



**CORK COUNTY COUNCIL**  
**WESTERN DIVISION**  
**WATER SERVICES**

**APPLICATION FOR WASTE**  
**WATER DISCHARGE LICENCE**  
**DUNMANWAY**

**REPLY TO REGULATION 18(3)(b)**  
**NOTICE**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



D0160-01 Cork County Council Western Division  
Regulation 18 Reply to EPA in respect of Dunmanway

## Index of Contents

- Dunmanway WWDL D0160-01- Reply to Regulation 18 (3)(b)Notice
- Section A D0160-01 Non-Technical Summary Dunmanway Revised
- Section B.3, B.4, B.5 Revised D0160-01 Dunmanway
- Table D.1 & D.2 Revised D0160-01 Dunmanway
- Table E.1 & E.4 D0160-01 Dunmanway
- Attachment F.1 D0160-01 for Reg 18 Compliance
- Drawings D0160-01 Dunmanway New & Revised



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

2<sup>nd</sup> June 2009

**Re: D0160-01 - Dunmanway Waste Water Discharge Licence Application**  
**- Reply to Notice in accordance with Regulation 18(3) of the Waste Water**  
**Discharge (Authorisation) Regulations 2007**

Dear Dr. McCarthy,

I refer to your letter of the 8<sup>th</sup> April 2009 concerning the above. The following is my reply to your request for further information in accordance with Regulation 18(3)(b) dealing in sequence with the points raised :

**Article 16 Compliance Requirements**

**Section A: Non Technical Summary**

Revised Non Technical Summary attached.

- i. The waste water works is generally supervised from Monday to Friday inclusive from 9.00 a.m. to 1.00 p.m. and from 2.00 p.m. to 5.00 p.m. and on Saturday and Sunday from 10.00 a.m. to 12.30 p.m. These times may be subject to variance if work outside of those hours such as emergencies arise.

**Section B: Location of Discharge Points**

- i. The discharge to the percolation area at Dunmanway Package Plant (GW01 Dway) was included in error as a discharge point as it is in

private ownership and consequently not in the charge of Cork County Council. When the Dunmanway Waste Water Treatment Plant is upgraded the Package Plant and Percolation Area will be decommissioned and development connected to sewerage scheme. Attached please find drawing nos. A1\_01R, A1\_02R and C2\_21R amended accordingly. Drawing nos. A1\_05, B2\_09 and B3\_12 denoting this discharge point are to be excluded. Attached also please find amended Sections B.3, B.4, B.5 of Application and tables E1.(i) and D.1 and D.2.

- ii. The discharges from the Long Bridge and Quarry Road Pumping Stations are emergency overflows and storm overflows. As such they are not secondary discharge points. Attached please find drawing nos. C2\_21R and E2\_22R amended accordingly. Drawing nos. B4\_13, B4\_14, B4\_15, B4\_16 and B4\_17 denoting these secondary discharge points are to be excluded and replaced by drawing nos. B5\_14, B5\_15, B5\_16, B5\_17 and B5\_18R denoting storm overflow discharges. Attached also please find amended Sections B.3, B.4, B.5 of Application and tables E1.(i) and D.1 and D.2.

### **Section B: Population Equivalent of Agglomeration**

Development with planning permission not yet commenced or completed to date:

- i. Population equivalent = 50
- ii. Domestic percentage = 90% ; Institutional (school) = 10%
- iii. Sources of commercial or trade effluent = none.
- iv. It is envisaged that the upgrade of the waste water treatment plant will be in place in June 2011 by the time this development is completed.

### **Section B: Capital Investment Programme**

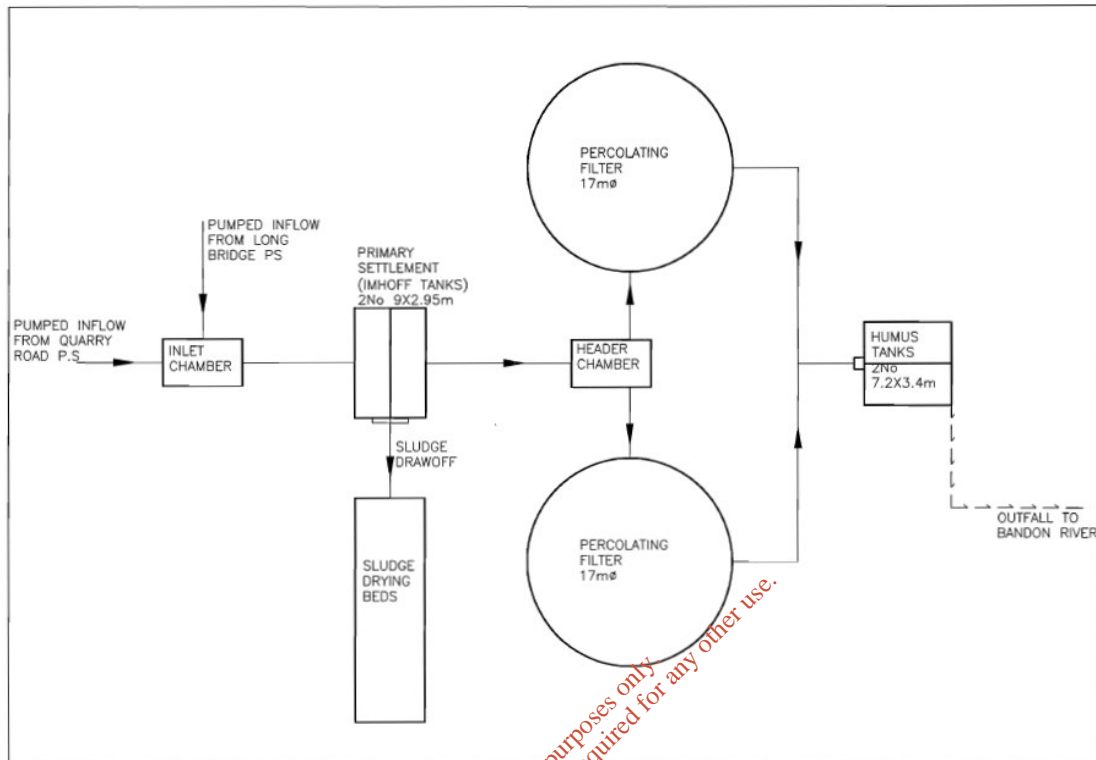
The Upgrade of Dunmanway Waste Water Treatment Plant and Pumping Stations is one of four schemes contained in a Design, Build and Operate bundle. Tenders for this bundle are presently being assessed by Cork County Council. The likely timeframe for completion of the upgrading of the Waste Water Treatment Plant and the Quarry Road and Long Bridge Pumping Stations is estimated at June 2011.

### **Section C: Infrastructure & Operation**

#### **C.1 Operational Information Requirements**

- i. Attached is drawing of flow diagram of existing Waste Water Treatment Plant. The treatment works is typical for its size and time of construction, comprising 2 No. Imhoff Tanks for primary settlement, 2 No. percolating filters for secondary treatment and final humus tanks prior to discharge to the River Bandon via an outfall

sewer. The sludge which is settled and partly stabilised in the Imhoff tanks is drawn off manually to sludge drying beds. There is no provision for humus sludge draw-off.



## C.2 Outfall Design and Construction

### Existing System

#### SW01DWAY Primary Effluent Discharge Point

The existing outfall to the river Bandon is a 9inch (225mm) cast iron outfall pipe which terminates at the river bank. There is no headwall structure at the outfall. The outfall was constructed in the early 1960's and the original design criteria are not known but it is likely that it was sized to accommodate the design flow (3dwf) from the original design population of 1,000pe

#### SW03DWAY Secondary Discharge Point Emergency Overflow Long Bridge Pumping Station

The existing overflow from the Long Bridge pumping station comprises a 225 dia concrete outfall pipe terminating in a ditch alongside the River Bandon. There is no headwall structure at the outfall. The outfall was constructed in the early 1960's and the original design criteria are not known.

#### SW05DWAY Secondary Discharge Point Emergency Overflow Quarry Road Pumping Station

The existing overflow from the Quarry Road pumping station comprises a 600mm long concrete weir discharging directly to the adjacent Brewery River. The weir is incorporated in the side wall of a concrete overflow chamber. The outfall was constructed in the early 1960's and the original design criteria are not known.



Fig 2 Outfall from Quarry Rd Pumping Station. (Existing)

### **SW07DWAY Combined Sewer Overflow**

The combined sewer overflow located in MH 68 in the bank of the Brewery stream at the rear of the Parkway Hotel is located where a 225mm dia siphon pipe enters a 375mm dia sewer. Information on the design criteria of this overflow is not available as the existing collection system including this overflow was designed in the early 1960's.

### **SW08DWAY Combined Sewer Overflow**

The combined sewer overflow located at manhole MH03 at the rear of houses on the south side of Castle St. is located on a 225mm dia sewer and the overflow pipe comprises a 225mm dia sewer discharging to the Dirty River upstream of the Green Bridge. Information on the design criteria of this overflow is not available as the existing collection system including this overflow was designed in the early 1960's.

### **SW09DWAY Combined Sewer Overflow**

The combined sewer overflow located at manhole MH53 at Chapel St is located on a 225mm dia sewer and the overflow pipe comprises a 225mm dia sewer discharging to Dunmanway Lake. Information on the design criteria of this overflow is not available as the existing collection system including this overflow was designed in the early 1960's.

### C1.3 Storm Water Overflows

- i. The following is an extract from Section C.1 of the Application:

#### “Design of the Pumping Stations

The significance of the stormwater overflows should be taken into account, i.e., the effect of the storm overflows on the receiving waters. The available dilution in the receiving water is used for determining the size of storage tanks to be provided at an overflow. This dilution factor is the ratio between the 95-percentile flow (Q95%) of the river and the average DWF.

The Q95% of the Dirty River is calculated as 468m<sup>3</sup>/h, using the “Hydra” software package. The average DWF for the Quarry Road PS is 675m<sup>3</sup>/ 24 = 28 m<sup>3</sup>/h. The dilution factor is hence 468 / 28 = 16.

The Scottish Development Department (SDD) has developed a method for estimating the effects of overflows at the river. According to this method, when a dilution factor in excess of 8 is available in the receiving water the overflow can be set at the Formula A level and no stormwater storage is necessary.

