

**Comhairle Chontae Chorcaí
Cork County Council**

Area Operations South,
Floor 5,
County Hall,
Carrigrohane Road,
Cork
Tel No. (021) 4285304



Administration
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency
Headquarters
PO Box 3000
Johnstown Castle Estate
County Wexford.

22nd April, 2009.

**Re : Notice in accordance with Regulation 18(3)(b) of the Waste water Discharge
(Authorisation) Regulations 2007**

Application: DO140-01- North Cobh, Co Cork.

Sir/ Madame

Further to your letter of 19th March, 2009 I now enclose response to the queries raised in the correspondence.

For clarity, I have responded point by point to the queries raised in your letter, with my responses outlined in blue on the attached document.

Please also find enclosed an electronic copy of the response. This electronic copy is a true copy of the submitted hardcopy.

I trust that this is to your satisfaction.

Regards

Patricia Power
Director of Services

Notice in accordance with Regulation 18(3)(b) of the Waste Water Discharge (Authorisation) Regulations 2007**Regulation 16 Compliance Requirements****Section A:**

Provide more details on the West Passage's assimilative capacity in relation to the discharge from the North Cobh WWTP and the existing quality of the receiving waters.

Response

The treated effluent is being discharged to the River Lee Estuary, Cork Harbour, West Passage. Carrigrenan WWTP also discharges to Cork Harbour upstream of the North Cobh discharge point. According to the Part 8 Planning Application (which is attached) for the North Cobh WWTP the Carrigrenan WWTP treats all of the sewage arising from Cork City and caters for a population equivalent of 413,000p.e. It suggests that it is reasonable to assume that if Cork Harbour West Passage can assimilate the treated effluent from a p.e. of 413,000 then it can assimilate treated effluent from an additional 8,000 p.e. which is equivalent to just 1.5% of the load from Carrigrenan.

Full details of the assimilative capacity of the West Passage are contained in the EIS prepared for the WWTP at Carrigrenan. Appendix 1 details mathematical modeling of bacteriological and chemical constituents of the treated effluent for the outfall location which is situated at Marino Point. The discharge point for the North Cobh WWTP at Carrigaloe, is south of the discharge at Marino Point.

The EIS for the Shanbally WWTP details in Vol II Part D describes the receiving environment. In EIS Vol III Part C Appendix 2A the Terrestrial and Marine Ecology is dealt with in the Flora and Fauna study.

Section B**B.3**

Please clarify the unique point code for the primary discharge (Referred to SW01NCBH in this section, and identified as SW01NCOB in the B.3 attachments and SW01 in the E.3 attachments. Also, please confirm the unique point code for the upstream and downstream monitoring points.

Response

Unique Point Code for the primary discharge has been clarified and identified as SW01NCOB. Section B.3 of the Application has been amended.

Upstream and downstream monitoring point codes have also been clarified in the application.

B.6

Provide details on the approved planning for the North Cobh WWTP, including copies of relevant approval documentation and any relevant reference numbers.

Response

Southern Committee Report and Part 8 Planning for North Cobh are attached.

B.9 (ii)

Please clarify as to whether there is any non-domestic activity contributing to the population equivalence of the plant. Specifically, are there any commercial premises already in existence in the zoned area?

If so, provide details of the volume and population equivalence of these wastes, and state their percentage contribution to the overall p.e. of the agglomeration.

Also, will any leachate and /or industrial sludges be accepted at the WWTP?

If so, provide details of the proposed quantity (volume and population equivalence), frequency and rate of introduction of these wastes.

Response

There is very little non-domestic activity contributing to the population equivalence of the plant at North Cobh. The only commercial premises within the catchment are a garage, shop, hair and beauty salon and a restaurant. These are located adjacent to one of the new housing developments being served by the WWTP.

The EPA wastewater treatment manual for small communities, business, leisure centre and hotels was used to calculate the hydraulic and organic load from these units.

The population equivalent is approximately 40 and the volume per day is approximately 7m³. This equates to a 0.67% contribution to the overall p.e. of the agglomeration.

No leachates or industrial sludges will be accepted at the WWTP.

B.10

State whether there has been any update regarding the status of the proposed connection to the Shanbally WWTP. Provide dates for the proposed completion of the Shanbally project and the cessation of discharges from the North Cobh plant.

Response

No decision has been issued from An Bord Pleanála regarding the Shanbally WWTP as the EIS for the scheme is currently before the board for approval. Cork County Council cannot make any formal declaration until this issue is resolved.

Section E**E.2**

Please provide more details on the primary discharge sampling point, with particular reference to the sampling methods involved and the safety of access.

Response

The primary discharge sampling point is accessed by contacting EPS, (the O&M contractors) and requesting a key to gain access to the plant. The primary discharge point is accessed by at a manhole adjacent to the treatment plant. Cork County Council and EPS are currently evaluating the necessity for the installation of a composite sampler at the primary discharge point. There is a composite sampler in place for the treated effluent from the current WWTP.

Section F

Please provide summary details and an assessment (by adequate cross referencing to the Shanbally EIS submitted with the application or by any other suitable means) of the impact of the primary discharge on the existing environment.

1. Give summary details and an assessment of the impacts of any existing or proposed emissions on the environment, including environmental media other than those into which the emissions are to be made.

Response

The discharge is entering transitional water and there is no impact predicted on the ecology of the area.

These issues have been addressed in the EIS Vol II Part D submitted as part of this application where the receiving environment is described. In EIS Vol III Part C, Appendix 2A the Terrestrial and Marine Ecology is dealt with in the Flora and Fauna study.

2. Details of all monitoring of the receiving water should be supplied via the following web based link: http://78.137.160.73/epa_wwd_licensing/. Tables F.1(i)(a) & (b) should be completed for the primary discharge point. Surface water monitoring locations upstream and downstream of the discharge point shall be screened for those substances listed in Tables F.1(i)(a) & (b). Monitoring of surface water shall be carried out at not less than two points, one upstream from the discharge location and one downstream.

Response

This information has been supplied in hard copy and PDF format. It was not entered into the online system due to the short timeframe of its implementation. Cork County Council has previously notified the EPA about this issue.

Details of monitoring points can be found in the hard copy Attachment F(i) (a) & (b) of the application.

3. For discharges from secondary discharge points Tables F.1(ii)(a) & (b) should be completed. Furthermore, provide summary details and an assessment of the impacts of any existing or proposed emissions on the surface water or ground (aquifers, soils, sub-soils and rock environment), including any impact on environmental media other than those into which the emissions are to be made.

Response

There are no secondary discharge points from this scheme as the emergency overflow discharges down the main outfall pipe.

4. Provide details of the extent and type of ground emissions at the works. For larger discharges to groundwaters, e.g., from Integrated Constructed Wetlands, large scale percolation areas, etc., a comprehensive report must be completed which should include, inter alia, topography, meteorological data,

water quality, geology, hydrology, and hydrogeology. The latter must in particular present the aquifer classification and vulnerability. The Geological Survey of Ireland Groundwater Protection Scheme Dept of the Environment and Local Government, Geological Survey of Ireland, EPA (1999) methodology should be used for any such classification. This report should also identify all surface water bodies and water wells that may be at risk as a result of the ground discharge.

Response

There are no ground /groundwater emissions from the WWTP.

5. Describe the existing environment in terms of water quality with particular reference to
 - environmental quality standards or other legislative standards.
 - Submit a copy of the most recent water quality management plan or catchment management plan in place for the receiving water body.
 - Give details of any designation under any Council Directive or Regulations that apply in relation to the receiving water.

Response

The EPA's Water Frame Work Directive - Proposed Quality Standards for Surface Water Classification - a Discussion Document for Public Consultation was consulted and screening was carried out as Part of F1 and showed that the effluent being discharged was below the limits for detection for most of the parameters. Positive results were recorded for Cyanide and Selenium but both were within the standards outlined on page 31 of the document.

The receiving environment is detailed in the EIS submitted with this application and in particular Vol II Part D, Section 3 – Receiving Environment.

Vol III Part C contains the Flora and Fauna Study, here the receiving environment is assessed with particular reference to Designated areas, Flora and habitats, Fauna and Water quality.

The 2008 harbour strategy plan for Cork Harbour has been included in the attachments.

6. Provide a statement as to whether or not emissions of main polluting substances (as defined in the *Dangerous Substances Regulations S.I. No. 12 of 2001*) to water are likely to impair the environment.

Response

The North Cobh WWTP treats wastewater from a domestic source and it is highly unlikely to be a source of main polluting substances as described in the *Dangerous Substances Regulations S.I. No. 12 of 2001*

7. In circumstances where water abstraction points exist downstream of any discharge describe measures to be undertaken to ensure that discharges from the waste water works will not have a significant effect on faecal coliform, salmonella and protozoan pathogen numbers, e.g., Cryptosporidium and Giardia, in the receiving water environment.

Response

There are no water abstraction points downstream of the wastewater works as the discharges are to saline waters.

8. Indicate whether or not emissions from the agglomeration or any plant, methods, processes, operating procedures or other factors which affect such emissions are likely to have a significant effect on –
- (a) a site (until the adoption, in respect of the site, of a decision by the European Commission under Article 21 of Council Directive 92/43/EEC for the purposes of the third paragraph of Article 4(2) of that Directive) –
 - (i) notified for the purposes of Regulation 4 of the Natural Habitats Regulations, subject to any amendments made to it by virtue of Regulation 5 of those Regulations,
 - (ii) details of which have been transmitted to the Commission in accordance with Regulation 5(4) of the Natural Habitats Regulations, or
 - (iii) added by virtue of Regulation 6 of the Natural Habitats Regulations to the list transmitted to the Commission in accordance with Regulation 5(4) of those Regulations,
 - (b) a site adopted by the European Commission as a site of Community importance for the purposes of Article 4(2) of Council Directive 92/43/EEC¹ in accordance with the procedures laid down in Article 21 of that Directive,
 - (c) a special area of conservation within the meaning of the Natural Habitats Regulations, or
 - (d) an area classified pursuant to Article 4(1) or 4(2) of Council Directive 79/409/EEC²;

¹Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ No. L 206, 22.07.1992)

²Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ No. L 103, 25.4.1979)

Response

The discharge from the North Cobh WWTP is characterised by comprising mainly of domestic wastewater with less than 1% volume to date being contributed by commercial activities. The effluent is treated to a high standard and is not expected to cause any adverse effects in the West Passage of Cork Harbour. Carrigrenan WWTP, which serves a population equivalent of 413,000p.e. discharges at Marino Point which is upstream of the discharge point for the North Cobh WWTP. The discharge volume from the North Cobh WWTP, when operating at a capacity of 8,000p.e. will only represent 1.5% of

the volume discharged from Marino Point. Therefore it is not determined that the discharge will affect any of the sites/areas listed above.

9. Describe, where appropriate, measures for minimising pollution over long distances or in the territory of other states.

Response

A high specification WWTP plant has been developed in North Cobh to ensure the minimisation of pollution over long distances and to enhance the water quality in the Harbour. There is no impact on the territory of other states.

10. This section should also contain full details of any modelling of discharges from the agglomeration. Full details of the assessment and any other relevant information on the receiving environment should be submitted as **Attachment F.1.**

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In addition, review the data submitted in the application having regard to the Department of Environment Circular Letter (L8/08) – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Carry out a screen as set out in Appendix 1 and submit the results of the screen, detailing the response to each question. If the result of the screen is to 'Assess Impacts' submit an update of the data in the EIS as specified in the Circular letter

Response to Circular L8/08 Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments

What Projects must be screened: If the answer is yes to any of the following, the project must be screened for its impacts.

1. Is the development in or on the boundary of a nature conservation site NHA/SAC/SPA?

No

2. Will nationally protected species be directly impacted? Wildlife Acts (1976 and 2000), Flora Protection order (S.I. 94 of 1999)?

No

3. Is the development a surface water discharge or abstraction in the surface water catchment¹, or immediately downstream of a nature conservation site with water dependant qualifying habitats/ species²?

No

4. Is the development a groundwater discharge or abstraction in the ground water catchment¹ or within 5 km of a nature conservation site with water-dependant qualifying habitats/species²?

No

5. Is the development in the surface water or groundwater catchment of salmonid waters?

No

6. Is the treatment plant in an active or former floodplain or flood zone of a river, lake, etc?

No

7. Is the development a surface discharge or abstraction to or from marine waters³ and within 3km of a marine nature conservation site?

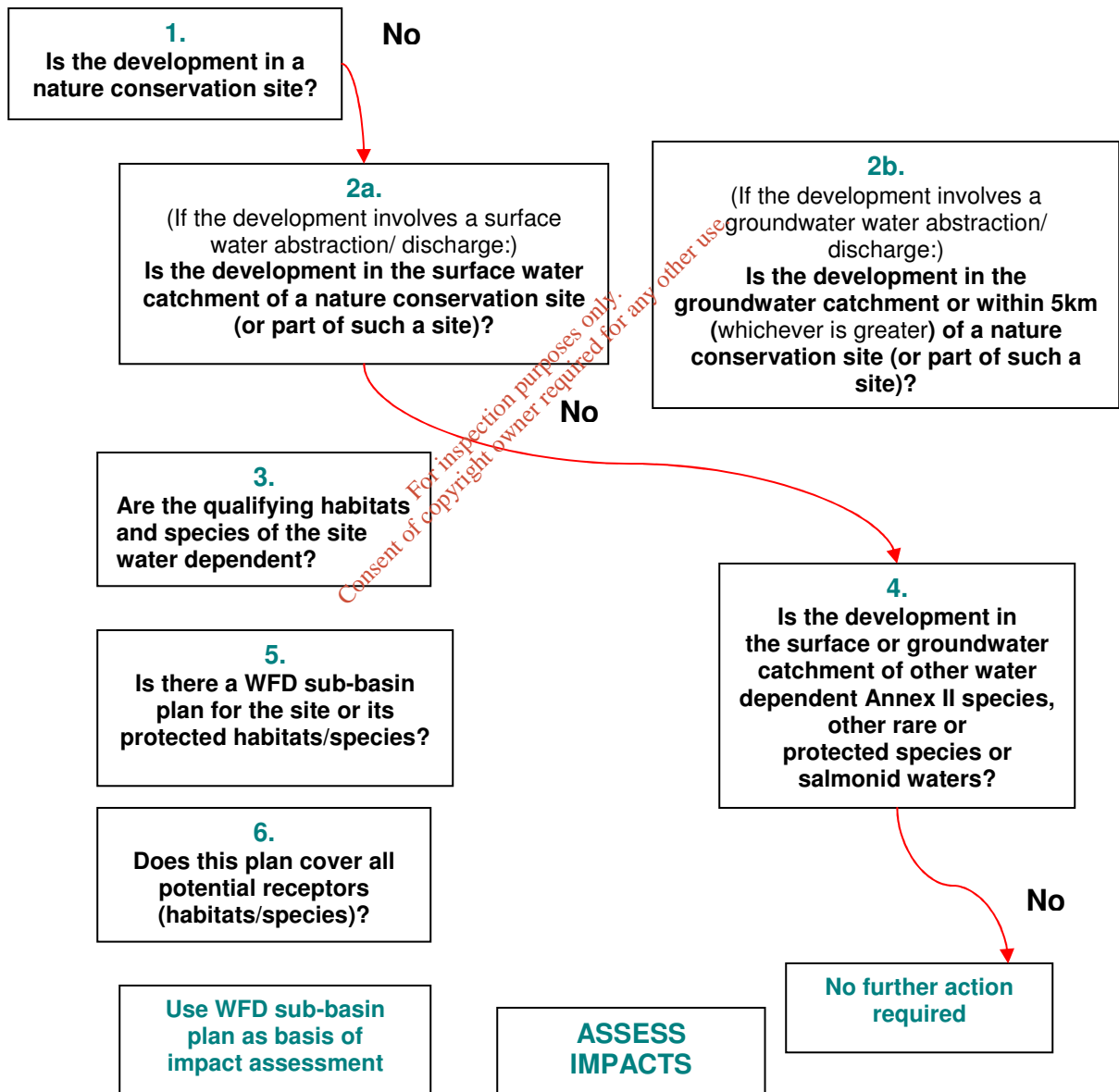
Yes

8. Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species?

No

The diagram was used to work through the screening requirements following the positive response to one of the above criteria, and it was found that none of the criteria applied and no further impact assessment was required.

The EIS which was prepared for the Shanbally WWTP addresses the issues of Archaeology and Ecological Impacts in detail.



F.2

Provide details of any dispersion modelling that may have been carried out or of an assessment based on the modeling for Shanbally UWWD or other adjacent discharges. This information must give some indication of the impact of the discharge on any protected areas (SPA's, SAC's, Shellfish Waters, etc.) in Cork Harbour.

Details of this study can be found in the EIS accompanying this application in Appendix 3A: Hydrodynamic and Modelling Report which can be found in Vol III, Parts F, G, H, I & J. Below is a brief outline of the modeling study.

Water Quality

Cork Harbour is the second largest natural harbour in the world and the second largest port in Ireland. The harbour is used extensively for recreational activities. Within the Lower Harbour area there are a number of protected conservation areas namely, Cork Harbour SPA and the Great Island Channel SAC. Two nationally important designated sites are also present, Monkstown Creek pNHA and Owenboy River pNHA. Currently, untreated waste water is discharged directly into the Lower Harbour area. The provision of a WWTP and upgraded collection system will improve water quality in the Lower Harbour area. The west passage of the River Lee is designated a sensitive water under the *Urban Waste Water Treatment (UWWT) Regulations 2001*, however, the Lower Harbour area is not designated as a sensitive water under the *UWWT Regulations*. There are no designated bathing areas within the study area and Cork Lower Harbour is not designated as a sensitive water under the *Quality 01 Shellfish Waters Regulations, 2006 (S.I. 268012006)*. According to the EPA, water quality in the Lower Harbour area is classed as 'intermediate' and water quality within Cork Harbour has exhibited an improvement over the last two years, due, in part, to the operation of Carrigrohane WWTP in 2005. At present, waste water from the Lower Harbour catchment area is discharged untreated into the Lower Harbour. It is proposed to treat the effluent at a WWTP in the townland of Shanbally and the treated effluent will then be discharged at the existing Ringaskiddy IDA outfall. This will result in a reduction in the number of outfall points in Cork Lower Harbour to a single outfall point and the discharge of treated effluent, as compared to the existing scenario where untreated effluent is discharged at multiple outfalls throughout the Lower Harbour area.

A hydrodynamic study conducted by University College Cork (UCC) modelled the flow rates and loadings of effluent from the Lower Harbour catchment area for 2010 for treated and untreated effluent. Concentrations of bacterial (faecal coliforms, *E. coli* and intestinal Enterococci) and viral (*Norovirus*) determinants were modelled in addition to nutrient levels (organic nitrogen, ammonia and nitrate) in the untreated and treated effluent.

Compared to the existing scenario, the hydrodynamic modelling study showed that there will be significant reductions in the levels of faecal coliforms, *E. coli*, intestinal enterococci and *Norovirus*. The concentrations of each of three species of nitrogen (organic nitrogen, ammonia and nitrate) in the harbour was found to decrease following treatment of the effluent, with the exception of organic nitrogen concentrations at Fountainstown, Myrtleville, Roches Point and upstream of the IDA outfall.

These slight increases in organic nitrogen are due to the discharge of all treated effluent through a single outfall, compared to the present scenario where there are numerous outfall points. No significant negative impacts on water quality are

anticipated during the construction of the WWTP and collection system following the implementation of all mitigation measures. During the operational phase, there is a potential for overflows to occur. The emergency overflow design will be refined at detailed design stage to the extent that they will meet all accepted industry design parameters and will not have a significant impact on water quality. All pumping stations and associated overflows will be designed in accordance with the Department of the Environment, Heritage and Local Government guidelines including the guideline document issued entitled *Procedures and Criteria in relation to Storm Water Overflows*. An automated control operating system will be put in place to ensure that if a downstream pumping station fails to operate, the upstream pumping station will cease pumping.

Provision of continuous monitoring and sampling of waste water flow entering and leaving the site will be provided and a waste water discharge licence will be required from the EPA for the Cork Lower Harbour WWTP.

As a result of the WWTP and upgraded collection system, water quality in Cork Lower Harbour is expected to improve within the Lower Harbour area, which will have significant positive impacts on the towns, villages, population and economy of the Lower Harbour catchment area.

Dispersion modelling was also carried out as part of the EIS prepared for the Carrigrenan WWTP which serves the agglomeration of Cork City, Glanmire and Little Island and discharges at Marino Point at the north eastern point of the West Passage of Cork Harbour.

This information can be found in Appendix 1 of the EIS submitted as part of the Cork City WWDL Application.

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Index List of attached documents

1. Section A: Revised Non-technical Summary
2. Section B: Revised
3. Section E: Revised
4. Section F: Revised

5. Attachment B.6: Planning Information & Part 8 Planning Report
6. Attachment F.1: North Cobh Heritage Maps
7. Attachment F.1: Cork Harbour Management Strategy
8. Attachment F.1: Cork Harbour Coastal Water Data

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Cork County Council

**Wastewater Discharge Licence Application under
S.I 684 of 2007 Regulations**

Scheme/Agglomeration: North Cobh

Submission Date: 22nd September 2008

Re-Submitted: 24th April 2009

This is a draft document and is subject to revision.



Waste Water Discharge Licence Application Form

EPA Ref. N^o:

(Office use only)

Environmental Protection Agency

PO Box 3000, Johnstown Castle Estate, Co. Wexford

Lo Call: 1890 335599 Telephone: 053-9160600 Fax: 053-9160699

Web: www.epa.ie Email: info@epa.ie

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REVISED SECTION A: NON-TECHNICAL SUMMARY

Advice on completing this section is provided in the accompanying Guidance Note.

A non-technical summary of the application is to be included here. The summary should identify all environmental impacts of significance associated with the discharge of waste water associated with the waste water works. This description should also indicate the hours during which the waste water works is supervised or manned and days per week of this supervision.

The following information must be included in the non-technical summary:

A description of:

- the waste water works and the activities carried out therein,
- the sources of emissions from the waste water works,
- the nature and quantities of foreseeable emissions from the waste water works into the receiving aqueous environment as well as identification of significant effects of the emissions on the environment,
- the proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the waste water works,
- further measures planned to comply with the general principle of the basic obligations of the operator, i.e., that no significant pollution is caused;
- measures planned to monitor emissions into the environment.

Supporting information should form **Attachment N° A.1**

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INTRODUCTION:

Cobh is located in Cork Harbour on the Great Island approximately 25 miles to the East of Cork City. This application is for the discharge from the North Cobh Waste Water Treatment Plant (WWTP), which serves the agglomeration of North Cobh and is situated in an area called Ballynoe. (See **Application Form Attachment A.1 Map 1** for details). This plant is under the administrative control of Cork County Council and is operated by Electrical & Pump Services Ltd. (EPS Ltd).

Developers with un-serviced zoned development land in the North Cobh region secured the development of this WWTP under the Serviced Lands Initiative in conjunction with Cork County Council to provide the necessary infrastructure as part of their overall strategy for this part of the North West Cobh Catchment. A Design Build and Operate and Maintenance Contract was procured for an 8000 Population Equivalent (PE) WWTP to be built in 2000 PE phases to match the anticipated development that was proposed in the 2001 Cork Area Strategic Plan and the 2005 Midleton Electoral Area Draft Local Area Plan and the Cobh Town Council Development Plan.

It was decided that a 4000 PE plant be built in the initial construction phase and that the expansion to 8000 PE could be facilitated in 2000 PE increments if demand from nearby development were realised. The plant is not manned full time but is operated and maintained on a regular basis by EPS staff based nearby in Midleton. The plant received its first flows in May 2008 and has recently successfully completed its commissioning phase.

The plant was constructed as an interim measure until the Cork Lower Harbour Main Drainage Scheme WWTP at Shanbally near Ringaskiddy (Cork Lower Harbour Sewerage Scheme) is constructed. The Cork Lower Harbour Sewerage Scheme will provide collection systems and a waste water treatment facility in the Cork Lower Harbour area servicing the towns of Carrigaline, Ringaskiddy, Shanbally, Coolmore, Cobh, Monkstown/Passage West and Crosshaven with an overall PE of 80,000.

The treatment plant at North Cobh is being operated by the DBO&M Contractor at present in a Contract to run for 5 years. The option is available to further extend this contract pending the development of Cork Lower Harbour Sewerage Scheme. When the new treatment plant at Shanbally is constructed and operational it will accept flows from the North Cobh treatment plant which will in turn be decommissioned.

Flows gravitate from North Cobh to the Pumping Station which pumps flows up to the WWTP located at Ballynoe. The North Cobh (WWTP) is required to receive the wastewater pumped forward from the Pumping Station, treat it to a secondary standard and then gravitate to the outfall pipeline for discharge to the marine environment.

The WWTP is required to treat the daily loading produced by the North Cobh catchment. This load will depend on the speed of construction of new residential dwelling and associated non domestic premises with the zoned land and is estimated as having a design Population Equivalent of between 4,000 and 8,000. The Biochemical Oxygen Demand associated with this PE is defined as between 240 - 480 kg/day, while the associated Dry Weather Flow is estimated as 720 - 1,440m³/day. The wastewater treatment plant is also required to treat any waste liquids generated on-site and suitable for treatment in conjunction with municipal waste water.

The WWTP is required to provide secondary treatment for flows up to DWF, producing an effluent with the following standards:

- 5 Day Biochemical Oxygen Demand, (BOD) BOD₅ 25 mg/l;
- Chemical Oxygen Demand, (COD) COD 125 mg/l; and
- Suspended Solids, (SS) SS 35 mg/l.

**A DESCRIPTION OF THE WASTE WATER WORKS AND THE ACTIVITIES CARRIED OUT THEREIN:
(SEE APPLICATION FORM ATTACHMENT A.1 DRAWING 1 FOR DETAILS)**

The North Cobh treatment plant was designed to treat a flow of 90m³/hr for a population equivalent of 4000. The design is carried out in up to 4 Phases i.e. 2000 PE for each Phase. The plant is based on Sequential Batch Reactors (SBR's). Two SBR's are utilized for Phases 1 and 2 to address the 4000 Population Equivalent. An allowance has been made with the design for the construction of an additional 2 no. SBR's so as to take treatment capacity up to a population equivalent of 8000.

Pumping Station

The pumping station accepts the raw sewage from the area network which is a completely separate foul system and therefore storm water is discharged directly to a separate outfall at Carrigaloe Cobh into the River Lee Estuary, Cork Harbour West Passage. The influent flows into the pumping station foul sump by gravity and is lifted to the inlet works by 3 no. submersible pumps via a twin rising main. The pumping station pumps up to 6DWF to the North Cobh WWTP.

Inlet Works

The inlet works contains an automatic 5mm screen. Solenoid valves control the washwater flow to the screen and the screen starts/stops automatically on a high level. In the event that the automated screen becomes blocked flows are diverted to a manual screen.

The manually raked bypass screen is provided in a bypass channel around the inlet screen. This bypass screen is constructed of galvanized steel and is of standard bar screen design with 10mm spacing between the bars. The inlet works is also provided with a section for installation of a second automatic screen which will cater for Phases 3 and 4.

Storm/Balance Tank

During high flows there is an overflow from the inlet works which is piped to the storm tank where it is stored for a minimum period of 2 hours (at 8000PE). During Phases 1 and 2 the storm is also operating as a balancing tank. When one of the SBR tanks is in the "fill aerate" stage, and when the pumping station pumps are not operating the storm pumps will pump the influent to the SBR tank.

Pumping will continue until stopped by any of (a) Level in both the SBR tanks reaching full level, (b) end of the fill/aerate phase in both tanks (c) storm tank level falls to cut-out level.

