070	Mergus merganser			65 i		**B**	**A**	**C**	
A130	Haematopus ostralegus			871 i		**C**	**A**	**C**	
A137	Charadrius hiaticula			50 i		**C**	**B**	**C**	
A141	Pluvialis squatarola			40 i		**C**	**B**	**C**	
A142	Vanellus vanellus			6000 i		**B**	**A**	**C**	
A149	Calidris alpina			6000 i		**B**	**A**	**C**	**A**
A156	Limosa limosa			590 i		**B**	**A**	**C**	**A**
A160	Numenius arquata			815 i		**C**	**B**	**C**	
A162	Tringa totanus			948 i		**B**	**A**	**C**	**A**
A164	Tringa nebularia			17 i		**B**	**B**	**C**	
A169	Arenaria interpres			50 i		**C**	**B**	**C**	

3.2.c. MAMMALS listed on Annex II of Council directive 92/43/EEC

3.2.d. AMPHIBIANS and REPTILES listed on Annex II of Council directive 92/43/EEC

3.2.e. FISHES listed on Annex II of Council directive 92/43/EEC

3.2.f. INVERTEBRATES listed on Annex II of Council directive 92/43/EEC

3.2.g. PLANTS listed on Annex II of Council directive 92/43/EEC

3.3. Other Important Species of Flora and Fauna

(B = Birds, M = Mammals, A = Amphibians, R = Reptiles, F = Fish, I = Invertebrates, P = Plants)

4. SITE DESCRIPTION

4.1. GENERAL SITE CHARACTER:

Habitat classes	% cover
Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	88
Salt marshes, Salt pastures, Salt steppes	2
Shingle, Sea cliffs, Islets	1
Bogs, Marshes, Water fringed vegetation, Fens	1
Heath, Scrub, Maquis and Garrigue, Phygrana	1
Dry grassland, Steppes	1
Humid grassland, Mesophile grassland	3
Broad-leaved deciduous woodland	1
Mixed woodland	1
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	1
Total habitat cover	**100 %**

Other site characteristics

This site comprises the north-eastern part of Cork Harbour. It includes all of the Great Island Channel, the intertidal areas between Fota Island and Little Island, and also the estuary of the Dungourney and Owennacurra Rivers as far as Midleton. The North Channel is on average 1 km wide but extends for about 9 km from east to west. The area is well sheltered and the intertidal sediments are predominantly fine muds. In addition to the estuarine habitats, the site includes some wet grassland areas which are used by roosting birds, as well as some broad-leaved woodland at Fota Island. Compared to the rest of Cork Harbour, the Great Island Channel is relatively undisturbed, with aquaculture the main activity.

4.2. OUALITY AND IMPORTANCE:

The site is of ecological importance for its examples of intertidal mud and sand flats and Atlantic salt meadows of the estuarine type. Both habitats are fairly extensive in area and of moderate to good quality. Site has high ornithological importance, supporting regularly c.50% of the wintering waterfowl of Cork Harbour. Significant proportions of the internationally important populations of Limosa limosa and Tringa totanus which winter in Cork Harbour utilise the site and it supports nationally important populations of a further 12 species, including Pluvialis apricaria and Limosa lapponica, both listed on Annex I of the EU Birds Directive.

4.3. VULNERABILITY

The site receives polluted waters from agricultural, domestic and industrial sources. Various surveys, however, indicate that the levels of pollutants in the water and sediments of this part of the harbour are not excessive, and the site appears to have a normal macro-invertebrate fauna. The Midleton sewage outfall has recently been relocated to a more favourable location. A major road has recently been constructed across intertidal flats in the north-western sector of the site. Owing to the proximity of the site to Cork City, reclamation schemes continue to be a threat. Aquaculture occurs in the North Channel and may cause disturbance to birds. Spartina is well established and may have caused some

alterations to the intertidal and salt marsh habitats.

4.4. SITE DESIGNATION:

4.5. OWNERSHIP

State : Department of the Marine

Private : multiple

4.6. DOCUMENTATION

Aquatic Services Unit (1995). Baseline Survey of Flora and Fauna (birds) of Inner Cork Harbour (March - June 1995). Unpublished report to Forbairt, Dublin.

Berrow, S.D. (1991). Heavy metals in sediments and shellfish from Cork Harbour, Ireland. Marine Pollution Bulletin 22: 467-469.

Bowman, J.J., Clabby, K.J., Lucey, J., McGarrigle, M. and Toner, P. (1996). Water Quality in Ireland 1991-1994. Environmental Protection Agency, Wexford.

Colhoun, K. (1998). I-WeBS Report 1996-97. BirdWatch Ireland, Dublin.

Coveney, J. (1992). Cork Harbour counts 1991-1992: An interim report. Cork Bird Report 1991: 71-75.

Cunningham, P. (1997). Lee Estuary and Cork Harbour. A Preliminary Review of the Results of EPA Water Quality Surveys 1994-1996. EPA, Wexford.

Curtis, T.G.F. and Sheehy Skeffington, M.J. (1998). The salt marshes of Ireland: an inventory and account of their geographical variation. Biology and the Environment, Proceedings of the Royal Irish Academy 98B: 87-104.

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Goodwillie, R. (1986). Areas of Scientific Interest in Co. Cork. Report compiled for Cork County Council.

Heffernan, M.L. (1995). Shellfish Farming and Special Protection Areas for birds in Ireland. Unpublished M.Sc. Thesis, University of Dublin.

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Hutchinson, C.D. and O'Halloran, J. (1984). The waterfowl of Cork Harbour. Irish Birds 2: 445-456.

Merne, O.J. (1989). Important Bird Areas in Ireland. In: Grimmett, R.F.A. and Jones, T.A. (eds.) Important Bird Areas in Europe. ICBP Technical Publication No. 9.

Nairn, R.G.W. (1986). Spartina anglica in Ireland and its potential impact on wildfowl and waders - a review. Irish Birds 3: 215-228.

Nixon, E., McLoughlin D., Rowe, A. and Smyth, M. (1995). Monitoring of Shellfish Growing Areas - 1994. Fishery Leaflet 166. Department of the Marine, Dublin.

O'Sullivan, M.C. (1977). Cork Harbour Pollution Report. A report to Cork County Council, Cork Corporation and Cork Harbour Commissioners.

O'Sullivan, M.C. (1981). Report on Midleton Sewage Treatment, for Midleton Urban District Council.

Sheppard, R. (1993). Ireland's Wetland Wealth. I.W.C., Dublin.

Smiddy, P., O'Halloran, J, Coveney, J.A., Leonard, P.G. and Shorten M. (1995).

Wintering waterfowl populations of Cork Harbour: an update. Irish Birds 5: 285-294.

Smyth, M., Rowe, A., McGovern, E. and Nixon, E. (1997). Monitoring of Shellfish Growing Areas - 1995. Fishery Leaflet 174. Marine Institute, Dublin.

Whelan, M. (1984). Survey of Cork Harbour: Summer 1984. A report to Cork County Council.

5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES

5.1. DESIGNATION TYPES at National and Regional level:

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or Regional level:

designated at International level:

5.3. RELATION OF THE DESCRIBED SITE WITH CORINE BIOTOPE SITES:

CORINE SITE CODE	OVERLAP TYPE	% COVER
800000079		

6. IMPACTS AND ACTIVITIES IN AND AROUND THE SITE

6.1. GENERAL IMPACTS AND ACTIVITIES AND PROPORTION OF THE SURFACE OF THE SITE AFFECTED

IMPACTS AND ACTIVITIES WITHIN the site

CODE	INTENSITY	% OF SITE	INFLUENCE
140	A **B** C	3	+ **0** -
200	**A** B C	1	+ 0 -
502	**A** B C	1	+ 0 -
701	**A** B C	88	+ 0 -
802	**A** B C	2	+ 0 -
952	A **B** C	88	+ 0 -
954	A **B** C	20	+ 0 -

IMPACTS AND ACTIVITIES AROUND the site

CODE	INTENSITY	INFLUENCE
120	A **B** C	+ 0 -
400	**A** B C	+ 0 -
701	**A** B C	+ 0 -

6.2. SITE MANAGEMENT AND PLANS

BODY RESPONSIBLE FOR THE SITE MANAGEMENT

SITE MANAGEMENT AND PLANS

A management plan for the conservation of this site will be prepared.