In the same way, the dilution factor for the overflow to the River Bandon from the Long Bridge Pumping Station might be calculated. Due to the lower capacity of this pumping station and the greater flows in the River Bandon, the dilution factor is even higher. The Long Bridge Pumping Station can be designed in the same way as the Quarry Road Pumping Station.”

The Scottish Development Department (SDD) method is that quoted in the “Procedures and Criteria in Relation to Storm Water Overflows, 1995” and thus the upgraded pump station overflows are designed in accordance with this document.

There are 3 existing stormwater overflows on the collection system (SW07DWAY, SW08DWAY and SW09DWAY). These overflows were installed on the original collection system at the time of construction and most likely do not comply with the DoEHLG guidelines. It is proposed to seal these outlets and allow the flow to pass forward. This will be carried out in conjunction with the Dunmanway Sewerage Scheme Collection System Upgrade for which a design brief has been prepared and consultant pre-qualification submissions have been invited. Each of the three overflows are located on the periphery of the collection system and separation of surface water inflows from the short sections of sewerage system upstream should not be excessively onerous to achieve.

### Section D: Discharges to the Aquatic Environment

- i. As outlined in Section B (ii) above, the emergency overflows from the two pumping stations were identified as secondary discharges in the application as had originally been indicated by the EPA. Subsequently this policy was altered and consequently there are no secondary discharges in this agglomeration. Unfortunately, no flow data is available for the storm overflows at this time. E4 tables in

relation to the characteristics of the emissions are supplied for the following:

- (a) Primary Discharge from WWTP SW01
  - (b) Combined Storm Overflow (CSO) at Long Bridge Pumping Station SWO2
  - (c) CSO at Quarry Road Pumping Station SW05
- ii. Owing to the short timeframe between introduction of the web based link for detailing discharges and due date for submission of application it was not possible to utilise this link.

## **Section E: Monitoring**

### **E.1 Waste Water Discharge Frequency and Quantities**

- i. A 24 hour time proportional sampler is utilised at the Dunmanway WWTP on the primary discharge point. Flow metering is not in place at the plant presently but it will be installed along with full sampling facilities when the upgrade of the works takes place and this is likely due for completion in June 2011.

### **E.2 Monitoring and Sampling Points**

- i. Cork County Council's Environment Directorate monitors the primary discharge effluent from the treatment plant to the river on a 6 times per year basis to measure compliance with the requirements of the Urban Wastewater Directive. Samples are also collected upstream and downstream of the discharge location 4 times per year as part of this sampling programme. The River Bandon which is the receiving water body is monitored in terms of the Water Framework Directive as part of the River Basin Project. The water quality section of Cork County Council currently monitors at a designated operational site (under WFD 20B020300) at approximately 2.5 kms downstream of the discharge location from the treatment plant. It is proposed to continue with this multi-faceted approach to monitoring the treatment plant and the impacts of the discharge to waters. The river is also monitored at the waterworks intake at Baxter's bridge for the Cork County Council drinking water plant in Bandon by Cork County Council on a quarterly programme as part of the of the Abstraction directive. Samples from the treatment plant discharge are analysed for BOD, COD, Ammonia, pH, Suspended Solids, Total Nitrogen, Total Phosphorus, Sulphate, Ortho phosphate (in recent times) and Metals (in recent times). Upstream and downstream samples were analysed in accordance with the urban waste water directive requirements for river samples.
- ii. The laboratory also participates in proficiency testing schemes which measure the accuracy of results and performance of the laboratory in



both the EPA scheme and the WRC Aquacheck scheme from the UK. The performance of the laboratory in these schemes is excellent and the non accredited tests are within the performance criteria for the schemes as evaluated by the scheme coordinators.

iii. The waste water Laboratory of Cork County Council is accredited for a number of analytical tests under the Irish National Accreditation Board (INAB) under the ISO 17025 international standard. It is currently accredited for the following parameters under this standard:

- pH
- Biochemical Oxygen Demand
- Chemical Oxygen Demand
- Suspended Solids
- Ammonia
- Ortho Phosphate
- Total Phosphate
- Chloride
- Sulphate

The laboratory performs a number of analytical tests e.g. Fats Oil, Grease & Metals (using an ICP-OES system), Total Nitrogen and other parameters and while it is not currently accredited for extra tests the analytical procedures and protocol are adhered to by the laboratory as if the tests are accredited.

iv. Proposed monitoring of discharges programme is as described at i. above.

## **Section F: Existing Environment & Impact of the Discharge(s)**

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

- i. As already outlined above emergency overflows from pumping stations are no longer considered secondary discharge points.
- ii. Owing to the short timeframe between introduction of the web based link for detailing discharges and due date for submission of application it was not possible to utilise this link.
- iii. See next item no. iv regarding correspondence with the National Parks and Wildlife Service (NPWS) in relation to the likelihood of significant effects on a Natura 2000 site.
- iv. The outfall SW01DWAY from the wastewater treatment plant at Dunmanway discharges to the Bandon River. The outfall is located within the Bandon River Special Area of Conservation (SAC), site code no 002171. This site consists of relatively short adjoining stretches of the Bandon and Caha rivers in West Cork and the area is

significant for a number of reasons. It contains small though very important examples of two priority habitats, alluvial forest and floating river vegetation. Otter, salmon, brook lamprey and freshwater pearl mussel are all species listed in the Habitats directive that are present on the site. The population of mussel is thought to be nationally important.

The Development Applications Unit of the Department of Environment Heritage and Local Government were contacted in Sept 2003 in respect of the proposed Dunmanway Sewerage Scheme and responded in a letter dated 3<sup>rd</sup> March 2004, copy at Attachment F.1.1. On foot of this correspondence an ecologist, Dixon Brosnan, was appointed to establish the baseline status of the site and to assist in the collation of information for an appropriate assessment in line with Article 6 of the Habitats directive. Their report, 'Assessment of the ecological impacts of providing an upgraded wastewater treatment system at Dunmanway, Co Cork is appended herewith at Attachment F.1.2. A Freshwater Mussel survey was undertaken by Dr Eugene Ross of Freshwater Bivalve Investigations as part of the ecological investigations. The findings of this survey are presented in the aforementioned Dixon Brosnan report, in Appendix 4 entitled 'An investigation of the status of *Margaritifera margaritifera* (L.) in the side channel of the Bandon River receiving effluent from the Dunmanway Sewage Treatment Plant'. Recommendations presented in this report have been incorporated in the design of the upgraded wastewater treatment plant and in the Contract Documents for the West Cork Grouped Wastewater Treatment Plants Scheme DBO Contract. The primary recommendation was that the discharge point be moved downstream to ensure that all effluent enters directly into 'Channel A' thereby preventing the possibility of effluent entering other channels containing mussels, during high flow conditions. The survey determined that the freshwater mussel was not present in side channel (Channel A) and that given the presence of the freshwater mussel in other channels in this section of the river Bandon, a discharge to channel A would create the least risk to this species.

The DoEHLG Circular letter BC14/2003 provides guidance for consent authorities regarding sub-threshold development Environmental Impact Assessment. Cork Co. Co. produced a determination in August 2004 in respect of Dunmanway Sewerage Scheme as to whether it would or would not be likely to have significant effects on the environment. This determination was produced as part of the Part 8 Planning Approval process for the proposed waste water treatment plant and is reproduced at Attachment F.1.3. Submissions were received by Cork Co. Co. in respect of the proposed development from the DoEHLG Development Applications Unit in respect of archaeology and nature

conservation. Copies of both letters dated 26<sup>th</sup> October and 6<sup>th</sup> December 2004 are included at Attachment F.1.4. T.J. O'Connor & Associates prepared a report on these submissions in December 2004 (copy at Attachment F.1.5). Cork County Council approved the Part 8 Planning application for Dunmanway WWTP on 14<sup>th</sup> February 2005 without modification of the documentation as included at Attachment F.1.6.

Therefore an appropriate assessment has been carried out in respect of the proposed wastewater treatment plant, a baseline survey has been completed, the development has been screened for likely impacts, and these impacts have been assessed and mitigation measures proposed. This process was concluded in advance of the publication of the Circular L8/08 but the requirements of Article 6 of the habitats Directive have been taken into account when Cork Co. Co. considered the scheme.

A pre-consultation draft Bandon River Sub-basin Management Plan for the freshwater Pearl Mussel has been produced by NS 2 for the DoEHLG. The effluent standards established for the proposed wastewater treatment plant at Dunmanway comply with the recommendations of Table 6.3 Freshwater Pearl Mussel Sub-basin Plan Measures in respect of municipal and industrial discharge survey insofar as phosphorus removal is incorporated in the treatment plant design. Furthermore, the outfall is being re-located in accordance with the recommendations of Table 6.2 Suite of Additional measures under the Draft RBMP's. The improved effluent quality arising from the upgrading of the wastewater treatment plant will result in a reduction in the suspended solids discharge to 'Channel A' of the Bandon River and will ensure an improvement in the quality of the side channel which extends for approximately 300m before rejoining the main river channel. Therefore the draft consultation paper on the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2008 can be complied with.

<b>List of Drawing Titles:</b>
--------------------------------

Revised Drawings:

- (a) A1\_01R
- (b) A1\_02R
- (c) B5\_18R
- (d) C2\_21R
- (e) E2\_22R

Drawings to be excluded:

- (a) A1\_05
- (b) B2\_09
- (c) B3\_12
- (d) B4\_13
- (e) B4\_14
- (f) B4\_15
- (g) B4\_16
- (h) B4\_17

New Drawings:

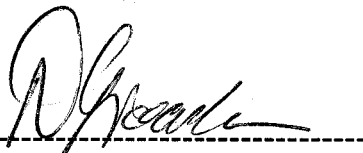
- (a) B5\_14
- (b) B5\_15
- (c) B5\_16
- (d) B5\_17

**List of Attachments**

- i. Non-Technical Summary Revised
- ii. Section B.3, B.4, B.5 Revised
- iii. WWTP flow diagram
- iv. Table D.1 Revised
- v. Table D.2 Revised
- vi. Table E.1(i) Revised
- vii. Tables E.4 Revised (8 no)
- viii. Table F.1 Revised
- ix. F1.1
- x. F1.2
- xi. F.1.3
- xii. F.1.4
- xiii. F.1.5
- xiv. F.1.6

For inspection purposes only.  
Consent of copyright owner required for any other use.