Sequence Batch Reactor (SBR) Tanks

Flows to the SBR Tanks are gravitated from the inlet works or through the storm balancing tank. The sewage is aerated in these tanks by a set of duty/standby air-blowers. It then is allowed to settle out. Clarified effluent is then decanted to the outfall for a preset time. Waste sludge is then pumped to the picket fence thickener for a preset time.

Picket Fence Thickener (PFT)

Sludge is pumped periodically from the bottom of the SBR tank to the PFT Tank by the Waste Activated Sludge (WAS) Pumps. Settled sludge is removed periodically from site via sludge tanker. Supernatant water is returned to the inlet works via supernatant pumps.

SOURCES OF EMISSIONS FROM THE WASTE WATER TREATMENT WORKS

The pollution load for the North Cobh agglomeration arises from the following areas:

- The local population (domestic). The area which the WWTP services has been zoned primarily for residential use with a limited amount of "dry" industrial development proposed.
- Retail and commercial activities serving the local population. These include a garage, shop, hair/beauty salon and restaurant with a pe of approximately 40.
- The WWTP will not accept leachate or industrial sludges during its lifetime.

NATURE AND QUANTITIES OF FORESEEABLE EMISSIONS FROM THE WASTEWATER WORKS INTO THE RECEIVING AQUEOUS ENVIRONMENT AS WELL AS IDENTIFICATION OF SIGNIFICANT EFFECTS OF THE EMISSIONS ON THE ENVIRONMENT:

Summary of Performance Requirements:

Ultimate Design Parameters	Section B	Section C	Section D
Design Population, PE	4,000	6,000	8,000
Loading to WWTP, kgBOD ₅ /day	240	360	480
Dry Weather Flow to WWTP, m ³ /day	720	1080	1,440
Peak Flow to WWTP, l/s	25	37.5	50
Treated Effluent Standards: BOD ₅ , mg/l	25	25	25
COD, mg/l	125	125	125
SS, mg/l	35	35	35

The treated effluent is discharged to the River Lee Estuary, Cork Harbour West Passage. Cork Harbour is reputed to be the second largest natural harbour in the world and it is used extensively for recreational activities. Within the Lower Harbour area there are a number of protected conservation areas namely, Cork Harbour Special Protection Area (SPA) and a number of proposed Natural Heritage Areas (pNHA's) including:

- Monkstown Creek (site code 001979);
- Lough Beg (site code 001066);
- Whitegate Bay (site code 001084); and
- Owenboy River (site code 001990)

The West Passage of Cork Harbour is designated a sensitive water under the Urban Waste Water Treatment (Amendment) Regulations, 2004. There are no bathing areas (designated or otherwise) adjacent to the outfall; the nearest (and only) designated bathing area in Cork Harbour is at Fountainstown. A car ferry operates daily from Carrigaloe Cobh to Passage West. The discharge point for the North Cobh WWTP is located below the low tide level at a sufficient distance from the shore line so as to achieve adequate diffusion/dispersion of the effluent.

An EIS has been completed for the proposed Cork Harbour Waste Water Treatment Plant at Shanbally (which has been submitted with this application). As part of this study, hydrodynamic modelling was undertaken by the Department of Civil Engineering at University College Cork. The use of the hydrodynamic dispersion model found that significant reductions in polluting substances would be realised throughout Cork Harbour following completion and operation of the proposed Lower Harbour development. The

ecological status of the marine environment would be raised, with beneficial impacts for the affected National Heritage Areas (NHA's) and Special Protection Area (SPA).

The outfall from Carrigrenan WWTP also discharges to Cork Harbour Passage West upstream of the outfall for the North Cobh WWTP. Carrigrenan WWTP treats all of the sewage arising from Cork City which has a population equivalent of 413,000 PE. The Foreshore Licence Application for the North Cobh Sewers SLI states that *"It seems reasonable to assume that if Cork Harbour West Passage can assimilate the treated effluent from a population equivalent of 413,000 then it can assimilate treated effluent from an additional 8,000 PE which is equivalent to just 1.5% of the load from Carrigrenan WWTP"*.

Erosion

The discharge points on the diffuser are orientated such that they discharge vertically upwards. The discharge ports extend 1.0m above the sea bed level. Based on this clearance and the direction of the discharge the risk of local erosion or bed scour is minimised. The flow rate from the diffuser will be negligible relative to the volumes arising from tidal flows.

PROPOSED TECHNOLOGY AND OTHER TECHNIQUES FOR PREVENTING OR, WHERE THIS IS NOT POSSIBLE, REDUCING EMISSIONS FROM THE WASTE WATER WORKS:

Technologies

The WWTP at North Cobh and its associated Pumping Station are equipped with duty/standby pumps. Measures for protection and control are in place in the event of power outage or equipment failure. These measures are fully addressed in **Section C.1**.

Techniques

A Performance Management System (PMS) is in place at the North Cobh Wastewater Treatment Plant which is based on the templates developed by the Water Services National Training Group (WSNTG) in conjunction with the Department of the Environment and the Local Authorities. The PMS provides a uniform approach to dealing with all relevant performance management issues, including Independent Compliance Audits, Management of Change, Dispute Resolution, Public Relations, Emergency Procedures and Reporting Procedures.

The current operator is contractually obliged to perform the Operation of the WWTP in accordance with the Performance Management System (excluding the web based system, which had not been implemented at the time of tender) and to maintain the design performance capability of the existing treatment plant.

FURTHER MEASURES PLANNED TO COMPLY WITH THE GENERAL PRINCIPLE OF THE BASIC OBLIGATIONS OF THE OPERATOR, I.E., THAT NO SIGNIFICANT POLLUTION IS CAUSED:

Prevention of Pollution

The waste water treatment facility is designed so that it will not cause pollution in the environment. In particular the WWTP is designed to enable any operator of the facility to prevent pollution of the environment by any of the following potential contaminants.

- Surface water run-off
- Spillages
- Solid waste

MEASURES PLANNED TO MONITOR EMISSIONS INTO THE ENVIRONMENT:

The current operator has developed, using the PMS as a template, procedures and processes for sampling and analysis of the incoming raw sewage and outgoing effluent, so that analytical results are reliable, repeatable, consistent and accurate.

Sampling procedures are in accordance with EU and Irish Regulations, and in particular in accordance with the Environmental Protection Agency's (EPA) monitoring and operating requirements. All laboratory analyses are performed in accordance with the latest edition of the Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association, and the Water Pollution Control Federation or other methods of comparable accuracy.

Regular independent laboratory analysis is also undertaken to externally monitor the operator's performance. Flow proportional or time based 24 hour samples are collected at the same well defined point at the inlet and outlet of the treatment works in order to monitor compliance with the requirements. A refrigerated sampler minimizes degradation between collection and analysis. Certain heavy metal analyses are also required on an annual basis as identified in 'Code of Good Practice for Use of Biosolids in agriculture'.

The operator is responsible for developing and implementing procedures to remedy defects in his laboratory procedures where the independent checking shows variations of more than $\pm 10\%$.

The sampling of the statutory samples is in accordance with the following procedures: -

- All samples are representative of the appropriate stream.
- 24-hour composite, flow proportional samples are collected weekly and these are fixed, stored and handled as per standard methods. Analysis of the samples (both operator's and Employer's) are undertaken within 24 hours and reported to the

Employer's Representative within 48 hours of the results being made available. Reports on the operation and maintenance of the plant are generated on a monthly basis.

The monitoring and recording of the status of all parameters appropriate to proper control and operation of the plant is carried out and documented at all stages. In the event of sample failures the operator informs Cork County Council at monthly progress meetings and in the event of serious breach of consents Cork County Council is contacted immediately.

During the operation of the proposed WWTP at Shanally, the treated discharge and adjoining areas of Cork Harbour would be monitored regularly and would include parameters such as suspended solids, heavy metals, organics, coliforms and faecal coliforms. The monitoring regime would be agreed in advance with Cork County Council, EPA, NPWS, SWRFB and the other relevant agencies. The fifth schedule of the *Urban Waste Water Treatment Regulations* would stipulate the monitoring requirements for this plant.

CONCLUSION

The treatment plant at North Cobh is currently treating flows from the surrounding developments. Should the population increases expected in the CASP and other development plans arise, then provisions are in place for the phased expansion of the plant in line with the projected growth.

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REVISED SECTION B: GENERAL

Advice on completing this section is provided in the accompanying Guidance Note.

B.1 Agglomeration Details

Name of Agglomeration: North Cobh
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Applicant's Details

Name and Address for Correspondence

Only application documentation submitted by the applicant and by the nominated person will be deemed to have come from the applicant.

Provide a drawing detailing the agglomeration to which the licence application relates. It should have the boundary of the agglomeration to which the licence application relates clearly marked in red ink.

Name*:	Cork County Council
Address:	Area Operations South
	Floor 5
	County Hall
	Cork
Tel:	021-4276891
Fax:	021-4276321
e-mail:	Corporate.affairs@corkcoco.ie

*This should be the name of the water services authority in whose ownership or control the waste water works is vested.

*Where an application is being submitted on behalf of more than one water services authority the details provided in Section B.1 shall be that of the lead water services authority.

Name*:	Patricia Power
Address:	Director of Services
	Area Operations South
	Floor 5
	County Hall
	Co. Cork
Tel:	021- 4285304
Fax:	021- 4342098
e-mail:	Patricia.Power@corkcoco.ie

*This should be the name of person nominated by the water services authority for the purposes of the application.

Co-Applicant's Details

Name*:	Not Applicable
Address:	
Tel:	
Fax:	
e-mail:	

*This should be the name of a water services authority, other than the lead authority, where multiple authorities are the subject of a waste water discharge (authorisation) licence application.

Design, Build & Operate Contractor Details

Name*:	Electrical and Pump Services Ltd
Address:	Quartertown Industrial Estate
	Mallow
	Co. Cork
Tel:	022-31200
Fax:	022-21378
e-mail:	info@epsireland.com

*Where a design, build & operate contract is in place for the waste water works, or any part thereof, the details of the contractor should be provided.

Attachment B.1 should contain appropriately scaled drawings / maps ($\leq A3$) of the agglomeration served by the waste water works showing the boundary clearly marked in red ink. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom containing sections B.2, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

B.2 Location of Associated Waste Water Treatment Plant(s)

Give the location of the waste water treatment plant associated with the waste water works, if such a plant or plants exists.

Name*:	Madeleine Healy
Address:	North Cobh WWTP
	Ballynoe
	Cobh
	Co. Cork
Grid ref (6E, 6N)	E178403 N067420
Level of Treatment	Secondary Treatment
Primary Telephone:	021 - 4285233
Fax:	n/a
e-mail:	Madeleine.healy@corkcoco.ie

*This should be the name of the person responsible for the supervision of the waste water treatment plant.

Attachment B.2 should contain appropriately scaled drawings / maps ($\leq A3$) of the site boundary and overall site plan, including labelled discharge, monitoring and sampling points. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g., ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. These drawings should be provided to the Agency on a separate CD-Rom containing sections B.1, B.3, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

B.3 Location of Primary Discharge Point

Give the location of the primary discharge point, as defined in the Waste Water Discharge (Authorisation) Regulation, associated with the waste water works.

Type of Discharge	Treated Effluent from WWTP and Emergency Overflow from Pumping Station
Unique Point Code	SW01NCOB
Location	Carrigaloe, Cobh, Co. Cork
Grid ref (6E, 6N)	E177535 N067632

Attachment B.3 should contain appropriately scaled drawings / maps ($\leq A3$) of the discharge point, including labelled monitoring and sampling points associated with the discharge point. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing the drawings and tabular data requested in sections B.1, B.2, B.4, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

B.4 Location of Secondary Discharge Point(s)

Give the location of **all** secondary discharge point(s) associated with the waste water works. Please refer to Guidance Note for information on Secondary discharge points.

Type of Discharge	Not Applicable as emergency overflow discharges down the main outfall pipe.
Unique Point Code	
Location	
Grid ref (6E, 6N)	

Attachment B.4 should contain appropriately scaled drawings / maps ($\leq A3$) of the discharge point(s), including labelled monitoring and sampling points associated with the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.5, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	Not Applicable	Not Applicable

B.5 Location of Storm Water Overflow Point(s)

Give the location of **all** storm water overflow point(s) associated with the waste water works.

Type of Discharge	Not Applicable as North Cobh Sewerage Catchment has a completely separate Storm Water System
Unique Point Code	
Location	
Grid ref (6E, 6N)	

Attachment B.5 should contain appropriately scaled drawings / maps ($\leq A3$) of storm water overflow point(s) associated with the waste water works, including labelled monitoring and sampling points associated with the discharge point(s). These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, C.1, D.2, E.3 and F.2.

Attachment included	Yes	No
	Not Applicable	Not Applicable

B.6 Planning Authority

Give the name of the planning authority, or authorities, in whose functional area the discharge or discharges take place or are proposed to take place.

Name:	Cork County Council
Address:	Area Operations, South Floor 5 County Hall Cork
Tel:	021-4276891
Fax:	021-4867007
e-mail:	planninginfo@corkcoco.ie

Planning Permission relating to the waste water works which is the subject of this application:- (tick as appropriate)

has been obtained	<input checked="" type="checkbox"/>	is being processed	<input type="checkbox"/>
is not yet applied for	<input type="checkbox"/>	is not required	<input type="checkbox"/>

Local Authority Planning File Reference N^o:	
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* Planning for the North Cobh WWTP SLI was submitted and granted in accordance with PART 8 for the REQUIREMENTS IN RESPECT OF SPECIFIC DEVELOPMENTS BY, ON BEHALF OF, OR IN PARTNERSHIP WITH LOCAL AUTHORITIES, in accordance with Statutory Instruments (S.I.) No. 600 of 2001, Planning and Development Regulations, 2001, Section 80(1)(d).

Attachment B.6 should contain *the most recent* planning permission, including a copy of *all* conditions, and where an EIS was required, copies of any such EIS and any certification associated with the EIS, should also be enclosed. Where planning permission is not required for the development, provide reasons, relevant correspondence, etc.

Attachment included	Yes	No
	✓	

B.7 Other Authorities

B.7 (i) Shannon Free Airport Development Company (SFADCo.) area

The applicant should tick the appropriate box below to identify whether the discharge or discharges are located within the Shannon Free Airport Development Company (SFADCo.) area.

Attachment B.7(i) should contain details of any or all discharges located within the SFADCo. area.

Within the SFADCo Area	Yes	No
	Not Applicable	Not Applicable

B.7 (ii) Health Services Executive Region

The applicant should indicate the **Health Services Executive Region** where the discharge or discharges are or will be located.

Name:	Health Service Executive
Address:	Aras Slainte Wilton Road Cork
Tel:	021-4545011
Fax:	021-4927228
e-mail:	grettam.crowley@mailp.hse.ie

B.7 (iii) Other Relevant Water Services Authorities

Regulation 13 of the Waste Water Discharge (Authorisation) Regulations, 2007 requires all applicants, not being the water services authority in whose functional area the relevant waste water discharge or discharges, to which the relevant application relates, takes place or is to take place, to notify the relevant water services authority of the said application.

Name:	Not Applicable
Address:	
Tel:	
Fax:	
e-mail:	

Relevant Authority Notified	Yes	No
	Not Applicable	Not Applicable

Attachment B.7(iii) should contain a copy of the notice issued to the relevant local authority.

Attachment included	Yes	No
	Not Applicable	Not Applicable

B.8 Notices and Advertisements

Regulations 10 and 11 of the Waste Water Discharge (Authorisation) Regulations, 2007 require all applicants to advertise the application in a newspaper and by way of a site notice. See *Guidance Note*.

Attachment B.8 should contain a copy of the site notice and an appropriately scaled drawing (≤A3) showing its location. **The original application must include the original page of the newspaper in which the advertisement was placed.** The relevant page of the newspaper containing the advertisement should be included with the original and two copies of the application.

Attachment included	Yes	No
	✓	

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B.9 (i) Population Equivalent of Agglomeration

TABLE B.9.1 POPULATION EQUIVALENT OF AGGLOMERATION

The population equivalent (p.e.) of the agglomeration to be, or being, served by the waste water works should be provided and the period in which the population equivalent data was compiled should be indicated.

Population Equivalent	6000
Data Compiled (Year)	2008
Method	Compiled from Development Plans/Zoning and Planning permissions in the area.

B.9 (ii) Pending Development

Where planning permission has been granted for development(s), but development has not been commenced or completed to date, within the boundary of the agglomeration and this development is being, or is to be, served by the waste water works provide the following information:

- information on the calculated population equivalent (p.e.) to be contributed to the waste water works as a result of those planning permissions granted,
- the percentage of the projected p.e. to be contributed by the non-domestic activities, and
- the ability of the waste water works to accommodate this extra hydraulic and organic loading without posing an environmental risk to the receiving water habitat.

Pending Development

The Population Equivalent for the North Cobh Area was compiled from the 2003 Cork Development plan and recent planning permissions granted in the area.

Two possible scenarios were predicted; the low case Population Projection, put future the population equivalent at the end of year 5 at 4440. The high case scenario put the future population equivalent at the end of year 5 at 8035.

These projections were concerned with residential development and commercial and light industrial enterprises in the North Cobh area. Of the 144 hectares zoned within the Development Plan 16.6 hectares are allocated for commercial

and light industrial. The zoned lands associated with the North Cobh WWTP amount to 72.8 hectares of medium density residential development.

The waste water treatment plant is well positioned to treat extra or future hydraulic loads given the phased nature of its construction in line with future need. The extra organic load is not thought to pose a threat to the receiving environment as the West Passage of Cork Harbour already assimilates the treated effluent from the Carrigrenan Waste Water Treatment Plant which serves the population of Cork City with a PE in the region of 413,000.

Table B.9 (ii) (a) overleaf provides details of planning permissions granted in the catchment of the WWTP. Current population connection to the network is approximately 850p.e which corresponds to approximately 293 dwellings at an occupancy of 2.9 persons. Un-built permissions within the agglomeration served by the WWTP amounts to a p.e of approximately 2288 which brings the p.e. to 3,138. The treatment plant is currently constructed to cater for a p.e. of 4000.

There is very little non-domestic activity contributing to the population equivalence of the plant at North Cobh. The only commercial premises within the catchment is a garage, shop, hair and beauty salon and a restaurant. These are located adjacent to one of the new housing developments being served by the WWTP. The EPA wastewater treatment manual for small communities, business, leisure centre and hotels was used to calculate the hydraulic and organic load from these units.

The population equivalent is approximately 40 and the volume per day is approximately 7m³. This equates to a 0.67% contribution to the overall p.e. of the agglomeration.

The housing strategy for North Cobh states that on zoned lands 20% of new residential development must be reserved for social and affordable housing, some of these developments will be served by the WWTP.

Zoned lands remains undeveloped with the catchment of the WWTP. Provision has been made in the design of the WWTP to cater for projected future development by means of phased expansion of the plant up to a p.e of 8000. It is expected, given recent trends in construction, that the p.e of the plant will not exceed 6000 over the period of the WWD Licence.

No leachate or industrial sludges will be accepted at the WWTP during its period of operation.

Table B.9 (ii) (a)

	Planning File No.	Applicant	No. of dwellings
R-10	04/1399	McInerney Construction	5
R-11	04/6296	McInerney Construction	23
R-10	04/6297 & 08/5240	McInerney Construction	228 & 21 No. Serviced Sites
R-11	05/1425	Alan Bardsley	36
R-12	05/2345	John Fleming Construction	280 & Creche
R-02	05/3848	Paul Montgomery	169
R-03	05/6541	J.J & Mary Frahill	243 & 6 No. Serviced Sites
R-11	05/7330	Joe Coughlan	7
R-11	05/7331	Joe Coughlan	16
R-13	07/6169	Alan Bardsley	48
TOTAL			1055 & 27 Serviced Sites

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Start up Flows at Completion of WWTP – High Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3 DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		40	2.9	116	0.24	0.73	1.45	2.07
R03 (Houses) - Grady O'Mahony		40	2.9	116	0.24	0.73	1.45	2.07
R04 (Houses) - Downgrad.			2.9				0.00	0.00
R05 (Houses) - Downgrad.			2.9				0.00	0.00
R09 (Houses) - Ballynoe Dev. Council			2.9	0	0.00	0.00	0.00	0.00
R10 (Houses) - McInerney		235	2.9	682	1.42	4.26	8.52	12.15
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		50	2.9	145	0.30	0.91	1.81	2.58
R13 (Area) - A. Bardsley		24	2.9	70	0.15	0.44	0.87	1.24
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		30	2.9	87	0.18	0.54	1.09	1.55
Sub Total				1302	2.71	8.14	16.28	23.21
Storm Sewer from 84 existing houses (30*50m2/h of 2 year intensity)						8.63	8.63	
Grand Total						16.77	24.91	
Flows at end of Year 1 – High Case								
Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3 DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		90	2.9	261	0.54	1.63	3.26	4.65
R03 (Houses) - Grady O'Mahony		90	2.9	261	0.54	1.63	3.26	4.65
R04 (Houses) - Downgrad.			2.9					0.00
R05 (Houses) - Downgrad.			2.9					0.00
R09 (Houses) - Ballynoe Dev. Council		50	2.9	145	0.30	0.91	1.81	2.58
R10 (Houses) - McInerney		290	2.9	841	1.75	5.26	10.51	14.99
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		100	2.9	290	0.60	1.81	3.63	5.17
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		40	2.9	116	0.24	0.73	1.45	2.07
Sub Total				2105	4.39	13.16	26.32	37.53
Storm Sewer from 40 existing houses (40*50m2/h of 2 year intensity)						11.51	11.51	
Grand Total						24.67	37.83	

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Flows at end of Year 2 – High Case								
Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF I/s	3 DWF I/s	6 DWF I/s	Formula A I/s
R02 (Houses) -Montgomery		140	2.9	406	0.85	2.54	5.08	7.24
R03 (Houses) - Grady O'Mahony		140	2.9	406	0.85	2.54	5.08	7.24
R04 (Houses) - Downgrad.			2.9					0.00
R05 (Houses) - Downgrad.			2.9					0.00
R09 (Houses) - Ballynoe Dev. Council		100	2.9	290	0.60	1.81	3.63	5.17
R10 (Houses) - McInerney		350	2.9	1015	2.11	6.34	12.69	18.09
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		150	2.9	435	0.91	2.72	5.44	7.75
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh	0.5		102	51	0.11	0.32	0.64	0.91
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					0.00
Nr of existing houses		84	2.9	244	0.51	1.52	3.05	4.34
Sub Total				3039	6.33	18.99	37.98	54.15
Storm Sewer from 84 existing houses (84*50m2/h of 2 year intensity)						24.18	24.18	
Grand Total						43.17	62.16	
Flows at end of Year 3 – High Case								
Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF I/s	3 DWF I/s	6 DWF I/s	Formula A I/s
R02 (Houses) -Montgomery		170	2.9	493	1.03	3.08	6.16	8.79
R03 (Houses) - Grady O'Mahony		200	2.9	580	1.21	3.63	7.25	10.34
R04 (Houses) - Downgrad.			2.9				0.00	0.00
R05 (Houses) - Downgrad.			2.9				0.00	0.00
R09 (Houses) - Ballynoe Dev. Council		165	2.9	479	1.00	2.99	5.98	8.53
R10 (Houses) - McInerney		420	2.9	1218	2.54	7.61	15.23	21.71
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		200	2.9	580	1.21	3.63	7.25	10.34
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh	1.5		102	153	0.32	0.96	1.91	2.73
I01 - Treat. Plant	1		14m3/ha-d	78	0.16	0.49	0.97	1.39
CASP Area			102				0.00	0.00
Nr of existing houses		84	2.9	244	0.51	1.52	3.05	4.34
Sub Total				4015	8.37	25.10	50.19	71.57
Storm Sewer from 84 existing houses (84*50m2/h of 2 year intensity)						24.18	24.18	
Grand Total						49.28	74.37	

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Flows at end of Year 4 – High Case									
Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3 DWF l/s	6 DWF l/s	Formula A l/s	
R02 (Houses) -Montgomery		170	2.9	493	1.03	3.08	6.16	8.79	
R03 (Houses) - Grady O'Mahony		258	2.9	748	1.56	4.68	9.35	13.34	
R04 (Houses) - Downgrad.			2.9					0.00	
R05 (Houses) - Downgrad.			2.9					0.00	
R09 (Houses) - Ballynoe Dev. Council		192	2.9	557	1.16	3.48	6.96	9.92	
R10 (Houses) - McInerney		480	2.9	1392	2.90	8.70	17.40	24.81	
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55	
R12 (Houses) - Fleming		260	2.9	754	1.57	4.71	9.43	13.44	
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86	
R14 (Area) - East Cobh	4		102	408	0.85	2.55	5.10	7.27	
I01 - Treat. Plant	6.5		14m3/ha-d	506	1.05	3.16	6.32	9.01	
CASP Area	7		102	714	1.49	4.46	8.93	12.73	
Nr of existing houses		84	2.9	244	0.51	1.52	3.05	4.34	
Sub Total					6007	12.51	37.54	75.08	107.06
Storm Sewer from 84 existing houses (84*50m2/h of 2 year intensity)							24.18	24.18	
Grand Total							61.72	99.26	
Flows at end of Year 5 – High Case									
Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3 DWF l/s	6 DWF l/s	Formula A l/s	
R02 (Houses) -Montgomery		170	2.9	493	1.03	3.08	6.16	8.79	
R03 (Houses) - Grady O'Mahony		258	2.9	748	1.56	4.68	9.35	13.34	
R04 (Houses) - Downgrad.			2.9				0.00	0.00	
R05 (Houses) - Downgrad.			2.9				0.00	0.00	
R09 (Houses) - Ballynoe Dev. Council		192	2.9	557	1.16	3.48	6.96	9.92	
R10 (Houses) - McInerney		520	2.9	1508	3.14	9.43	18.85	26.88	
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55	
R12 (Houses) - Fleming		276	2.9	800	1.67	5.00	10.01	14.27	
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86	
R14 (Area) - East Cobh	7		102	714	1.49	4.46	8.93	12.73	
I01 - Treat. Plant	11.48		14m3/ha-d	893	1.86	5.58	11.16	15.91	
CASP Area	18.5		102	1887	3.93	11.79	23.59	33.63	
Nr of existing houses		84	2.9	244	0.51	1.52	3.05	4.34	
Sub Total					8035	16.74	50.22	100.44	143.22
Storm Sewer from 84 existing houses (84*50m2/h of 2 year intensity)							24.18	24.18	
Grand Total							74.40	124.62	

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Start up Flows at Completion of WWTP – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		5	2.9	15	0.03	0.09	0.18	0.26
R03 (Houses) - Grady O'Mahony		5	2.9	15	0.03	0.09	0.18	0.26
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council			2.9	0	0.00	0.00	0.00	0.00
R10 (Houses) - McInerney		235	2.9	682	1.42	4.26	8.52	12.15
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		50	2.9	145	0.30	0.91	1.81	2.58
R13 (Area) - A. Bardsley		24	2.9	70	0.15	0.44	0.87	1.24
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses			2.9	0	0.00	0.00	0.00	0.00
Sub Total				1012	2.11	6.33	12.65	18.04
Grand Total						6.33	12.65	

Flows at end of Year 1 – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		50	2.9	145	0.30	0.91	1.81	2.58
R03 (Houses) - Grady O'Mahony		50	2.9	145	0.30	0.91	1.81	2.58
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council			2.9	0	0.00	0.00	0.00	0.00
R10 (Houses) - McInerney		285	2.9	827	1.72	5.17	10.33	14.73
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		100	2.9	290	0.60	1.81	3.63	5.17
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses			2.9	0	0.00	0.00	0.00	0.00
Sub Total				1598	3.33	9.99	19.97	28.48
Grand Total						9.99	19.97	

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Flows at end of Year 2 – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		100	2.9	290	0.60	1.81	3.63	5.17
R03 (Houses) - Grady O'Mahony		100	2.9	290	0.60	1.81	3.63	5.17
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council		50	2.9	145	0.30	0.91	1.81	2.58
R10 (Houses) - McInerney		335	2.9	972	2.02	6.07	12.14	17.32
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		150	2.9	435	0.91	2.72	5.44	7.75
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		20	2.9	58	0.12	0.36	0.73	1.03
Sub Total				2381	4.96	14.88	29.76	42.44
Storm Sewer from 20 existing houses (20*50m2/h of 2 year intensity)						5.75	5.75	
Grand Total						20.63	35.51	

Flows at end of Year 3 – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		150	2.9	435	0.91	2.72	5.44	7.75
R03 (Houses) - Grady O'Mahony		150	2.9	435	0.91	2.72	5.44	7.75
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council		100	2.9	290	0.60	1.81	3.63	5.17
R10 (Houses) - McInerney		385	2.9	1117	2.33	6.98	13.96	19.90
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		200	2.9	580	1.21	3.63	7.25	10.34
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		40	2.9	116	0.24	0.73	1.45	2.07
Sub Total				3164	6.59	19.77	39.55	56.39
Storm Sewer from 40 existing houses (40*50m2/h of 2 year intensity)						11.79	11.79	
Grand Total						31.56	51.34	

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Flows at end of Year 4 – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		170	2.9	493	1.03	3.08	6.16	8.79
R03 (Houses) - Grady O'Mahony		200	2.9	580	1.21	3.63	7.25	10.34
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council		150	2.9	435	0.91	2.72	5.44	7.75
R10 (Houses) - McInerney		435	2.9	1262	2.63	7.88	15.77	22.49
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		250	2.9	725	1.51	4.53	9.06	12.92
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		60	2.9	174	0.36	1.09	2.18	3.10
Sub Total				3860	8.04	24.12	48.25	68.80
Storm Sewer from 60 existing houses (60*50m2/h of 2 year intensity)							17.69	17.69
Grand Total						41.81	65.94	

Flows at end of Year 5 – Low Case

Catchment Zone	Area Ha	No. of Houses	PE/ha or PE/house	PE No.	DWF l/s	3DWF l/s	6 DWF l/s	Formula A l/s
R02 (Houses) -Montgomery		170	2.9	493	1.03	3.08	6.16	8.79
R03 (Houses) - Grady O'Mahony		258	2.9	748	1.56	4.68	9.35	13.34
R04 (Houses) - Downgrad.			2.9					
R05 (Houses) - Downgrad.			2.9					
R09 (Houses) - Ballynoe Dev. Council		192	2.9	557	1.16	3.48	6.96	9.92
R10 (Houses) - McInerney		485	2.9	1407	2.93	8.79	17.58	25.07
R11 (Houses) - McInerney		30	2.9	87	0.18	0.54	1.09	1.55
R12 (Houses) - Fleming		276	2.9	800	1.67	5.00	10.01	14.27
R13 (Area) - A. Bardsley		36	2.9	104	0.22	0.65	1.31	1.86
R14 (Area) - East Cobh			102	0	0.00	0.00	0.00	0.00
I01 - Treat. Plant			14m3/ha-d	0	0.00	0.00	0.00	0.00
CASP Area			102					
Nr of existing houses		84	2.9	244	0.51	1.52	3.05	4.34
Sub Total				4440	9.25	27.75	55.50	79.14
Storm Sewer from 84 existing houses (84*50m2/h of 2 year intensity)							24.18	24.18
Grand Total						51.93	79.68	

B.9 (iii) FEES

State the relevant Class of waste water discharge as per Column 1 of the Second Schedule, and the appropriate fee as per Columns 2 or 3 of the Third Schedule of the Waste Water Discharges (Authorisation) Regulations 2007, S.I. No. 684 of 2007.