7. MAPS OF THE SITE

- Physical map

- Aerial photograph(s) included:

NUMBER	AREA	SUBJECT	DATE
O636018	Great Island Channel	Overview of western / central sections	199506

8. SLIDES

Conservation Objectives for Great Island Channel SAC [001058]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- [1140] Mudflats and sandflats not covered by seawater at low tide
- [1330] Atlantic salt meadows (*Glauco-Puccinellietalia* maritimae)

APPENDIX 2: PROJECT DESCRIPTION

3.0 PROJECT DESCRIPTION

3.1 Introduction

This Chapter of the EIS describes the main components of the proposed redevelopment works at Ringaskiddy, Co Cork. Consideration is also given to construction activities associated with the works and operation and maintenance of the completed facilities. The proposed redevelopment is primarily located on or immediately adjacent to existing port lands in the vicinity of the existing port facilities at Ringaskiddy.

3.2 Proposed Development Works

The proposed redevelopment works comprise the following main construction elements;

Ringaskiddy East (*Container Berths and Multi-purpose Berth (CB/MPB)*

- A new 314m Container Berth 1/ Multipurpose Berth that will be capable of accommodating vessels carrying a range of different cargoes including containers, freight and general cargoes
- An additional 200m Container Berth 2
- Surfacing of existing port lands to provide operational areas
- Dredging of the seabed to a level of -13.0 m Chart Datum (CD)
- Demolition of existing link-span
- Installation of link-span comprising a floating pontoon and access bridge
- Installation of container handling cranes and terminal transport equipment
- Maintenance building, administrative buildings and entrance kiosks
- Ancillary car parking, lighting and fencing

Ringaskiddy West (Deepwater Berth Extension)

- A new 182m extension to the existing Deepwater Berth (DWB) which will comprise a filled quay structure extending no further seaward than the edge of the existing DWB
- Dredging works to varying levels to facilitate navigational access to the new facilities
- Lighting

Road Improvements

- Improvements to the external road entrance into the Ringaskiddy Deepwater Terminal and to Ringaskiddy West
- Improvements to the internal link road between Ringaskiddy East and Ringaskiddy West
- Road improvement works within the existing harbour lands at Ringaskiddy East
- Improvements to internal road network at Ringaskiddy East to facilitate future access to the N28
- Lighting and fencing

Paddy's Point Amenity Area

- Construction of a new public pier, slipway and boarding platform
- New planting and landscaping to provide public amenity area
- Boat storage, lighting and fencing

Figure 3.1 which is contained within EIS Volume II illustrates the complete extent of the proposed redevelopment works.

3.2.1 Ringaskiddy East

3.2.1.1 Proposed Port Operations

The proposed general arrangement at Ringaskiddy East is shown in Figure 3.2 which is contained within EIS Volume II.

Port operations will comprise three potential modes;

Lift on Lift off (LoLo)

LoLo operations will involve the loading/unloading of containers from vessels and temporary storage on the site before onward transport by road.

In a typical import cycle the Ship to Shore Gantry Crane (SSG) cranes are used to lift the containers from vessels berthing alongside the new quays. The cranes then place the containers onto trailers/tractor units which transport the containers to the onsite container stacks. Electrically operated Rubber Tyred Gantry (RTG) cranes are used for the handling of containers in the main stacks. These cranes lift the containers into the stack and at a later time facilitate onward transport of the containers by transferring to road going Heavy Goods Vehciles (HGVs). In an export cycle the above mentioned process is reversed.

Each container stack is orientated perpendicular to the CB/MPB and is 7 containers in width with a vehicle lane being provided beneath the RTG's. In the early stages of use harbour mobile cranes may also be used for ship unloading. Containers will be stacked at an approximate height of 5 containers high, equivalent to 12.8m.

At the end of each main stack is a gantry where refrigerated containers, otherwise known as reefers, can be powered and stored. Hazardous container storage facilities are accommodated within the main stacks.

General Cargo Operations

The general cargo area will initially be used to accommodate general break bulk and project cargoes. Materials will generally be stored in the open and no storage buildings are proposed. Generally the maximum height of stored materials will be approximately 5.5m.

Cargo will generally be lifted from vessels using a mobile harbour crane or SSG and will then either be placed directly into the storage area or will be placed on the quayside for onward movement and stacking by internal port equipment such as reach stackers.

Roll on Roll off (RoRo) Operations

The RoRo ramp, once installed will be used to allow direct access by freight HGV traffic to vessels with suitable vehicle loading ramps. Freight traffic may comprise two different types;

Unaccompanied - in this mode the freight trailers are transported on and off the vessel by dedicated port transport tractor units. The trailers are then stored in the port area where they are subsequently collected by road going lorries.

Accompanied – in this mode each trailer on the vessel is accompanied by a road going freight tractor unit. On disembarkation these vehicle will drive directly onto the public road network without being temporarily stored in the port area. During embarkation such vehicles will marshal at the port shortly before the vessel is due to depart.

3.2.1.2 Quay Structures

Container Berth 1 will be constructed along the western edge of the existing area of reclaimed land. The quay has been positioned to provide adequate width of berth slot without impinging on the existing

deepwater basin navigable space. Provision is also given to the construction of a landing area and linkspan in order to accommodate RoRo freight operations.

An additional berth is provided as an extension to the Container Berth 1 and is aligned to coincide with the shape of the existing reclaimed land. This second quay will be primarily used for port container traffic.

The new berthing facilities will comprise a concrete deck surface supported on steel/concrete piles. It is anticipated that the new quay wall will comprise a vertical steel wall tied to a sheet piled anchor wall The main wall will likely comprise a combi-wall form of construction which involves the installation of intermittent tubular steel piles with traditional steel piles infilling between the main piles although other forms of construction such as open piled, or a combination of open piled and closed structures could be used.

The berthing face to the quay structure will be formed by the installation of a reinforced concrete capping beam which will also be used to support the seaward leg of the main quayside container handling SSG cranes. The concrete capping beam will extend to approximately Mean Low Water Springs (MLWS) and will provide a smooth berthing face.

Plate 3.1 illustrates a Combi-wall form of quay construction.



Plate 3.1 Example of Combi-wall Under Construction

The quay will be provided with collection facilities for surface water which will be discharged to sea after passing through an oil and silt interceptor. The quay will also be provided with necessary services including power outlets, lighting and water.

Quay construction may be undertaken either by traditional construction contract or on a design and build basis where the contractor undertakes the final detailed design within certain parameters/requirements specified by Port of Cork.

3.2.1.3 Reclamation Works

The main container terminal area is largely located on existing reclaimed lands and new reclamation as part of these works will be limited to a small area (0.5ha) immediately behind the quay walls.

It is anticipated that suitable fill material will be imported from local land sources.

3.2.1.4 Demolition

Internal roads improvement works will require the removal of the existing ferry terminal No 2 link span which is no longer in use.

3.2.1.5 Dredging

Dredging works will be carried out to -13.0m CD adjacent to the new quay structures to provide sufficient water depths for vessels at all stages of the tide.

Bed conditions comprise uncompacted silts overlying gravel, clay and limestone depending on location. Dredging will be required in all materials including bedrock.

The soft overlying silt material is unsuitable for use in the works and therefore this will be removed, either by backhoe or trailing suction hopper dredger, and disposed of at a sea disposal site. The quantity involved is in the order of 90,000m³. The disposal of the dredged material will require application for a Dumping at Sea Permit from the Environmental Protection Agency, which is subject to a separate consenting process.