Yours sincerely,



Declan Groarke,  
A/Senior Engineer  
Western Division

Enclosures

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**NON-TECHNICAL SUMMARY**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## **Section A – Non Technical Summary Revised**

### **A description of the Wastewater Works and the Activities Carried Out Therein**

#### **Introduction**

Dunmanway is located at the confluence of the Brewery and the Dirty rivers with the Bandon River. It is sheltered by elevated land on three sides. To the north and west lie the foothills of the Shehy Mountains and to the south lie smaller hills. The topography and landscape of the wider area consists of pasture, rough grazing and rock outcrop.

#### **Existing Situation**

##### **Existing Wastewater Treatment Plant**

The existing wastewater treatment plant in Dunmanway is located in the townland of Dunmanway North approximately 60km west of Cork City (see Drg No. Dunmanway – A1 – 01R in attachment A1). This plant treats the domestic sewage from the town and its immediate environs as well as non domestic/industrial flows. The extent of the agglomeration is shown on Drg. No. Dunmanway - B1 - 06 in Attachment B1.

The original design capacity of the existing WWTP is 1000p.e. while the future capacity is set at 3,500p.e. The WWTP was constructed in the 1960's and has seen no significant upgrade since then. The existing WWTP does not incorporate an inlet works with screens and grit traps. The load to the existing plant is in excess of the design capacity that the plant was constructed to serve. Therefore the discharge standard for BOD and SS cannot be met on occasions. Furthermore, the hydraulic load of the primary settlement tanks (Imhoff tanks) and the humus tanks is excessive.

The outfall from the existing wastewater treatment plant discharges to the River Bandon within an Area designated as an SAC.

The existing wastewater treatment plant was built approximately 40 years ago. It was designed for a capacity of 1,000 PE and would have been intended to achieve the Royal Commission Effluent Treatment Standards of the time.

The treatment works is typical for its size and time of construction, comprising 2 No. Imhoff Tanks for primary settlement, 2 No. percolating filters for secondary treatment and final humus tanks prior to discharge to the River Bandon via an outfall sewer. The sludge which is settled and partly stabilised in the Imhoff tanks is drawn off manually to sludge drying beds. There is no provision for humus sludge drawoff.

Drawing No. Dunmanway\_A1\_03 shows a view from the inlet chamber at the WWTP with the Imhoff tanks on the left and the drying beds and trickling filters on the right.

Based on the design capacity of the pumps installed in 1993, the current maximum influent flow from the pumping stations is 148 m<sup>3</sup>/h. However, it is reported by the caretaker for the scheme that the forward pumping capacity is greatly reduced when several pumps are operating simultaneously and it is considered unlikely that this maximum flow rate is achieved at present.

The design capacity of the existing WWTP is 1,000 PE, while the future capacity is set at 3,500 PE. The load to the existing plant and especially the trickling filters will become so high, that the discharge standard for BOD cannot be met. Furthermore, the hydraulic load of the primary settlement tanks (Imhoff tanks) and the humus tanks will be excessive. Finally, the existing WWTP does not incorporate an inlet works with screens and grit traps. This will have to be constructed in the upgraded WWTP.

It can be concluded, that the existing WWTP can hardly be re-used. Almost all process units have to be renewed or extended. Taking the structural status of the superstructures and plant into account, it is recommended to construct a new wastewater treatment plant at the same site.

#### Quarry PS and Long Bridge PS

The wastewater from the greater part of Dunmanway agglomeration is currently pumped from Quarry Road Pumping Station to the wastewater treatment plant via a 150mm dia. rising main. A second pumping station at the Long Bridge Pumping Station pumps the remainder of the agglomeration catchment area to the WWTP via a 100mm dia. rising main. Both rising mains are pvc pipelines and they were installed in the early 1960's as part of the Dunmanway Sewerage Scheme. Both pumping stations incorporate wet wells which are external to the pumping station building and which were originally open to the elements. In recent years these chambers have been covered in. Both pumping stations incorporate secondary outfalls which discharge to the Dirty and Bandon rivers respectively.

The current structural and mechanical/electrical status of both pumping stations in Dunmanway is such that substantial works are required to refurbish the buildings and to comply with Health & Safety Legislation. Furthermore, the capacity of the existing pumps is not sufficient to cater for the flows arriving at the stations, particularly in incidents of heavy rainfall. Therefore, it is proposed to construct new pumping stations at the current sites. The location of the pumping stations referred to above as shown on Drg. No. Dunmanway – B5 – 18R.

#### **The Proposal**

It is proposed to construct a new wastewater treatment plant on an extended site at the location of the existing waste water treatment plant in Dunmanway. The wastewater treatment plant will cater for a design population of 3,500pe. This includes for pollution loads from non-domestic sources such as shops, hotels, restaurants and local industries. No phasing of the upgrading of the WWTP is proposed.

It is also proposed to construct new pumping stations at the sites of the existing Quarry Rd and Long Bridge pumping stations. The new pumping stations will incorporate stormwater holding tank which will reduce the frequencies of overflows to the Dirty River and the Bandon River, greatly reducing the polluting load on the rivers.

**A description of the Wastewater Works and the activities to be carried out therein**

It is proposed that the above works will be constructed in conjunction with the West Cork Grouped WWTP DBO Scheme. Tenders have been received recently by Cork County Council and are currently being assessed with a view to award of contract shortly. The programme for the construction of this scheme provides for a period of 18months in which to substantially complete the works.

As is the nature of DBO contracts, the Contractor may specify which plant he chooses to meet the performance specification. With this in mind, the following is a description of the expected operation of the new plant. The rising mains from the two pumping stations would most likely be connected to an inlet works which will incorporate screening, grit removal, flow measurement and sampling. The flow would then enter the activated sludge tanks for the biological treatment. Separation of sludge and final effluent would take place in the secondary clarifiers, prior to flow measurement and discharging to the Bandon River. The process design will incorporate biological or chemical phosphorus reduction. Waste sludge would be pumped to the sludge thickening tank. Thickened sludge would be dewatered and stored in holding tank prior to removal off site for further treatment and disposal.

As is the nature of DBO contracts, the plant will be operated by a private service provider on behalf of the local authority under a 20 year Operation and Maintenance Contract.

The design flows to the plant are based on a contributing population of 2,404 p.e. with an expansion capacity to 3,500p.e. The effluent requirements specified for the proposed Wastewater Treatment Plant are as follows:

Table A.1 Effluent Requirements:

Parameters	Concentration (mg/l)	Maximum Concentration (mg/l)	Minimum Percentage Reduction
BOD	*25	50	90
Suspended Solids	*35	70	90
COD	*125	250	75
Phosphorus	*1.5		80

\* Standard to be achieved in 95% of samples or more

An indicative layout of the proposed wastewater treatment plant is shown on Drg. No. Dunmanway – A1 - 04 in Attachment A1.



A summary of the proposed treatment processes is presented below:

Preliminary Treatment	Preliminary Treatment of the incoming sewage is carried out at the inlet works. Inlet works machinery unit comprising 2 No. continuous band screens(duty/standby) with 6mm spacing grit trap with bypass to remove screenings, grit and larger solids. Screenings are washed, compacted and bagged. Grit is classified and washed for disposal to landfill. Inlet works are envisaged in a building approximately 10m x 5m in plan and air treatment equipment will be provided for odour control.
Secondary Treatment	This stage comprises biological oxidation of the sewage by an activated sludge process followed by a settling stage. The dimensions of the two aeration basins are 5m x 12.5m each and 4m (liquid) deep. The two final clarifiers have a diameter of 11m.
Sludge Treatment	The sludge removed from the final clarifiers would be directed to a picket fence thickener. The thickened sludge will be stored in a sludge holding tank. Its volume is reduced so that it is suitable for transportation to the regional sludge hub centre for stabilisation and reuse. Both picket fence thickener and the sludge holding tank have a diameter of 4m and will 5 m high.
Phosphorus Removal	Phosphorus will be chemically removed by dosing a coagulant into the splitter box ahead of the aeration tanks.

### The Sources of Emissions from the Wastewater Works

1. The primary discharge of the treated effluent through the outfall pipe into Bandon River.
2. A screened overflow to the Dirty River from the Quarry Road pumping Station is proposed to cater for flows in excess of 12 DWF or in the case of power failure.
3. A screened overflow to the Bandon River from the Long Bridge Pumping Station is proposed to cater for flows in excess of 7 DWF or in the case of power failure.
4. Noise and odour emissions from the treatment works units which are regulated by the limits set in the planning approval.

Unscreened overflows from the existing Quarry Road and Long Bridge pumping Stations and discharges from Combined storm overflows to the Brewery and Dirty Rivers will be eliminated together with a percolation area from a package treatment plant at Dun Ogra on the Macroom Road.

**The 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**

The operation of the treatment works produces a treated effluent which is discharged to the Bandon River and a treated sludge which is reused on agricultural land, forestry land, or to landfill. These effluents and residue are described in detail above. There is no long term storage or accumulation of residues on the treatment works site.

The discharge of treated effluent from the wastewater plant is via a single outfall pipeline to the Bandon River (see Drg. No. Dunmanway – A1-03). The outfall is proposed to be relocated from its existing location in order to minimise the impact of the discharge of the treated effluent on the SAC in the Bandon River.

The discharge at the pumping station of the excess storm water in storm/rainfall events (which occurs when the storage capacity of the storm tank is exceeded) via the outfall pipeline should not give rise to any significant adverse effects on the receiving waters as the storm water holding tank capacity conforms to the recommendation of the DoE Guidelines for Combined Storm Overflows.

### **Environmental Impacts**

In conjunction with the Part 8 Planning process, Cork Co. Co. has prepared a document entitled “Determination whether Dunmanway Sewerage Scheme would or would not be likely to have significant effects on the environment” which encompasses a sub-threshold environmental assessment of the impact of the proposed WWTP.