Class of waste water discharge	Fee (in €)
	€25,000

Appropriate Fee Included	Yes	No
	✓	

B.10 Capital Investment Programme

State whether a programme of works has been prioritised for the development of infrastructure to appropriately collect, convey, treat and discharge waste water from the relevant agglomeration. If a programme of works has been prioritised provide details on funding, (local or national), allocated to the capital project. Provide details on the extent and type of work to be undertaken and the likely timeframes for this work to be completed.

Attachment B.10 should contain the most recent development programme, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

Attachment included	Yes	No
	✓	

The Preliminary Report has been completed for the Cork Lower Harbour Sewerage Scheme. The EIS has been completed and is currently with An Bord Pleanála.

No decision has been issued from An Bord Pleanála regarding the Shanbally WWTP. Cork County Council cannot make any formal declaration until this issue is resolved.

B.11 Significant Correspondence

Provide a summary of any correspondence resulting from a Section 63 notice issued by the Agency in relation to the waste water works under the Environmental Protection Agency Acts, 1992 and 2003, as amended by Section 13 of Protection of the Environment Act, 2003.

Attachment B.11 should contain a summary of any relevant correspondence issued in relation to a Section 63 notice.

Attachment included	Yes	No
	Not Applicable	Not Applicable

B.12 Foreshore Act Licences.

Provide a copy of the most recent Foreshore Act licence issued in relation to discharges from the waste water works issued under the Foreshore Act 1933.

Attachment B.12 should contain the most recent licence issued under the Foreshore Act 1933, including a copy of **all** conditions attached to the licence and any monitoring returns for the previous 12-month period, if applicable.

Attachment included	Yes	No
	✓	

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SECTION C: INFRASTRUCTURE & OPERATION

Advice on completing this section is provided in the accompanying Guidance Note.

C.1 Operational Information Requirements

Provide a description of the plant, process and design capacity for the areas of the waste water works where discharges occur, to include a copy of such plans, drawings or maps, (site plans and location maps, process flow diagrams), and such other particulars, reports and supporting documentation as are necessary to describe all aspects of the area of the waste water works discharging to the aquatic environment. Maps and drawings must be no larger than A3 size.

C.1.1 Storm Water Overflows

For each storm water overflow within the waste water works the following information shall be submitted:

- An assessment to determine compliance with the criteria for storm water overflows, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 and any other guidance as may be specified by the Agency, and
- Identify whether any of the storm water overflows are to be decommissioned, and identify a date by which these overflows will cease, if applicable.

C.1.2 Pumping Stations

For each pump station operating within the waste water works, provide details of the following:

- Number of duty and standby pumps at each pump station;
- The measures taken in the event of power failure;
- Details of storage capacity at each pump station;
- Frequency and duration of activation of emergency overflow to receiving waters. Clarify the location where such discharges enter the receiving waters.

Attachment C.1 should contain supporting documentation with regard to the plant and process capacity, systems, storm water overflows, emergency overflows, etc., including flow diagrams of each with any relevant additional information. These drawings / maps should also be provided as geo-referenced digital drawing files (e.g. ESRI Shapefile, MapInfo Tab, AutoCAD or other upon agreement) in Irish National Grid Projection. This data should be provided to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, B.5, D.2, E.3 and F.2.

Attachment included	Yes	No
	✓	

C.2 Outfall Design and Construction

Provide details on the primary discharge point & secondary discharge points and storm overflows to include reference, location, design criteria and construction detail.

Attachment C.2 should contain any supporting documentation on the design and construction of any and all discharge outfalls, including stormwater overflows, from the waste water works.

Attachment included	Yes	No
	✓	

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C.1 Operational Information Requirements

The North Cobh treatment plant was designed to treat a flow of 90m³/hr for a population equivalent of 4000. The design is carried out in up to 4 Phases i.e. 2000 PE for each Phase. The plant is based on Sequential Batch Reactors (SBR's). Two SBR's are utilized for Phases 1 and 2 to address the 4000 Population Equivalent. An allowance has been made with the design for the construction of an additional 2 no. SBR's so as to take treatment capacity up to a population equivalent of 8000. (See Application Form Attachment C.1 Drawing No's. 1 & 2).

(See Application Form Attachment C.1 Drawing No's. 3, 4, 5 & 6 for details on the following section).

Inlet Works

Introduction

The influent entering from the Pumping Station enters the inlet automatic screen **IS001**.

Process

The Inlet Works is fitted with an automatic 5mm inlet screen. If required due to blockage of the automatic screen, flow can be diverted to a manual screen by closing the handstops at the automatic screen channel and opening the manual screen handstops. The handstops on the manual screen will act as a weir in the event of the automatic screen failing. A manually raked bypass screen is also provided in a bypass channel around the inlet screen. This bypass screen is constructed of galvanized steel and is of standard bar screen design with 10mm spacing between the bars. The inlet works is also designed to accommodate a future second automatic screen which will be required for phases 3 and 4.

The screen starts automatically when the inlet pumps start or when the level reaches a preset level. When the screen runs, washwater solenoids **SV002** and **SV003** open. When the level falls below a preset value or the inlet pumps stop, the screen stops. The solenoid valves remain open for 1 minute following screen shutdown and then close. The solenoid valve operation will be to open for 1 minute then close for 1 min repeating this during the operation of the screen. Screenings pass from the screen via a chute into a wheelie bin for disposal.

Protection and Control

- The screen motor is fitted with overload protection.

- An emergency-stop push button is located adjacent to the screen. Operation of the E-Stop will stop the motor and generate an alarm. Reset is via MCC push button.
- The screen will have Hand/Off/Auto control. In hand, overload protection will be provided.
- Failure of the 4-20mA Ultrasonic signal causes the solenoid to open and the screen to run continuously. An alarm is generated.
- In the event of a power loss in the Main Plant the pumping station pumps are inhibited.
- High-high level detected by **US002** will generate an alarm and a text is sent to the operator.

Inlet Sampling and Monitoring

Influent to the inlet works is sampled at Sampler Point **SP001** by an automatic sampler. Sample command is only initiated on detection of inlet flows.

Storm/Balance Tank

Introduction

During high flows to the inlet works influent overflows into the storm tank where it is stored. The storm tanks are also to be used as a balancing tank during phase 1 and 2. When one of the SBR tanks is in the "fill aerate" stage, and when the pumping station pumps are not operating the storm pumps (**SW001 OR SW002**) will pump the influent to the SBR Tank. Flowmeter **FM005** records the flow to the SBR tanks. In the event of a high level in the storm/balance tank, U/S level (**US003**) will inhibit the pumping station pumps and will send an alarm to the SCADA.

Process

Overflow from the inlet works enters the storm tank by gravity. When one of the SBR tanks is in its "fill aerate" phase the duty storm pump will start and pump into the SBR tank provided that no pumping station pump is running. Pumping will continue until stopped by any of (a) Level in both the SBR tanks reaching full level, (b) end of the fill/aerate phase in both tanks (c) storm tank level falls to cut-out level. Low level control in the storm tank is via Ultrasonic **US003**. Storm Tank Cleaning Unit (**VP001**) is controlled by Ultrasonic **US003** and operates on a duty basis by circulating the storm water from the bottom of

the tank into the ejector nozzle which prevents settlement and build up of sludge in the storm tank.

Motor Protection and Control

- The pumps are fitted with overload and thermal protection.
- If the duty pump trips, the standby pump will start automatically. A pump trip will generate an alarm.
- Each storm pump has an Emergency-stop pushbutton located adjacent to the pump sump. Operation of the E-Stop will stop the motor and generate an alarm to the PLC. Reset will be via MCC pushbutton.
- The pumps have Hand/Off/Auto control. In hand, the following protection will be provided. Overload and low level cut-out via a hardwired relay in the ultrasonic.
- High-high level detected by **US003** generates an alarm and a text will be sent to the operator.

Sequence Batch Reactor (SBR) Tanks

Introduction

Flows to the SBR Tanks are restricted to 25l/s. Flowmeter **FM005** will monitor the flows to the SBR's.

The sewage is aerated in these tanks by a set of duty/standby by air-blowers. It then is allowed to settle out. Clarified water is then decanted to outfall for a preset time. Waste sludge is then pumped to the picket fence thickener for a preset time.

Process

Fill/ Aeration

The influent gravitates into the aeration tanks from the inlet screen via open actuated valves **AV001 or AV002**, depending on which tank is in the "fill/aerate" stage. After a pre-determined time, the duty air blower (**AB001 or AB002**) starts. Only one of the tanks will aerate at any time. The actuated valves **AV003 and AV004** control which tanks are supplied by the blowers. Effluent will continue to flow into the tank until the fill time has elapsed or the tank reaches its full level as detected by either **US004 or US005**. When this

happens, valves **AV001** or **AV002** closes. The tank will continue to aerate for a preset time period.

Two Variable Speed Drive (VSD) blowers **AB001** and **AB002**, in a duty/standby configuration are provided. Speed control of the Air blowers VSD is by means of a PID loop from dissolved oxygen probe **DO001** or **DO002** in the SBR tanks. The blower speeds up or slows down to maintain a preset DO level in the SBR. A local/remote switch is fitted to each drive. In remote this provides the air blowers with a 4-20mA signal which increases or decreases the speed of the blowers depending on the levels of DO required. In local a potentiometer is mounted on each blower starter section in the MCC panel to control the blowers in manual. Each blower motor will run at a set minimum speed to ensure proper ventilation of the unit. The air blower enclosures are each fitted with an acoustic hood and 2 no. cooling fans.

Pressure transducer **PT001** monitors the pressure in the air pipeline. If both SBR tanks are full, influent from the inlet screen gravitates to the storm holding tank.

Fit-Out

The floors of the SBR Tanks are fitted with a piped air diffuser system. The air is supplied from a pair of VSD controlled air-blower units (**AB001** & **AB002**) arranged in a duty/standby configuration. The blower units also each contain sound attenuation baffles and non-return valves. Dissolved Oxygen probes (**DO001** & **DO002**) are fitted to the tanks to monitor and control the process.

Settlement Phase

When the fill phase time period has elapsed, aeration continues for a timed period. Following this the blower stops and the settlement period commences. This cycle continues for a set time period.

Decanting Phase

When the settlement stage is finished the decanting stage commences. The Winch **WH001** or **WH002** (depending on which SBR tank is in the decanting stage) on the decanting arms lower and the final effluent is decanted to the outfall pipe. The winch remains lowered until either **US004** or **US005** detects a pre-determined low level or until a timed period is achieved. Floating buoys control the travel of the decant arm which prevents sludge being decanted to outfall in the event of the decant process not ending in time. At the start of the decant cycle, winches **WH001** or **WH002** lift and the cycle will restart.

Wasting Phase

During the settlement phase time period, sludge is withdrawn from the SBR and pumped into the picket fence thickener by a pair of WAS pumps in each SBR tanks **WAS001, WAS002, WAS003 & WAS004**. Pumps operate on a time sequence. If a high level is detected in the Picket Fence Thickener the WAS pumps will be inhibited.

Monitor Protection & Control

- The pumps are fitted with overload and thermistor over-temperature protection.
- The ventilation fans are fitted with over load protection.
- Start/Stop control of the blowers is via the start control of the ventilation fan i.e. the blower starts and stops via an auxiliary contact on the Vent Fan Contactor. This prevents an unvented blower running.
- If the duty blower trips the standby blower starts automatically. A trip generates an alarm to the PLC.
- Each blower has an Emergency-stop pushbutton located adjacent to the acoustic hood. Operation of the E-stop stops the fan and blower motor and generates an alarm to the PLC. Reset is via MCC pushbutton.
- The blower has Hand/Off/Auto control. In hand the blower runs at a preset fixed speed.
- The blower motors are fitted with cooling fans interlocked with the motor run contractor.

Typical SBR Sequence. Times are adjustable and dependant on plant loadings

SBR Tank No. 1		SBR Tank No. 2	
Stage	Time (Hrs)	Stage	Time (Hrs)
Fill & Aeration (1 st hr Fill only)	6	Settlement	3
Aeration Only	1	Decant (Last 30 mins waste)	2
Settlement	3	Fill & Aeration (1 st hr Fill only)	6
Decant (Last 30 mins waste)	2	Aeration Only	1

All the above times to be adjustable through the HMI

Before changeover of blowers from one tank to the other, an open signal must be received from the actuated valve on that line.

Waste Sludge (WAS)

Introduction

Sludge from the SBR Tank is pumped to the PFT during the WAS cycle.

Fit-Out

Each tank is fitted with two pumps arranged in duty/standby configuration, **WAS001, WAS002, WAS003 & WAS004.**

Process

The pumps run for a certain period of time each day during the batching cycle to pump sludge to the Picket Fence Thickener. When required, the WAS cycle occurs during the end of the decant phase. Dry run protection is provided by a hardwired relay on ultrasonics **US004 & US005.**

Motor Protection and Control

- The WAS pumps is fitted with overload protection
- An Emergency-stop pushbutton is located adjacent to the tank edge. Operation of the E-Stop stops the motor and generates an alarm. Reset is via MCC pushbutton.
- The pumps have Hand/Off/Auto control. In hand, the following protection will be provided: Overload.
- A high level in the supernatant tank inhibits the Waste stage of the SBR sequence

Picket Fence Thickener (PFT)

Introduction

Sludge is pumped periodically from the bottom of the SBR tank to the PFT Tank by the WAS Pumps **WAS001, WAS002, WAS003 & WAS004.**

Settled sludge is removed periodically from site via tanker. Supernatant water is returned to the inlet works via supernatant pumps.

Fit-Out

The PFT is fitted with a rotating picket fence gate. Supernatant water is allowed to run out of the tank via a V-notched weir to the supernatant sump.

Process

The PFT gate turns continuously- switched on/off via manual control and the MCC.

Protection and Control

The PFT drive motor (M017) is fitted with overload protection.

Supernatant Sump

Introduction

The Supernatant Sump collects runoff from the PFT. The water flows into the Sump by gravity and is lifted to the Inlet Works by a pair of submersible pumps.

Process

The ultrasonic **US006** provides an analogue 4-20mA signal to the PLC. When the level in the sump rises to a preset cut-in level, the duty pump, **M018** or **M019** starts. The duty pump runs until the liquid level reaches pump cut-out level.

Protection and Control

- The pumps are fitted with overload protection.
- If the duty pump trips, the standby pump will start automatically. A pump trip generates an alarm.
- Each pump has an Emergency-stop pushbutton located adjacent to the pump sump. Operation of the E-stop stops the motor and generates an alarm. Reset is via MCC push button.
- Failure of the 4-20mA Ultrasonic signal inhibits the pumps and generates an alarm.
- The pumps have Hand/Off/Auto control. In hand the following protection is provided: overload and low-low level cut-out. Low-low control is via hardwired relay on Ultrasonic **US006**.
- A high level in the supernatant tank inhibits the Waste stage of the SBR sequence.
- High-high level detected by **US006** generates an alarm and a text is sent to the operator.

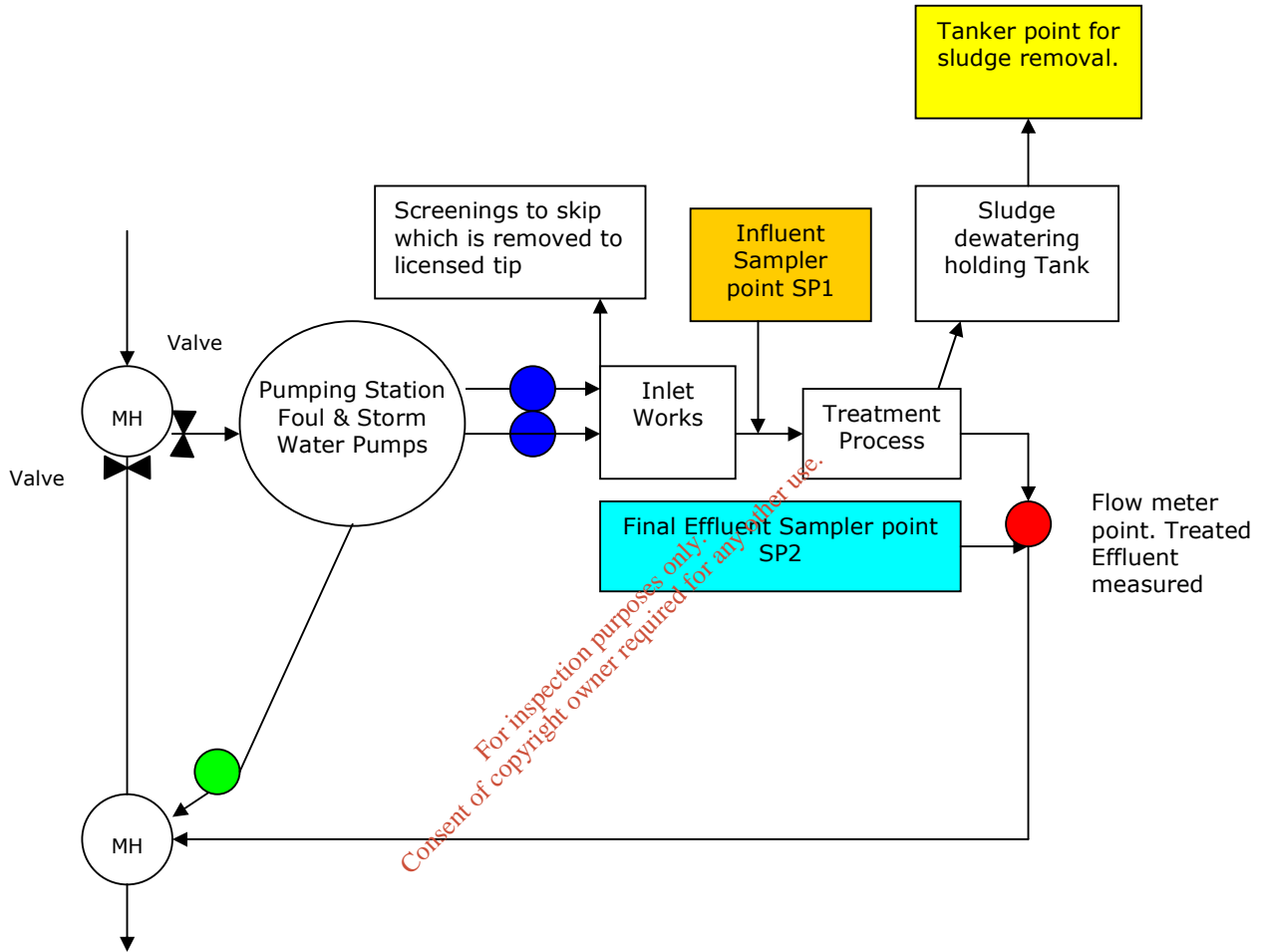
Outfall Sampling & Monitoring

Effluent to the outfall is sampled at Sampler Point **SP002**.

The final effluent then leaves the plant via the outfall pipe. Sample command is only initiated on detection of a preset period of outlet flow.

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North Cobh WWTP Schematic Diagram Showing Flow Metering and Sample Points



Note:-

- Final Effluent flow measurement
- Inlet Sample point SP1 - Outlet Sample Point SP2
- Tanker point to remove sludge.
- Emergency overflow measurement

C.1.1 Storm Water Overflows

There are no storm water overflow points associated with the North Cobh Waste Water Treatment Plant. The entire sewer network (with the exception of 20 existing dwellings) in the North Cobh area has been newly constructed and the foul and storm sewers are completely separate systems.

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C.1.2 Pumping Stations

(See Application Form Attachment C.1 Drawing No's. 7 & 8 for details on the following section).

Pumping Station

The pumping station accepts the raw sewage from the area network. The influent flows into the pumping station foul sump by gravity and is lifted to the inlet works by 3 no. submersible pumps via a twin 200mm rising main.

Fit-Out

The sump of the pumping station is fitted with 3 no. fixed speed submersible Zenith pumps arranged in a Duty/Assist/Standby configuration. These pump the sewage to the inlet works via the twin rising main and through flow-meters **FM001** and **FM002** in a flow-meter chamber at the pumping station. These flow-meters record the inlet flows to the plant via PLC. Start/Stop control of these pumps is carried out by means of an ultrasonic level controller mounted in the sump which measures the level of the liquid. On failure of the duty pump the standby pump will start automatically.

Process

The ultrasonic level sensor provides an analogue 4-20mA signal to the PLC. The PLC programme has 4 preset levels corresponding to sump level. These are, from sump bottom to top: *Cut-out: duty*, *Cut-out: Assist*, *Cut-in: duty*, and *Cut-In: assist*. When the level in the wet well rises to the *duty cut-in level*, the duty pump **IP001, IP002 or IP003** starts. The duty pump runs until the liquid level falls to duty pump cut-out level.

During peak flows, the level in the sump continues to rise while the duty pump is running. The level in the sump rises to the *assist cut-in level*. This causes the Assist pump to start. As the sump pumps down, the *assist cut-out level* is reached and the assist pump stops. The duty pump continues to run until the liquid level drops to *duty cut-out level* and the pump stops.

Should either duty or assist pump fail, the standby unit will operate in its place. Should all three inlet pumps fail to operate or the incoming flow is greater than pumped flow the liquid level in the sump will rise to the overflow level and will overflow to the plant outfall via a 450mm dia. pipe to the plant outfall pipe by gravity. The emergency outfall is protected by a 5mm brushed screen. The Ultrasonic **US001** will open and close a wash actuated valve **SV01** and sends an alarm signal to the SCADA system when the liquid level reaches the overflow. An open channel flow meter **FM004** will measure flow through the

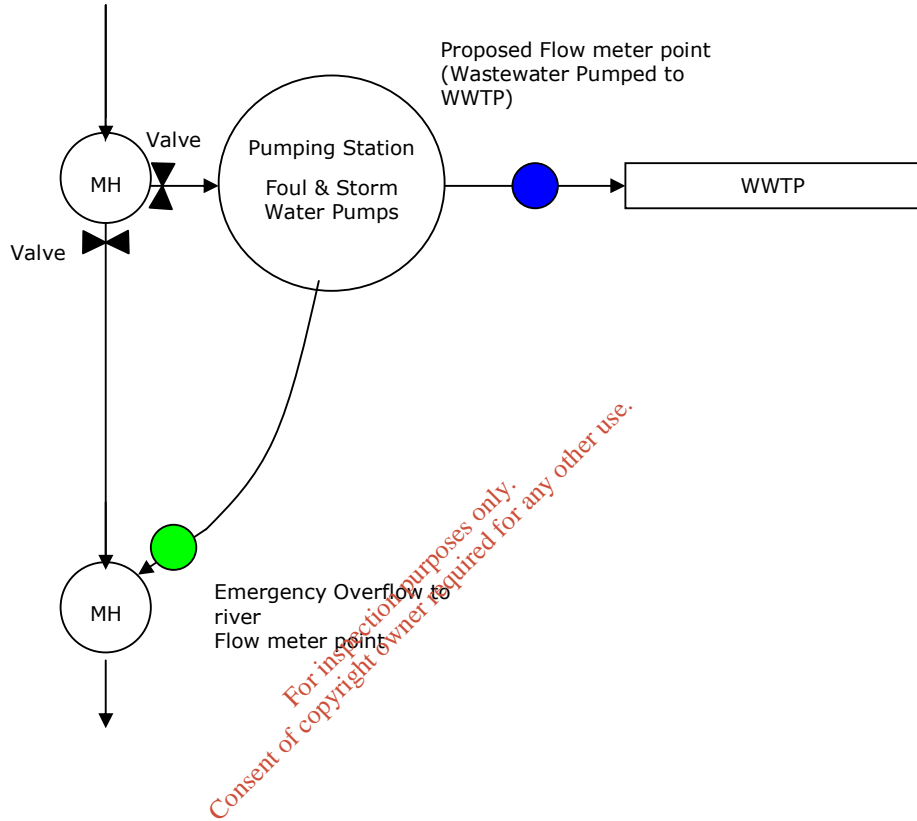
emergency overflow pipe in the event of a mechanical failure of all pumps. This discharges screened wastewater into the final effluent pipeline which discharges at Carrigaloe, Cobh.