Bedrock and other hard strata will most likely be removed by a combination of drilling and blasting, and / or the use of use of mechanical plant working from a floating or jack-up barge. Typical floating plant is illustrated in Plate 3.2. Dredged rock and other suitable material will be re-used in the reclamation works. The total volume of rock to be removed is anticipated to be in the order of 47,000m³. Further detailed site investigations will be carried out prior to dredging to confirm the precise volume of rock to be removed.

3.2.1.6 Surfacing

The container terminal area will be surfaced using a combination of concrete slabs and bituminous surfacing or block paving for trafficked areas. A series of piled concrete runway beams will be installed along the edges of each container stack in order to provide lanes along which the RTG cranes can operate.

The general cargo / RoRo storage area will generally be surfaced using bituminous surfacing.

3.2.1.7 Linkspan

The CB/MPB will be provided with a floating linkspan to facilitate RoRo traffic. The linkspan will comprise a floating pontoon of steel construction which will rise and fall with variations in tidal level, maintaining a constant freeboard above water level. Vehicular access to the linkspan pontoon will be via a ramp structure the upper end of which will be fixed to the quay structure with the lower end resting on the pontoon. A linkspan pontoon arrangement is illustrated in Plate 3.3.



Plate 3.2 Mechanical Excavator on Floating Plant



Plate 3.3 Typical Linkspan

3.2.1.8 Container Terminal Buildings

A total of 3 new structures will be provided within the development area, as follows:

- Two new portacabin offices will house port administration staff, welfare facilities and other ancillary activities. Each office is likely to comprise a small two storey building of pre-fabricated construction, approximately 5.15m high x 3.80m wide x 12.2m long. Staff car parking will be provided immediately adjacent to the administration building
- A maintenance building will also be provided for the maintenance and repair of terminal equipment and other port infrastructure. The size of this building is approximately 7.82m high x 18.2m wide x 20.5m long
- Security kiosks and associated canopies will be provided at the entrance and exit gates.

The location and size of these buildings are illustrated on the planning application drawings.

3.2.1.9 Services and Security

The Container Terminal will be provided with the following services and security features.

Foul and Storm Water Drainage

Separate foul and storm drainage systems will be installed within the development sites.

Port of Cork has been actively consulting with Cork County Council with respect to the Council's proposal to upgrade the existing sewer systems and to install a new pumping station in Ringaskiddy as part of the Lower Harbour Main Drainage Scheme. The latest feedback from these consultations is that the Lower Harbour Main Drainage Scheme will be completed by the end of 2015.

Given that the proposed construction works for the Ringaskiddy Port Redevelopment project are scheduled to commence in 2016, with a view to having the new facilities operational in 2018, It is intended that foul sewage from the proposed buildings (maintenance building and new portacabin offices) will be discharged directly into the upgraded Council sewer system. It is also anticipated that foul drainage from existing port facilities will be diverted to the new system.

Should the proposed sewer upgrade works not proceed as intended or occur beyond the timescales indicated, then the Port of Cork will install a new package treatment works on the site in order to dispose of sewage from the proposed redevelopment. The plant will treat to a standard approved by Cork County Council of 30 mg/l SS and 20 mg/l BOD prior to discharge to a soakaway.

Storm water runoff from the site will be collected in a dedicated storm water drainage system. The storm water drainage system will collect rainwater incident upon the site for discharge to the harbour waters via a series of silt traps and oil interceptors.

Mechanical and Electrical Services

The proposed lighting for the general working areas will comprise high mast lighting, details of which will be subject to detailed design. Roadway lighting will comprise standard road lighting columns and lights. Lighting will be designed to provide an average lighting level of 20 Lux for roadways, 50-100 Lux for quayside areas and 30-50 Lux for storage and circulation areas.

Due to operational reasons the container stacking and quay working areas will not be provided with lighting masts. These areas will be illuminated by working lights fitted to the various cranes working in the terminal area which illuminate the area in the immediate vicinity of the particular crane. Illumination levels in the working area under the cranes will be 100-200 Lux.

The lighting will be designed to prevent direct glare into surrounding properties and illumination of the night sky.

Power supply will be by connection to the local electricity grid system.

Water supply will be by connection to the local mains system.

Fencing and Security

Palisade fencing will be provided around the entire landward perimeter of the Container Terminal to comply with the requirements of the International Ship and Port facility Security Code (ISPS). Security gates will be positioned at the entrance and exit of the main CB/MPB terminal.

CCTV cameras will be installed within the CB/MPB.

Safety Equipment

All quayside areas will be provided with mooring bollards, ladders and safety chains in accordance with the requirements of BS6349 Code of Practice for Maritime Structures.

Fire hydrants will be provided at regular intervals in all working and storage areas.

Navigation

In order to accommodate the proposed works there will be some amendments to the existing navigation markers which shall be carried out in conjunction with the Harbour Master. The relevant changes are illustrated on the planning application drawings.

Navigation simulations have been carried out by Port of Cork pilots and personnel from the Harbour Masters department to confirm the proposed quay can be accessed in a safe and efficient manner.

3.2.2 Ringaskiddy West - Deepwater Berth Extension

The proposed general arrangement at the new DWB extension is illustrated in Figure 3.3 which is contained within EIS Volume II.

3.2.2.1 Proposed Port Operations

The new berth extension will be primarily used for the importation of bulk materials such as animal feeds and fertilisers, and general cargoes.

Port operations on this new berth will be similar to those currently carried out on the existing DWB. Harbour mobile cranes will be used for cargo handling with loose bulk materials being lifted using a grab bucket and deposited via hoppers into awaiting lorries. The materials will then be transferred into bulk stores situated in the existing hinterland areas.

The imported goods are stored until such time when collection is arranged and lorries distribute the cargoes using the local and national road networks. Depending on demand for a particular cargo, there will also be times when the imported materials will be deposited directly onto lorries waiting nearby the quayside for distribution.

Handling of general cargo and specialist project cargoes will be carried out by harbour Mobile Cranes, on the quayside from where they will be transferred to the port hinterland using reach stackers and / or terminal transport vehicles.

3.2.2.2 Quay Structures

The length of the new extension is 182m. Given the proximity of existing commercial sites it is anticipated that a closed form of structure will be most appropriate at this location, however final design solutions could comprise a combination of closed and open piled forms of structure.

3.2.2.3 Reclamation Works

Approximately 0.8ha of new land will be created as part of the works. The vast majority of the material arising from the proposed dredging works will be unsuitable for use in the reclamation works and as such it is anticipated that suitable fill material will need to be imported from local quarried sources.

3.2.2.4 Dredging

Dredging works will be carried out to -13.4m CD at the new berth slot in order to maintain a consistent water depth with the existing DWB. The approach to the berths will be dredged to -11.75m CD.

Bed conditions are similar to that in Ringaskiddy East however rock levels are deeper which will mean that no rock dredging will be required as part of the proposed dredging works. Dredging to the required depths will therefore either be by backhoe or trailing suction hopper dredger, and disposed of at a sea disposal site. Again, the disposal of the dredged material will require application for a Dumping at Sea Permit from the Environmental Protection Agency. Excavation of approximately 215,000m^3 of material is estimated.

3.2.2.5 Services and Security

The new DWB will be provided with services and drainage similar to that used on the existing berth. All drainage will be connected to the existing drainage system on the DWB.

3.2.3 Road Improvements

New road improvement works are proposed in order to provide better access to Ringaskiddy East and West.

A new signalised access is proposed at the western connection to the N28 (at the junction of the N28 and R613) which will act as the main entrance to the port in the short term.

In the longer term it is anticipated that a new eastern connection to the N28 will be provided at the eastern side of Ringaskiddy village. Internal road improvements to facilitate connection to such a new junction are included in the scope of works.

A new internal port link road is proposed which will connect Ringaskiddy East and Ringaskiddy West. Some limited reclamation and new revetments are required to accommodate the new access road as it passes behind the existing ferry berth. A left hand turning lane will also be provided from the N28 which will form the new access to the DWB.