The discharge of effluent from the wastewater treatment plant at Dunmanway together with the overflows from the pumping stations at the Quarry Road and the Long bridge have a negative impact on water quality in the Rivers Bandon and Dirty at present. The proposed scheme will improve the quality of the effluent being discharged from the wastewater treatment plant and will greatly reduce the frequency of discharges from the pumping stations. The incorporation of phosphorus removal at the treatment plant will reduce the nutrient load on the river. The relocation of the outfall serving the WWTP plant will serve to protect the river mussel habitats within the river Bandon.

The proposed effluent quality standards will meet the requirements stated in the Urban Wastewater Directive

### **The proposed technology and other techniques for preventing or where this is not possible, reducing emissions from the wastewater works**

#### **Technologies**

At Dunmanway WWTP, standby pumps and mobile generator equipment will be provided in order to ensure continuation of the wastewater and sludge treatment operations and to comply with specified standards in case of equipment failures or breakdowns. Standby equipment will be installed in the critical processes should the duty units fail.

## **Techniques**

Overall management responsibility for operation of the treatment works is borne by Cork County Council. However, operation of the wastewater treatment plant and management of sludge transport, treatment and disposal will be contracted out to a private service provider through a 20 year operation and maintenance contract. Full time staff will be employed by the service provider to run the facility and to carry out the required monitoring and maintenance requirements.

**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 operation of the treatment works produces a treated effluent in compliance with the specific standards prior to its discharge to the River Bandon.

## **Toxic Substances**

All chemicals and dangerous substances will be stored safely at all times and appropriate safety measures will be taken to ensure against leakage and spillage in accordance with relevant Health and Safety Legislation. Chemical and diesel storage tanks will be banded to contain these liquids in the event of a leak occurring in the storage tanks.

## **Measures planned to monitor emissions into the environment**

Monitoring the operation of the wastewater treatment plant will be carried out on private basis by private plant operators. This monitoring will ensure that all the processes operate optimally, including the odour control system. Analysis of the final effluent and treated sludge is carried out on a routine basis as evidenced by the results contained in Section E. The spreading of treated sludge on agricultural land is logged and regulated in order to ensure the protection of surface water and groundwater from risk of pollution. Monitoring of water quality in the Brewery, Dirty and the Bandon River is carried out by both Cork County Council and the EPA.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**SECTION B.3, B.4, B.5 REVISED**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

### 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.

Existing Discharge Point:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Non-return Flap Valve
<b>Unique Point Code</b>	SW01Dway Dunmanway WWTP Primary Effluent Discharge Point (Outfall to River)
<b>Location</b>	Bandon River
<b>Grid ref (6E, 6N)</b>	E124142 N052545

Proposed Discharge Point:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Non-return Flap Valve
<b>Unique Point Code</b>	SW02Dway Dunmanway WWTP Proposed Primary Effluent Discharge Point (Outfall to River)
<b>Location</b>	Bandon River
<b>Grid ref (6E, 6N)</b>	E124122 N052532

### 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.

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Not Applicable
<b>Unique Point Code</b>	
<b>Location</b>	
<b>Grid ref (6E, 6N)</b>	

**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
		✓

### 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.

Existing Storm Overflow:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Piped outfall
<b>Unique Point Code</b>	SW03Dway Long Bridge Pumping Station (Outfall to River)
<b>Location</b>	Bandon River
<b>Grid ref (6E, 6N)</b>	E124057 N053010

Proposed Storm Overflow:

<b>Type of Discharge</b>	Screened Overflow
<b>Unique Point Code</b>	SW04Dway Long Bridge Pumping Station (Outfall to River)
<b>Location</b>	Bandon River (At the Long Bridge)
<b>Grid ref (6E, 6N)</b>	E124081, N053008

Existing Storm Overflow:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Weir Discharge
<b>Unique Point Code</b>	SW05Dway Quarry Road Pumping Station (Outfall to River)
<b>Location</b>	Dirty River at Quarry Rd Bridge
<b>Grid ref (6E, 6N)</b>	E123566 N052546

Proposed Storm Overflow:

<b>Type of Discharge</b>	Screened Overflow
<b>Unique Point Code</b>	SW06Dway Quarry Road Pumping Station (Outfall to River)
<b>Location</b>	Dirty River
<b>Grid ref (6E, 6N)</b>	E123566, N052546

Existing Combined Storm Overflow:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Weir overflow
<b>Unique Point Code</b>	SW07Dway Combined Sewer Overflow Point (Outfall to River)
<b>Location</b>	Brewery Stream
<b>Grid ref (6E, 6N)</b>	E123235 N052182

Existing Combined Storm Overflow:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Piped overflow
<b>Unique Point Code</b>	SW08Dway Combined Sewer Overflow Point (Outfall to River)
<b>Location</b>	Dirty River
<b>Grid ref (6E, 6N)</b>	E122787 N052453

Existing Combined Storm Overflow:

<b>Type of Discharge</b>	E.g. Diffuser, Lunar Valve, Non-return flap valve etc. Piped overflow
<b>Unique Point Code</b>	SW09Dway

	Combined Sewer Overflow Point
<b>Location</b>	Dunmanway Lake
<b>Grid ref (6E, 6N)</b>	E123730 N053010

**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
	✓	

For inspection purposes only.  
 Consent of copyright owner required for any other use.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**TABLES D.1, D.2 REVISED**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



**TABLE D.1(i)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Primary Discharge Point)**

**Discharge Point Code:** SW01-Dunmanway

Source of Emission:	Dunmanway WWTP Primary Discharge
Location:	Milleenanannig, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	124143E, 52536N
Name of receiving waters:	River Bandon
River Basin District:	South Western River Basin District
Designation of receiving waters:	SAC
Flow rate in receiving waters:	<div style="text-align: right;"> <u>0.07</u> m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow  <u>0.14</u> m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow         </div>

For inspection purposes only.  
Consent of copyright owner required for any other use.

**Emission Details:**

(i) Volume emitted			
Normal/day	864m <sup>3</sup>	Maximum/day	864m <sup>3</sup>
Maximum rate/hour	100m <sup>3</sup>	Period of emission (avg)	<u>60</u> min/hr <u>24</u> hr/day <u>365</u> day/yr
Dry Weather Flow	Not available		

**TABLE D.1(i)(b): EMISSIONS TO SURFACE/GROUND WATERS - Characteristics of the emission (Primary Discharge Point)**

**Discharge Point Code:** SW01-Dunmanway

Number	Substance	As discharged	
		Max. daily average	
1	pH	6.5-8.5	
2	Temperature	25 °C	
3	Electrical Conductivity(@25°C)	1000	
		Max. daily average (mg/l)*	kg/day*
4	Suspended Solids	75	64.8
5	Ammonia (as N)	25	21.6
6	Biochemical Oxygen Demand	2.05	62.25
7	Chemical Oxygen Demand	200	172.8
8	Total Nitrogen (as N)	50	43.2
9	Nitrite (as N)	Not available	Not available
10	Nitrate (as N)	Not available	Not available
11	Total Phosphorus (as P)	5	4.32
12	Orthophosphate (as P) <sup>Note 1</sup>	4	3.456
13	Sulphate (SO <sub>4</sub> )	Not available	Not available
14	Phenols (sum) <sup>Note 2</sup> (ug/l)	Not available	Not available

Note 1: For waste water samples this monitoring should be undertaken on a sample filtered on 0.45µm filter paper.

Note 2: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

**TABLE D.1(i)(c): DANGEROUS SUBSTANCE EMISSIONS TO SURFACE/GROUND WATERS**

**Primary Discharge Point - Characteristics of the emission**

**Discharge Point Code: SW01-Dunmanway**

Number	Substance	As discharged		
		Max. daily average (µg/l)	kg/day*	kg/year*
<b>1</b>	Atrazine	Not available	Not available	Not available
<b>2</b>	Dichloromethane	Not available	Not available	Not available
<b>3</b>	Simazine	Not available	Not available	Not available
<b>4</b>	Toluene	Not available	Not available	Not available
<b>5</b>	Tributyltin	Not available	Not available	Not available
<b>6</b>	Xylenes	Not available	Not available	Not available
<b>7</b>	Arsenic	Not available	Not available	Not available
<b>8</b>	Chromium	Not available	Not available	Not available
<b>9</b>	Copper	Not available	Not available	Not available
<b>10</b>	Cyanide	Not available	Not available	Not available
<b>11</b>	Fluoride	150	0.1296	47.304
<b>12</b>	Lead	Not available	Not available	Not available
<b>13</b>	Nickel	Not available	Not available	Not available
<b>14</b>	Zinc	Not available	Not available	Not available
<b>15</b>	Boron	Not available	Not available	Not available
<b>16</b>	Cadmium	Not available	Not available	Not available
<b>17</b>	Mercury	Not available	Not available	Not available
<b>18</b>	Selenium	Not available	Not available	Not available
<b>19</b>	Barium	Not available	Not available	Not available

Note 1: For waste water samples this monitoring should be undertaken on a sample filtered on 0.45µm filter paper.

Note 2: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

**TABLE D.1(i)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Primary Discharge Point)**

**Discharge Point Code:** SW02-Dunmanway (Proposed)

Source of Emission:	Dunmanway WWTP Primary Discharge
Location:	Milleenanannig, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	124122E, 52532N
Name of receiving waters:	River Bandon
River Basin District:	South Western River Basin District
Designation of receiving waters:	SAC
Flow rate in receiving waters:	0.07 m <sup>3</sup> .sec <sup>-1</sup> Dry Weather Flow 0.14 m <sup>3</sup> .sec <sup>-1</sup> 95%ile flow

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	864m <sup>3</sup>
Maximum rate/hour	Not Available	Period of emission (avg)	60 min/hr 24 hr/day 365 day/yr
Dry Weather Flow	Not Available		

**TABLE D.1(ii)(b): EMISSIONS TO SURFACE/GROUND WATERS**

- Characteristics of the emission (1 table per discharge point)(Primary Discharge Point)

**Discharge Point Code:** SW02 Dunmanway proposed

Number	Substance	As discharged	
		Max. daily average	
1	pH	6.5 -8.5	
2	Temperature	25°C	
3	Electrical Conductivity (@25°C)	1000	
		Max. daily average (mg/l)	kg/day
4	Suspended Solids	35	30.24
5	Ammonia (as N)	Not available	Not available
6	Biochemical Oxygen Demand	25	21.6
7	Chemical Oxygen Demand	125	108
8	Total Nitrogen (as N)	25	21.6
9	Nitrite (as N)	Not available	Not available
10	Nitrate (as N)	Not available	Not available
11	Total Phosphorus (as P) <sup>Note 1</sup>	2.0	1.728
12	Orthophosphate (as P)	1.6	1.3824
13	Sulphate (SO <sub>4</sub> )	Not available	Not available
14	Phenols (sum) <sup>Note 2</sup> (ug/l)	Not available	Not available

Note 1: For waste water samples this monitoring should be undertaken on a sample filtered on 0.45µm filter paper.