When a high level in the storm tank is detected (**US003**), such high level will over-ride the operation of the assist pump. Assist pump will be returned to operation when the level in the storm tank drops to a predetermined level.


Protection and Control


- The pumps are fitted with overload and thermistor over-temperature protection.
- Oil seal protection is provided which generates an alarm upon seal failure.
- If the duty or assist pumps trip, the standby pump automatically takes its place.
- A pump trip generates an alarm.
- Dry run protection is provided via a hardwired relay on Ultrasonic **US001**. If this low level is reached all pumps are inhibited and an alarm is generated.
- There is a basket type arrangement on the inlet pipe to collect any large items that may enter the sump. Operation of the E-stop will stop the motor and generate an alarm.
- Failure of the 4-20mA Ultrasonic signal inhibits the foul pumps and generates an alarm.
- The pumps have Hand/Off/Auto Control. In hand, the following protection will be provided: Overload, over-temperature, and low low level cut-out.
- High-high level detection by **US001** generates an alarm and a text is sent to the operator.

Cobh Pumping Station Schematic Diagram Showing Flow Metering Points



Note:-

 Flow meter point (Wastewater Pumped to WWTP)

 Flow meter point at which emergency overflow to river is measured

C.2 Outfall Design and Construction

Provide details on the primary discharge point & secondary discharge points and storm overflows to include reference, location, design criteria and construction detail.

Introduction

The North Cobh Sewers SLI project was advanced as part of the overall Cork Lower Harbour Sewage Scheme. As part of this advance contract a sewerage scheme was provided in the North Cobh area to allow development in this area to proceed.

The Cobh sewer system consists of two separate sewer outfalls one for surface water and the other for foul wastewater. Although both outfalls are discharging to the harbour the basic design concept for each of the outfalls is different.

Surface waters are to be discharged through an outfall located above the high tide level whereas the foul wastewater is to discharge below the low tide level at a sufficient distance from the shore line so as to achieve adequate diffusion/dispersion of the effluent.

Foul Sewer Outfall

The foul outfall consists of a 150m length of 300mm diameter polyethylene (PE) pipe which is buried at a depth of 1.0m under the sea bed. The outfall pipe is covered by a flexible concrete mattress which provides anti-flotation restraint and protects it from risks such as being hit by a direct anchor drop.

Attached to the end of the outfall pipe is a diffuser constructed from a 5m length of 300mm diameter PE pipe. This diffuser has two 150mm diameter ports which have duckbill type non-return valves at the end of the ports. A drawing showing the plan, elevation and longitudinal section of the foul outfall is included in **Application Form Attachment C.2 Drawing No. 7.**

Hydraulic design

The foul outfall discharges treated effluent. It is an interim measure to cater for the treated effluent from North Cobh. It is expected that within the next 10 year period or so that the Cork Lower Harbour Scheme will be implemented and the foul outfall will become redundant.

The outfall was designed to cater for an ultimate hydraulic flow of up to 75l/s. This is equivalent to the contribution from a population equivalent of 8,000 p.e.

The development of North Cobh is to occur on a phased basis. The outfall has been designed to cater for an initial flow of 11l/s which is considerably lower than the ultimate flow.

Impact of Foul Outfall

Receiving waters

The treated effluent is discharged to the River Lee Estuary, Cork Harbour West Passage. Within the Lower Harbour area there are a number of protected conservation areas namely, Cork Harbour Special Protection Area (SPA). The West Passage of Cork Harbour is designated a sensitive water under the Urban Waste Water Treatment (Amendment) Regulations, 2004. There are no bathing areas (designated or otherwise) adjacent to the outfall; the nearest (and only) designated bathing area in Cork Harbour is at Fountainstown. A car ferry operates daily from Carrigaloe, Cobh to Passage West, the discharge point for the North Cobh WWTP is located below the low tide level at a sufficient distance from the shore line so as to achieve adequate diffusion/dispersion of the effluent.

The outfall from Carrigrenan WWTP also discharges to Cork Harbour Passage West upstream of this proposed outfall. Carrigrenan WWTP treats all of the sewage arising from Cork City which has a population equivalent of 413,000 pe. Cork County Council carries out routine assessment of the water quality in Cork Lower Harbour. The installation of the WWTP will result in a significant reduction in untreated wastewater discharging into the Cork Lower Harbour.

Erosion

The discharge points on the diffuser are orientated such that they discharge vertically upwards. The discharge ports extend 1.0m above the sea bed level. Based on this clearance and the direction of the discharge the risk of local erosion or bed scour is minimised.

REVISED SECTION D: DISCHARGES TO THE AQUATIC ENVIRONMENT

Advice on completing this section is provided in the accompanying Guidance Note.

Give particulars of the source, location, nature, composition, quantity, level and rate of discharges arising from the agglomeration and, where relevant, the period or periods during which such emissions are made or are to be made.

Details of all discharges of waste water from the agglomeration should be submitted via the following web based link: http://78.137.160.73/epa_wwd_licensing/. The applicant should address in particular all discharge points where the substances outlined in Tables D.1(i), (b) & (c) and D.1(ii), (b) & (c) of Annex 1 are emitted.

Where it is considered that any of the substances listed in Annex X of the Water Framework Directive (2000/60/EC) or any of the Relevant Pollutants listed in Annex VIII of the Water Framework Directive (2000/60/EC) are being discharged from the waste water works or are seen to be present in the receiving water environment downstream of a discharge from the works (as a result of any monitoring programme, e.g., under the Water Framework Directive Programme of Measures) the applicant shall screen the discharge for the relevant substance.

D.1 Discharges to Surface Waters

Details of all discharges of waste water from the agglomeration should be supplied via the following web based link: http://78.137.160.73/epa_wwd_licensing/. Tables D.1(i)(a), (b) & (c), should be completed for the primary discharge point from the agglomeration and Tables D.1(ii)(a), (b) & (c) should be completed for each secondary discharge point, where relevant. Table D.1(iii)(a) should be completed for each storm water overflow. Individual Tables must be completed for each discharge point.

Where monitoring information is available for the influent to the plant this data should also be provided in response to Section D.1.

Supporting information should form **Attachment D.1**

Attachment included	Yes	No
	✓	

D.2 Tabular Data on Discharge Points

Applicants should submit the following information for each discharge point:

Table D.2:

PT_CD	PT_TYPE	LA_NAME	RWB_TYPE	RWB_NAME	DESIGNATION	EASTING	NORTHING
Point Code Provide label ID's	Point Type (e.g., Primary/Secondary/Storm Water Overflow)	Local Authority Name (e.g., Donegal County Council)	Receiving Water Body Type (e.g., River, Lake, Groundwater, Transitional, Coastal)	Receiving Water Body Name (e.g., River Suir)	Protected Area Type (e.g., SAC, candidate SAC, NHA, SPA etc.)	6E-digit GPS Irish National Grid Reference	6N-digit GPS Irish National Grid Reference

An individual record (i.e. row) is required for each discharge point. Acceptable file formats include Excel, Access or other upon agreement with the Agency. A standard Excel template can be downloaded from the EPA website at www.epa.ie. This data should be submitted to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, B.5, C.1, E.3 and F.2.

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REVISED SECTION E: MONITORING

Advice on completing this section is provided in the accompanying Guidance Note.

E.1 Waste Water Discharge Frequency and Quantities – Existing & Proposed

Provide an estimation of the quantity of waste water likely to be emitted in relation to all primary and secondary discharge points applied for. This information should be included in Table E.1(i) via the following web based link: http://78.137.160.73/epa_wwd_licensing/.

Provide an estimation of the quantity of waste water likely to be emitted in relation to all storm water overflows within the agglomeration applied for. This information should be included in Table E.1(ii) via the following web based link: http://78.137.160.73/epa_wwd_licensing/.

Indicate if composite sampling or continuous flow monitoring is in place on the primary or any other discharge points. Detail any plans and timescales for the provision of composite sampling and continuous flow meters.

E.2. Monitoring and Sampling Points

Programmes for environmental monitoring should be submitted as part of the application. These programmes should be provided as Attachment E.2.

Reference should be made to, provision of sampling points and safe means of access, sampling methods, analytical and quality control procedures, including equipment calibration, equipment maintenance and data recording/reporting procedures to be carried out in order to ensure accurate and reliable monitoring.

In determining the sampling programme to be carried out, the variability of the emission and its effect on the receiving environment should be considered.

Details of any accreditation or certification of analysis should be included. **Attachment E.2** should contain any supporting information.

Attachment included	Yes	No
	✓	

E.3. Tabular data on Monitoring and Sampling Points

Applicants should submit the following information for each monitoring and sampling point:

PT_CD	PT_TYPE	MON_TYPE	EASTING	NORTHING	VERIFIED
Point Code Provide label ID's assigned in	Point Type (e.g., Primary, Secondary,	Monitoring Type M = Monitoring S = Sampling	6E-digit GPS Irish National Grid Reference	6N-digit GPS Irish National Grid Reference	Y = GPS used N = GPS not used

section E of application	Storm Water Overflow)				
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An individual record (i.e., row) is required for each monitoring and sampling point. Acceptable file formats include Excel, Access or other upon agreement with the Agency. A standard Excel template can be downloaded from the EPA website at www.epa.ie. This data should be submitted to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, B.5, C.1, D.2 and F.2.

E.4 Sampling Data

Regulation 16(1) (h) of the Waste Water Discharge (Authorisation) Regulations 2007 requires all applicants in the case of an existing waste water treatment plant to specify the sampling data pertaining to the discharge based on the samples taken in the 12 months preceding the making of the application.

Regulation 16(1) (l) of the regulations requires applicants to give details of compliance with any applicable monitoring requirements and treatment standards.

Attachment E.4 should contain any supporting information.

Attachment included	Yes	No
	✓	

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E.1 Waste Water Discharge Frequency and Quantities – Existing & Proposed

Treated effluent discharged from the North Cobh WWTP is sampled at the treatment plant by means of a 24-hour composite sampler. The final effluent flow is also measured at the same location.

A flow monitor is located at the emergency overflow from the pumping station prior to discharge to the main treated effluent sewer outfall.

E.2 Monitoring and Sampling Points

The plant will be incorporated into the Urban Waste Water monitoring programme from January 2009.

The Contractor is required to monitor and record the status of all parameters appropriate to proper control and operation of the plant. Specifically the following parameters are to be monitored and recorded:

- All parameters required by the Contractor to operate the facility in accordance with his methods and practices;
- Instantaneous and totalised flows pumped forward to the aeration tank from the onsite Pumping Station;
- Weekly COD analysis of 24 hour flow proportional samples of the waste water received from the catchment sample to be taken at the inlet works – Influent Sampler Point;
- Weekly BOD₅ analysis of random 24 hour flow proportional samples of the waste water received from the catchment sample to be taken at the inlet works – Influent Sampler Point;
- Weekly SS analysis of 24 hour flow proportional samples of the waste water received from catchment sample to be taken at the inlet works – Influent Sampler Point 1;
- Weekly pH analysis of 24 hour flow proportional samples of the waste water received from catchment sample to be taken at the inlet works – Influent Sampler Point;
- Monthly TP-P analysis of 24 hour flow proportional samples of the waste water received from catchment sample to be taken at the inlet works – Influent Sampler Point;

- Weekly COD analysis of 24 hour flow proportional samples of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- Weekly BOD₅ analysis of random 24 hour flow proportional samples of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- Weekly SS analysis of 24 hour flow proportional samples of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- Weekly pH analysis of 24 hour flow proportional samples of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- Monthly TP-P analysis of 24 hour flow proportional samples of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- DS Content of all sludges leaving the WWTP
- Instantaneous analysis of the turbidity of the treated effluent discharged from the WWTP – Final Effluent Sampler Point;
- Odour sampling analysis using olfactometry at the site boundary shall be carried out upon commencement of the O&M Contract and then on request of the Employer.
- Noise monitoring shall be carried out upon commencement of the O&M Contract and then on request of the Employer. Noise shall be monitored at the site boundaries. Noise shall be monitored at different locations and on different boundaries on consecutive tests;
- The Collection and issuing of samples for pH, BOD, COD, SS, , TP-P, once a month to an independent laboratory for analysis; and
- All parameters necessary to demonstrate the proper performance of the treatment process including DO, SVI & MLSS monitoring.

The EPA carries out routine assessment of the water quality in Cork Lower Harbour. The installation of the WWTP will result in a significant reduction in untreated wastewater discharging into the Cork Lower Harbour. Therefore no mitigation measures are deemed to be required.

The primary discharge sampling point is accessed by contacting EPS, (the O&M contractors) and requesting a key to gain access to the plant. The primary discharge point is accessed by at a manhole adjacent to the treatment plant. Cork County Council and EPS are currently negotiating the installation of a composite sampler at the primary discharge point.

REVISED SECTION F: EXISTING ENVIRONMENT & IMPACT OF THE DISCHARGE(S)

Advice on completing this section is provided in the accompanying Guidance Note.

Detailed information is required to enable the Agency to assess the existing receiving environment. This section requires the provision of information on the ambient environmental conditions within the receiving water(s) upstream and downstream of any discharge(s).

Where development is proposed to be carried out, being development which is of a class for the time being specified under Article 24 (First Schedule) of the Environmental Impact Assessment Regulations, the information on the state of the existing environment should be addressed in the EIS. **In such cases, it will suffice for the purposes of this section to provide adequate cross-references to the relevant sections in the EIS.**

1. Give summary details and an assessment of the impacts of any existing or proposed emissions on the environment, including environmental media other than those into which the emissions are to be made.

Response

The discharge is entering transitional water and there is no impact predicted on the ecology of the area.

These issues have been addressed in the EIS Vol II Part D submitted as part of this application where the receiving environment is described. In EIS Vol III Part C, Appendix 2A the Terrestrial and Marine Ecology is dealt with in the Flora and Fauna study.

2. Details of all monitoring of the receiving water should be supplied via the following web based link: http://78.137.160.73/epa_wwd_licensing/. Tables F.1(i)(a) & (b) should be completed for the primary discharge point. Surface water monitoring locations upstream and downstream of the discharge point shall be screened for those substances listed in Tables F.1(i)(a) & (b). Monitoring of surface water shall be carried out at not less than two points, one upstream from the discharge location and one downstream.

Response

This information has been supplied in hard copy and PDF format. It was not entered into the online system due to the short timeframe of its implementation. Cork County Council has previously notified the EPA about this issue.

Details of monitoring points can be found in the hard copy Attachment F(i) (a) & (b) of the application.

3. For discharges from secondary discharge points Tables F.1(ii)(a) & (b) should be completed. Furthermore, provide summary details and an assessment of the impacts of any existing or proposed emissions on the surface water or ground (aquifers, soils, sub-soils and rock environment), including any impact on environmental media other than those into which the emissions are to be made.

Response

There are no secondary discharge points from this scheme as the emergency overflow discharges down the main outfall pipe.

4. Provide details of the extent and type of ground emissions at the works. For larger discharges to groundwaters, e.g., from Integrated Constructed Wetlands, large scale percolation areas, etc., a comprehensive report must be completed which should include, inter alia, topography, meteorological data, water quality, geology, hydrology, and hydrogeology. The latter must in particular present the aquifer classification and vulnerability. The Geological Survey of Ireland Groundwater Protection Scheme Dept of the Environment and Local Government, Geological Survey of Ireland, EPA (1999) methodology should be used for any such classification. This report should also identify all surface water bodies and water wells that may be at risk as a result of the ground discharge.

Response

There are no ground /groundwater emissions from the WWTP.

5. Describe the existing environment in terms of water quality with particular reference to
 - environmental quality standards or other legislative standards.
 - Submit a copy of the most recent water quality management plan or catchment management plan in place for the receiving water body.
 - Give details of any designation under any Council Directive or Regulations that apply in relation to the receiving water.

Response

The EPA's Water Framework Directive - Proposed Quality Standards for Surface Water Classification - a Discussion Document for Public Consultation was consulted and screening was carried out as Part of F1 and showed that the effluent being discharged was below the limits for detection for most of the parameters. Positive results were recorded for Cyanide and Selenium but both were within the standards outlined on page 31 of the document.

The receiving environment is detailed in the EIS submitted with this application and in particular Vol II Part D, Section 3 – Receiving Environment.

Vol III Part C contains the Flora and Fauna Study, here the receiving environment is assessed with particular reference to Designated areas, Flora and habitats, Fauna and Water quality.

The 2008 harbour strategy plan for Cork Harbour has been included in the attachments.

6. Provide a statement as to whether or not emissions of main polluting substances (as defined in the *Dangerous Substances Regulations S.I. No. 12 of 2001*) to water are likely to impair the environment.

Response

The North Cobh WWTP treats wastewater from a domestic source and it is highly unlikely to be a source of main polluting substances as described in the *Dangerous Substances Regulations S.I. No. 12 of 2001*

7. In circumstances where water abstraction points exist downstream of any discharge describe measures to be undertaken to ensure that discharges from the waste water works will not have a significant effect on faecal coliform, salmonella and protozoan pathogen numbers, e.g., Cryptosporidium and Giardia, in the receiving water environment.

Response

There are no water abstraction points downstream of the wastewater works as the discharges are to saline waters.

8. Indicate whether or not emissions from the agglomeration or any plant, methods, processes, operating procedures or other factors which affect such emissions are likely to have a significant effect on –
- (a) a site (until the adoption, in respect of the site, of a decision by the European Commission under Article 21 of Council Directive 92/43/EEC for the purposes of the third paragraph of Article 4(2) of that Directive) –
 - (i) notified for the purposes of Regulation 4 of the Natural Habitats Regulations, subject to any amendments made to it by virtue of Regulation 5 of those Regulations,
 - (ii) details of which have been transmitted to the Commission in accordance with Regulation 5(4) of the Natural Habitats Regulations, or
 - (iii) added by virtue of Regulation 6 of the Natural Habitats Regulations to the list transmitted to the Commission in accordance with Regulation 5(4) of those Regulations,
 - (b) a site adopted by the European Commission as a site of Community importance for the purposes of Article 4(2) of Council Directive 92/43/EEC¹ in accordance with the procedures laid down in Article 21 of that Directive,
 - (c) a special area of conservation within the meaning of the Natural Habitats Regulations, or
 - (d) an area classified pursuant to Article 4(1) or 4(2) of Council Directive 79/409/EEC²;

¹Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ No. L 206, 22.07.1992)

²Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ No. L 103, 25.4.1979)

Response

The discharge from the North Cobh WWTP is characterised by comprising mainly of domestic wastewater with less than 1% volume to date being contributed by commercial activities. The effluent is treated to a high standard and is not expected to cause any adverse effects in the West

Passage of Cork Harbour. Carrigrenan WWTP, which serves a population equivalent of 413,000p.e. discharges at Marino Point which is upstream of the discharge point for the North Cobh WWTP. The discharge volume from the North Cobh WWTP, when operating at a capacity of 8,000p.e. will only represent 1.5% of the volume discharged from Marino Point. Therefore it is not determined that the discharge will affect any of the sites/areas listed above.

9. Describe, where appropriate, measures for minimising pollution over long distances or in the territory of other states.

Response

A high specification WWTP plant has been developed in North Cobh to ensure the minimisation of pollution over long distances and to enhance the water quality in the Harbour. There is no impact on the territory of other states.

10. This section should also contain full details of any modelling of discharges from the agglomeration. Full details of the assessment and any other relevant information on the receiving environment should be submitted as **Attachment F.1.**

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F.2 Tabular Data on Drinking Water Abstraction Point(s)

Applicants should submit the following information for each downstream or downgradient drinking water abstraction point. The zone of contribution for the abstraction point should be delineated and any potential risks from the waste water discharge to the water quality at that abstraction point identified.

ABS_CD	AGG_SERVED	ABS_VOL	PT_CD	DIS_DS	EASTING	NORTHING	VERIFIED
Abstraction Code	Agglomeration served	Abstraction Volume in m ³ /day	Point Code Provide label ID's	Distance Downstream in meters from Emission Point to Abstraction Point	6E-digit GPS Irish National Grid Reference	6N-digit GPS Irish National Grid Reference	Y = GPS used N = GPS not used

Note: Attach any risk assessment that may have been carried out in relation to the abstraction point(s) listed.

An individual record (i.e. row) is required for each abstraction point. Acceptable file formats include Excel, Access or other upon agreement with the Agency. A standard Excel template can be downloaded from the EPA website at www.epa.ie. This data should be submitted to the Agency on a separate CD-Rom containing sections B.1, B.2, B.3, B.4, B.5, C.1, D.2 and E.3.

Attachment F.2 should contain any supporting information.

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F.1. Assessment of Impact on Receiving Surface or Ground Water

Foreshore Licence & Current Discharge Standards

The current treatment standards that the WWTP is operating to is contained within Cork County Councils application to the Department of the Marine & Natural Resources for a Foreshore licence in August 2006 which states the North Cobh WWTP shall achieve a final effluent standard of:-

- BOD 25MG/L
- SS 35MG/L

Assessment of Relevant Legislation Applicable to North Cobh WWTP

The following assesses the relevant European Union Directives and Irish Statutory Legislation that is applicable to the discharge standards from the North Cobh WWTP.

- Dangerous Substances Directive 2006/11/EC,
- Water Framework Directive 2000/60/EC,
- Birds Directive 79/409/EEC,
- Groundwater Directives 80/68/EEC & 2006/118/EC,
- Drinking Water Directives 80/778/EEC,
- Urban Waste Water Treatment Directive 91/271/EEC,
- Habitats Directive 92/43/EEC,
- Environmental Liabilities Directive 2004/35/EC,
- Bathing Water Directive 76/160/EEC, and
- Shellfish Waters Directive (79/923/EEC).

Dangerous Substances Directive 2006/11/EC,

Council Directive 2006/11/EEC recognises the need for action to be taken by member states to protect the aquatic environment from pollution, in particular that caused by certain persistent, toxic and bioaccumulable substances. The North Cobh WWTP treats wastewater from primarily domestic sources with a very limited amount of 'dry' industry associated with it. The influent and effluent have been screened for dangerous substances and is compliant to the above regulation.

Birds Directive 79/409/EEC,

Cork Harbour is a Special Protection Area, the WWTP at North Cobh was designed and assessed so that no environmental damage will arise from the WWTP. This is discussed in detail in the EIS in Attachment B.6 of the application.

Groundwater Directives 80/68/EEC & 2006/118/EC,

Not Applicable

Drinking Water Directives 80/778/EEC,

There are no water abstraction points down stream of the discharge point from the WWTP at North Cobh

The Urban Waste Water Treatment Directive 91/271/EEC and Amendment Directive 98/15/EEC

The Urban Waste Water Treatment Regulations, (S.I. 254 of 2001) gives effect to provisions of the Urban Wastewater Treatment Directive (91/271/EEC). The 2001 Irish Regulations cover various requirements in relation to the collection and treatment of urban wastewater.

Article 4 (1) (c) states that *'In the case of urban waste water entering collecting systems, a sanitary authority shall provide treatment plants which provide for secondary treatment or an equivalent treatment by 31 December 2005, in respect of all discharges to freshwaters and estuaries from agglomerations with a population of between 2,000 and 10,000.'*

The **Second Schedule (Part 1)** of the 2001 Regulations states that the Treated Effluent should have the characteristics shown in **Table G.1** below.

Table F.1.(a) Treated Effluent Characteristics

Parameter	Concentration		Minimum % of Reduction
BOD₅	25.0	mg/l O ₂	70-90
SS	35.0	mg/l	90
COD	125	mg/l O ₂	75

The **Third Schedule** of the 2001 Regulations (as Amended by the **2004 Regulations**) gives a list of sensitive areas which in accordance with Article 4 (2) (a) for population equivalent above 10,000PE in sensitive areas require phosphorus and nitrogen consents in accordance the **Second Schedule (Part 2)**. The Lee Estuary, Cork Harbour West Passage is identified as a sensitive area however the plant is designed for a PE of less than 10,000 therefore this part of the regulation does not apply.

Urban Waste Water Treatment (Amendment) Regulations 2004 (S.I. No. 440 of 2004)

These Regulations amend the Waste Water Treatment Regulations, 2001 by-

- a. Designating two additional areas (in Cork Harbour) as sensitive areas, and
- b. Making some minor technical amendments

The Waste Water Treatment Regulations, 2001 impose requirements in relation to discharges from urban waste water treatment facilities and give effect to Directive No. 91/271/EEC (the Urban Waste Water Treatment Directive) and Directive No. 2000/60/EC (the Water Framework Directive)

Habitats Directive 92/43/EEC,

Cork Harbour is designated as an SPA (site code 004030). A site synopsis for the designation is included in Attachment F.

Bathing Water Directive 76/160/EEC

Council Directive 76/160/EEC 1975 concerning bathing water quality and the associated Bathing Water Regulations (SI No 177 of 1998) lay down quality requirements for inland and coastal waters designated bathing areas. The quality standards rely predominantly on microbiological parameters. The Lee Estuary, Cork Harbour West Passage is not designated as a bathing water (nearest bathing water is at Fountainstown approximately 5 miles down-stream of the final effluent outfall). There are no other bathing areas within the immediate vicinity of the discharge point. Therefore there are no further refinements of the treated effluent characteristics listed in **Table F.1. (a)** above arising from the Bathing Water Directive.

EU Shellfish Waters Directive (79/923/EEC); and EU Directive on Health Conditions and the Placing on the Market of Live Biovalve Molluscs (91/67/EEC) and associated amendments

There are two main EU directives relating to Shellfish Waters. These are the Shellfish Directive (79/923/EEC) as implemented by the Quality of Shellfish Waters Regulations 2006 (SI No 268 of 2006), and the Directive on Health Conditions and the placing on the market of Live Biovalve Molluscs (91/67/EEC) and its associated amendments.

The Lee Estuary, Cork Harbour West Passage is not designated, "Shellfish Waters", under the Quality of Shellfish Waters Regulations 2006. However it is a licensed aquaculture area. It is proposed to designate areas of Cork Harbour near Rostellan and Aghada as designated Shellfish Waters. The Department of Communications, Marine, and Natural Resources Live Bivalve Molluscs (Production Areas) Designation 2006 has confirmed that Cork Harbour, into which the Lee Estuary, Cork Harbour West Passage flows, is a licensed area for the cultivation of shellfish such as oysters as detailed in **Table F.1.(b)** below.

Table F.1. (b) Designated Bivalve Mollusc Production Areas in Ireland - October 2006

Production Area	Boundaries	Bed Name	Species	Previous Classification	Current Classification
Cork Harbour	Between 8°16.4' W and 8° 15.6' W.	North Channel West	Oysters	B	B
	Between 8°14.6'W and 8°13.2'W.	North Channel East	Oysters	B	B
	Ahada Pier to Gold Point	Rostellan	Oysters	B	B

In accordance with the Live Bivalve Molluscs (Production Areas) Designation 2006 and Council Directive 91/492/EEC, Cork Harbour has a Category B status which means that shellfish from this area have to be treated in a purification centre or a relay bed before they can be placed on the market for human consumption. The water quality standards for Shellfish in Category B Waters is summarised in **Table F.3**. The status of the shellfish waters is monitored on a monthly basis by the National Marine Institute.