In the event that the new N28 terminates at the R613 (Barnahely) then the western connection to the N28 will continue to act as the main port entrance in the longer term. Should this be the case then this junction will be expanded as indicated on the planning application drawings. The main upgrade in this case is the addition of 2 further lanes to the internal port link road. Both options for the western entrance are illustrated on the planning application drawings. It is anticipated that the final N28 route details will be confirmed prior to commencement of the Ringaskiddy Port Redevelopment by Cork County Council thus allowing final determination of entrance details prior to construction.

The arrangement of the proposed road improvements are illustrated in Figure 3.4 which is contained within EIS Volume II.

3.2.4 Amenity Area at Paddy's Point

The existing Ringaskiddy Pier will be retained in use by Port of Cork however public access will not be possible given that it will coincide with the entrance and exit gates to the Container Terminal. It is therefore proposed that a replacement pier and slipway will be constructed on Port lands at Paddy's Point.

The proposed general arrangement of the new facility is illustrated in Figure 3.5 which is contained within EIS Volume II.

The pier and slipway will comprise concrete decks on concrete or tubular steel piles.

An amenity area will be provided adjacent to the pier providing parking and associated amenity facilities such as:

- New planting and landscaping to provide new public amenity area
- New pedestrian circulation routes
- Boat Storage

The construction of the amenity area will include some reclamation on the foreshore using imported fill which will be protected at the edges by rock armoured revetments.

3.3 Terminal Operations Equipment

The details and approximate dimensions of the types of equipment anticipated to be used in port operations associated with the proposed works are described in the following sections. Precise dimensions will vary from manufacturer to manufacturer and final dimensions will only be determined when the supplier of the equipment has been identified. Dimensions considered in preparation of this EIS are based on typical dimensions of equipment currently available in the marketplace.

Equipment may be installed in a number of phases up to those numbers indicated on the planning application drawings.

3.3.1 Ringaskiddy East

The Container Terminal will be provided with various items of equipment for the handling and movement of containers and other cargo.

A list of probable terminal equipment is listed below.

Ship to Shore Gantry Cranes	-	2 nr
Rubber Tyred Gantry Cranes	-	6 nr
Harbour Mobile Cranes		1 nr
Terminal Tractors	-	12 nr
Reach Stackers		2 nr

3.3.1.1 Ship to Shore Gantry Cranes

SSG cranes as illustrated in Plate 3.4 are used to transfer containers to and from ships and are located on the quayside. The final size of cranes will be determined by the terminal operator however the maximum size anticipated would have the capacity to service vessels up to 13 containers in width.

Typical maximum overall heights/dimensions for a crane of this capacity are summarised in Table 3.2, although the final dimensions may be smaller.

Table 3.2 Typical Ship to Shore Crane Dimensions

Height to underside Jib (m)	Height to Apex (m)	Overall height with Jib raised (m)
Approx 37m	Approx 65.5m	Approx 89m



Plate 3.4 Typical Rail Mounted Ship to Shore Crane

3.3.1.2 Rubber Tyred Gantry Cranes

Electrically powered RTG cranes are generally of short span and in this case are anticipated to accommodate 7 containers and a vehicle lane between the legs. A typical height for this type of crane would be in the order of 23m.

Typical photographs of RTG yard cranes are illustrated in Plates 3.5 and 3.6.



Plate 3.5 Typical RTG Yard Crane



Plate 3.6 Typical RTG Yard Crane

3.3.1.3 Yard Transport

Terminal Tractors
Containers will generally be transported to and from the stack using terminal tractors. These are basically similar to a normal HGV tractor unit. A typical unit is illustrated in Plate 3.7.



Plate 3.7 Typical Terminal Tractor

Reach Stacker
Reach stackers are front lifting items of equipment which use telescopic arms to place containers at height in stacks. This type of equipment will be used in the CB/MPB area to handle containers. They will also be used in the main container terminal to move and handle empty containers. A typical unit is illustrated in Plate 3.8.



Plate 3.8 Typical Reach Stacker

3.3.2 Ringaskiddy West – Extension to Deepwater Berth

Operations at the DWB extension will be similar to those currently undertaken on the existing DWB.

Ship to shore operations will be undertaken by harbour Mobile Cranes with cargo being transferred to mobile hoppers discharging into HGV's for transport to onsite storage facilities or directly offsite.

A typical harbour mobile crane is illustrated in Plate 3.9.



Plate 3.9 Typical Harbour Mobile Crane

3.4 Phased Implementation

The various elements of infrastructure proposed may be implemented in a single construction or alternatively they may be implemented in a number of phases as a result of trade demands, port operational requirements and funding.

It is anticipated that a phased implementation is likely to comprise three main elements as listed below and illustrated in Figure 3.6 which is contained within EIS Volume II.

Phase 1 – Ringaskiddy East comprising;

(a) Improvements to existing port entrance adjacent to existing DWB entrance
(b) Pier, slipway and amenity area at Paddy's Point
(c) Elements of internal road improvements to facilitate access to Ringaskiddy East
(d) Construction of the CB/MPB and associated container storage and handling areas
(e) Additional Internal Roads to facilitate connection to new N28, when constructed, at eastern end of port complex / Ringaskiddy Village

Phase 2 – Ringaskiddy West comprising the extension to the existing DWB

Phase 3 – Ringaskiddy East comprising additional quay wall and floating linkspan to accommodate RoRo traffic at the CB/MPB. This facility will not be brought into commission for accompanied RoRo freight traffic until the new N28 is in place and operational.

3.5 Construction Activities

3.5.1 Programme

As indicated in section 3.4 the construction of the proposed works may be undertaken in a number of phases. It is estimated that the construction period for Ringaskiddy East will be approximately 24 months.

Construction of the DWB extension at Ringaskiddy West is anticipated to require approximately 11 months. It is not anticipated that this element will be constructed concurrently with Ringaskiddy East.

3.5.2 Temporary Site Compound

An area will be required for the establishment of the Contractor's site compound. The site compound will be used for the Contractor's site office accommodation and facilities and will include an area for temporary storage of construction materials.

At Ringaskiddy East the extent of the site is such that the contractor will be able to establish facilities within the immediate site area. Should further areas be required then the existing freight compound could be made available.

At Ringaskiddy West an area for a site compound will be made available in the area immediately behind the proposed works / existing DWB as indicated in Figure 3.7 which is contained within EIS Volume II.

3.5.3 Site Access

Existing port operations will continue as normal during the construction period.

Suitable traffic management and other systems will be put in place as required to minimise disruption to existing activities during the construction period. These will include:

- Upgrade of the existing DWB entrance prior to major construction works being undertaken.
- Segregation of entrances
- Suitable restrictions on timing of deliveries to avoid peak traffic periods
- Preparation of a detailed traffic management plan for the construction phase

3.5.4 Pollution Control

Pollution control measures will be put in place during the construction period as described in Chapter 13 of this EIS.

3.5.6 Site Safety

The works will be subject to the Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations, 2013. All aspects of design construction will be reviewed with regard to health and safety and a risk assessment will be carried out. A project supervisor (design phase) will be appointed to produce a pre-tender Health and Safety Plan for the project. The principal contractor will be responsible for the control and co-ordination of health and safety during the works and will be appointed as the project supervisor (construction stage).

3.5.7 Waste Disposal

Contractors working on site during the works will be responsible for the collection, control and disposal of all wastes generated by the works. An indication of the types of waste likely to be generated by the works and the most appropriate method of disposal are presented in Table 3.3.

Table 3.3 Typical Wastes Generated by the Construction Works

Activity	Waste Generated	Disposal/Treatment Recommendations
General Construction Waste	Waste oils	Collected by waste recycling contractor.
	Other waste	Collected in skips for disposal by licensed waste contractor.
General Office/Messing	Paper, packaging, canteen etc.	Collected in covered skips/large bins for disposal by a licensed waste contractor.
Temporary Site Toilets	Sewage	Emptied under contract for disposal at an appropriate facility.

3.6 Operational Activities

3.6.1 Maintenance

When construction work has been completed, the quays and revetments will require little by way of maintenance.