Note 2: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

**TABLE D.1(ii)(c): DANGEROUS SUBSTANCE EMISSIONS TO SURFACE/GROUND WATERS**

**Secondary Discharge Point - Characteristics of the emission (1 table per discharge point)**

**Discharge Point Code:** SW02 Dunmanway Proposed

Number	Substance	As discharged		
		Max. daily average (µg/l)	kg/day	kg/year
1	Atrazine	Not available	Not available	Not available
2	Dichloromethane	Not available	Not available	Not available
3	Simazine	Not available	Not available	Not available
4	Toluene	Not available	Not available	Not available
5	Tributyltin	Not available	Not available	Not available
6	Xylenes	Not available	Not available	Not available
7	Arsenic	Not available	Not available	Not available
8	Chromium	Not available	Not available	Not available
9	Copper	Not available	Not available	Not available
10	Cyanide	Not available	Not available	Not available
11	Fluoride	Not available	Not available	Not available
12	Lead	Not available	Not available	Not available
13	Nickel	Not available	Not available	Not available
14	Zinc	Not available	Not available	Not available
15	Boron	Not available	Not available	Not available
16	Cadmium	Not available	Not available	Not available
17	Mercury	Not available	Not available	Not available
18	Selenium	Not available	Not available	Not available
19	Barium	Not available	Not available	Not available

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW03 Storm Overflow

Source of Emission:	Storm Overflow Long Bridge Pumping Station
Location:	Dunmanway North
Grid Ref. (12 digit, 6E, 6N):	124057E, 53010N
Name of receiving waters:	River Bandon
River Basin District:	South Western River Basin District
Designation of receiving waters:	SAC
Flow rate in receiving waters:	<p style="text-align: right;">_____ 0.07 m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: right;">_____ 0.14 m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

For inspection purposes only.  
Consent of copyright owner required for any other use.

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	<u>Not available</u>
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> min/hr _____hr/day _____day/yr
Dry Weather Flow	Not Available		

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW04 Storm Overflow(Proposed)

Source of Emission:	Storm Overflow Long Bridge Pumping Station
Location:	Dunmanway North
Grid Ref. (12 digit, 6E, 6N):	124081E, 53008N
Name of receiving waters:	River Bandon
River Basin District:	South Western River Basin District
Designation of receiving waters:	SAC
Flow rate in receiving waters:	<p style="text-align: right;">_____ 0.07 m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: right;">_____ 0.14 m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

For inspection purposes only.  
Consent of copyright owner required for any other use.

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	<u>Not available</u>
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> min/hr _____hr/day _____day/yr
Dry Weather Flow	Not Available		



**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW05 Storm Overflow

Source of Emission:	Storm Overflow Quarry Road Pumping Station
Location:	Brookpark, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	123566E, 52546N
Name of receiving waters:	Dirty River
River Basin District:	South Western River Basin District
Designation of receiving waters:	None
Flow rate in receiving waters:	<p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	Not available
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> Min/hr _____ hr/day day/yr

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW06 Storm Overflow (Proposed)

Source of Emission:	Storm Overflow Quarry Road Pumping Station
Location:	Brookpark, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	123566E, 52546N
Name of receiving waters:	Dirty River
River Basin District:	South Western River Basin District
Designation of receiving waters:	None
Flow rate in receiving waters:	<p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	Not available
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> Min/hr _____ hr/day day/yr

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW07 Storm Overflow

Source of Emission:	Brewery Bridge Storm Overflow
Location:	Dunmanway South, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	123235E, 52182N
Name of receiving waters:	Brewery River
River Basin District:	South Western River Basin District
Designation of receiving waters:	None
Flow rate in receiving waters:	<p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	Not available
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> Min/hr _____ hr/day day/yr

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW08 Storm Overflow

Source of Emission:	Castle Street Storm Overflow
Location:	Dunmanway South, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	122787E, 52453N
Name of receiving waters:	Dirty River
River Basin District:	South Western River Basin District
Designation of receiving waters:	None
Flow rate in receiving waters:	<p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	Not available
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> Min/hr _____ hr/day day/yr

**TABLE D.1(iii)(a): EMISSIONS TO SURFACE/GROUND WATERS  
(Storm Water Overflow) (1 table per discharge point)**

**Discharge Point Code:** SW09 Storm Overflow

Source of Emission:	Main Street Storm Overflow
Location:	Dunmanway North, Dunmanway
Grid Ref. (12 digit, 6E, 6N):	123730E, 53010N
Name of receiving waters:	Dirty River
River Basin District:	South Western River Basin District
Designation of receiving waters:	None
Flow rate in receiving waters:	<p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> Dry Weather Flow</p> <p style="text-align: center;">_____ <u>Not available</u> _____ m<sup>3</sup>.sec<sup>-1</sup> 95%ile flow</p>

**Emission Details:**

(i) Volume emitted			
Normal/day	Not Available	Maximum/day	Not available
Maximum rate/hour	Not Available	Period of emission (avg)	<u>Not available</u> Min/hr _____ hr/day day/yr



**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**TABLES E.1, E.4 REVISED**

**3/6/09**

For inspection purposes only.  
Consent of copyright owner required for any other use.

**TABLE E1.(i) Revised**

Identification Code for Discharge Point	Frequency of Discharge (days/annum)	Quantity of Waste Discharged (m3/annum)
SW01DWAY	365	315360
SW02DWAY	365	315360

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



## Attachment E4- CSO Long Bridge In Dunmanway

Sample Date	21/05/2008	30/07/2008	Average			
Sample	CSO	CSO				
Sample Code		GS739				
Flow M <sup>3</sup> /Day	*	*	*			
pH	7.6	7.4	7.5			
Temperature °C	*	*	*			
Cond 20 °C	*	381	381			
SS mg/L	70	110	90			
NH <sub>3</sub> mg/L	0.5	16.3	8.4			
BOD mg/L	14.8	146.9	80.85			
COD mg/L	10.5	320	165.25			
TN mg/L	1.4	25.766	13.583			
Nitrite mg/L	*	0.0061	0.0061			
Nitrate mg/L	*	<0.400	<0.400			
TP mg/L	0.21	3.58	1.895			
O-PO4-P mg/L	0.06	2.16	1.11			
SO4 mg/L	*	<30	<30			
Phenols µg/L	*	11.02	11.02			
Atrazine µg/L	*	<0.01	<0.01			
Dichloromethane	*	<1	<1			
Simazine µg/L	*	<0.01	<0.01			
Toluene µg/L	*	<1	<1			
Tributyltin µg/L	*	*	*			
Xylenes µg/L	*	<1	<1			
Arsenic µg/L	*	<0.96	<0.96			
Chromium ug/L	*	<10	<10			
Copper ug/L	*	0.0369	0.0369			
Cyanide µg/L	*	<5	<5			
Fluoride ug/l	*	260	260			
Lead ug/L	*	5.9	5.9			
Nickel ug/L	*	<5	<5			
Zinc ug/L	*	57.8	57.8			
Boron ug/L	*	<0.2	<0.2			
Cadmium ug/L	*	<1	<1			
Mercury µg/L	*	<0.2	<0.2			
Selenium µg/L	*	<0.74	<0.74			
Barium ug/L	*	27.4	27.4			

value at 1/2 of LOD for Statistical Purposes

## Attachment E4-CSO Quarry Road In Dunmanway

Sample Date	21/5/2008	30/7/2008	Average				
Sample	CSO	CSO	*				
Sample Code	*	GS740	*				
Flow M <sup>3</sup> /Day	*	*	*				
pH	7.3	7.4	7.35				
Temperature °C	*	*	*				
Cond 20°C	*	263	263				
SS mg/L	188	12	100				
NH <sub>3</sub> mg/L	*	11.5	11.5				
BOD mg/L	36	29	32.5				
COD mg/L	200	48	124				
TN mg/L	4.2	13.89	9.045				
Nitrite mg/L	*	0.063	0.063				
Nitrate mg/L	*	0.945	0.945				
TP mg/L	1.05	1.64	1.345				
O-PO4-P mg/L	0.09	0.54	0.315				
SO4 mg/L	*	<30	<30				
Phenols µg/L	*	6.16	6.16				
Atrazine µg/L	*	<0.01	<0.01				
Dichloromethane	*	<1	<1				
Simazine µg/L	*	<0.01	<0.01				
Toluene µg/L	*	<1	<1				
Tributyltin µg/L	*	not required	*				
Xylenes µg/L	*	<1	<1				
Arsenic µg/L	*	<0.96	<0.96				
Chromium ug/L	*	<20	<20				
Copper ug/L	*	<20	<20				
Cyanide µg/L	*	6	6				
Fluoride ug/l	*	90	90				
Lead ug/L	*	<20	<20				
Nickel ug/L	*	<20	<20				
Zinc ug/L	*	<20	<20				
Boron ug/L	*	<20	<20				
Cadmium ug/L	*	<20	<20				
Mercury µg/L	*	<0.2	<0.2				
Selenium µg/L	*	<0.74	<0.74				
Barium ug/L	*	<20	<20				

Consistent Copyright owned by the Inspector General only. Required for any other use.