Table F.3 Requirements for Faecal Coliform levels for Live Bivalve Molluscs in Accordance with EEC Directive 91/492/EEC

Category of Waters	Faecal Coliforms /100g of Flesh	Compliance of Samples	Further Treatment
A- Immediate Human Consumption	<300	100% <300	Not Required
B- Human Consumption After Treatment	300 - 6,000	90% < 6,000	Purification after Relaying
C-Human Consumption After Treatment	6,000 - 60,000	100% < 60,000	Relaying for long period -Intensive Purification

Environmental Liabilities Directive 2004/35/EC,

The WWTP was designed to ensure that no environmental damage would be caused to the surrounding environment. This included the separation of foul and surface water to remove combined surface water overflows discharging untreated sewage into the watercourse.

Supporting Information

A flora and fauna study was carried prior to the construction of the WWTP at North Cobh this is provided in Attachment F.1. An EIS have been completed for the Lower Harbour Sewerage Scheme and is available in Attachment E.6 of the Application.

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SECTION G: PROGRAMMES OF IMPROVEMENTS

Advice on completing this section is provided in the accompanying Guidance Note.

G.1 Compliance with Council Directives

Provide details on a programme of improvements to ensure that emissions from the agglomeration or any premises, plant, methods, processes, operating procedures or other factors which affect such emissions will comply with, or will not result in the contravention of the;

- Dangerous Substances Directive 2006/11/EC,
- Water Framework Directive 2000/60/EC,
- Birds Directive 79/409/EEC,
- Groundwater Directives 80/68/EEC & 2006/118/EC,
- Drinking Water Directives 80/778/EEC,
- Urban Waste Water Treatment Directive 91/271/EEC,
- Habitats Directive 92/43/EEC,
- Environmental Liabilities Directive 2004/35/EC,
- Bathing Water Directive 76/160/EEC, and
- Shellfish Waters Directive (79/923/EEC).

Attachment G.1 should contain the most recent programme of improvements, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

Attachment included	Yes	No
	✓	

G.2 Compliance with Water Quality Standards for Phosphorus Regulations (S.I. No. 258 of 1998).

Provide details on a programme of improvements, including any water quality management plans or catchment management plans in place, to ensure that improvements of water quality required under the Water Quality Standards for Phosphorous Regulations (S.I. No. 258 of 1998) are being achieved. Provide details of any specific measures adopted for waste water works specified in Phosphorus Measures Implementation reports and the progress to date of those measures. Provide details highlighting any waste water works that have been identified as the principal sources of pollution under the P regulations.

Attachment G.2 should contain the most recent programme of improvements and any associated documentation requested under Section G.3 of the application.

Attachment included	Yes	No
		Not Applicable

G.3 Impact Mitigation

Provide details on a programme of improvements to ensure that discharges from the agglomeration will not result in significant environmental pollution.

Attachment G.3 should contain the most recent programme of improvements, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

Attachment included	Yes	No
		Not Applicable

G.4 Storm Water Overflow

Provide details on a programme of improvements to ensure that discharges other than the primary and secondary discharges comply with the definition of 'storm water overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007.

Attachment G.4 should contain the most recent programme of improvements, including a copy of any approved funding for the project and a timeframe for the completion of the necessary works to take place.

Attachment included	Yes	No
		Not Applicable

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G.1 Compliance with Council Directives

The plant was designed to meet all current legislation and therefore no programme of improvements is considered necessary. The plant will be incorporated into the Urban Waste Water monitoring programme from January 2009.

G.4 Storm Water Overflows

The North Cobh sewerage system comprises two completely separate foul and storm systems and therefore there are no combined storm water overflows.

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SECTION H: DECLARATION

Declaration

I hereby make application for a waste water discharge licence/revised licence, pursuant to the provisions of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007).

I certify that the information given in this application is truthful, accurate and complete.

I give consent to the EPA to copy this application for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA and local authority offices, and via the EPA's website.

This consent relates to this application itself and to any further information or submission, whether provided by me as Applicant, any person acting on the Applicant's behalf, or any other person.

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

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SECTION I: JOINT DECLARATION

NOT APPLICABLE

Joint Declaration ^{Note1}

I hereby make application for a waste water discharge licence/revised licence, pursuant to the provisions of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007).

I certify that the information given in this application is truthful, accurate and complete.

I give consent to the EPA to copy this application for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA and local authority offices, and via the EPA's website.

This consent relates to this application itself and to any further information or submission whether provided by me as Applicant, any person acting on the Applicant's behalf, or any other person.

Lead Authority

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

Co-Applicants

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

Signed by : _____ **Date :** _____
(on behalf of the organisation)

Print signature name: _____

Position in organisation: _____

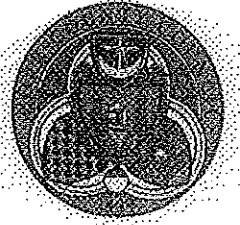
Note 1: In the case of an application being lodged on behalf of more than a single water services authority the following declaration must be signed by all applicants.

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Comhairle Contae Chorcaí Cork County Council

County Hall,
Cork, Ireland.
Tel: (021) 4276891 & Fax: (021) 4276321
Web: www.corkcoco.ie
Halla an Chontae,
Corcaigh, Éire.
Fón: (021) 4276891 & Faxes: (021) 4276321
Suíomh Gréasáin: www.corkcoco.ie



Gus Cahill,
Administrative Officer,
Water Services Capital,
South Cork Rural,
Floor 4.

Direct Tel. No. (021) 4285305
Direct Fax No. (021) 4348334
e-mail: ted.oleary@corkcoco.ie

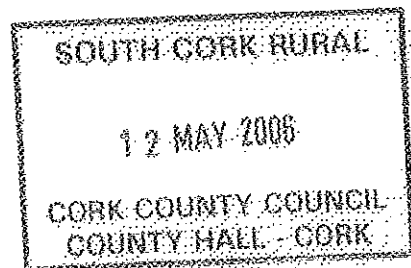
11th May, 2006.

Re: Report under Article 179(3)(b) of the Planning & Development Act, 2000.
Report under Article 81 of the Planning & Development Regulations, 2001.
The construction of new foul and surface water outfall pipelines and
temporary North Cobh Waste Water Treatment Plant with pumping stations,
detention tank, screened overflow, access road, process tanks, control building,
associated site works, boundary fencing and gates at Ballynoe Td., Cobh, Co. Cork.

At the meeting of the Council held on the 8th May, 2006 the recommendation of the Southern
Committee was approved in respect of the above.

I attach letter dated 10th May, 2006 from the A/Senior Executive Officer, Corporate Affairs.

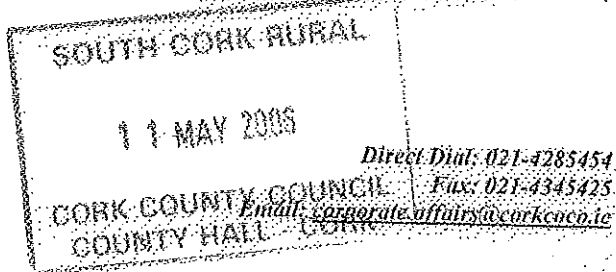
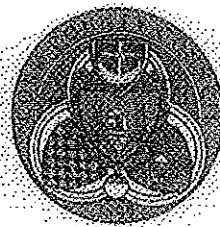
Mary Banks
TED O'LEARY,
A/Senior Executive Officer,
South Cork Rural,
Floor 4.



Comhairle Contae Chorcaí Cork County Council

Valerie O'Sullivan,
A/Senior Executive Officer,
South Cork - City Hinterland,
Floor 4.

County Hall,
Cork, Ireland.
Tel: (021) 4276891 • Fax: (021) 4276321
Web: www.corkcoco.ie
Halla an Chontae,
Corcaigh, Éire.
Fón: (021) 4276891 • Fais: (021) 4276321
Suíomh Gréasáin: www.corkcoco.ie



10th May, 2006.

Re: Report under Article 179 (3) (b) of the Planning & Development Act, 2000.

Report under Article 81 of the Planning & Development Regulations, 2001.

The construction of new foul and surface water outfall pipelines and temporary North Cobh Waste Water Treatment Plant with pumping stations, detention tank, screened overflow, access road, process tanks, control building, associated site works, boundary fencing and gates at Ballynoe Td., Cobh, Co. Cork.

I refer to your letter dated 18th April, 2006 in connection with the above.

At the meeting of Cork County Council held on 8th May, 2006 the recommendation of the Southern Committee was approved.

Marian M. McCarthy
MARIAN MCCARTHY
A/SENIOR EXECUTIVE OFFICER





**CORK LOWER HARBOUR SEWERAGE SCHEME
ADVANCE CONTRACT NR. 2**

**NORTH COBH SEWERS
SERVICED LAND INITIATIVE**

FOUL AND SURFACE WATER OUTFALLS

PART 8 PLANNING APPLICATION

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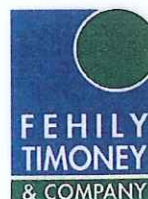
Prepared for:

Cork County Council
Water Services Capital
South Cork Rural
County Hall
Cork

Prepared by:

Fehily Timoney & Co.
Core House
Pouladuff Road
Cork

February 2006



J. B. Barry & Partners Ltd., (Cork).
 Incoming Document / Drawing
 Date Received
 15 FEB 2006

Registration No.	10000009
Assoc. Correspondence No.	422
File Reference:	75343 / Box F&E

**CORK LOWER HARBOUR MAIN DRAINAGE SCHEME
 ADVANCE CONTRACT NR. 2**

**NORTH COBH SEWERS
 SERVICED LAND INITIATIVE**

FOUL AND SURFACE WATER OUTFALLS

PART 8 PLANNING APPLICATION

User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue for Approval	CM	DMcH	CM	15/02/06

Client: Cork County Council

Keywords: Cork Lower Harbour Sewerage Scheme, Serviced Land Initiative, advance contract, sewerage scheme, foul outfall, surface water outfall, Part 8 Planning Application.

Abstract: This report presents details of the proposed foul and surface water outfalls to be constructed as part of the North Cobh Sewers Serviced Land Initiative project. The Report has been prepared for submission as part of the overall Part 8 Planning Application.

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1. INTRODUCTION

1.1. General

The North Cobh Sewers SLI project is being advanced as part of the overall Cork Lower Harbour Sewerage Scheme. As part of this advance contract, a sewerage scheme is to be provided to the North Cobh area, to allow development in this area proceed.

The Cobh sewer system consists of two separate sewer outfalls, one for surface water and the other for foul wastewater. Although both outfalls are discharging to the harbour (River Lee estuary), the basic design concept for each of the outfalls is obviously different.

It is intended to discharge the surface water through an outfall located above the high tide level (topography permitting), whereas the foul wastewater is proposed to discharge below the low tide level, at a sufficient distance from the shore line so as to achieve adequate diffusion/dispersion of the effluent. A brief description of the design of these two outfalls is given in this report.

The purpose of this Report is to provide the information required for the Part 8 Planning Application, being submitted to Cork County Council for approval. The Report is also accompanied by the required planning drawings.

Two drawings accompany this Report, namely:

- Drg. No. 2005-004-07-309 – Details of the Proposed Foul Sewer Outfall
- Drg. No. 2005-004-07-409 – Details of the Proposed Surface Water Sewer Outfall

2. FOUL SEWER OUTFALL

2.1. General

The proposed foul outfall consists of a 150m length of 300mm diameter PE pipe, which will be buried at a depth of 1.0m under the sea bed. The outfall pipe is covered by a flexible concrete mattress, which will provide anti-flotation restraint and protect it from risks such as being hit by a direct anchor drop.

Attached to the end of the outfall pipe is a diffuser constructed from a 5m length of 300mm diameter PE pipe. This diffuser will have two 150mm diameter ports, which will have *Tideflex* (or equivalent) duckbill type non-return valves at the end of the ports. A drawing showing details of the proposed foul outfall is attached to this planning application (Drg. No. 2005/004/07/309).

The construction method for the installation of the outfall pipe will be determined by the Contractor appointed for the works. Since such an appointment will not occur for a number of months, a detailed method statement for these marine works cannot be provided at this stage. It is possible, however, to provide an overview of the likely construction methodology.

- It is expected that the Contractor will excavate a trench in the sea-bed, by means of a jack-up rig, or some such marine based system.
- The outfall pipeline will most likely be fabricated on shore and placed into the prepared trench using the "Float and Flood" method.
- The outfall pipeline will then be backfilled.
- Such an operation is likely to take a number of weeks.

It should be noted that there are other possible construction sequences that the appointed Contractor may choose to adopt.

The co-ordinates of the outfall are as follows:

Location	X Co-ordinate	Y Co-ordinate
Landfall - manhole adjacent to proposed quay wall	8° 19' 31.8036"	51° 51' 39.2472"
Seaward end of diffuser - terminal port	8° 19' 36.0036"	51° 51' 37.0836"

2.2. Hydraulic Design

The proposed foul outfall will discharge treated domestic wastewater. It is an interim measure to cater for the treated effluent from North Cobh. It is expected that within a ten year period, the Cork Lower Harbour Sewerage Scheme will be implemented, and the foul outfall will be redundant.

The outfall has been designed to cater for an ultimate hydraulic flow of up to 75 l/s. This is equivalent to the contribution from a population equivalent of 6,400 pe. Such a design capacity is adequate to cater for the development of all lands zoned in the Midleton Electoral Area Local Area Plan that are in the catchment area of the proposed sewer. This ultimate capacity also includes an allowance for storm water – this is to allow for an element of combined sewage from existing houses that will be connected into the sewerage system.

It is appreciated that this development will occur on a phased basis. Accordingly, the outfall has been designed to cater for an initial flow of 11 l/s (equivalent to 1,800 pe), which is considerably less than the ultimate flow.

The basis of the hydraulic design was to ensure that there will be adequate dispersion of the treated effluent to prevent localised pollution in the form of a plume. Other elements of the hydraulic design considered included:

- Adequate dilution to be provided to discharge
- Pressure and flow balance over diffuser ports
- Hydraulic head for discharge in all tidal conditions

2.3. Impact of Foul Outfall

2.3.1. Receiving Waters

The treated effluent will be discharged to the River Lee Estuary, Cork Harbour West Passage. The water body has been designated as sensitive waters under the Urban Waste Water Treatment (Amendment) Regulations, 2004. Such a designation requires additional treatment, in the form of nutrient removal, for discharges from agglomerations with a population equivalent in excess of 10,000 pe. However, since the discharge from the North Cobh Sewers SLI scheme is less than this threshold, these additional treatment requirements do not apply.

In order to determine the assimilative capacity of an estuarine area such as the Cork Harbour West Passage, complex modelling would be required. Such an extensive modelling exercise is not considered necessary in this instance, since other comparative data is available.

The outfall from Carrigrenan WWTP also discharges to Cork Harbour West Passage upstream of this proposed outfall. Carrigrenan WWTP treats all of the sewage arising from Cork City, and caters for a population equivalent of 413,000 pe. It seems reasonable to assume that if Cork Harbour West Passage can assimilate the treated effluent from a population equivalent of 413,000 pe, then it can assimilate treated effluent from up to an additional 8,000 pe, which is equivalent to just 1.5% of the load from Carrigrenan WWTP.

2.3.2. Erosion

The discharge ports on the diffuser will be orientated such that they discharge vertically upwards. The discharge ports will extend 1.0m above the sea bed level. Based on this clearance and the direction of discharge, the risk of local erosion or bed scour is minimised.

The flow rate from the diffuser will be negligible relative to the volumes of water arising from tidal flows. Hence, if any erosion of the sea bed was to occur, it would be expected to arise from local currents from either tides or marine vessel propellers. Conversely, sea bed deposition around the diffuser ports may arise from these local currents. In consideration of such potential deposition, the diffuser design includes for extending the diffuser ports a height of 1.0m above the sea bed, to prevent the diffuser ports becoming buried.

2.3.3. Navigation

In order to minimise any impact on the navigational channel, the outfall does not extend past the 10m depth sounding, as indicated on the Admiralty Chart. Thus, the outfall is kept as far as possible from the main shipping channel.

The Commissioner of Irish Lights will be consulted in relation to the sanctioning of new navigational aids/buoys and/or alteration of existing navigational aids/buoys, as required. The Port of Cork has been consulted, and any requirements that they have for a mark buoy to be located at the end of the diffuser will be complied with.

2.3.4. Fishing & Fisheries

The following fish species are known to pass through the area:

- Codling
- Plaice
- Mackerel
- Coal fish
- Pollock
- Flounder
- Salmon

There will be localised disturbance to fishing activities in the vicinity of the outfall during the construction period. The excavation of the sea bed will also give rise to elevated water sediment levels during the construction period. However, since the impact will be localised, this is not expected to adversely affect fish passing through the area.

There are no licensed aquaculture developments in the area.

2.3.5. Marine Traffic/Pleasure Boating / Sailing

The proposed outfall is primarily buried under the sea bed. There will be two diffuser ports extending 1.0m above the bed level. The highest point of the diffuser port will be approximately 4m below the mean low water spring (MLWS). These diffuser ports will also be marked with navigational aids/buoys, as directed by the Commissioner of Irish Lights/Port of Cork/DCMNR.

Based on this design, and the use of navigational aids/buoys, the proposed development will not interfere with marine traffic that uses the Cork Harbour West Passage.

2.3.6. Air Navigation

The proposed development will not interfere with air navigation.

2.4. Public Health & Safety Issues

The outfall and diffuser will be inaccessible to the general public.

The effluent being discharged through the diffuser will have received secondary biological treatment (or primary treatment in the case of a very small portion of the flow). There are no designated bathing areas in the vicinity, so the probability of the public coming in contact with the treated effluent is low. Furthermore, the dilution available to the treated effluent indicates a low likelihood of harm in the event of the public coming in contact with the waters in the vicinity. Therefore, it is concluded that the proposed development does not pose a significant Health and Safety risk to the public.

2.5. Consultations

The proposed outfall pipe will pass through private property before it enters the foreshore. The landowner in question has been consulted, and has no objection to the proposed development. A wayleave agreement is currently being negotiated with this landowner.

The underwater archaeology unit of the Department of the Environment, Heritage and Local Government (DoEH&LG) have been consulted, and have no objections to the proposed works.

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3. SURFACE WATER SEWER OUTFALL

3.1. General

The surface water sewer outfall is to be located in Ballynoe, just above the high tide (foreshore) level, adjacent to the main R624 Cork-Cobh road.

The outfall comprises a stilling chamber and riprap launching apron, to minimise the possibility of scour. Details of the proposed outfall are given on Drawing No. 2005-004-07-409, which accompanies this planning application.

3.2. Outfall

As outlined, the storm outfall will primarily comprise an energy dissipation structure, with a small stilling basin. A flap valve is also considered necessary, so as to prevent the ingress of saline water in to the pipework during the period of high tide.

The optimum location for the flap valve is a manhole immediately upstream of the outfall chamber. This arrangement has been adopted to ensure ease of cleaning and maintenance of the outfall.

Riprap (stone) will also be placed in front of the outfall structure, to minimise the possibility of scour associated with the discharge of surface water through the outfall.

3.3. Design Flows

The storm outfall has been designed to discharge the peak 1 in 20 year storm event. This flow has been determined as approximately 2,647 l/s (2.65 m³/sec). As this is quite a substantial flow, it is considered necessary to dissipate the energy of the surface water, prior to discharge. Details of the proposed energy dissipation and stilling basin are shown on Drg. No. 2005-004-07-409.

3.4. Outfall Location

The outfall has been located just at or above high tide level. This will ensure a free discharge of surface water at all times, to the foreshore. The stilling basin and energy dissipation will ensure that the flow from the outfall will not endanger the general public, who might use this foreshore. Access to the outfall chamber will be limited, for maintenance purposes only and cognisance has been taken of all relevant health and safety issues, during the detailed design.

3.5. Impact of Surface Water Outfall

3.5.1. Receiving Waters

The surface water will be discharged to the foreshore of the River Lee Estuary, Cork Harbour West Passage. The surface water will be largely uncontaminated and is not likely to impact on the water quality of the receiving waters, given the considerable assimilative capacity of the River Lee Estuary.

3.5.2. Erosion

The volume of surface water, during extreme storm events, will be significant (up to 2.65 m³/sec). It is critical therefore, to dissipate the energy of the surface water, prior to discharge. It is for this reason that a stilling basin is being constructed.

As a further measure, to prevent scour and erosion of the foreshore, a riprap launching apron is to be constructed from the outfall, over a distance of approximately 7 m. This riprap will minimise the potential for scour and erosion, both from the discharging surface water and the incoming tide and potential storm surges/wave action.

3.5.3. Navigation

The outfall is located above the high water mark and therefore will have no impact on navigation in the main channel of the River Lee estuary.

3.5.4. Fishing & Fisheries

The following fish species are known to pass through the area:

- Codling
- Plaice
- Mackerel
- Coal fish
- Pollock
- Flounder
- Salmon

There are no licensed aquaculture developments in the area. The construction and operation of the surface water outfall are unlikely to impact fishing activities in the area.

3.5.5. Marine Traffic / Pleasure Boating / Sailing

As the surface water outfall is located above the high water mark, there will be no impact on marine traffic, pleasure boating or sailing.

3.5.6. Air Navigation

The proposed development will not interfere with air navigation.

3.5.7. Adjacent Public Road

The outfall chamber is to be constructed adjacent to the main R624 Cork-Cobh road. During construction, there will be an impact on traffic utilising this road, as road access will be restricted. Any traffic restrictions will be kept to a minimum and suitable traffic management systems will be in place throughout.

There will be no impact on the adjacent road, once the outfall is constructed.

3.6. Public Health & Safety Issues

The outfall will be located in an area accessibly by the public. However, all authorised access to the outfall chamber will be provided, with locked covers at all access points. The public can access the foreshore adjacent to the outfall chamber. Surface water discharging from the stilling basin will flow over the proposed riprap to the River Lee estuary. The stilling basin and riprap have been designed primarily to reduce the energy of the surface water and to protect against scour and erosion around the outfall chamber. In this way, potential public health and safety issues have been minimised.

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North Cobh SAC Maps – Heritage Data



North Cobh NHA Areas – Heritage Maps



Cork Harbour

Integrated Management Strategy

MAY 2008





Acknowledgements

The development of this Strategy was enabled by the COREPOINT project (Coastal Research and Policy Integration), funded under the EU INTERREG III B programme. The project was implemented by the COREPOINT project partners at the Coastal and Marine Resources Centre (CMRC), University College Cork and the Planning Policy Unit (PPU), Cork County Council.

COREPOINT PROJECT PARTNERS



Coastal and Marine Resources Centre

Project duration: October 2004 to April 2008

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Cork County Council

STRATEGIC ADVISORY GROUP



Cobh and Harbour Chamber



Cork City Council



Cork County Development Board



Cork Docklands



Department of Agriculture, Fisheries and Food



Department of Environment, Heritage and Local Government



East Cork Area Development



Environmental Protection Agency



Fáilte Ireland



Irish Naval Service



National Maritime College of Ireland



Port of Cork



South Western River Basin District



University College Cork

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EXECUTIVE SUMMARY

The aim of the Strategy is: to bring all those involved in the development, management and use of Cork Harbour together in a framework which encourages the integration of their interests and responsibilities to achieve common objectives in a sustainable manner.

The current fragmented approach to planning and management means that the full potential of Cork Harbour as a distinct and unique geographical unit is not being realised. An Integrated Coastal Zone Management (ICZM) approach can facilitate a move towards sustainable development, involving economic, social and environmental interests across all levels of decision-making. The added value of implementing an ICZM approach in Cork Harbour includes:

- Better communication between different stakeholder groups;
- A framework for taking a holistic view of the Harbour, from the Docklands in the city centre to the Harbour entrance at Roches Point.

This Strategy document outlines how such an approach might be pursued.

The process that underpinned the development of this Strategy involved:

- Facilitation by the Interreg IIIB COREPOINT project partners;
- Widespread consultation with stakeholders in the Cork Harbour Forum;
- The organisation of two stakeholder workshops;
- Consultation with the Strategic Advisory Group, involving organisations with statutory responsibilities within the Harbour.

The aim of the Strategy is to bring all those involved in the development, management and use of Cork Harbour together in a framework which encourages the integration of their interests and responsibilities to achieve common objectives in a sustainable manner.

This aim will be achieved by the realisation of the following objectives:

1. To develop a policy framework to facilitate integration for planning and management of Cork Harbour;
2. To protect and promote the unique natural environment of the Harbour;
3. To protect the social and cultural assets of the Harbour to maintain / protect the unique identity of the area;
4. To promote the economic development of the Harbour in line with the principles of sustainable development;
5. To promote and develop the Harbour as a facility for water based sport and leisure activity.

This Strategy is based on a voluntary partnership between key statutory agencies and local stakeholders that will focus attention on the Harbour as a whole, and deliver a set of agreed actions to enhance the future management of the coastal zone. Although the Strategy is a non-statutory one, it aims to bring about a new approach to coastal management in Cork Harbour by focusing the attention on the regulatory duties and powers of the statutory agencies to deliver their goals.

The Strategy will be implemented through two key mechanisms:

- Partnership (i.e. identification of objectives that can be facilitated by collaborative action in the short, medium and long-term).
- The integration of objectives into statutory planning documents and into the strategic policies of relevant organisations.

The development of an Action Plan for 2008 to 2011, based on priorities identified from this Strategy document, will form the next step in the implementation process. Implementation of the Action Plan will be enabled by the Interreg IVB project, Innovative Management for Europe's Changing Coastal Resource (IMCORE), which will run over the corresponding period.



1.1 Background

This Strategy was developed through the Coastal Research and Policy Integration (COREPOINT) project, funded by the EU Interreg IIIB Programme, which ran from November 2004 to April 2008.

The aim of COREPOINT was to implement best practice in coastal management across North West Europe. Cork Harbour and Donegal Beaches were the Irish case study areas.

The local COREPOINT partners - the Coastal and Marine Resources Centre (CMRC), University College Cork and the Planning Policy Unit (PPU), Cork County Council focused their efforts on Cork Harbour.

The COREPOINT project provided funding for local actions including research into marine recreational activities, the development of a harbour wide Geographic Information System (GIS) and the development of a forum to encourage a proactive approach to Harbour management. Further information is available at <http://corepoint.ucc.ie>.



1.2 The Need for Integrated Coastal Zone Management (ICZM)

The coast provides access to important natural resources which support significant economic sectors such as fisheries, shipping and tourism. However, human activities (e.g. urbanisation, waste disposal and habitat depletion) and climate change (e.g. increased storminess and flooding) are placing the coastline under increased pressure. Furthermore, conflict arises from demands for coastal space and resources from competing interest groups.

Dealing with these issues can be challenging, especially where planning and regulation are not fully integrated between land and sea and/or between different sectors of activity.

Integrated Coastal Zone Management (ICZM) aims to address these issues by promoting better integration between the different policies that have an effect on the coast. This is achieved by bringing together the relevant stakeholders to inform, support and implement a 'joined up' approach to management.

1.3 The Principles of ICZM

For effective ICZM, management approaches should:

- **Think ahead** – by thinking beyond traditional planning timeframes, to plan for long-term issues such as climate change.
- **Try to see the bigger picture** – by taking both the land and marine dimensions of the coastal zone into consideration in planning and management.
- **Be flexible and adaptable** – by taking a 'learning by doing' approach to management.
- **Work with nature rather than against it** – by recognising the limitations of the coastal systems for assimilating pollution and the negative impacts of development and human activity.
- **Use a combination of tools** - by using techniques such as awareness raising, technology, legal and policy instruments to achieve management objectives.
- **Get everyone involved** – by including all relevant statutory bodies and other stakeholders in the decision-making process to harness local solutions to local problems.



1.4 An Integrated Management Strategy for Cork Harbour

The current fragmented approach to planning and management (see Section 3) means that the full potential of Cork Harbour as a distinct and unique geographical unit is not being realised.