Although some siltation may occur in the new dredged areas the water depth is such that this is unlikely to cause any significant problem in the short term. Any maintenance dredging which may be required in the longer term will be carried out as part of the Port of Cork's regular maintenance dredging programme. The material generated would likely be disposed of at sea at a licensed disposal site agreed in accordance with Port of Cork's maintenance dredging licence.

3.6.2 Pollution Control

Surface water from the main quay and working areas will be collected by a system of drainage channels and gullies. The surface water will be discharged to sea via oil and sludge interceptors to ensure that no pollution is released into the harbour or surrounding waters.

Sewage disposal from the proposed buildings will be by connection to the proposed Lower Harbour Drainage Scheme, or if this is not in place by package treatment works and discharge to a soakaway system.

3.6.3 Waste Disposal from Vessels

Port of Cork operates an Environmental Management System (EMS) which includes procedures for the disposal of waste from berthed vessels.

All waste to be disposed of from berthed vessels will be handled and disposed by a licensed waste disposal contractor. Waste awaiting disposal will not be permitted to be stored on the quayside.

Discharges from vessels to the harbour waters will not be permitted.

3.7 Construction and Operational Phase Mitigation

Various environmental mitigation measures will be implemented in both the construction and operational phases as detailed in Chapter 17 of this EIS.

APPENDIX 3: SCHEDULE OF ENVIRONMENTAL COMMITMENTS

17.0 SCHEDULE OF ENVIRONMENTAL COMMITMENTS

17.1 Introduction

This Chapter summarises the environmental commitments proposed in the EIS for the proposed Ringaskiddy Port Redevelopment. The purpose of these environmental commitments is to mitigate or ameliorate potentially adverse impacts that have been identified in each Chapter of the EIS.

17.2 Human Beings

- Environmental improvements shall be implemented at Paddy's Point Amenity Area to include new landscaping and enhanced facilities for casual amenity.
- Paddy's Point Amenity Area shall provide a pier and slipway in place of the existing Ringaskiddy Pier which shall be closed to the public. The new slipway and pier will provide access to the six established moorings in Ringaskiddy (which will remain in their current location) with improved parking facilities and provision for boat storage.
- Relocation of the Sculpture Garden to another site in Ringaskiddy in consultation with the original artist.
- Construction access shall be restricted to existing port access road.
- Construction site shall be established within and restricted to existing, undeveloped lands within Port of Cork ownership.
- Prior to construction a preliminary Health and Safety Plan will be completed by the Project Supervisor Design Process (PSDP). During the construction process all areas will be delineated and will be under the control of the Project Supervisor Construction Stage (PSCS). A safety plan will be maintained throughout the duration of the project.
- In line with existing procedures, all site access, both vehicular and pedestrian shall be logged.

17.3 Cultural Heritage

- Prior to construction, a small area of seabed previously not inspected as a result of a minor design change, shall be subject to updated inspection survey.
- The area of impact on the Prospect Villa boundary wall will be recorded archaeologically in advance of its destruction, which will be monitored archaeologically.
- Appropriate archaeological monitoring by a suitably qualified and experienced maritime archaeologist licensed by the Department of Arts, Heritage and Gaeltacht (DAHG) shall be conducted during all seabed, inter-tidal/foreshore and terrestrial disturbances associated with the development. An archaeologist experienced in maritime archaeology will be retained for the duration of the relevant works.
- All necessary permits shall be in place before site works commence.
- In the event of archaeologically significant features or material being uncovered during the construction phase, machine work will cease in the immediate area to allow the archaeologist/s to inspect any such material; full archaeological recording of significant material will be recommended.
- If it is not possible for the construction works to avoid the material, full excavation will be recommended. A suitable archaeological team will be on standby to deal with any such rescue excavation.

- Machinery traffic during construction will be restricted to avoid any identified archaeological site/s and their environs.

- Spoil will not be dumped on any of the selected sites or their environs.

17.4 Landscape & Visual

- The proposals for the pier and slipway and amenity area at Paddy's Point shall be implemented as outlined within drawing nr. 1004.1.02.

- Planting shall be provided in the form of tree-lines and woodland screen planting adjacent to the southern site boundary and internal roads to provide screening, as per drawing nr. 1004.1.03. Further planting will be provided on the northern boundary, as per drawing nr. 1004.1.04.

- Cranes will be mid-grey in colour, based on existing landscape and predominant sky colour.

- Directional downlight style cut-off luminaries shall be implemented to prevent up lighting and reduce glare and sky glow.

- Down lighting style cut-off luminaries shall be used on any crane superstructures to prevent up lighting and reduce glare and sky glow.

- Lighting control systems shall be used to reduce amount of light spill, sky glow, and visual appearance during periods of low activity during the construction phase.

- The use of flashing, moving, strobe, or blinking lights will be kept to a minimum.

17.5 Traffic & Transportation

- The new Roll on Roll off (RoRo) facility will not be operational until the opening of the N28 Upgrade (assumed to be 2023).

- Reduce Heavy Goods Vehicle (HGV) traffic volumes generated by the Port to Do Minimum levels during the AM and PM peaks by introducing the Ringaskiddy Mobility Management Plan (RMMP) to manage HGV traffic to and from the Port until the opening of the N28 Upgrade. Port HGV traffic, above Do Minimum levels, will be distributed into the Inter Peak period where there is significantly more spare road capacity. The RMMP measures include:

    - Introduce booking & scheduling system to manage the discharge of HGV Lift on Lift off (LoLo) traffic onto the strategic road network over the whole day, i.e. outside of peak periods.
    - Control and optimise gate operations, to regulate the HGV traffic flow rate onto the strategic road network.
    - Extend operating hours, to facilitate HGV traffic spreading outside of peak periods, in particular bulk related traffic.
    - Introduce IT solutions to transfer information and communicate with hauliers.
    - Reduce construction traffic volumes during peak hours by applying elements of the RMMP during the construction phase. Additional construction traffic will be spread over the whole day.

17.6 Noise & Vibration

- During the construction phase, the Contractor shall adhere to all of the recommendations for reducing noise included in British Standard *BS5228:2009 – Noise and vibration control on construction and open sites: Part 1 – Noise.*

- Three 4m noise barriers as illustrated in Figure 9.15 (EIS, Volume II) must be built prior to the commencement of operations associated with the proposed redevelopment; these barriers shall be maintained during the operational phase.

- During operational phase, a noise threshold limit of 100dB L_w (95dB L_w with tone) will be set for alarm systems associated with the plant/equipment on-site.

17.7 Air Quality & Climate

- During the construction phase, a site dust monitoring programme will be put in place with secure monitoring locations to ensure compliance with dust deposition limits.

- An odour management plan will be adopted during the construction phase of the proposed development to mitigate potential odour issues and implement remedial action through agreement with Cork County Council. The management plan will include but not be limited to odour monitoring proposals, odour control mechanisms and odour complaint procedures.

- Within the management plan, monitoring proposals for odour emissions will be submitted for agreement to the planning authority prior to the commencement of dredging activities in the construction phase of the proposed development.

- A Construction Environmental Management Plan (CEMP) will be developed and implemented. The CEMP will provide a framework for the management and implementation of construction activities incorporating the mitigation measures identified in the relevant chapters of this EIS, including dust and odour. The CEMP will be reviewed regularly, and revised as necessary, to ensure that the measures implemented are effective.

- During the operational phase, emissions to air from berthed shipping will be controlled by strict international limits. Good cargo unloading practices will minimise the impact of exhaust fumes from HGVs.

- Bulk grain cargo unloading will be carried out in a manner that minimises cargo spillage. To this effect all loading/unloading will be subject to appropriate operation specific control and containment protocols as adhered to by Port of Cork. The current method of handling cargoes will be continued and extended to service the proposed berth extension and dust monitoring at site peripheries will be continued.

17.8 Soils, Geology & Contamination

- At construction stage, a Groundwater Management Plan based on CIRIA C515 Groundwater Control – Design and Practice will be implemented by the contractor.