# Attachment E4-Dunmanway WWTP Inlet

CI

Sample Date	9/8/2007	24/10/2007	07/02/2008	03/04/2008	04/06/2008	19/06/2008	02/07/2008	30/07/2008	Average	Ave kg/day	Ave Kg/year
Sample	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent			
Sample Code			GS050	GS221	GS484	GS577	GS599	GS736	*	*	
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	*	*	
pH	*	7.2	*	*	*	*	*	7.4	7.3	*	
Temperature °C	*	*	*	*	*	*	*	*	*	*	
Cond 20°C	*	718	*	682	184	*	236	348	433.6	*	
SS mg/L	*	231	*	*	60	*	*	43	111.333	97.92	35739.75
NH <sub>3</sub> mg/L	*	38.5	16.7	*	*	29.5	*	21.3	26.5	22.896	8357.04
BOD mg/L	*	*	*	*	*	*	*	53.3	53.3	46.05	16808.69
COD mg/L	143	658	250	523	176	557	184	96	323.375	279.396	101979.5
TN mg/L	*	54	*	*	27	*	*	29.083	36.694	31.704	11571.82
Nitrite mg/L	*	*	*	*	*	*	*	0.124	0.124	0.1072	39.1046
Nitrate mg/L	*	*	*	*	*	*	*	3.759	3.759	3.2478	1185.438
TP mg/L	*	7.9	2.9	*	2.21	*	2.12	2.33	3.492	3.0171	1101.237
O-PO4-P mg/L	*	6.07	1.65	3.71	0.9	6.67	*	1.83	3.4717	2.9995	1094.835
SO4 mg/L	*	52.4	31	*	*	*	*	15	32.8	28.3392	10343.81
Phenols µg/L	*	*	*	*	*	*	*	6.67	6.67	0.00576	2.1035
Atrazine µg/L	*	*	*	*	*	*	*	<0.01	<0.01	<0.0000864	<0.003154
Dichloromethane µg/L	*	*	*	*	*	*	*	<1	<1	0.000864	0.31536
Simazine µg/L	*	*	*	*	*	*	*	<0.01	<0.01	<0.0000864	<0.003154
Toluene µg/L	*	*	*	*	*	*	*	15.887	15.887	0.01373	5.0101
Tributyltin µg/L	*	*	*	*	*	*	*	not required	*	*	*
Xylenes µg/L	*	*	*	*	*	*	*	20.35	20.35	0.0176	6.4176
Arsenic µg/L	*	*	*	*	*	*	*	<0.96	<0.96	<0.000829	<0.3027
Chromium ug/L	<20	*	<20	*	*	<20	*	<20	<20	<0.01728	<6.3072
Copper ug/L	<20	*	<20	*	*	<20	*	<20	<20	<0.01728	<6.3072
Cyanide µg/L	*	*	*	*	*	*	*	<5	<5	<0.00432	<1.5768
Fluoride ug/l	*	*	*	*	*	*	*	210	210	0.1814	66.2256
Lead ug/L	10	*	10	*	*	36	*	21	19.25	0.016632	6.07068
Nickel ug/L	<20	*	<20	*	*	<20	*	<20	<20	<0.01728	<6.3072
Zinc ug/L	83	*	31	*	*	60	*	33	51.75	0.044712	16.31988
Boron ug/L	*	*	81	*	*	45	*	10	45.33333	0.03917	14.2962
Cadmium ug/L	<20	*	<20	*	*	<20	*	<20	<20	<0.01728	<6.3072
Mercury µg/L	*	*	*	*	*	*	*	<0.2	<0.2	<0.0001728	<0.063072
Selenium µg/L	*	*	*	*	*	*	*	<0.74	<0.74	<0.0006394	<0.233366
Barium ug/L	22	*	10	*	*	23	*	10	16.25000	0.01404	5.1246

value at 1/2 of LOD for Statistical Purposes  
 \*Predicted daily flow of 864m3 inlet

Attachment E4-Dunmanway WWTP Outlet 2007 Data

Sample Date	6/2/2007	7/3/2007	12/4/2007	3/5/2007	13/6/2007	4/7/2007	9/8/2007	6/9/2007	24/10/2007	12/12/2007	Average
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	2007
Sample Code											
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	*	*	*
pH	7.1	7.3	7.3	7.3	7.4	7.1	7.2	7.4	7.3	7.2	7.26
Temperature °C	*	*	*	*	*	*	*	*	*	*	*
Cond 20 °C	*	*	*	*	*	*	*	*	*	*	*
SS mg/L	82	37	55	114	102	47	51	71	30	19	60.8
NH <sub>3</sub> mg/L	*	*	*	*	*	17.7	12.7	25	19.2	*	18.65
BOD mg/L	208	65	83	84	78	57	40	65	37	16.24	73.324
COD mg/L	410	129	231	295	244	167	142	253	124	49	204.4
TN mg/L	10.8	12.5	*	26	54	*	24.8	28	27	11.4	24.3125
Nitrite mg/L	*	*	*	*	*	*	*	*	*	*	*
Nitrate mg/L	*	*	*	*	*	*	*	*	*	*	*
TP mg/L	7.18	2.49	6.58	8.13	2.45	5.4	3.48	7.55	6.48	1.31	5.105
O-PO4-P mg/L	*	*	*	*	*	*	*	*	4.09	0.88	2.485
SO4 mg/L	*	*	*	*	*	32	15	37.8	31.5	*	29.25
Phenols µg/L	*	*	*	*	*	*	*	*	*	*	*
Atrazine µg/L	*	*	*	*	*	*	*	*	*	*	*
Dichloromethane µg/L	*	*	*	*	*	*	*	*	*	*	*
Simazine µg/L	*	*	*	*	*	*	*	*	*	*	*
Toluene µg/L	*	*	*	*	*	*	*	*	*	*	*
Tributyltin µg/L	*	*	*	*	*	*	*	*	*	*	*
Xylenes µg/L	*	*	*	*	*	*	*	*	*	*	*
Arsenic µg/L	*	*	*	*	*	*	*	*	*	*	*
Chromium ug/L	*	*	*	*	*	*	<20	<20	*	*	<20
Copper ug/L	*	*	*	*	*	*	10	21	*	*	15.5
Cyanide µg/L	*	*	*	*	*	*	*	*	*	*	*
Fluoride ug/l	*	*	*	*	*	*	*	*	*	*	*
Lead ug/L	*	*	*	*	*	*	<20	<20	*	*	<20
Nickel ug/L	*	*	*	*	*	*	<20	<20	*	*	<20
Zinc ug/L	*	*	*	*	*	*	55	50	*	*	52.5
Boron ug/L	*	*	*	*	*	*	*	*	*	*	*
Cadmium ug/L	*	*	*	*	*	*	<20	<20	*	*	<20
Mercury µg/L	*	*	*	*	*	*	*	*	*	*	*
Selenium µg/L	*	*	*	*	*	*	*	*	*	*	*
Barium ug/L	*	*	*	*	*	*	<20	<20	*	*	<20

value at 1/2 of LOD for Statistical Purposes

Attachment E4-Dunmanway WWTP Outlet 2008 Data

Sample Date	07/02/2008	03/04/2008	22/05/2008	04/06/2008	19/06/2008	02/07/2008	30/07/2008	03/09/2008	11/09/2008	30/10/2008	27/11/2008	02/12/2008	Average	Kg/day	Kg/year
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent			
Sample Code	GS051	GS222	GS458	GS483	GS578	GS600	GS737	GS843	GS901	GS1159	GS1291	GS1305			
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	*	*	*	*	864	*	*
pH	7.1	*	7.2	7.2	7.2	7.1	7	7.3	7.2	*	*	7.4	7.188889	*	*
Temperature °C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cond 20 °C	*	509	377	167	417	194	204	295	271	*	*	*	304.25	*	*
SS mg/L	40	74	152	57	59	122	81	42	45	32	49	33	65.5	56.592	20656.08
NH <sub>3</sub> mg/L	11.8	24.5	12.6	*	18.1	4.1	6	11.3	7.8	*	*	*	12.025	10.3896	3792.204
BOD mg/L	44.2	87.4	311	45.4	85.7	35	44.1	30	30.9	16.9	60	74	72.05	62.2512	22721.69
COD mg/L	133	280	570	118	200	85	105	76	82	49	157	201	171.3333	148.032	54031.68
TN mg/L	15.9	46	17.5	8.7	77	2.3	12.4534	27	*	*	*	*	25.85668	22.34017	8154.161
Nitrite mg/L	*	*	*	*	*	*	0.0884	*	*	*	*	*	0.0884	0.076378	27.87782
Nitrate mg/L	*	*	*	*	*	*	1.165	*	*	*	*	*	1.165	1.00656	367.3944
TP mg/L	2.28	*	0.96	1.83	3.53	1.82	2.44	2.49	*	*	*	*	2.192857	1.894629	691.5394
O-PO <sub>4</sub> -P mg/L	1.48	4.28	1.4	1.09	2.26	0.5	1.48	1.99	*	*	*	*	1.81	1.56384	570.8016
SO <sub>4</sub> mg/L	<30	*	*	*	*	*	<30	*	*	*	*	*	<30	<23.7	<8650.5
Phenols µg/L	*	*	*	*	*	*	<0.10	*	*	*	*	*	<0.10	<0.079	<28.835
Atrazine µg/L	*	*	*	*	*	*	<0.01	*	*	*	*	*	<0.01	<0.0079	<2.8835
Dichloromethane	*	*	*	*	*	*	<1	*	*	*	*	*	<1	<0.79	<288.35
Simazine µg/L	*	*	*	*	*	*	<0.01	*	*	*	*	*	<0.01	<0.0079	<2.8835
Toluene µg/L	*	*	*	*	*	*	<1	*	*	*	*	*	<1	<0.79	<288.35
Tributyltin µg/L	*	*	*	*	*	*	not required	*	*	*	*	*	*	*	*
Xylenes µg/L	*	*	*	*	*	*	<1	*	*	*	*	*	<1	<0.79	<288.35
Arsenic µg/L	*	*	*	*	*	*	<0.96	*	*	*	*	*	<0.96	<0.7584	<276.816
Chromium ug/L	<20	*	<20	<20	<20	*	<10	<20	<20	*	*	*	<18.57143	<0.01586	<5.7889
Copper ug/L	10	*	10	10	174	*	39.4	10	10	*	*	*	37.62857	0.03213	11.729
Cyanide µg/L	*	*	*	*	*	*	5	*	*	*	*	*	<5	<.00432	<1.5768
Fluoride ug/l	*	*	*	*	*	*	140	*	*	*	*	*	140	0.12096	44.1504
Lead ug/L	10	*	10	10	40.5	*	11.6	10	10	*	*	*	14.58571	0.012602	4.59973
Nickel ug/L	<20	*	<20	<20	<20	*	<0.05	<20	<20	*	*	*	<24	<0.020736	<7.56864
Zinc ug/L	23.1	*	61	62	268	*	73.61	29	53.7	*	*	*	81.48714	0.07074	25.8201
Boron ug/L	10	*	51	10	54	*	10	25	10	*	*	*	24.28571	0.020983	7.658795
Cadmium ug/L	<20	*	<20	<20	<20	*	<1	<20	<20	*	*	*	<17.286	<0.01494	<5.451
Mercury µg/L	*	*	*	*	*	*	<0.2	*	*	*	*	*	<0.2	<0.0001728	<0.06307
Selenium µg/L	*	*	*	*	*	*	<0.74	*	*	*	*	*	<0.74	<0.0006394	<0.23366
Barium ug/L	10	*	24	39	90	*	43.5	10	10	*	*	*	32.35714	0.02796	10.2054