An integrated, proactive approach to the management of the Harbour should provide an opportunity to address this issue. ICZM can facilitate a move towards sustainable development, involving economic, social and environmental interests across all levels of decision-making.

The added value of implementing an ICZM approach in Cork Harbour includes:

- Better communication between different stakeholder groups.
- A framework for taking a holistic view of the Harbour, from the Docklands in the city centre to the Harbour entrance at Roches Point.

This document outlines how such an approach might be pursued.

1.5 Aim and Approach to the Strategy Document

The aim of this Strategy document is to set the context for **ICZM in Cork Harbour and to present a Strategy, from which a detailed implementation plan can be developed.**

Context is provided in Sections 2 and 3. Section 2 describes the ecological, social and economic assets of the Harbour. Section 3 outlines the current approaches to management in Cork Harbour.

The process behind the development of the Integrated Management Strategy is described in Section 4. This section also summaries the key issues of concern to stakeholders within the Harbour. Finally, the Strategy itself, as agreed by the stakeholders involved in the process, is contained in Section 5.

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“Because of the importance of Cork Harbour to the economic, leisure, amenity, marine transport and heritage role of the county, it is appropriate to promote the idea of managing the area in line with the best principles of Coastal Zone Management that have developed over recent years throughout Europe”.

(Cork County Council 2003:164).



2.1 Ecological Profile

Cork Harbour is a **sheltered coastal environment**, with a **diverse natural heritage** that accommodates a range of activities and uses.

The topography of the landscape is gently undulating, with a **mixed coastline** consisting of built infrastructure, shallow cliffs, intertidal mudflats, reed beds, shingle and rocky foreshores. The western extent of the Harbour is characterised by **estuarine** influences where the River Lee discharges to the complex estuary zone.

The navigation channel in the Harbour is maintained at a depth of 11m for shipping and maritime transport.

Cork Harbour is of major international importance for **waders** (20,000) and **wildfowl** (5,000), particularly winter migrants, which are supported by its extensive mudflat areas around Lough Mahon, the Douglas Estuary and the North Channel, Lough Beg, Saleen, Rostellan and Whitegate. As a consequence, Cork Harbour is designated as both a **Ramsar wetland site of international importance** and a **Special Protection Area for birds**.

Other designations within the Harbour protect important habitats of salt marsh, reedbed and intertidal mudflat. They include **candidate Special Areas of Conservation** (Great Island Channel) and proposed **Natural Heritage Areas** (Douglas Estuary, Great Island Channel, Lough Beg, Rostellan Lough/Aghada Shore/Poul nabibe inlet, Whitegate Bay, Cuskinny Marsh).

The River Lee is also designated as a salmonid river under the EC Directive on the quality of fresh waters needing protection or improvement in order to support fish life. This provides an obligation to maintain specific water quality standards and to control pollution in this area.

Protected fauna occasionally seen in the Harbour include the otter (*Lutra lutra*), the grey seal (*Halichoerus grypus*) and the common seal (*Phoca vitulina*). Cetaceans such as common dolphins (*Delphinus delphina*) and bottlenose dolphins (*Tursiops truncatus*) are also regular visitors to the Harbour. In summer 2001, the arrival of a pod of three Orca whales (*Orcinus orca*) in Cork Harbour attracted attention from local spectators and national media.

The main **fishing** activities within the harbour are potting for shrimp, crab and lobster and to a lesser extent small boat trawling for flounder, plaice and codling. A short season for pelagic trawling for sprat is carried out in winter. The Harbour waters supply important spawning and nursery areas for sea fish species.

Cork Harbour has been described as a "thriving mixed coastal zone in a distinctive landscape setting". Most of the landscapes within Cork Harbour contain a coastal element and there exists an obvious **inter-visibility between land and sea components**. Landscape characteristics include cliff coastlines with open and expansive sea views at the Harbour mouth, to rocky or muddy shores backed by urban industrial settings further inshore.

While contemporary use of large tracts of the Harbour is marked by concentrations of urban populations, and chemical and pharmaceutical industries, much of the coast remains unspoilt and characterised by rural agricultural land-use or protected habitats, with reduced influences from human activities.





Figure 1. Aerial photograph of Cork Harbour and its environs showing the distribution of settlements and mixed land-use composition. Copyright © Cork County Council 2005 - all rights reserved - Includes Ordnance Survey Ireland data reproduced under Osi - Licence number 2003/07CMA/Cork County Council - Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright - © Ordnance Survey Ireland, 2004.



2.2 Socio-Economic Profile

2.2.1 Social context

Cork Harbour influences, and is influenced by, the lives of the people of Cork City and its surrounding towns and villages such as Blackrock, Monkstown, Passage West, Crosshaven, Ringaskiddy, Cobh and Aghada.

The Harbour area is characterised by a strong concentration of development, where increasing **economic prosperity and population growth** have occurred over the past decade. Projected **rises in population** for the Greater Cork Area will continue to have repercussions for urban areas around the Harbour, which are in prime locations relative to Cork City.

Harbour towns are generally well connected by **road** (e.g. the N25 on the north side of the Harbour, and the N28 on the south side of the Harbour) and a **rail service** connects Cork to Cobh. Proposals to initiate a **water taxi** service to link the Lower Harbour with the City Centre by 2010 will further improve access.

The Greater Cork Area is designated as a national **Gateway** under the Irish National Spatial Strategy, based on the strategic importance of the City and the Harbour area, including the **Port of Cork**.

Quality of life for residents living around the Harbour is enhanced by opportunities for **employment in coastal sectors** such as shipping, marine services, petro-chemicals, power generation and marine recreation. The Harbour itself provides a **natural public amenity**. Natural assets enjoyed by local communities include an attractive coastline and a rich maritime heritage.

Cork Harbour also represents a Centre of Excellence in maritime research, training and education. The **Maritime Campus of Ireland** brings together scientists, engineers and technologists, and represents collaboration between experts in University College Cork and the National Maritime College of Ireland (NMCI), including the Cork Institute of Technology and the Irish Naval Service.

A concentration of research and development activities relating to the maritime sector will be located in Ringaskiddy, where state of the art facilities of a world class nature exist in the NMCI and where the National Ocean Energy test facility is to be relocated.

Cork Harbour is steeped in **maritime heritage**. The Lower Harbour is strongly influenced by **naval heritage**. **Military fortifications** include the impressive forts which mark the entrance to the Harbour; Camden Fort (renamed Fort Meagher, 1938) and Carlisle Fort (renamed Fort Davis, 1938). Other fortifications include installations on Spike Island, Rocky Island and Fort Templebreedy. There are also five Martello Towers, dating to the Napoleonic era located in the Harbour.

Cork Harbour continues to be influenced by naval activities; Haulbowline Island has been the headquarters of the **Irish Naval Service** since the withdrawal of the British Royal Navy in 1938.

The heritage town of **Cobh**, formally known as Queenstown, is intertwined with the **Titanic**, the **Lusitania** and **emigration**. Cobh overlooks **Spike Island**, which is steeped in history influenced by its strategic location within the Harbour.



Historic records for Spike Island date back to the 7th century, when a monastic settlement was located there. At one stage, convicts were held on the Island prior to deportation to Van Diemens Land. Since the closure of the contemporary prison on Spike Island in 2005, local campaigners have been lobbying for access to, and redevelopment of, the island as a tourism and heritage destination.

The development of marine tourism and recreation activities in Cork Harbour is dependent on maintaining good environmental quality standards. **Water quality** in the Upper Harbour has been improved by the engineering works conducted under the **Cork Main Drainage Scheme**, which included the implementation of an integrated **sewage treatment facility at Carrigrennan**. Plans are currently underway to improve sewage facilities in the lower part of the Harbour.

European Directives such as the **Water Framework Directive** and the **Urban Wastewater Treatment Directive** stipulate management approaches that have to be applied to maintain 'good' water quality status. **Conservation areas** are monitored by the National Parks and Wildlife Service (NPWS), while the Environmental Protection Agency (EPA) has a remit to regulate **discharges from industrial activities** around the Harbour. The proposed Indaver waste **incinerator** for the Ringaskiddy area is a particularly contentious environmental issue within the Harbour at the time of writing.

Fortunately, there have been no major environmental incidents in Cork Harbour in recent years. An oil spillage in the Lower Harbour in 1997 had minimum environmental consequences due to the scale of the incident and favourable weather conditions for dispersal at the time. Previously contaminated **brownfield sites**, such as the former Irish Steel (ISPAT) site on Haulbowline Island, are currently undergoing **remediation**.

Flooding is a significant issue in Cork Harbour. Flooding has negative social and economic implications, especially for residents and business owners in vulnerable areas of the City Centre, where the problem is intensified during certain environmental conditions. The Office of Public Works have commissioned a review of **flood management options** for Cork Harbour, including the potential for a flood **barrage** to prevent against extreme conditions that may arise in light of future **climate change**.

Decision-makers are faced with the need to develop **adaptive management** techniques for these types of scenarios.



2.2.2 Industry Context

The industrial profile of the Harbour has changed over the last century, although an enduring characteristic has been the development of industries that have a dependency on this prime coastal location. **Ship building and heavy manufacturing activities have declined** with the closure of the Verome Dockyard and Irish Fertiliser Industries in Cobh and Irish Steel on Haulbowline Island.

These brownfield sites are earmarked for future re-development. The opportunities presented through the redevelopment of Haulbowline Island in the centre of Cork Harbour are of strategic significance in the context of this Strategy and it will be important that they complement and enhance the sustainability of the regeneration of the Lower Harbour.

Despite its sheltered location, the **role of Cork as a commercial fisheries harbour has also declined**. However, significant tonnages of herring continue to be landed by pelagic boats into Ringaskiddy pier during the autumn/ winter fishery.

While a limited number of pelagic vessels operate from Cork Harbour, it is an important hub for **deep sea angling activities**. Angling boats operate primarily from Crosshaven and Passage West and target the **fishing grounds within and adjacent to the harbour**. Fish catches within the Harbour itself are limited to small scale activities (see Section 2.1).

Commercial drift-net fishing for salmon in the Harbour was banned in 2006 and has impacted on the livelihoods of local salmon fishermen. However, draft-netting for salmon is permitted within the Harbour, and salmon catches have improved following the drift-net ban.

Since the 1970s Cork Harbour has emerged as the primary national location for **pharmaceutical companies**. Today, Cork Harbour represents one of the largest concentrations of pharmaceutical industries in the world. These facilities are concentrated mainly in the Ringaskiddy area with excellent port infrastructure and access to the national road network, which is important as these multinational pharmaceutical companies are critically dependent on the efficient movement of goods in and out of the country.

The physical geography of the Harbour on the south coast of Ireland provides a strategic location for the Port of Cork situated in close proximity to the main shipping line to northern Europe. The **Port of Cork**, the second most important port in the Republic of Ireland, provides a significant economic contribution to the southern half of the country; the Port handled 10.3 million tonnes of traffic in 2006.

Port operations are distributed throughout the Harbour, from a city centre location to the ferry terminal at Ringaskiddy. The container terminal upstream in Tivoli has reached its carrying capacity, resulting in the need for a **new container terminal**. Following a site selection process, plans to relocate the container port to a new deep water facility at the Oyster Bank in Ringaskiddy are currently going through the statutory planning process.

The **Docklands Development Strategy** in the City Centre will also impact on port operations in that area if plans for non-port related water front activities are successful. The Docklands Development Strategy will have positive repercussions for the Harbour which could be optimised through an integrated approach to planning for the Harbour as a whole. To facilitate docklands regeneration there will be a requirement to provide replacement commercial port facilities in the Lower Harbour to cater for the trades which will be displaced from the City.



More recently, Cork Harbour has become a primary destination for **cruise liners**, which berth in the heritage town of Cobh. Cruise liner facilities at Cobh and Ringaskiddy have been upgraded by the Port of Cork and, unique amongst Irish ports, can now accommodate vessels up to 340m in overall length. In 2008, 52 vessels are scheduled to avail of the Port of Cork facilities in Cork Harbour. The regional economic contribution of these vessels amounted to approximately €28 million, supporting the equivalent of 204 full time jobs.

The Harbour also contains Ireland's only **oil refinery situated at Whitegate**. The presence of the **Kinsale and Seven Head gas fields**, offshore from Cork Harbour, has resulted in the location of many exploration companies in the Harbour over the last 30 years, including Conocco Philips, Shell and Marathon.

Because of the geographic scope and sheltered nature of Cork Harbour it has a long tradition of **recreational boating**, including sailing, fishing and power boating. The Harbour has developed a world class reputation for **sailing**. Cork Week, which is held bi-annually in Crosshaven, generates significant revenue for the local economy and is one of the most popular sailing regattas in European waters. The Ocean to City rowing race runs on an annual basis from Crosshaven to the City quays; the race is open to traditional and non-traditional craft.

There has been a significant growth in the number of recreational boats located in the Harbour, which places demands on space for **moorings and marinas** in popular locations such as Crosshaven and Monkstown. Current demand for marina berths exceeds supply. Applications for planning permission for marina developments within the harbour include: Passage West (200 berth); Monkstown (80 berth); Cobh (120 berth) and Haulbowline (200 berth).

The **coastal scenery** around the Harbour provides scope for many other **coastal recreational activities** such as walking and golfing. A comprehensive review of all of the marine recreation activities and supporting infrastructure within Cork Harbour, was undertaken as part of the COREPOINT project, including activities such as marine heritage trails and rowing. The review concluded that Cork Harbour offers significant potential for further development of the **marine recreation sector as an important source of revenue** for the local economy.



3.1 Who's who: Stakeholders and their Functions




The following section outlines the key national (Table 1) and sub national (Table 2) stakeholders with management responsibilities in Cork Harbour. The hierarchy of statutory organisations with a coastal remit is shown in Figure 2. The relationships between those organisations operating at national, regional and local levels are depicted.

In general, the organisational approach to the management of Cork Harbour is characterised by a sectoral approach, where a strong land/marine divide prevails.

3.1.1 National Stakeholders

The key government departments¹ with coastal functions, which influence the decision making process in Cork Harbour are contained in Table 1.

Table 1. Key Government Departments with statutory functions in relation to coastal planning and management.

Department	Key Coastal / Marine Functions
<p>Agriculture, Fisheries and Food</p> 	<p><u>Fisheries and Marine Infrastructure</u>: responsibility for sea fisheries; aquaculture; coastal protection; marine research; marine engineering; pier and harbour development for all piers and harbours (with the exception of commercial and island harbours).</p> <p><u>Licensing</u>: tasked with responsibility for all aquaculture licensing and foreshore licensing (except energy, aggregate and mineral extraction and commercial harbours).</p>
<p>Environment, Heritage and Local Government</p> 	<p><u>Environmental Protection</u>: meeting international and European commitments on environmental issues; licensing of mineral extraction projects on the foreshore under national legislation.</p> <p><u>Heritage</u>: remit extends to cover built and natural aspects of heritage, including archaeological functions.</p> <p><u>Development</u>: implementation of the national spatial planning system (which generally ends at the mean high water mark) incorporating protection of the natural and built environment and promoting the efficient use of land and infrastructure.</p>
<p>Transport and the Marine</p> 	<p><u>Maritime Affairs</u>: regulating and enforcing maritime safety and security standards; safeguarding the maritime environment; ports and shipping policy (including foreshore licensing of commercial harbours).</p>





¹ It should be noted that the Departmental transfer of function(s) process, following the last General Election, has not yet been fully finalised, therefore the Department of Communications, Energy and Natural Resources may yet retain some aspect of foreshore planning and administration.

3.1.2 Regional and Local Stakeholders



Table 2 outlines the key functions of regional and local stakeholder organisations, while Figure 2 demonstrates the relationships between national and local level statutory organisations which influence coastal planning and management activities.

In addition to statutory bodies, **Non Governmental Organisations (NGOs)** play an important role in influencing policy, conservation and development within Cork Harbour. National level NGOs, such as Birdwatch Ireland or Coastwatch, may engage in decisions relating to planning issues such as the proposed Indaver incinerator in Ringaskiddy. At the more local level, the Cork Harbour Alliance for a Safe Environment, (CHASE), members are particularly active on this issue. Other examples of lobby groups include the Spike Island Heritage Committee, engaged in lobbying for the development of Spike Island as a heritage attraction and the Ringaskiddy Residents Association, concerned with incinerator and port development proposals which may impact on their community.

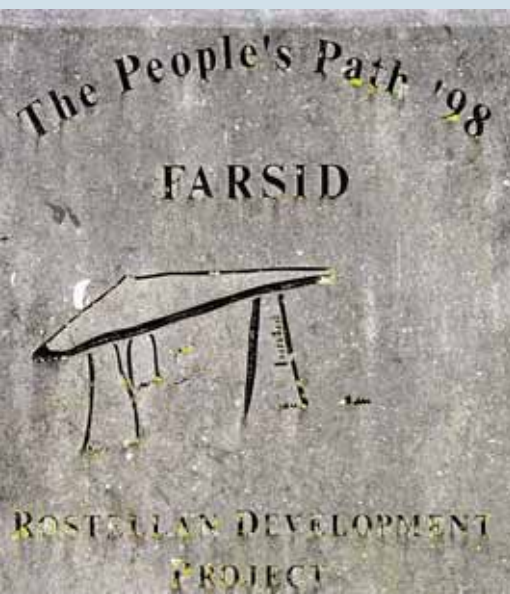
Table 2. Key functions of regional and local stakeholder organisations (not listed in any rank order) with a coastal remit, and their relevance to Cork Harbour.

Organisation	Key Functions	Cork Harbour
<p>Cork County Council http://www.corkcoco.ie</p> 	<p>Manages the delivery of local government services in the County of Cork including housing, roads and transportation, water and waste water services, planning and development, environmental protection, community development, recreation and amenity, agriculture, health and welfare services.</p>	<p>The County Council is a major stakeholder with responsibility for land-use planning around Cork Harbour.</p>
<p>Cork City Council http://www.corkcity.ie</p> 	<p>Administers local governance, proper planning and sustainable development of the city area through provision of local government services (e.g. planning; waste management; water and road services).</p>	<p>The redevelopment of the city docklands, which will have a significant impact on the Harbour, is managed through a directorate of the City Council.</p>
<p>South Western River Basin District http://www.swrbd.ie</p> 	<p>Multi-partner group comprising public and private bodies tasked with managing the South Western River Basin District (SWRBD) and producing River Basin Management Plans (RBMPs) and Programme of Measures (POMs) for the SWRBD.</p>	<p>The waters and catchment area of Cork Harbour fall within the South Western River Basin District.</p>
<p>Cork County Development Board http://www.cdbcorkco.ie</p> 	<p>The Board, which is drawn from local government, social partners, state agencies and local development groups under the aegis of the County Council, is tasked with developing and implementing a strategy for integrating the economic, social and cultural development of Cork County.</p>	<p>The County Development Board supports interagency work within the Harbour, as developed within its key priority projects; examples include the current development of the tourism potential of Spike Island.</p>

Organisation	Key Functions	Cork Harbour
<p>National Parks and Wildlife Service http://www.npws.ie</p> 	<p>Part of the Department of the Environment Heritage and Local Government, the Service is charged with the conservation of a range of habitats and species in Ireland. This includes the designation and protection of sites such as Natural Heritage Areas (NHAs), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).</p>	<p>Areas of Cork Harbour are ecologically important and designated as SACs, SPAs and NHAs.</p>
<p>Fáilte Ireland http://www.failteireland.ie</p> 	<p>The National Tourism Development Authority for Ireland whose role is to guide and promote tourism as a leading indigenous component of the Irish economy.</p>	<p>As part of the implementation of the Tourism Development Plan for the South West region (2008-2010), Fáilte Ireland intends to capitalise upon Cork Harbour's assets for the purposes of tourism development.</p>
<p>Environmental Protection Agency http://www.epa.ie</p> 	<p>The EPA has a wide range of statutory duties and powers including responsibility for licensing, enforcement, monitoring and assessment activities associated with environmental protection.</p>	<p>The EPA licenses and monitors the activities of industrial facilities in Cork Harbour.</p>
<p>Port of Cork Company http://www.portofcork.ie</p> 	<p>The Port of Cork, under the authority of Port of Cork Company, is the key seaport in the south of Ireland.</p>	<p>The Port plays a significant role in the facilitation of trade and economic activity in the region and in the management of Cork Harbour – including navigation, leisure, access, maritime safety and recreation.</p>
<p>South West Regional Authority http://www.swra.ie</p> 	<p>The South West Regional Authority (SWRA) is a statutory public body with responsibility for strategic planning in the southwest region.</p>	<p>The Authority is responsible for regional planning relevant to Cork Harbour.</p>
<p>Irish Naval Service http://www.military.ie/naval/</p> 	<p>The Naval Service is the State's principal seagoing agency with a general responsibility to meet contingent and actual maritime defence requirements.</p>	<p>National headquarters in Cork Harbour. Naval personnel and vessels (eight) regularly use the Harbour's waters to commute on/off the island base, for training purposes, and at the beginning/completion of patrols.</p>

Organisation	Key Functions	Cork Harbour
<p>East Cork Area Development Ltd. http://www.eastcork.com</p> 	<p>East Cork Area Development Ltd (ECAD) is a local and rural development company operating in the East and South Cork area, including the geographic area surrounding Cork Harbour.</p>	<p>ECAD's remit extends to include the environs of Cork Harbour.</p>
<p>Industrial Development Agency http://www.idaireland.com</p> 	<p>IDA Ireland is a state sponsored agency, which reports to the Department of Enterprise, Trade and Employment. The Agency has responsibility for securing new investment from overseas in manufacturing and internationally traded services sectors. It also encourages existing investors to expand and develop their businesses.</p>	<p>Over the last 30 years, IDA Ireland has used its development land bank in the Ringaskiddy area to concentrate pharmaceutical and biopharma developments of strategic importance to Cork and Ireland.</p>

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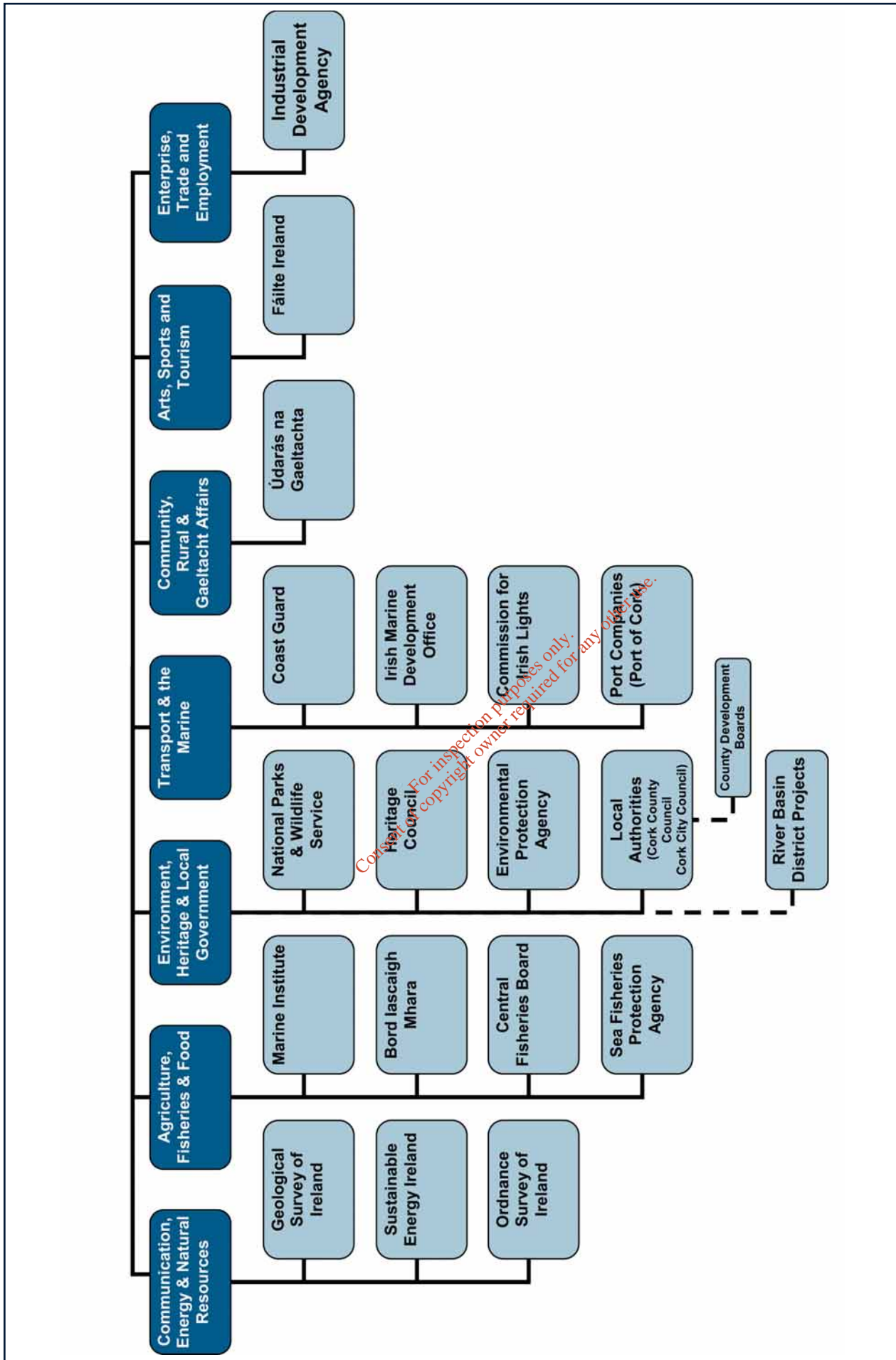


Figure 2. Hierarchy of key statutory organisations which influence coastal planning and management at central, regional and local government levels.

3.2 Policy and Legislative Framework

3.2.1. EU Policy

A complex range of legislation and policy influences the management approaches directed towards Cork Harbour by the organisations described in Section 3.1, for example:

The **EC Recommendation on Integrated Coastal Zone Management** urges Member States to formulate national ICZM strategies. A national ICZM strategy has yet to be formulated for Ireland. Consequently, the 'bottom up' approach to delivering ICZM for Cork Harbour is being progressed in a national policy vacuum. As a result, lessons learned from the Cork Harbour experience may be used to influence future developments in this area.

The **EU Maritime Policy** points to the need for an effective regulatory framework for the maritime environment and to promote the maritime economy of Europe. It also advocates the need for Member States to develop local ICZM and Marine Spatial Planning strategies at appropriate spatial scales.

3.2.2. National Policy

At a national level, policies that influence how areas such as Cork Harbour are managed include:

- Climate Change Strategy (2007-2012) – provides a framework for Ireland to meet international obligations for the reduction of greenhouse gas emissions, and to plan and manage the impacts of climate changes (e.g. increased flooding and coastal erosion).
- Marine Tourism and Leisure Development Strategy (2007-2013) – outlines priorities in terms of achieving and managing growth of the marine tourism and leisure sector in Ireland.
- Maritime Heritage Strategy (2006) – identifies the strategic measures to be undertaken to identify and protect the unique aspects of Ireland's maritime heritage.
- Irish National Spatial Strategy (2002-2020) – a planning framework for achieving balanced social, economic and physical development within the regions of Ireland. Within the Strategy, Cork is identified as a gateway location.
- National Biodiversity and National Heritage Plans (2002) - both of which advocate the adoption of ICZM for the purposes of conserving and protecting Ireland's heritage. **Note:** the National Biodiversity Plan is currently being updated by the National Parks and Wildlife Service, the new plan is due before the end of 2008.
- National Sustainable Development Strategy (1997) - sets priorities and measures for environmental protection and sustainable development;



3.2.3. EC and National Legislation

While a large number of EC Directives impact on coastal planning and management activities, of particular significance are the **Bird and Habitats Directives**, the **Environmental Impact Assessment (EIA) Directive**, the **Shellfish Waters Directive** (including the European Communities (Quality of Shellfish Waters) Regulations 2006), the **Strategic Environmental Assessment (SEA)** and **Water Framework Directives**. The new **Marine Strategy Directive** and **Floods Directive** will also have repercussions for coastal environments.