- Any contaminated groundwater encountered during earthworks or piling shall be disposed off site to a licensed waste disposal facility or treated by passing it through a three stage interceptor and discharged to sewer under license from the Local Authority.

- Material imported onto the site will be assessed to ensure that contamination is not introduced to the site.

- Topsoil which is imported onto the site will be chemically analysed and screened against generic screening values for a commercial end use to ensure that it does not pose a risk to human health.

- Fill material imported onto the site will undergo Waste Acceptance Criteria (as per BS 12457/3) testing to ensure that the material is classified as inert and does not pose a risk to the underlying groundwater.

- The existing Port of Cork Oil Spill Contingency Plan shall continue to be implemented on site.

17.9 Coastal Processes

- None.

17.10 Water Environment

Water Quality

- Water quality monitoring will be carried out by the main contractor with continuous in-situ monitoring carried out in advance of the works to establish a water quality baseline and during the dredging activities to ensure effective response to any incidents that may impact on water quality at sensitive sites.

- A protocol for regular communication with statutory agencies such as National Parks and Wildlife Service (NPWS) and Cork County Council and other third parties shall be established to ensure all pollution incidents or potential incidents are reported in an efficient and timely manner;

- Management and auditing procedures, including tool box talks to all personnel, shall be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with required permits, licences, certificates and planning permissions.

- Existing and proposed surface water drainage and discharge points shall be mapped on a site plan which shall also include the location of existing and proposed measures such as monitoring points, sediment traps, settlement lagoon and oil interceptors.

- An appropriate dredging regime will be implemented with due regard to best practice.

- Dredge material will be transported in closed systems to prevent overspill.

- Contractors shall implement best practice and relevant guidance to ensure silt laden or contaminated surface run-off from the entire construction site; i.e. the Container Berth / Multi-purpose Berth, Deepwater Berth extension, road upgrades, site compound and Paddy's Point pier and slipway, does not discharge directly to the Harbour.

- Imported fill material required to complete the infilling behind the quay walls will be clean graded stone sourced from local quarries.

- Concrete use and production shall adhere to control measures outlined in PPG 6 Working at demolition & construction sites (Environment Agency, 2012).

- For the sections of concrete that are under water, pre-cast units shall be used for construction. Where the use of pre-cast units is not possible, where *in situ* stitching is required or where concrete is to be placed under water or in tidal conditions, specific fast-setting mix is required to limit segregation and washout of fine material / cement.

- In relation to fuel and chemical storage the control measures outlined in PPG 26 "*Safe storage – drums and intermediate bulk containers"* (Environment Agency, 2011a) shall be implemented. The safe operation of refuelling activities shall be in accordance with PPG 7 *"Safe Storage – The safe operation of refuelling facilities"* (Environment Agency, 2011b).

- With regard to potential oil spills during dredging operations, an emergency spill kit and oil spill containment equipment will be held on board by the dredging operator;

- A contingency plan for the works shall be prepared in accordance with *PPG 21 Pollution Incident Response Planning* (Environment Agency, 2009). The Plan shall also detail the procedures to be followed if there is a breach in any licence conditions or a non compliance.

- Operations shall be undertaken in cognisance of the existing Port of Cork Oil Spill Contingency Plan.

- The following shall be adhered to with respect to vessels at berth or travelling through the Port of Cork:

  - Bilge water shall be treated in accordance with Marpol standards;
  - De-ballasting shall be undertaken offshore in accordance with International Maritime Organisation guidelines;
  - Vessels shall be equipped with oil-water separation systems in accordance with Marpol requirements;
  - Spills on deck shall be contained and controlled using absorbing materials;
  - Vessels without sewage treatment systems shall have suitable holding tanks and will bring waste onshore for treatment by licensed contractors;
  - Chemicals shall be stored appropriately in suitably bunded areas and with material safety data sheets.

Sewage and Storm Water Infrastructure

- The proposed redevelopment will connect to the new Cork Lower Harbour Main Drainage Scheme and therefore will receive appropriate treatment prior to discharge to coastal waters.

- All surface drainage waters, including road drainage, will be presumed to be contaminated and will be routed through highway quality oil interceptors and sediment traps prior to discharge into the sea.

17.11 Marine Ecology

During the construction phase:

- Vehicles will not be allowed to traverse the mussel bank during construction.
- Refuelling of plant will be undertaken away from the intertidal area to minimise the effects of possible fuel spillage.
- Standing machinery will be placed on drip trays to avoid spillages.
- No overflow from the dredger shall be permitted during dredging.
- To minimise potential effects on marine mammals during piling operations it is recommended that a qualified Marine Mammal Observer shall be appointed to implement mitigation measures derived from '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters'* (NPWS, 2014) following consultation with NPWS.

During the operational phase:

- Surface water will be collected in drainage channels and gullies, and passed through oil interceptors prior to discharge.
- Port of Cork will contribute to an environmental education programme for local primary schools concentrating on the marine environment. To that end they will engage with Inland Fisheries Ireland, and with the relevant educational institutions on the initiative with a view to agreeing a programme to commence within 18 months of project commencement should it be approved.

17.12 Terrestrial Ecology & Ornithology

- A suitably qualified Ecological Clerk of Works will be appointed prior to the commencement of any works to ensure the mitigation is implemented in the manner for which it is intended and to act as a liaison between Port of Cork and NPWS.

- Landscaping will prioritise the use of native species in keeping with habitats immediately adjacent to the proposed development footprint.

- A pre-construction re-survey of the shoreline will be undertaken by a suitably qualified Ecologist to identify otter activity prior to construction.

- Construction works at the shoreline will be restricted to daytime hours in order to allow otters and other wildlife to forage at dusk, through the night and at dawn.

- Light spill will be minimised during construction and operation through the use of directional lighting and by minimising lighting requirements.

- Vegetation clearance will be undertaken outside of the breeding bird season i.e. it will not take place between 1st March to 31st August.

- Dredging will not be undertaken between May and August.

- Mature trees within the application site will be retained where possible. If any are to be removed they will be felled during the months of September to November inclusive.

- Any ivy-covered trees which require felling will be left to lie for 24 hours after cutting to allow any bats beneath the cover to escape.

- A 4m visual screen will be constructed as part of the works along the northern perimeter of the internal road at the location shown in Planning Application Drawing 0474-PL-0802. This screen will include predator perching post deterrents.

- The construction of the internal road between the existing security hut and the existing RoRo ramp will not take place between April and August inclusive unless the visual screen is in place before construction works commence.

- Construction of the DWB extension shall be screened from the ADM Training Wall and ADM Jetty.

APPENDIX 15.2 FLORA AND HABITAT SURVEY

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Flora and Habitat Survey:

Ringaskiddy, Co. Cork

Report version 2 prepared for RPS, Belfast.

By Karen Banks, MIEEM, Ecological Consultant

12th June 2012

Karen Banks

Duros Road

Cornamona

Co. Galway

1. Introduction

Ringaskiddy is located at Cork Harbour, to the south- east of County Cork. Karen Banks, Ecological Consultant, was requested by RPS Engineering to carry out a habitat and flora survey of part of the port at Ringaskiddy, at the locations shown outlined in red in the map in appendix 1.

This report presents the results of a botanical and habitat survey carried out on 23rd May 2012, with an update on 09th June 2012.

2. Methodology

The site was walked over and habitats mapped according to Fossitt (2000) classifications. A detailed botanical survey was carried out, and species lists made in all but very improved habitats or any planted flower beds. The results of the habitat survey were mapped on to an aerial photograph, as shown in appendices 2 and 3. A comprehensive species list is provided in appendix 4.