value at 1/2 of LOD for Statistical Purposes

\*Predicted daily flow

## Attachment E4-Dunmanway Upstream- River Bandon

Sample Date	07/02/2008	04/03/2008	22/05/2008	04/06/2008	19/06/2008	02/07/2008	30/07/2008	03/09/2008	11/9/2008	Average
Sample	River	River	River	River	River	River	River	River	River	River
Sample Code	GS052	GS223	GS459	GS485	GS579	GS597	GS738	GS844	GS900	n/a
Flow M <sup>3</sup> /Day		*	*	*	*	*	*	*	*	
pH	7.20	*	7.30	7.50	7.40	7.40	7.10	7.40	*	7.33
Temperature °C		*	*	*	*	*	*	*	*	
Cond 20°C		124	89.5	128	*	83	79	109	*	102.08333
SS mg/L	1.25	1.25	3	1.25	1.25	1.25	1.25	1.25	*	1.46875
NH <sub>3</sub> mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BOD mg/L	0.5	0.5	*	2.94	*	0.5	3.36	0.5	*	1.3833333
COD mg/L	10.5	*	*	*	*	*	26	10.5	*	15.666667
TN mg/L	0.6	*	0.25	0.25	24	0.25	2.309	11	*	5.5227
Nitrite mg/L		*	*	*	*	*	0.011		*	0.011
Nitrate mg/L		*	*	*	*	*	0.618		*	0.618
TP mg/L	0.1	0.35	0.1	0.1	0.1	0.1	0.1	0.1	*	0.13125
O-PO4-P mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SO4 mg/L	<30		*	*	*	*	<30	*	*	<30
Phenols µg/L	*	*	*	*	*	*	<0.10	*	*	<0.10
Atrazine µg/L	*	*	*	*	*	*	<0.01	*	*	<0.01
Dichloromethane	*	*	*	*	*	*	<1	*	*	<1
Simazine µg/L	*	*	*	*	*	*	<0.01	*	*	<0.01
Toluene µg/L	*	*	*	*	*	*	<1	*	*	<1
Tributyltin µg/L	*	*	*	*	*	*	not required	*	*	*
Xylenes µg/L	*	*	*	*	*	*	<1	*	*	<1
Arsenic µg/L	*	*	*	*	*	*	<0.96	*	*	<0.96
Chromium ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Copper ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	*	*	<5	*	*	<5
Fluoride ug/l	*	*	*	*	*	*	50	*	*	50
Lead ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Nickel ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Zinc ug/L	*	10	10	10	10	*	10	10	537	85.285714
Boron ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Cadmium ug/L	*	<20	<20	<20	<20	*	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	*	*	<0.2	*	*	<0.2
Selenium µg/L	*	*	*	*	*	*	<0.74	*	*	<0.74
Barium ug/L	*	10	10	10	44	*	47	34	10	23.571429

■ value at 1/2 of LOD for Statistical Purposes

For inspection purposes only. Consent of copyright owner required for any other use.

## Attachment E4-Dunmanway Downstream River Bandon

Sample Date	07/02/2008	03/04/2008	22/05/2008	19/06/2008	02/07/2008	30/07/2008	3/9/2008	11/9/2008	Average
Sample	River	River	River	River	River	River	River	River	River
Sample Code	GS053	GS224	GS460	GS580	GS598	GS741	GS845	GS899	n/a
Flow M <sup>3</sup> /Day	*	*	*	*	*	*	*	*	*
pH	7	*	7.1	7.2	7.2	7	7.3	*	7.133333
Temperature °C	*	*	*	*	*	*	*	*	*
Cond 20°C	*	132	94.6	*	101	88	120	*	107.12
SS mg/L	1.25	1.25	3	1.25	1.25	1.25	1.25	*	1.5
NH <sub>3</sub> mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BOD mg/L	0.5	0.5	*	*	0.5	3.46	0.5	*	1.092
COD mg/L	10.5	*	*	*	*	26	10.5	*	15.6667
TN mg/L	2.4	*	0.6	47	0.25	1.8032	7	*	9.8422
Nitrite mg/L	*	*	*	*	*	0.0082	*	*	0.0082
Nitrate mg/L	*	*	*	*	*	0.675	*	*	0.675
TP mg/L	<0.2	<0.20	<0.2	<0.2	<0.2	<0.20	<0.20	*	<0.20
O-PO4-P mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SO4 mg/L	<30	*	*	*	*	<30	*	*	<30
Phenols µg/L	*	*	*	*	*	<0.10	*	*	<0.10
Atrazine µg/L	*	*	*	*	*	<0.01	*	*	<0.01
Dichloromethane	*	*	*	*	*	<1	*	*	<1
Simazine µg/L	*	*	*	*	*	<0.01	*	*	<0.01
Toluene µg/L	*	*	*	*	*	<1	*	*	<1
Tributyltin µg/L	*	*	*	*	*	not required	*	*	*
Xylenes µg/L	*	*	*	*	*	<1	*	*	<1
Arsenic µg/L	*	*	*	*	*	<0.96	*	*	<0.96
Chromium ug/L	<20	<20	<20	<20	*	<20	<20	<20	<20
Copper ug/L	<20	<20	<20	<20	*	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	*	<5	*	*	<5
Fluoride ug/l	*	*	*	*	*	40	*	*	40
Lead ug/L	<20	<20	<20	<20	*	<3	<20	<20	<18
Nickel ug/L	<20	<20	<20	<20	*	<5	<20	<20	<0.02
Zinc ug/L	<20	<20	<20	<20	*	<10	<20	<20	<19
Boron ug/L	10	36	10	10	*	10	10	10	13.7143
Cadmium ug/L	<20	<20	<20	<20	*	<1	<20	<20	<17
Mercury µg/L	*	*	*	*	*	<0.2	*	*	<0.2
Selenium µg/L	*	*	*	*	*	<0.74	*	*	<0.74
Barium ug/L	10	35	31	45	*	66.5	33	10	32.9286

value at 1/2 of LOD for Statistical Purposes

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**TABLES F.1(i) REVISED**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



**TABLE F.1(i)(a): SURFACE/GROUND WATER MONITORING Revised**  
**(Primary Discharge Point – one table per upstream and downstream location)**  
**Discharge Point Code: SWO1 DUNMANWAY**  
**MONITORING POINT CODE: aSWO1u DUNM**

Parameter	Results (mg/l <sup>Note 1</sup> )				Sampling method (grab, etc.)	Limit of Quantitation	Analysis method / technique
	02/07/2008	30/07/08	03/09/08	11/09/08			
pH	7.4	7.1	7.4	Not available	Grab	2	Electrochemical
Temperature	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Electrical Conductivity (@20°C)	83	79	109	Not available	Grab	0.5 µmhos/cm	Electrochemical
Suspended Solids	<2.5	<2.5	<2.5	<2.5	Grab	0.5 mg/L	Gravimetric
Ammonia (as N)	<0.1	<0.1	<0.1	<0.1	Grab	0.02 mg/L	Colorimetric
Biochemical Oxygen Demand	<1.0	3.36	<1.0	Not available	Grab	0.06 mg/L	Electrochemical
Chemical Oxygen Demand	Not available	26	21	Not available	Grab	8 mg/L	Digestion + Calorimetric
Dissolved Oxygen	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Hardness (as CaCO <sub>3</sub> )	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Total Nitrogen (as N)	<0.5	2.309	11	Not available	Grab	0.5 mg/L	Digestion + Calorimetric
Nitrite (as N)	Not available	0.011 <sup>^</sup>	Not available	Not available	Grab	0.004mg/L	Colorimetric
Nitrate (as N)	Not available	0.618 <sup>^</sup>	Not available	Not available	Grab	0.4 mg/L	Colorimetric
Total Phosphorus (as P)	<0.2	<0.2	<0.2	Not available	Grab	0.2 mg/L	Digestion + Calorimetric
Orthophosphate (as P) - unfiltered	<0.05	<0.05	<0.05	<0.05	Grab	0.02 mg/L	Colorimetric
Sulphate (SO <sub>4</sub> )	Not available	<30	Not available	Not available	Grab	30 mg/L	Turbidimetric
Phenols (sum) <sup>Note 2</sup> (ug/l)	Not available	<0.10	Not available	Not available	Grab	0.1 µg/L	GC-MS 2

Note 1: Or other unit as appropriate – please specify.