Examples of key national statutory instruments pertaining to coastal management include:

- Foreshore Acts, 1933-2005;
- Planning and Development Act, 2000 and associated Regulations;
- Heritage Act, 1995;
- Harbours Acts, 1946-2000;
- Local Government Acts 1925-2006;
- Maritime Safety Act, 2005;
- Environmental Protection Agency Acts, 1992 and 2003;
- Planning and Development (Strategic Infrastructure) Act, 2006; and
- Sea Fisheries and Maritime Jurisdiction Act, 2006.

3.2.4. Local Policy and Plans

Local policies and plans impact strongly on activities in Cork Harbour. Such policies and plans range from county to town level and address single or multi-sector issues. Examples are illustrated in Figure 3.



Figure 3. Examples of planning documents of relevance to Cork Harbour.

Key local statutory plans include:

- Draft Cork County Development Plan (2007);
- Cork County Development Plan (2003);
- Cork City Development Plan (2004);
- South Docks Local Area Plan (2008);
- North Docks Local Area Plan (2005);
- Cork Area Strategic Plan (2001-2020);
- Carrigaline Local Area Plan (2005);
- Midleton Local Area Plan (2005);
- Blarney Local Area Plan (2005);
- County Cork Heritage Plan (2005-2010);
- Cork City Heritage Plan (2007-2012);
- Cobh Town Council Development Plan (2005);
- Cork County Biodiversity Action Plan (Draft);
- Cork City Biodiversity Action Plan (Draft).

Examples of non statutory local plans include:

- Port of Cork Strategic Development Plan (2002);
- Cobh – The Path to Renaissance and Resurgence (2007).



4.1 The Process

Section 3 demonstrates the complexity of arrangements currently in place for the planning and management of the Cork Harbour area. The ICZM process facilitated under the COREPOINT project, aimed to address this issue by enhancing communication and understanding between the multiple stakeholder groups, with remits for, and vested interests in, the development of the Harbour.

The process that underpinned the development of this Strategy document involved a leadership and facilitation role by the local COREPOINT project partners, communication with stakeholders through the Cork Harbour Forum, the organisation of two stakeholder workshops, and consultation with a Strategic Advisory Group. These activities are described in more detail below.

4.1.1 COREPOINT Project Partnership

The process was led and facilitated by the COREPOINT project partners from the Coastal and Marine Resources Centre, University College Cork and the Planning Policy Unit, Cork County Council.

A process of stakeholder identification and engagement was initiated by the project partners to identify the need and desire for an integrated approach to management in the Harbour area. This led to the establishment of the Cork Harbour Forum and the Strategic Advisory Group.

4.1.2 The Cork Harbour Forum

Established in 2006, the Forum provides an opportunity for stakeholders living and working in Cork Harbour to engage in dialogue, while also raising awareness of the Harbour. The Cork Harbour Forum is a multi-stakeholder group comprising individuals and organisations with an interest in the Harbour. The Forum is open to any interested stakeholder.

To date, the project partners, who act as the Secretariat for the Forum, have organised a number of information events such as Cork Harbour boat trips and information evenings covering topics such as port development, flood management and the marine tourism potential of Spike Island. A website has been developed to promote the Forum, as well as the natural assets and activities within the Harbour; www.corkharbour.ie.



4.1.3 Stakeholder Workshops

Two stakeholder workshops were organised in June and October 2006 to identify the need for integrated management in Cork Harbour. Over 80 workshop participants were divided into working groups focusing on the thematic areas of:

- 1) Industry, Transport and Development;
- 2) Natural Environment;
- 3) Tourism, Culture and Heritage; and,
- 4) Management, Spatial Planning and Integration.

Over the course of the two workshops, participants identified issues and proposed recommendations for action in relation to the sustainable development of Cork Harbour. The workshop outputs were compiled into a workshop report, which was subsequently disseminated with requests for feedback and additional comment. This feedback has strongly underpinned the drafting process for this Strategy. The workshop outputs were also submitted to the review of the Cork County Development Plan.

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SUMMARY OF ISSUES IDENTIFIED

Table 3. Issues identified at the Stakeholders Workshop, June 2006

INDUSTRY, TRANSPORT AND DEVELOPMENT:
<ul style="list-style-type: none"> • Need to recognise that the continued viability of the Port of Cork is important to the future of area. Need to address port capacity for business and leisure • Lack of shoreline access infrastructure – berths, piers, parking • Lack of enforcement of environmental controls • Need to develop Harbour capacity to support growing leisure industry, including sailing, heritage activities and cruise liner sectors • Lack of promotion and marketing of the Harbour as an entity in itself • Need to link the Lower Harbour with the Docklands development
NATURAL ENVIRONMENT:
<ul style="list-style-type: none"> • Lack of information on habitats and species diversity • Lack of zoning in the Harbour designated for conservation • Need to protect natural heritage and resources • Lack of understanding of the functioning of coastal processes e.g. circulation of currents, tides, etc. • Lack of understanding of the natural carrying capacity of the Harbour for different types of development and waste disposal • Lack of integration between terrestrial and coastal planning- development of marginal land without consultation • Conflict between industrial development and environmental objectives
TOURISM, RECREATION AND CULTURE:
<ul style="list-style-type: none"> • Lack of access to sections of the Harbour, - road network, parking, access for recreation – beach, piers and marinas • Need for clarification of the limits of statutory control in the Harbour • Under-utilisation of amenity potential of the Harbour • Need for strategic view of marina development, ISPAT redevelopment, and Spike Island – World Heritage Site Potential • Lack of identification and preservation of natural and cultural coastal/maritime heritage assets • Lack of Harbour trails • Lack of inter-agency working for promotion and dealing with inter-linked issues
MANAGEMENT, SPATIAL PLANNING AND INTEGRATION:
<ul style="list-style-type: none"> • Lack of integration in planning and management • Problems arising from mix of land uses and lack of integration of marine aspects • Need to develop sustainable economic activities • Risk of sea level rise and flooding • Deterioration of environmental quality – need to protect scenic amenities, rural character of landscape, promote a clean environment

4.1.4 Strategic Advisory Group

Specialist knowledge and additional direction was sought from high level managers and decision makers through the establishment of a Special Advisory Group (SAG). The SAG comprises representatives of key statutory bodies with remits relevant to Cork Harbour; the members are listed in Table 4.

Meetings of the Strategic Advisory Group were convened on four occasions to consult on the development of this Integrated Management Strategy, (February, June, November 2007 and January 2008).

The Strategy outlined in Chapter 5 has been approved by all of the participating SAG organisations.

Table 4. Strategic Advisory Group Members (affiliations correct at time of publication).

Organisation	Representative(s)
Coastal Research and Policy Integration (COREPOINT) Project	P. Griffin – Planning Policy Unit D. O’Suilleabhain - Planning Policy Unit E. Walsh - Planning Policy Unit V. Cummins - CMRC J. Gault - CMRC C. O’Mahony - CMRC
Cobh and Harbour Chamber of Commerce	J. Mansworth D. Bird
Cork County Council - executives	K. Walsh – County Development P. Lyons - Planning S. Corcoran – Corporate Affairs B. Murphy – County Development N. O’Driscoll - Corporate Community and Economic Development
Cork County Council – council	Cllr. K. Murphy (on behalf of the CZM Committee)
Cork City Council	E. Mitchell - Docklands M. Walsh – Planning A. Bogan - Planning
Department of Agriculture, Fisheries and Food	J. O’Keeffe
East Cork Area Development Ltd.	R. Howard S. Kearney
Environmental Protection Agency	T. O’Mahony M. Owens
Industrial Development Agency	R. O’Connor
Irish Naval Service / National Maritime College of Ireland	Cdr. M. Mellett
National Parks and Wildlife Service	P. Smiddy
Port of Cork	B. Keating P. Murphy
South Western River Basin District	S. O’Breasail
Fáilte Ireland	F. Buckley

5.1 Statement of Strategy

The Strategy is based on a process of stakeholder consultation with the Cork Harbour Forum and the Strategic Advisory Group, as outlined in Section 4.

To bring all those involved in the development, management and use of Cork Harbour together in a framework which encourages the integration of their interests and responsibilities to achieve common objectives in a sustainable manner.

5.2 Strategy Objectives

The objectives of the Strategy are to:

1. Develop a policy framework to facilitate integration for planning and management of Cork Harbour
2. Protect and promote the unique natural environment of the Harbour
3. Protect the social and cultural assets of the Harbour to maintain / protect the unique identity of the area
4. Promote the economic development of the Harbour in line with the principles of sustainable development
5. Promote and develop the Harbour as a facility for water based sport and leisure activity

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5.3 Key Characteristics of Delivering the Strategy Objectives

The delivery of the Strategy objectives will be characterised by key features of the process to date:

Voluntary partnership: This Strategy is based on a voluntary partnership between key statutory agencies and local stakeholders. The voluntary partnership approach will focus attention on the Harbour as a whole, and deliver a set of agreed actions via an implementation plan to deliver the objectives outlined on page 23.

Non-statutory approach: Although the Strategy is non-statutory, it aims to bring about a new approach to coastal management in Cork Harbour by focusing the attention on the regulatory duties and powers of the statutory agencies to deliver their goals. Statutory agencies will contribute to the identification, implementation and support of actions to emerge from the Strategy.

Added value: The aim is to complement the work of existing organisations and to achieve added value for the stakeholders involved.

Bottom up: The Strategy provides a framework for a bottom-up approach to coastal management, where local stakeholders are encouraged to engage in positive action towards the promotion of Cork Harbour.

Stakeholder engagement: The Strategy reflects a process of stakeholder consultation and takes the broader policy context into consideration. The implementation of the Strategy will continue to have regard for these important factors.

Balanced perspective: The delivery of the Strategy objectives will provide a balanced perspective that is not biased towards the vested interest of any one particular group.

Sustainable development: The Strategy objectives reflect stakeholder commitments to achieve a balance between the social, environmental, economic and cultural aspects of development.

5.4 Implementation of the Strategy

The development and implementation of an ICZM programme can be typified according to five key stages as identified by the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) (Figure 4).

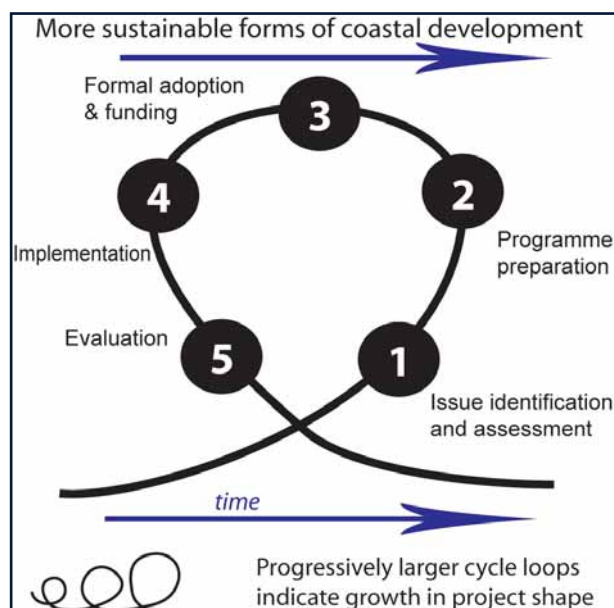


Figure 4. The five stages of ICZM representing the iterative and circular nature of the process (adapted from GESAMP, 1996).



The first three stages of an ICZM process (as outlined in Figure 4) **have been achieved for Cork Harbour through the COREPOINT project.**

Implementation of the Strategy will be delivered in the next step. This will involve the development and publication of an **Action Plan for 2008-2011**. Examples of actions proposed through the consultative process with the Strategic Advisory Group (SAG) are given in Appendix A and these will form the basis of the development of the Action Plan. In developing the Action Plan it is envisaged that these actions will be prioritised and scoped in more detail with the SAG and relevant stakeholders; those responsible for implementing various actions will be identified and a detailed timeframe for implementation worked out. It is envisaged that additional actions will also be identified as the process progresses.

The Action Plan will be **reviewed** on an annual basis, taking into consideration the iterative nature of ICZM and the need to ensure a flexible process to deal with emerging and changing priorities.

Examples of actions proposed through the consultative process are given in Appendix A.

5.5 Enabling Mechanisms

5.5.1 Funding

Funding has been secured to support the implementation of the Strategy through a new Interreg IVB project. The new **IMCORE** project, which follows from the success of the COREPOINT initiative, will run from May 2008 to November 2011.

IMCORE funds will be used to run the Secretariat and to coordinate future SAG integration and Cork Harbour Forum activities (5.5.2).

Additional resources and match funding will be sought for specific priority actions from relevant statutory bodies, i.e. decentralised responsibility for funding to relevant statutory agencies.

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5.5.2 Management Structure

Figure 5 outlines the structures that will be put in place to coordinate the implementation of the Cork Harbour Action Plan, based on the Strategy objectives.

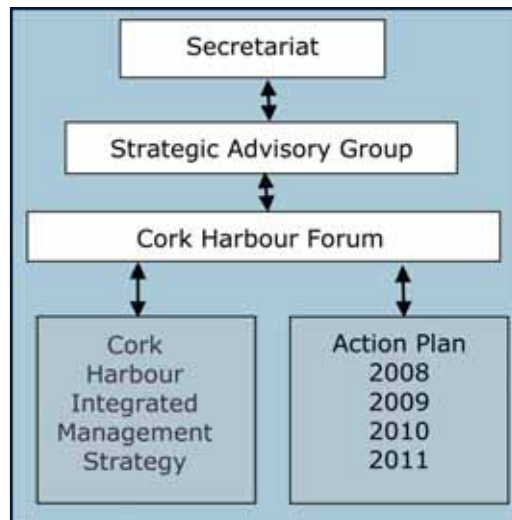


Figure 5. Relationships between the groups involved in delivering the Integrated Management Strategy.

Secretariat – The IMCORE project partners (PPU and CMRC) will operate the Secretariat, which will provide a focal point for the ICZM process within Cork Harbour.

The functions of the Secretariat will be to:

- Coordinate the development and implementation of the proposed Action Plan 2008-2011;
- Facilitate integration within the Strategic Advisory Group by providing administrative support and a coordinating role;
- Enable the successful operation of the Cork Harbour Forum;
- Seek additional sources of future funding to realise opportunities for the promotion of Cork Harbour;
- Manage the stakeholder contact database for the Forum and maintain the www.corkharbour.ie website, which will be a focal point for information on relevant activities.

The Planning Policy Unit of Cork County Council is committed to:

- Assessing the potential for developing an Integrated Local Area Plan for Cork Harbour as part of the review of the Local Area Plans in 2009;
- Promoting the importance of planning for Cork Harbour through the new County Development Plan 2009-2015.

Planning jurisdictions of Local Authorities generally extend to the Mean High Water Mark. Furthermore, the planning remit within Cork County Council does not include areas of the Upper Harbour governed by the City Council. These limitations are recognised within the Strategy and other mechanisms exist for participation by relevant bodies such as the City Council and the Port of Cork.



SAG – The Strategic Advisory Group will be maintained throughout the lifespan of the IMCORE project. The SAG will be co-chaired by the PPU and CMRC.

The functions of the SAG will be to:

- Work in partnership to advise on, and help implement, the Action Plan 2008-2011;
- Endeavour to integrate the objectives of the Cork Harbour Integrated Management Strategy into statutory planning documents and strategic policies where appropriate.

Cork Harbour Forum – The Cork Harbour Forum will be maintained over the duration of the IMCORE project. Participation in the Cork Harbour Forum is **open to all stakeholders**, with an interest in Cork Harbour.

The objectives of the Cork Harbour Forum are to:

- Facilitate opportunities for **networking** among stakeholders in Cork Harbour;
- Promote a forum for **dialogue**;
- Create and raise **awareness** of Cork Harbour resources;
- Participate in the organisation of **outreach** activities;
- Work in **partnership** to facilitate discussion on specific **management** concerns in Cork Harbour, where appropriate.

To date, forum activities have included Harbour boat trips, information evenings and workshops. At present, there are over 100 stakeholders included in the contacts database.

For further information on the Cork Harbour Forum, see <http://www.corkharbour.ie> or contact:

Cathal O Mahony,
Coastal & Marine Resources Centre (UCC),
Naval Base, Haulbowline
Cobh, Co. Cork
Tel: (021) 4703100 email: c.omahony@ucc.ie



APPENDIX A EXAMPLES OF PROPOSED ACTIONS

Note: These actions, proposed through the consultation process, will be further developed and consolidated into the **Action Plan 2008-2011**. They will be prioritised and refined on an annual basis following consultation with the Cork Harbour Forum and the Strategic Advisory Group. They are not presented in any order of priority in this Appendix.

Objective 1: Develop a policy framework to facilitate integrated planning and management of Cork Harbour (Examples of Proposed Actions)	
1.1	Launch the Integrated Management Strategy for Cork Harbour.
1.2	Oversee the transition of the Cork Harbour Forum Strategic Advisory Group (SAG) into the Harbour Management Focus Group to promote the Harbour through the implementation of the Strategy/development of the Action Plan 2008-2011.
1.3	Submit the Strategy objectives for inclusion into: <ul style="list-style-type: none"> o The development, corporate and strategic plans of statutory organisations and relevant agencies with a remit for the Harbour (e.g. County Development Plans, River Basin Plan) o The strategic plans of key industry stakeholders.
1.4	Facilitate communication between agencies and other organisations through the Harbour Management Focus Group.
1.5	Engage local communities in the development and delivery of Harbour initiatives through the Cork Harbour Forum.
1.6	Develop a Promotion Strategy to lever support for the Cork Harbour ICZM process from ongoing, scheduled activities. Target events such as Cork Week and the Ocean to City Race.
1.7	Promote greater understanding of the roles and responsibilities of management authorities within the Harbour.
1.8	Use the process and outcomes from the Cork Harbour Integrated Management Strategy to influence policy at a regional and national level.
Objective 2: Protect and promote the unique natural environment of the Harbour (Examples of Proposed Actions)	
2.1	Develop and promote Harbour trails.
2.2	Develop an online atlas of the natural heritage of Cork Harbour.
2.3	Make environmental information relevant to the Harbour available from a central location.
2.4	Undertake a baseline study on an integrated assessment of the state of the coast including the quality of Harbour waters and environs.
2.5	Assess the current state of the protected areas and implement habitat restoration measures.
2.6	Plan for flood risk management (e.g. status of seawall defences), taking future development needs and climate scenarios into consideration.
2.7	Promote awareness of the natural heritage of Cork Harbour by engaging with local schools.
2.8	Build capacity among local tourist providers to deliver tourism services that utilise the natural assets of Cork Harbour.
2.9	Organise Harbour clean up activities to remove marine debris from the water and the inter-tidal areas.
2.10	Undertake a Landscape Character Assessment of Cork Harbour.

Objective 3: Protect the social and cultural assets of the Harbour to protect the unique identity of the area (Examples of Proposed Actions)	
3.1	Identify constraints to access to heritage sites (e.g. Fort Camden, Spike Island and Haulbowline) with a view to improving public access.
3.2	Examine the potential for including heritage studies of the Harbour as part of the curriculum for primary and secondary education (e.g. maritime heritage education package of Cork Harbour - Martello towers, archaeological heritage).
3.3	Promote the cultural heritage of Cork Harbour by dissemination of information through popular media.
3.4	Support the development of a maritime museum in Cork Harbour (e.g. Haulbowline Island).
3.5	Promote and celebrate the social and cultural importance of Cork Harbour among local communities through an Open Harbour Day.
3.6	Build capacity among local tourist providers to deliver tourism services that utilise the social and cultural heritage of Cork Harbour.

Objective 4: Promote the economic development of the Harbour in line with the principles of sustainable development (Examples of Proposed Actions)	
4.1	Recognise the importance of the Port of Cork to the economy of the region and encourage its sustainable development.
4.2	Build capacity to realise the economic potential of the tourism sector within the Harbour (e.g. by promoting added value from the cruise liner industry and improving access to information).
4.3	Conduct a socio-economic carrying capacity study for different uses of the Harbour, relative to each other (e.g. marine recreation, shipping).
4.4	Identify infrastructural deficiencies which constrain economic development.
4.5	Develop a brand identity to reflect and market the unique features of the Harbour.
4.6	Promote the Maritime Campus Ireland initiative in Cork Harbour to develop new opportunities for the maritime sector such as ocean energy and shipping, logistics and transport.
4.7	Engage Harbour industries to promote the Harbour through Corporate Social Responsibility programmes.
4.8	Recognise the strategic opportunity presented by the re-development of City Docklands and other coastal brownfield sites (e.g. Haulbowline) and facilitate links with the Docklands Development Strategy.

Objective 5: Promote and develop the Harbour as a facility for water based sport and leisure activity (Examples of Proposed Actions)

5.1	Build on work done through the COREPOINT project to explore the potential for future growth of water based sport, leisure and general recreational activities in Cork Harbour, (e.g. strategies for marinas, dinghy parks, moorings, walking trails and cycling paths).
5.2	Support the dissemination of guidelines for safe access to the shore and on the water for recreational users.
5.3	Undertake an audit of foreshore access within Cork Harbour to identify future planning requirements.
5.4	Promote cultural aspects of tourism in Cork Harbour (e.g. genealogy and historic landmark buildings).
5.5	Assess the feasibility of providing a marina recycling disposal and collection point in Crosshaven and at other potential marina locations.

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- **Coastal Research and Policy Integration (COREPOINT) Project**
<http://COREPOINT.ucc.ie>
- **Review of Integrated Coastal Zone Management and principles of best practice**
<http://www.heritagecouncil.ie/publications/index.html>
- **Cork Docklands Development Strategy**
http://www.corkcity.ie/docklands/planning/development_strategy_2001.shtml
- **Port of Cork Strategic Development Plan**
<http://www.portofcork.ie/about.aspx?id=10>
- **Cork Area Strategic Plan**
<http://www.corkcity.ie/docklands/planning/casp.shtml>
- **South Western River Basin District**
<http://www.swrbd.ie>
- **Conserving Ireland's Maritime Heritage**
http://www.heritagecouncil.ie/publications/marine_policy_2006/index.html
- **A National Survey of Water-Based Leisure Activities in Ireland 2003**
<http://www.marine.ie/home/publicationsdata/publications/Special+Reports.htm>
- **Water Quality in Ireland 2006**
<http://www.epa.ie/downloads/pubs/water/indicators/name,23540,en.html>
- **Ireland's National Spatial Strategy**
<http://www.irishspatialstrategy.ie/>
- **Ireland's National Biodiversity Plan**
<http://www.npws.ie/media/Media,4590,en.pdf>
- **The Heritage Council Strategic Plan 2007-2011**
http://www.heritagecouncil.ie/publications/Strat_Plan_2007/index.html
- **Ireland's National Climate Change Strategy**
<http://www.environ.ie/en/PublicationsDocuments/FileDownload,1861,en.pdf>
- **National Sustainable Development Strategy – Ireland**
<http://www.environ.ie/en/Environment/SustainableDevelopment/>
- **Sea Change: A Marine Knowledge, Research and Innovation Strategy for Ireland 2007-2013**
<http://www.marine.ie/home/publicationsdata/publications/>
- **EC Recommendation on Integrated Coastal Zone Management (ICZM)**
<http://ec.europa.eu/environment/iczm/home.htm>
- **An Integrated Maritime Policy for the European Union (The Blue Book)**
<http://ec.europa.eu/maritimeaffairs/>
- **The Changing Faces of Europe's Coastal Areas**
http://www.eea.europa.eu/themes/coast_sea

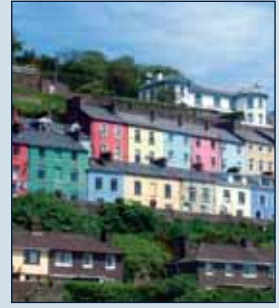


NOTES

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Waterbody	RBD	Typology	Monitoring	Location	Site	Latitude	Longitude	Decimal_lat	Decimal_long	X	Y
Lough Mahon	SWRBD	TW2	OP	Lough Mahon, Marino Point	LE340	51° 52' 40.080" N	8° 20' 9.960" W	51.8778	-8.3361	176856.8	69550.36
Lough Mahon (Harper's Island)	SWRBD	TW2	OP	Glounthane Channel, Harpers Island	LE350	51° 54' 17.280" N	8° 19' 3.000" W	51.9048	-8.3175	178150.7	72548.50
Cork Harbour	SWRBD	CW8	SM	Ringaskiddy	LE380	51° 50' 16.080" N	8° 18' 45.360" W	51.8378	-8.3126	178455.9	65092.98
North Channel	SWRBD	TW2	OP	Belvelly Bridge	LE410	51° 53' 22.200" N	8° 18' 12.960" W	51.8895	-8.3036	179100.1	70842.22
North Channel	SWRBD	TW2	OP	North Channel, Weir Island (Pylons)	LE420	51° 53' 6.360" N	8° 16' 14.880" W	51.8851	-8.2708	181356.2	70343.79
North Channel	SWRBD	TW2	OP	North Channel, Brick Island	LE430	51° 52' 47.280" N	8° 14' 35.520" W	51.8798	-8.2432	183254.4	69747.43
North Channel	SWRBD	TW2	OP	North Channel, Bagwells Hill	LE450	51° 52' 54.120" N	8° 12' 14.400" W	51.8817	-8.2040	185954.2	69950.53
Cork Harbour	SWRBD	CW8	SM	Adjacent to Aghada	LE610	51° 50' 25.800" N	8° 14' 31.560" W	51.8405	-8.2421	183315.7	65374.87
Cork Harbour	SWRBD	CW8	SM	E Spike Island	LE620	51° 50' 11.760" N	8° 15' 47.880" W	51.8366	-8.2633	181853.1	64946.05
Outer Cork Harbour	SWRBD	CW5	OP	Roches Point	LE810	51° 47' 23.640" N	8° 15' 54.720" W	51.7899	-8.2652	181703.2	59750.98