3. Results

The breakwater is classified as the habitat sea walls, piers and jetties (**CC1**). The wall is partially inundated at high tide, and is covered in seaweed up to the top of the wall, which is vegetated for most of its length. Sea Beet (*Beta vulgaris*) is abundant along most of the length of the wall, with Red Fescue (*Festuca rubra*) frequent and locally abundant. Common Scurvygrass (*Cochlearia officinalis*) and Scentless Mayweed (*Tripleurospermum inodorum*) are frequent, while Spear-leaved Orache (*Atriplex prostrata*), Sea Campion (*Silene uniflora*) and Sea Couch (*Elymus pycnanthus*) are occasional species. Thrift (*Armeria maritima* ssp *maritima*), Frosted Orache (*Atriplex laciniata*), Biting Stonecrop (*Sedum acre*), Rock Samphire (*Crithmum maritimum*) and Greater Sea-spurrey (*Spergularia media*) are also present on the breakwater in small amounts.

Plate 1. The breakwater at Ringaskiddy.



The area to the north of the car park and ferry terminal supports the habitats dry calcareous and neutral grassland (**GS1**) and scrub (**WS1**). The grassland is rabbit grazed, and the sward comprises abundant Sweet Vernal-grass (*Anthoxanthum odoratum*), frequent to abundant Red Fescue (*Festuca rubra*) and Common Bent (*Agrostis capillaris*), locally abundant Cock's-foot (*Dactylis glomerata*) and Yorkshire Fog (*Holcus lanatus*), occasional Smooth Meadow-grass (*Poa pratensis*) and rare Annual Meadow-grass (*P. annua*) and Rough Meadow-grass (*P. trivialis*).

Herbs in the sward include frequent to locally abundant Ragwort (*Senecio jacobaea*), occasional to locally frequent Germander Speedwell (*Veronica chamaedrys*), Common Bird's-foot trefoil (*Lotus pedunculatus*), Common Dog-violet (*Viola riviniana*) and Hop Trefoil (*Trifolium campestre*); and occasional Red Clover (*Trifolium pratense*), Common Vetch (*Vicia sativa*), Ribwort Plantain (*Plantago lanceolata*), Common Mouse-ear (*Cerastium fontanum*), Creeping Buttercup (*Ranunculus repens*), Scarlet Pimpernell (*Anagalis arvensis*), Dove's-foot Crane's-bill (*Geranium molle*) and Teasel (*Dipsacus fullonum*). Rare species include Common Restharrow (*Ononis repens*), Eyebright sp. (*Euphrasia agg.*), Kidney Vetch (*Anthyllis vulneraria*), Sea Beet (*Beta vulgaris*), Yellow-wort (*Blackstonia perfoliata*), Alexanders (*Smyrnium olusatrum*) and Lesser/Rough Hawkbit (*Leontodon sp.*). Bell Heather (*Erica cinerea*) and Tormentil (*Potentilla erecta*) are locally abundant in a small more acidic patch in the grassland.

Eight spikes of an Orchid species were observed during the initial survey of the grassland, but could not be identified to species level as they were not in flower at that time (23rd May). Later checks on

the Orchid species carried out by Richard Mundy on 9th June 2012, confirmed the species as Bee Orchid (*Ophrys apifera*), with a total of 75 spikes present at this date (locations shown on map in appendix 3).

The scrub in this area is dominated by Gorse (*Ulex europaeus*), with frequent Bramble (*Rubus fruticosus*) and Elder (*Sambucus nigra*), and occasional Buddleja (*Buddleja davidii*), Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*).

A non-native hedgerow (**WL1**) is positioned between the grassland and the terminal building road, and a surfaced area (old car park) (**BL3**) is positioned in the middle of the two areas of scrub and grassland.

Plate 2. Grassland and scrub to the north of the car park and ferry terminal.



Plate 3. Orchid sp. in grassland (23rd May 2012).



Plate 4. Bee Orchid, taken by Richard Mundy, 09/06/2012.



Around the car park and terminal building is a mixture of amenity grassland (**GA2**), and planted trees (**WD5**). As the grassland here is improved a species list was not taken, but a note of tree species was made, and includes Sycamore (*Acer pseudoplatanus*), various other *Acer* species, Ash (*Fraxinus excelsior*), Pine (*Pinus sp.*), Rowan (*Sorbus aucuparia*) and European Lime (*Tilia x europea*). There are also flower beds close to the terminal building (**BC4**).

A bank between the amenity grassland and a car park is more semi-natural in nature, and although it had been mown recently it looks from the species present that it may not be mown as regularly as the adjoining amenity grassland, and so has been included as Dry Meadows and Grassy Verges (**GS2**). Sweet Vernal-grass (*Anthoxanthum* odoratum) is abundant, with Yorkshire Fog (*Holcus lanatus*), Red Fescue (*Festuca rubra*) and Sheep's Fescue (*Festuca ovina*) frequent, and Cock's-foot (*Dactylis glomerata*) and Common Bent (*Agrostis capillaris*) occasional.

Germander Speedwell (*Veronica chamaedrys*) is frequent to locally abundant here, with Creeping Buttercup (*Ranunculus repens*), Hop Trefoil (*Trifolium campestre*) and Dandelion (*Taraxacum agg.*) frequent. Common Bird's-foot trefoil (*Lotus pedunculatus*) is occasional to locally frequent, and Common Mouse-ear (*Cerastium fontanum*), Mouse-ear Hawkweed (*Pilosella officinarum*), Rough/ Lesser Hawkbit (*Leontodon sp.*), Common Vetch (*Vicia sativa*) and Red Clover (*Trifolium pratense*) are occasional species, with a Sedge sp. (*Carex sp.*) unidentifiable as it had been mown, Creeping Cinquefoil (*Potentilla reptans*) and Wild Carrot (*Daucus carota*) rare.

A line of trees (**WL2**) comprising Cypress sp. (*Cupressus sp.*) runs along the south of this area, forming a boundary between the southernmost amenity grassland area, the car park and the port.