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Waterbody	RBD	Typology	Monitoring	Location	Site	Latitude	Longitude	Decimal_lat	X	Y
Lough Mahon	SWRBD	TW2	OP	Lough Mahon, Marino Point	LE340	51° 52' 40.080" N	8° 20' 9.960" W	51.8778	176856.8	69550.36
Lough Mahon (Harper's Island)	SWRBD	TW2	OP	Glounthane Channel, Harpers Island	LE350	51° 54' 17.280" N	8° 19' 3.000" W	51.9048	178150.7	72548.50
Cork Harbour	SWRBD	CW8	SM	Ringaskiddy	LE380	51° 50' 16.080" N	8° 18' 45.360" W	51.8378	178455.9	65092.98
North Channel	SWRBD	TW2	OP	Belvelly Bridge	LE410	51° 53' 22.200" N	8° 18' 12.960" W	51.8895	179100.1	70842.22
North Channel	SWRBD	TW2	OP	North Channel, Weir Island (Pylons)	LE420	51° 53' 6.360" N	8° 16' 14.880" W	51.8851	181356.2	70343.79
North Channel	SWRBD	TW2	OP	North Channel, Brick Island	LE430	51° 52' 47.280" N	8° 14' 35.520" W	51.8798	183254.4	69747.43
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Station No	Sample Label	Survey Date	Salinity S ‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season	
LE380	LE380/S	05/07/2004	32.46	0	81.8	0.198	9.99	3.2432432	S	
LE380	LE380/B	05/07/2004	32.72	4.97297	82.7	0.2	9.99	4.972973	S	
LE380	LE380/R/S	05/07/2004	30.07	2.48649	91	0.453	13	2.4864865	S	
LE380	LE380/R/B	05/07/2004	32.8	5.45946	90.7	1.3	0.209	5.4594595	S	
LE380	LE380/S	01/06/2005	29.69	4	93.4	0.705	33	4	S	
LE380	LE380/B	01/06/2005	33.8	5.8	95.7			5.8	S	
LE380	LE380R/S	01/06/2005	31.63	5.1	96.3			5.1	S	
LE380	LE380R/S	01/06/2005	33.52		96.4	1.207	34	n/a	S	
LE380	LE380/S	11/07/2005	33.3	6.7		1.7	0.371	30	6.7	S
LE380	LE380/B	11/07/2005	33.5	4.7			1.155	9.99	4.7	S
LE380	LE380/SR	11/07/2005	31.2	11.2		1.4	0.382	13	11.2	S
LE380	LE380/BR	11/07/2005	32.9	7.9			0.48	9.99	7.9	S
LE380	LE380C	22-May-06	19.67	4.4	91.1	0.999	0.73	176	4.4	S
LE380	LE380C	22-May-06	33.67	4.4	89		0.73	176	4.4	S
LE380	LE380SR	22-May-06	24.78	7.4	91.8	1	0.718	170	7.4	S
LE380	LE380BR	22-May-06	32.86	6.4	89.2	0.999	0.246	9.9	6.4	S
LE380	LE380S	21-Jun-06	32.02	16.2	94	2.6	0.842	10	16.2	S
LE380	LE380B	21-Jun-06	34.42	8.1	91.5	2.1	0.069	9.9	8.1	S
LE380	LE380SR	21-Jun-06	33.17	2.3	99.1	2.5	0.149	9.9	2.3	S
LE380	LE380BR	21-Jun-06	34.25	1.1	94.4	2.3	0.069	9.9	1.1	S
LE380	LE380S	19-Jul-06	33.92	7.4	112.8	2.5	0.0379	9.9	7.4	S
LE380	LE380B	19-Jul-06	34.18	7.2	108.5	1.4	0.0469	9.9	7.2	S
LE380	LE380SR	19-Jul-06	33.4	9	118.6	2.8	0.053	9.9	9	S
LE380	LE380BR	19-Jul-06	33.6	6.4	113.3	1.8	0.045	9.9	6.4	S
LE380	LE380C	11-Jun-07	32.3	15.6	120.1	1.4	0.123	9.9	15.6	S
LE380	LE380SR	11-Jun-07	33.02	5.7	119.2	2.4	0.073	9.9		S
LE380	LE380BR	11-Jun-07	33.62	5.7		2.1	1.329	9.9		S
LE380	LE380C	09-Jul-07	30.62	2.5	113.8	1.2	0.1999	9.9	5.7	S
LE380	LE380C	09-Jul-07		2		1.2	0.1999	9.9	5.7	S
LE380	LE380SR	09-Jul-07	32.08		113.9	1.9	0.1699	9.9	2.5	S
LE380	LE380BR	09-Jul-07	33.05		108		0.0899	9.9	2	S
LE380	LE380S	20-Aug-07	32.14		104.2	0.99	0.276	16		S
LE380	LE380B	20-Aug-07	34.13		100.3	0.99	0.188	11		S
LE380	LE380CR	20-Aug-07	29.54		111.5	0.99	0.444	18		S
LE380	LE380CR	20-Aug-07	31.76		102	0.99	0.444	18		S
	Average		31.78		100.431034	1.65832	0.3828	27.771212	6.1915058	
	Median		32.83		96.4	1.4	0.209	9.99	5.7	
	95%				85.22					
	5%				119.6					
	90%								2.21	
LE380	LE380C	28-Feb-07	23.09		93	1.23	28	1.2	W	
LE380	LE380C	28-Feb-07	31.48		89.9	1.23	28	1.2	W	
	Average		27.285		91.45	1.23	28	1.2		
	Median		27.285		91.45	1.23	28	1.2		
	95%				90.055					
	5%				92.845					
	90%								1.2	
Cork Harbour	SWRBD	CW8	LE610							

Station No	Sample Label	Survey Date	Salinity S ‰			DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m ³	Season
LE610	LE610/C	11/07/2005	34.4					0.309	9.99	2.5	S
LE610	LE610/SR	11/07/2005	33.2					0.24	9.99	10.9	S
LE610	LE610/BR	11/07/2005	34.2					0.243	9.99	3.4	S
LE610	LE610C	21-Jun-06	33.66			94.2		0.066	9.9		S
LE610	LE610C	21-Jun-06	34.43			92		0.066	9.9		S
LE610	LE610C	19-Jul-06	34.87			99.1	1.1	0.1089	9.9	8	S
LE610	LE610C	19-Jul-06						0.1089	9.9	8	S
LE610	LE610S	09-Jul-07	33.87			107.8		0.0499	9.9		S
LE610	LE610B	09-Jul-07	34.65			103.7		0.0699	9.9		S
LE610	LE610S	20-Aug-07	34.15			100.4		0.1369	10	153	S
LE610	LE610B	20-Aug-07	35.1			nr		0.0909	13	0.8	S
		Average	34.253			99.53333333	1.1	0.1354	10.215455	26.657143	
		Median	34.3			99.75	1.1	0.1089	9.9	8	
		95%				92.55					
		5%				106.775					
		90%								1.82	
Cork Harbour	SWRBD	CW8	LE620								
Station No	Sample Label	Survey Date	Salinity S ‰			DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m ³	Season
LE620	LE620/S	05/07/2004	33.37			82.9		0.103	9.99	2.0810811	S
LE620	LE620/B	05/07/2004	34.64			85.2		0.049	9.99	2.8918919	S
LE620	LE620/R/S	05/07/2004	32.79			92.4		0.172	9.99		S
LE620	LE620/S	01/06/2005	33.22			96.1	1.4	0.387	21	1.3	S
LE620	LE620/B	01/06/2005	34.34			96.3		0.999	29	5.9	S
LE620	LE620C	22-May-06	32.21			90.9	1.2	0.255	9.9	4	S
LE620	LE620C	22-May-06	34.38			87.7		0.255	9.9	4	S
LE620	LE620C	11-Jun-07	33.95			115.8	2.7	0.0349	9.9	4.8	S
LE620	LE620C	11-Jun-07	34.03			11.8	2.7	0.0349	9.9	4.8	S
		Average	33.7			84.34444444	1.84	0.254422222	13.285556	3.7216216	
		Median	33.95			90.9	1.4	0.172	9.99	4	
		95%				40.24					
		5%				108					
		90%								1.8467568	
Outer Cork Harb	SWRBD	CW5	LE630								

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Station No	Sample Label	Survey Date	Salinity S ‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE340	LE240/S	18/06/2003	30.6	92.5	3.2	0.81	20	2.7	S
LE340	LE240/5m	18/06/2003	32.9	96.8				2.9	S
LE340	LE240/B	18/06/2003	34.3	95.9	1.8	0.333	11	3.0	S
LE340	LE240/RS	18/06/2003	24.6	86.0	1.8	0.922	22	3.0	S
LE340	LE240/R5m	18/06/2003	25.8	89.8				3.6	S
LE340	LE240/RB	18/06/2003	30.3	85.7	1.4	0.489	16	3.8	S
LE340	LE240/S	29/07/2003	28.9	105.0		0.28299	10	24.2	S
LE340	LE240/B	29/07/2003	29.8	105.1		0.24199	10	23.0	S
LE340	LE240R/S	29/07/2003	30.7	115.7		0.21399	10	23.2	S
LE340	LE240R/B	29/07/2003	31.8	107.4		0.213		25.8	S
LE340	LE340/S	05/07/2004	25	80.1	1.9	0.829	23	2.3243243	S
LE340	LE340/B	05/07/2004	32.22	83.1	1.7	0.31	9.99	5.3153153	S
LE340	No sample	05/07/2004	28.06	90.8				6.2108108	S
LE340	LE340/S	01/06/2005	25.04	89.1	1.8	2.574	17	4.2	S
LE340	LE340/C	01/06/2005	31.7	91.1	1.2	0.762	39	3.8	S
LE340	LE340R/S	01/06/2005	25.91	95.4	1.2	2.536	44	2	S
LE340	LE340R/B	01/06/2005	31.88	93.1	1.1	0.631	39	6.6	S
LE340	LE340/S	11/07/2005	31.2			0.528	9.99	8.7	S
LE340	LE340/B	11/07/2005	32.4			1.773	11	7.1	S
LE340	LE340/SR	11/07/2005	29.3			0.558	18	20.4	S
LE340	LE340/BR	11/07/2005	30.6			1.517	9.99	9.3	S
LE340	LE340S	22-May-06	20.87	90.5		160.222	35	5.5	S
LE340	LE340B	22-May-06	32.99	87.3		0.2239	105	7.9	S
LE340	LE340SR	22-May-06	19.58	94.7		1.382	28	17.6	S
LE340	LE340BR	22-May-06	32.67	87.8		0.548	22	12.8	S
LE340	LE340C	21-Jun-06	29.85	92.9		0.423	22	18.6	S
LE340	LE340C	21-Jun-06	32.14	90.7		0.423	22	18.6	S
LE340	LE340CR	21-Jun-06	32.14	99.2		0.224	9.9	7.7	S
LE340	LE340CR	21-Jun-06	33.33	95.9		0.224	9.9	7.7	S
LE340	LE340S	19-Jul-06	32.62	118.7		0.126	10	9.6	S
LE340	LE340B	19-Jul-06	33.04	116.8		0.115	9.9	1.8	S
LE340	LE340SR	19-Jul-06	31.74	137.9		0.151	9.9	17.6	S
LE340	LE340BR	19-Jul-06	32.23	126.3		0.106	10	1.7	S
LE340	LE340S	11-Jun-07	29.43	118.1		0.418	19		S
LE340	LE340B	11-Jun-07	31.99	117.6		0.245	17		S
LE340	LE340SR	11-Jun-07	31.52	123.6		0.259	36	7.4	S
LE340	LE340BR	11-Jun-07	32.79	NR		0.16	19	7.3	S
LE340	LE340C	09-Jul-07	28.17	110.1		0.367	15	1.4	S
LE340	LE340C	09-Jul-07	32.24	106.6		0.367	15	1.4	S
LE340	LE340CR	09-Jul-07	25.7	121		0.47	13	6.6	S
LE340	LE340CR	09-Jul-07	29.86	121.1		0.47	13	6.6	S
LE340	LE340S	20-Aug-07	29.12	104.2		0.617	22	5.6	S
LE340	LE340B	20-Aug-07	33.25	99.2		0.207	15	3.6	S
LE340	LE340SR	20-Aug-07	27.78	109.6		0.731	26	1.1	S
LE340	LE340BR	20-Aug-07	30.34	112.4		0.592	40	2.1	S
	Average		29.7	102.1	1.7	28.204735	21	8.4	
	Median		30.7	98.0	1.8	0.423	17	6.6	
	95%			85.6					
	5%			123.7					
	90%							1.8	
LE340	LE340S	28-Feb-07	17.6	90.7		2.536	40	2.7	W
LE340	LE340B	28-Feb-07	31.99	89.9		0.719	29	2	W
	Average		24.795	90.3		1.6275	34.5	2.35	
	Median		24.795	90.3		1.6275	34.5	2.35	
	95%			89.94					

		5%				90.66					
		90%								2.1	

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Station No	Sample Label	Survey Date	Salinity S‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE350	LE350S	23-May-06	#REF!	81.4	1.7	1.705	103	7.6	S
LE350	LE350CR	23-May-06	24.44365	97.5	1.7	0.934	17	2.4	S
LE350	LE350S	22-Jun-06	0.6552168	77.4	2	0.526	43	9.5	S
LE350	LE350RC	22-Jun-06	0.1326941	78.2	1.6	0.431	27	7.8	S
LE350	LE350RC	22-Jun-06		NR		0.431	27	7.8	S
LE350	LE350S	20-Jul-06	31.68	67.4	3.3	0.205	38	10.3	S
LE350	LE350	12-Jun-07	0	106	1.8	0.358	37	2	S
LE350	LE350	10-Jul-07	0	73	1.8	1.604	44	2.4	S
LE350	LE350RS	10-Jul-07	0	120	2.2	0.694	31	4.4	S
LE350	LE350S	21-Aug-07	0	78.8		0.857	37	4.8	S
	Average		7.113945113	86.63333333	2.0125	0.7745	40.4	5.9	
	Median		0.06634705	78.8	1.8	0.61	37	6.2	
	95%			69.64					
	5%			114.4					
	90%							2.36	
Station No	Sample Label	Survey Date	Salinity S‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE420	LE 320/C	19/06/2003	27.8	93.0	2.9	0.532	15	6.1	S
LE420	LE 320/C	19/06/2003	27.9	92.0	2.9	0.532	15	6.1	S
LE420	LE320/S	31/07/2003	30.2	96.3		0.1998	13	26.1	S
LE420		31/07/2003	30.8	104.7		0.1998	13	26.1	S
LE420	LE420/S	06/07/2004	EF	EF	1.7	0.111	9.99		S
LE420	LE420/B	06/07/2004	EF	EF		0.128	11		S
LE420	LE420/S	02/06/2005	29.83	95.8	2.1	6.847	51	5.9	S
LE420	LE420/C	12/07/2005	32.6	148	3	5.349	21	13.5	S
LE420	LE420/C	12/07/2005	32.6	126.5		0.688	9.99		S
LE420	LE420C	23-May-06	28.29	91.7	1.4	0.575	9.9	5.8	S
LE420	LE420C	23-May-06	28.36	91.6		0.575	9.9	5.8	S
LE420	LE420C	22-Jun-06	32.12	92.7	3	0.227	15	7.6	S
LE420	LE420C	22-Jun-06	32.12	91.6		0.227	15	7.6	S
LE420	LE420C	20-Jul-06	33.24	105.2	2	40.076	9.9	11.9	S
LE420	LE420C	20-Jul-06	33.23	102.8		40.076	9.9	11.9	S
LE420	LE420S	12-Jun-07	32.62	83.6	1.6	0.157	27		S
LE420	LE420S	10-Jul-07	30.5	110.9	3.1	0.0799	9.9	4.8	S
LE420	LE420S	10-Jul-07	30.38	112.9	3.1	0.0799	9.9	4.8	S
LE420	LE420C	21-Aug-07	30.44	102.7	4	0.251	9.9	8.8	S
LE420	LE420C	21-Aug-07	30.45	102.1	4	0.251	9.9	8.8	S
	Average		30.2	102.5	2.7	4.840088	15	10.1	
	Median		30.4	99.2	2.9	0.251	10	7.6	
	95%			90.4					
	5%			129.7					
	90%							5.3	
LE420	LE420C	27-Feb-07	24.48	92.8	1.5	1.464	49	0.99	W
LE420	LE420C	27-Feb-07	25.47	91.5	1.5	1.464	49	0.99	W
	Average		24.975	92.15	1.5	1.464	49	0.99	
	Median		24.975	92.15	1.5	1.464	49	0.99	
	95%			91.565					
	5%			92.735					
	90%							0.99	

Station No	Sample Label	Survey Date	Salinity S ‰			DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE430	LE 330/C	19/06/2003	28.8			90.0	2.5	0.53		5.6	S
LE430	LE 330/C	19/06/2003	28.8			90.0	2.5	0.53		5.6	S
LE430	LE430/S	06/07/2004	EF			EF		0.116	9.99		S
LE430	LE430/S	02/06/2005	30.75			95		2.351	19	5.4	S
LE430	LE430/S	12/07/2005	32.6			134.5		1.584	9.99	20.6	S
LE430	LE430C	23-May-06	29.21			92.8		0.53	9.9	5.3	S
LE430	LE430C	23-May-06	29.57			91.7		0.53	9.9	5.3	S
LE430	LE430C	22-Jun-06	31.96			92.7		0.222	9.9	11.5	S
LE430	LE430C	22-Jun-06	32.35			88.7		0.222	9.9	11.5	S
LE430	LE430C	20-Jul-06	33.5			102.5		38.279	9.9	12.4	S
LE430	LE430C	20-Jul-06	33.48			102.5		38.279	9.9	12.4	S
LE430	LE430S	12-Jun-07	33			98.9		0.117	13		S
LE430	LE430S	10-Jul-07	30.63			121		0.1299	9.9	3.7	S
LE430	LE430S	10-Jul-07	31.19			118.2		0.1299	9.9	3.7	S
LE430	LE430C	21-Aug-07	30.23			108.1		0.46	9.9	10.3	S
LE430	LE430C	21-Aug-07	30.84			106.1		0.46	9.9	10.3	S
		Average	31.1			102.2	2.5	5.2793625	11	8.8	
		Median	30.8			98.9	2.5	0.495	10	8.0	
		95%				89.6					
		5%									
		90%				125.1				4.2	
LE430	LE430C	27-Feb-07	24.3			92.7		1.41	36	0.99	W
LE430	LE430C	27-Feb-07	24.3			92.7		1.41	36	0.99	W
		Average	24.3			92.7		1.41	36	0.99	
		Median	24.3			92.7		1.41	36	0.99	
		95%				92.7					
		5%				92.7					
		90%								1.0	
Station No	Sample Label	Survey Date	Salinity S ‰			DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE440	LE 340/C	19/06/2003	29.2			91.0		0.567			S
LE440	LE340B	19/06/2003	29.1			92.0				5.4	S
LE440	LE340/S	31/07/2003	31.3			108.5		0.01998	10	30.5	S
LE440		31/07/2003	31.3			107.3		0.01998	10	30.5	S
LE440	LE440/S	06/07/2004				EF	1.3	0.119	9.99		S
LE440	LE440/S	02/06/2005	30.98			95.6	1.6	2.425	18	5.3	S
LE440	LE440/S	12/07/2005	32.7			142	3.4	0.126	9.99	15.6	S
LE440	LE440/S	12/07/2005	32.7					0.115	9.99		S
LE440	LE440C	23-May-06	30.35			91.7	0.999	0.454	10	4.6	S
LE440	LE440C	23-May-06	30.38			91.8		0.454	10	4.6	S
LE440	LE440C	22-Jun-06	32.97			94.4	2.8	0.197	9.9	11.6	S
LE440	LE440C	22-Jun-06	32.96			93.9		0.197	9.9	11.6	S
LE440	LE440C	20-Jul-06	33.75			100.7		0.09	9.9	8.3	S
LE440	LE440C	20-Jul-06	33.79			101		0.09	9.9	8.3	S
LE440	LE440S	12-Jun-07	33.3			102.7		0.0759	10		S
LE440	LE440S	10-Jul-07	31.83			116.4	1.7	0.1299	9.9	6.6	S
LE440	LE440S	10-Jul-07	31.96			116.2	1.7	0.1299	9.9	6.6	S
LE440	LE440C	21-Aug-07	30.85			106.7		0.3749	9.9	6	S
LE440	LE440C	21-Aug-07	31.35			98.8		0.3749	9.9	6	S
		Average	31.7			103.0	1.9	0.331	10	10.8	
		Median	31.6			100.7	1.7	0.1299	10	6.6	
		95%				91.6					
		5%				121.5					
		90%								4.9	

Station No	Sample Label	Survey Date	Salinity S ‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE450	LE 350/C	19/06/2003	29.9	91.0		0.548		5.9	S
LE450	LE350B	19/06/2003	30.2	89.0				5.5	S
LE450	LE350/S	31/07/2003	31.6	110.1		0.01998	10	27.5	S
LE450	LE350/B	31/07/2003	31.8	107.4		0.01998	10	27.3	S
LE450	LE450/S	06/07/2004		EF		0.155	9.99		S
LE450	LE450/S	02/06/2005	31.19	94.6		2.589	18	4.6	S
LE450	LE450/B	02/06/2005	31.99	96.8		1.96	20	3.2	S
LE450	LE450/S	12/07/2005	32.9	141	3.3			12.5	S
LE450	LE450/B	12/07/2005	33.4	123.5	2.9	0.04	9.99	4.1	S
LE450	LE450C	23-May-06	29.74	89.4		0.472	9.9	2.2	S
LE450	LE450C	23-May-06	29.77	89.5		0.472	9.9	2.2	S
LE450	LE450C	22-Jun-06	32.95	94.6		0.165	9.9	11.2	S
LE450	LE450C	22-Jun-06	33.2	96		0.165	9.9	11.2	S
LE450	LE450C	20-Jul-06	33.71	100.3	1.8	25.757	9.9	8.8	S
LE450	LE450C	20-Jul-06	33.88	102.3		25.757	9.9	8.8	S
LE450	LE450S	12-Jun-07	33.33	104.4		0.0699	9.9		S
LE450	LE450S	10-Jul-07	32.15	116.9	2.1	0.6899	9.9	6.9	S
LE450	LE450S	10-Jul-07	32.64	119.1	2.1	0.6899	9.9	6.9	S
LE450	LE450C	21-Aug-07	31.4	102.2	2.9	0.2769	9.9	4.6	S
LE450	LE450C	21-Aug-07	32.83	98.5	2.9	0.2769	9.9	4.6	S
	Average		31.6	103.5	2.6	3.34019222	11	8.8	
	Median		32	100.3	2.9	0.37445	10	6.4	
	95%			89.4					
	5%			125.3					
	90%							2.9	
LE450	LE450C	27-Feb-07	26.3	92.3		1.214	54	0.99	W
LE450	LE450C	27-Feb-07	29.59	93.3		1.214	54	0.99	W
	Average		27.945	92.8		1.214	54	0.99	
	Median		27.945	92.8		1.214	54	0.99	
	95%			92.35					
	5%			93.25					
	90%							0.99	
Station No	Sample Label	Survey Date	Salinity S ‰	DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE810	LE710/S	29/07/2003	33.8	105.1		0.01998	10	12.9	S
LE810	LE810	29/07/2003	34.6	98.7		0.01998	10	12.9	S
LE810	LE810/S	05/07/2004	34.47	91		0.044	9.99	1.0810811	S
LE810	LE810/B	05/07/2004	34.53	93.7		0.044	9.99	2.954955	S
LE810	LE810/C	01/06/2005	34.28	100.9	1.2	0.206	9.99	5.6	S
LE810	LE810/C	11/07/2005	34.3			0.041	77	1.8	S
LE810	LE810S	19-Jul-06	34.88	100.7	1.3	0.0379	9.9	2.3	S
LE810	LE810B	19-Jul-06	34.86	105.9		0.1709	9.9	5.7	S
LE810	LE810C	11-Jun-07	34.14	118.6		0.0298	9.9	6.3	S
LE810	LE810C	11-Jun-07	34.52	95.5		0.0298	9.9	6.3	S
LE810	LE810C	09-Jul-07	34.43	115.6		0.0699	9.9	2	S
LE810	LE810C	09-Jul-07	34.87	100		0.0699	9.9	2	S
LE810	LE810B	20-Aug-07	34.56	100.8	0.99	0.1089	10	0.499	S
LE810	LE810B	20-Aug-07	35.19	nr		0.0849	12	0.499	S
	average		34.5	102.2	1.2	0.069782857	15	4.5	
	median		34.5	100.8	1.2	0.044	10	2.6	
	95%			92.5					
	5%			117.0					
	90%							0.7	

Station No	Sample Label	Survey Date	Salinity S ‰			DO S % Sat	B.O.D. mg/l O2	DIN mg/l N	PO4 µg/l P	Chlorophyll a mg/m	Season
LE510	LE410/S	19/06/2003	0.9			87.0		4.589	21	1.6	S
LE510	LE410/B	19/06/2003	17.0			76.0	2.2	3.545	12	3.7	S
LE510	LE410/S	31/07/2003	10.4			79.9	3.1	2.65999	22	19.9	S
LE510	LE410/B	31/07/2003	14.9			77.6	3.4	2.45999	15	21.7	S
		average	10.8			80.1	2.9	3.313495	18	11.7	
		median	12.7			78.8	3.1	3.102495	18	11.8	
		95%				76.2					
		5%				85.9					
		90%								2.23	
Summary Sheet											
Summer											
Location	Salinity average	Salinity median	95% DO S % SAT	5% DO S % SAT	B.O.D. mg/l O2 Median	DIN mg/l N Median	PO4 µg/l P Median	Chlorophyll a mg/m 90%			
LE380	31.78	32.83	85.22	119.6	1.4	0.209	9.99	1.2			
LE610	34.253	34.3	92.55	106.775	1.1	0.1089	9.9	1.82			
LE620	33.7	33.95	40.24	108	1.4	0.172	9.99	1.85			
LE340	29.7	30.7	85.6	123.7	1.8	0.423	17	1.8			
LE350	7.11	0.066	69.64	114.4	1.8	0.61	37	2.36			
LE420	30.2	30.4	90.4	129.7	2.9	0.251	10	5.3			
LE430	31.1	30.8	89.6	125.1	2.5	0.495	10	4.2			
LE440	31.7	31.6	91.6	121.5	1.7	0.1299	10	4.9			
LE450	31.6	32	89.4	125.3	2.9	0.375	10	2.9			
LE810	34.5	34.5	92.5	117	1.2	0.044	10	0.7			
LE410	10.8	12.7	76.2	85.9	3.1	3.1	8	2.23			
Winter											
Location	Salinity average	Salinity median	95% DO S % SAT	5% DO S % SAT	B.O.D. mg/l O2 Median	DIN mg/l N Median	PO4 µg/l P Median	Chlorophyll a mg/m 90%			
LE380	27.3	27.3	90.1	92.9		1.23	28	1.2			
LE340	24.8	24.8	89.94	90.66		1.63	34.5	2.1			
LE420	24.975	24.975	91.6	92.7	1.5	1.464	49	0.99			
LE430	24.3	24.3	92.7	92.7		1.41	36	1			
LE450	27.9	27.9	92.35	92.25		1.214	54	0.99			

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Summary Sheet

Summer

Location	Salinity average	Salinity median	95% DO S % SAT	5% DO S % SAT	B.O.D. mg/l O2 Median	DIN mg/l N Median	PO4 µg/l P Median	Chlorophyll a mg/m 90%
LE380	31.78	32.83	85.22	119.6	1.4	0.209	9.99	1.2
LE610	34.253	34.3	92.55	106.775	1.1	0.1089	9.9	1.82
LE620	33.7	33.95	40.24	108	1.4	0.172	9.99	1.85
LE340	29.7	30.7	85.6	123.7	1.8	0.423	17	1.8
LE350	7.11	0.066	69.64	114.4	1.8	0.61	37	2.36
LE420	30.2	30.4	90.4	129.7	2.9	0.251	10	5.3
LE430	31.1	30.8	89.6	125.1	2.5	0.495	10	4.2
LE440	31.7	31.6	91.6	121.5	1.7	0.1299	10	4.9
LE450	31.6	32	89.4	125.3	2.9	0.375	10	2.9
LE810	34.5	34.5	92.5	117	1.2	0.044	10	0.7
LE410	10.8	12.7	76.2	85.9	3.1	3.1	18	2.23

Winter

Location	Salinity average	Salinity median	95% DO S % SAT	5% DO S % SAT	B.O.D. mg/l O2 Median	DIN mg/l N Median	PO4 µg/l P Median	Chlorophyll a mg/m 90%
LE380	27.3	27.3	90.1	92.9		1.23	28	1.2
LE340	24.8	24.8	89.94	90.66		1.63	34.5	2.1
LE420	24.975	24.975	91.6	92.7	1.5	1.464	49	0.99
LE430	24.3	24.3	92.7	92.7		1.41	36	1
LE450	27.9	27.9	92.35	92.25		1.214	54	0.99