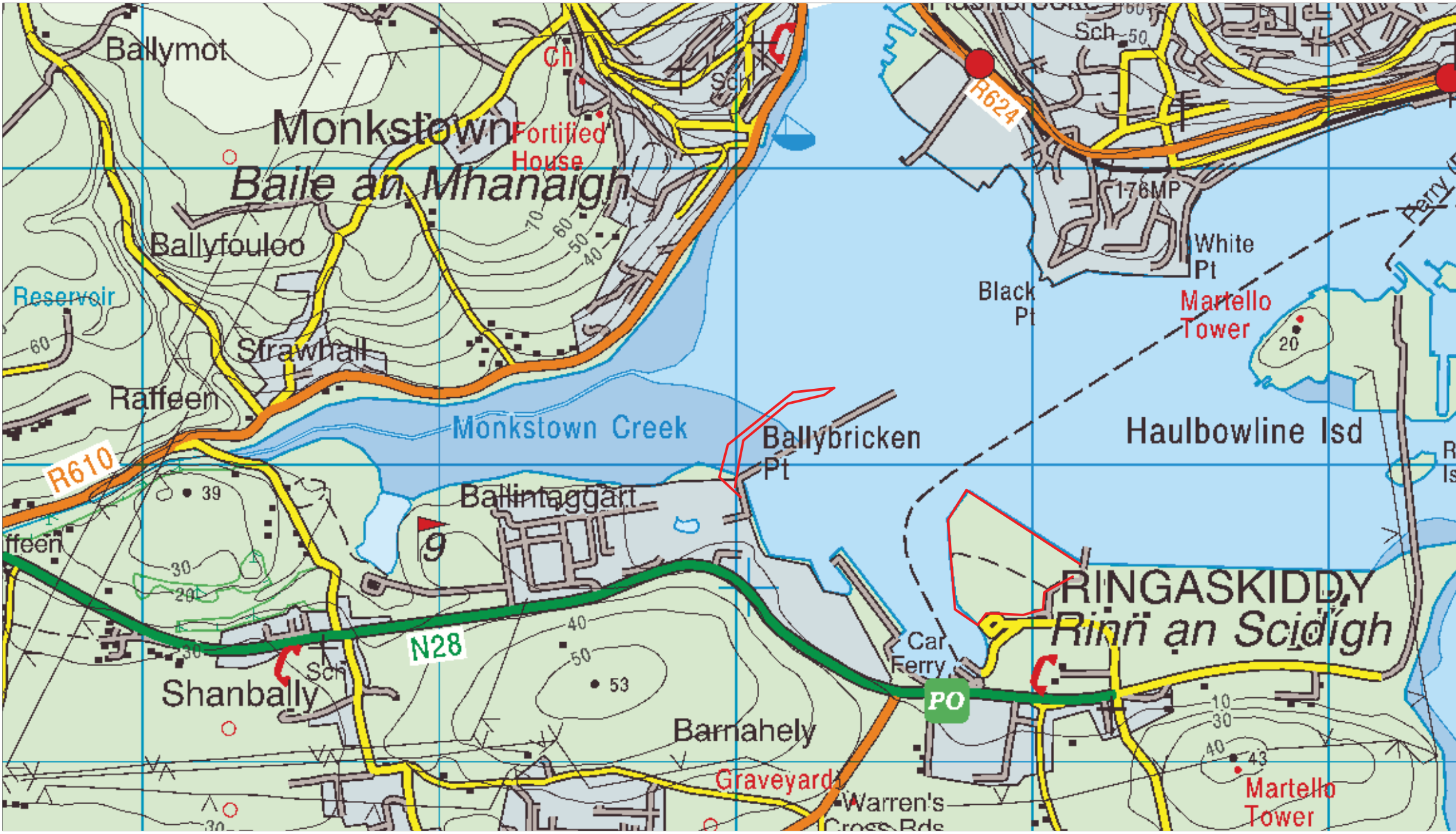
4. Conclusion

The area surveyed at Ringaskiddy comprises a mixture of habitats, including some cultivated areas such as flower beds, amenity grassland, and built areas such as car parks. It does, however, also support some semi-natural habitats such the bank around one of the car parks, and in particular the grassland and scrub positioned in the north of the eastern area. This grassland, classified as habitat dry calcareous and neutral grassland, supports some species indicative of a less improved nature, such as Common Restharrow, Kidney Vetch, Sea Beet, Yellow-wort, and of particular note is the amount of Bee Orchids present on site, with a total of 75 spikes present.

5. References

Fossitt, J. A. (2000). A Guide to Habitats in Ireland. Heritage Council, Kilkenny.

Appendix 1. Location of survey area, Ringaskiddy.



Appendix 2.

Habitat map of the breakwater, Ringaskiddy.



Appendix 3.

Habitat Map of the eastern area of Ringaskiddy, showing location of Bee Orchids.



Appendix 4. Vascular plant species list Ringaskiddy 23/05/2012					
Latin Name	**Common name**	**GS1**	**GS2**	**CC1**	**WS1**
Acer pseudoplatanus	Sycamore			*	*
Agrostis capillaris	Common Bent	*	*		
Alchemilla vulgaris	Lady's-mantle	*			
Anagallis arvensis	Scarlet Pimpernell	*		*	
Anthoxanthum odoratum	Sweet Vernal-grass	*	*		
Anthyllis vulneraria	Kidney Vetch	*			
Armeria maritima ssp maritima	Thrift			*	
Atriplex laciniata	Frosted Orach			*	
Atriplex prostrata	Spear-leaved Orache			*	
Bellis perennis	Daisy	*	*	*	
Beta vulgaris	Sea Beet	*		*	
Blackstonia perfoliata	Yellow-wort	*			
Brachypodium sylvaticum	False Brome	*			
Buddleja davidii	Buddleja				*
Cardamine flexuosa	Wavy Bitter-cress	*			
Carex remota	Remote Sedge				*
Carex sp	Sedge sp		*		
Cerastium fontanum	Common Mouse-ear	*	*	*	
Cirsium arvense	Creeping Thistle	*			
Cirsium vulgare	Spear Thistle	*			
Cochlearia officinalis	Common Scurvygrass			*	
Convulvulus arvensis	Bindweed				*
Crataegus monogyna	Hawthorn				*
Crithmum maritimum	Rock Samphire			*	
Cut-leaved Crane's-bill	Geranium dissectum	*			
Dactylis glomerata	Cocksfoot	*	*		
Daucus carota	Wild Carrot		*		
Dipsacus fullonum	Teasel	*			
Elymus pycnanthus	Sea Couch			*	
Epilobium parviflorum	Hoary Willowherb		*		
Epilobium tetragonum	Square-stalked Willowherb	*			
Erica cinerea	Bell Heather	*			
Euphrasia agg	Eyebright	*		*	
Festuca ovina	Sheep's Fescue	*	*		
Festuca rubra	Red Fescue	*	*	*	
Galium aparine	Cleavers				*
Geranium molle	Dove's-foot Crane's-bill	*			
Geranium robertianum	Herb-Robert				*
Hedera helix	Ivy				*
Heracleum sphondylium	Hogweed	*			
Holcus lanatus	Yorkshire Fog	*	*		
Juncus effusus	Soft Rush				*
Leontodon sp.	Rough/ Lesser Hawkbit	*	*		
Lotus pedunculatus	Common bird's-foot trefoil	*	*		
Luzula campestre	Field Wood-rush				*
Medicago lupulina	Black Medick	*			
Montbretia?	Crocosmia?				*
Ononis repens	Common Restharrow	*			
Ophrys apifera	Bee Orchid	*			

Petasites hybridus	Butterbur	*			
Phyllitis scolopendrium	Hart's-tongue Fern				*
Pilosella officinarum	Mouse-ear-hawkweed		*		
Plantago lanceolata	Ribwort Plantain	*	*		
Poa annua	Annual Meadow-grass	*		*	
Poa pratensis	Smooth Meadow-grass	*			
Poa trivialis	Rough Meadow-grass	*			
Potentilla anserina	Silverweed	*			
Potentilla erecta	Tormentil	*			
Potentilla reptans	Creeping Cinquefoil		*		
Prickly Sow-thistle	Sonchus asper	*			
Prunella vulgaris	Selfheal	*		*	
Prunus spinosa	Blackthorn				*
Ranunculus repens	Creeping Buttercup	*	*		
Reseda luteda	Weld	*			
Rubus fruticosus agg	Bramble	*			*
Rumex acetosa	Common Sorrel	*			
Rumex crispus	Curled Dock	*		*	
Sagina procumbens	Procumbent Pearlwort	*			
Salix cinerea	Grey Willow			*	
Sambucus nigra	Elder				*
Sedum acre	Biting Stonecrop			*	
Senecio jacobaea	Common Ragwort	*	*		
Silene uniflora	Sea Campion			*	
Sinapis arvensis	Charlock	*			
Smyrnium olusatrum	Alexanders	*		*	
Sonchus arvensis	Perennial Sow-thistle			*	
Spergularia media	Greater Sea-spurrey			*	
Stellaria holostea	Greater Stitchwort				*
Stellaria media	Common Chickweed	*			
Taraxacum agg	Dandelion	*	*	*	
Teucrium scorodonia	Wood sage	*			
Trifolium campestre	Hop Trefoil	*	*		
Trifolium pratense	Red Clover	*	*		
Tripleurospermum inodorum	Scentless Mayweed	*	*	*	
Ulex europaeus	Gorse	*			*
Urtica dioica	Nettle	*			
Verbascum thapsus	Great Mullein	*			
Veronica chamaedrys	Germander Speedwell	*	*		
Veronica persica	Common Field Speedwell	*			
Vicia sativa	Common Vetch	*	*		
Viola riviniana	Common Dog-violet	*			
	Crucifer sp.	*			
	Orchid sp.	*			
Calliergonella cuspidata		*			
Pseudoscleropodium purum		*			
Rhytidiadelphus squarrosus		*	*		
Planted trees around car park					
Acer pseudoplatanus	Sycamore				
Acer species	Various Acer species				
Betula pendula	Silver Birch				

Cupressus sp.	Cypress sp.				
Fraxinus excelsior	Ash				
Pinus sp.	Pine sp.				
Sorbus aucuparia	Rowan				
Tilia x europea	European Lime				