Note 2: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

<sup>^</sup>Note 3: Samples taken on 30/07/08

**TABLE F.1(i)(b): SURFACE/GROUND WATER MONITORING (Dangerous Substances) Revised**  
**(Primary Discharge Point - one table per upstream and downstream location)**  
**Discharge Point Code: SWO1 DUNMANWAY**  
**MONITORING POINT CODE: aSWO1uDUNM**

Parameter	Results (µg/l)				Sampling method (grab, etc.)	Limit of Quantitatio n	Analysis method / technique
	02/07/2008	30/07/08	03/09/08	11/09/08			
Atrazine	Not available	<0.01	Not available	Not available	Grab	0.96 µg/L	HPLC
Dichloromethane	Not available	<1	Not available	Not available	Grab	1 µg/L	GC-MS 1
Simazine	Not available	<0.01	Not available	Not available	Grab	0.01 µg/L	HPLC
Toluene	Not available	<1	Not available	Not available	Grab	0.02 µg/L	GC-MS 1
Tributyltin	Not required	Not required	Not required	Not required	Not required	1 µg/L as Sn	GC-MS 1
Xylenes	Not available	<1	Not available	Not available	Grab	0.96 µg/L	GC-MS 1
Arsenic	Not available	<0.96	Not available	Not available	Grab	0.02 mg/L	ICP-MS
Chromium	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Copper	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Cyanide	Not available	<5	Not available	Not available	Grab	5 µg/L	Colorimetric
Fluoride	Not available	50	Not available	Not available	Grab	100 µg/L	ISE
Lead	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Nickel	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Zinc	Not available	<20	<20	537	Grab	0.02 mg/L	ICP-OES
Boron	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Cadmium	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Mercury	Not available	<0.2	Not available	Not available	Grab	0.02 µg/L	ICP-MS
Selenium	Not available	<0.74	Not available	Not available	Grab	0.74 µg/L	ICP-MS
Barium	Not available	47	34	<20	Grab	0.02 mg/L	ICP-OES

^Note 3: Samples taken on 30/07/08

**TABLE F.1(i)(a): SURFACE/GROUND WATER MONITORING Revised**  
 (Primary Discharge Point – one table per upstream and downstream location)  
**Discharge Point Code: SWO1 DUNMANWAY**  
**MONITORING POINT CODE: aSWO1dDUNM**

Parameter	Results (mg/l <sup>Note 1</sup> )				Sampling method (grab, etc.)	Limit of Quantitation	Analysis method / technique
	02/07/2008	30/07/08	03/09/08	11/09/08			
pH	7.2	7.0	7.3	Not available	Grab	2	Electrochemical
Temperature	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Electrical Conductivity (@20°C)	101	88	120	Not available	Grab	0.5 µmhos/cm	Electrochemical
Suspended Solids	<2.5	<2.5	<2.5	Not available	Grab	0.5 mg/L	Gravimetric
Ammonia (as N)	<0.1	<0.1	<0.1	<0.1	Grab	0.02 mg/L	Colorimetric
Biochemical Oxygen Demand	<1.0	3.46	<1.0	Not available	Grab	0.06 mg/L	Electrochemical
Chemical Oxygen Demand	Not available	26	<21	Not available	Grab	8 mg/L	Digestion + Calorimetric
Dissolved Oxygen	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Hardness (as CaCO <sub>3</sub> )	Not available	Not available	Not available	Not available	Grab	N/A	N/A
Total Nitrogen (as N)	<0.5	1.8032	7	Not available	Grab	0.5 mg/L	Digestion + Calorimetric
Nitrite (as N)	Not available	0.0082 <sup>^</sup>	Not available	Not available	Grab	0.004mg/L	Colorimetric
Nitrate (as N)	Not available	0.675 <sup>^</sup>	Not available	Not available	Grab	0.4 mg/L	Colorimetric
Total Phosphorus (as P)	<0.2	<0.2	<0.2	Not available	Grab	0.2 mg/L	Digestion + Calorimetric
Orthophosphate (as P) - unfiltered	<0.05	<0.05	<0.05	<0.05	Grab	0.02 mg/L	Colorimetric
Sulphate (SO <sub>4</sub> )	Not available	<30	Not available	Not available	Grab	30 mg/L	Turbidimetric
Phenols (sum) <sup>Note 2</sup> (ug/l)	Not available	<0.10	Not available	Not available	Grab	0.1 µg/L	GC-MS 2

Note 1: Or other unit as appropriate – please specify.

Note 2: USEPA Method 604, AWWA Standard Method 6240, or equivalent.

<sup>^</sup>Note 3: Samples taken on 30/07/08

**TABLE F.1(i)(b): SURFACE/GROUND WATER MONITORING (Dangerous Substances) Revised**  
**(Primary Discharge Point - one table per upstream and downstream location)**  
**Discharge Point Code: SWO1 DUNMANWAY**  
**MONITORING POINT CODE: aSWO1dDUNM**

Parameter	Results (µg/l)				Sampling method (grab, etc.)	Limit of Quantitation	Analysis method / technique
	02/07/2008	30/07/08	03/09/08	11/09/08			
Atrazine	Not available	<0.01	Not available	Not available	Grab	0.96 µg/L	HPLC
Dichloromethane	Not available	<1	Not available	Not available	Grab	1 µg/L	GC-MS 1
Simazine	Not available	<0.01	Not available	Not available	Grab	0.01 µg/L	HPLC
Toluene	Not available	<1	Not available	Not available	Grab	0.02 µg/L	GC-MS 1
Tributyltin	Not required	Not required	Not required	Not required	Grab	1 µg/L as Sn	GC-MS 1
Xylenes	Not available	<1	Not available	Not available	Grab	0.96 µg/L	GC-MS 1
Arsenic	Not available	<0.96	Not available	Not available	Grab	0.02 mg/L	ICP-MS
Chromium	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Copper	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Cyanide	Not available	<5	Not available	Not available	Grab	5 µg/L	Colorimetric
Fluoride	Not available	40	Not available	Not available	Grab	100 µg/L	ISE
Lead *	Not available	<3	<20	<20	Grab	0.003 mg/L	ICP-MS
Nickel*	Not available	<5	<20	<20	Grab	0.005 mg/L	ICP-MS
Zinc*	Not available	<10	<20	<20	Grab	0.01 mg/L	ICP-MS
Boron	Not available	<20	<20	<20	Grab	0.02 mg/L	ICP-OES
Cadmium*	Not available	<1	<20	<20	Grab	0.001 mg/L	ICP-MS
Mercury	Not available	<0.2	Not available	Not available	Grab	0.02 µg/L	ICP-MS
Selenium	Not available	<0.74	Not available	Not available	Grab	0.74 µg/L	ICP-MS
Barium	Not available	66.5	33	<20	Grab	0.02 mg/L	ICP-OES

^Note 3: Samples taken on 30/07/08 \*NOTE ; LOD for all analysis by ICP-OES is 0.02 mg/l -Some metals analysed by ICP-OES and subcontracted to ICP - MS on different batches

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.1**

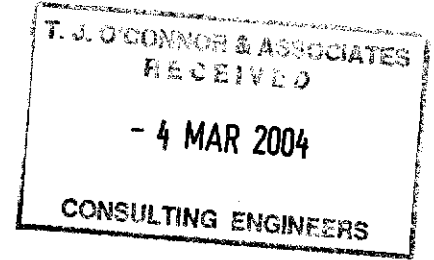
**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

3 March, 2004

Our Ref: G2003/650

Mr. Ben Gaffney,  
T.J. O'Connor and Associates,  
Corrig House,  
Corrig Road,  
Sandyford,  
Dublin 18.



**Re: West Cork Grouped Wastewater Treatment Plants**

Dear Mr. Gaffney,

We refer again to your letter of 25 September, 2003 regarding the above-proposed scheme and apologise for the delay in responding. Outlined below are the nature conservation recommendations of the Heritage and Planning Division of the Department of the Environment, Heritage and Local Government.

It is noted that discharges from Skibbereen, Baltimore and Schull are proposed to exit into Roaringwater Bay candidate Special Area of Conservation (cSAC) site code noo. 000101 (see attached site synopsis). Also the proposed land purchase area for the Dunmanway Works is inside the Bandon River cSAC site code no. 002171 (see attached site synopsis). As these areas are protected, these facts should be taken into account as the project develops and should be addressed in the planning documents.

We note that, although some material has been presented regarding the developments, in line with Article 6 of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna), more information is required to make an appropriate assessment. The following should be included when individual applications are submitted:

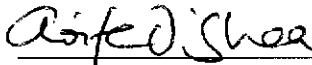
- 1 Hydrodynamic environment (if marine) in which the activity will take place including the residence or flushing time of the bay/catchment.
- 2 Nutrient levels in the discharge and how this differs from the current discharges
- 3 Biological communities over which the activity will impact including an inventory of flora & fauna (infauna, epifauna and marine mammals)
- 4 If the development requires a foreshore licence, the biological communities or habitats likely to be impacted must be described?
- 5 Construction activities that may impact on resident and/or transient bird and mammal populations.
- 6 Will construction activities result in noise/visual disturbance to marine mammals.



This recommendation is based on papers submitted to this Department on a pre-planning basis and is made without prejudice to any decision the Minister may take upon sight of a formal planning application.

Finally, please note that archaeological comments were forwarded to you on 8 October 2003. We have no architectural comments to make with regard to this development.

Yours sincerely,



Aoife O'Shea  
Development Applications Unit

Encl.

For inspection purposes only.  
Consent of copyright owner required for any other use.

## SITE SYNOPSIS

**SITE NAME: BANDON RIVER**

**SITE CODE: 002171**

The site consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the Bandon takes an easterly course. The predominant rock formations are Old Red Sandstone to the north and Carboniferous Slate stretching south of Dunmanway. Soils in the northern section consist of peats, podzols and skeletal soils. The southern section consists of alluvial soils and Brown Podzolics.

The east-west exposure of Old Red Sandstone to the north of Dunmanway displays distinct ridgelines of bare rock with poor pasture and scrub. In this area around Lovers Leap the Bandon River cuts a narrow channel southwards, cascading over a series of rock steps through a narrow valley. Below this and above Long Bridge the river widens and meanders through a fertile floodplain. Immediately south of the Long Bridge the reduced flow gradient and broad, flat valley permit the main channel to split and extend into a network of braided streams forming islands.

The site is important for a number of reasons. It contains a small though very important example of the Annex I priority habitat Alluvial Forest as well as good examples of another Annex I habitat Floating River Vegetation. The Annex II animal species Otter, Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) occur. The populations of the Mussel are thought to be nationally important. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. The river channels are well defined and the islands appear solid. Canopy dominants are Hazel (*Corylus avellana*) (multi-stemmed) and Sessile Oak (*Quercus petraea*), with scattered Downy Birch (*Betula pubescens*), Ash (*Fraxinus excelsior*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Alder (*Alnus glutinosa*). There is a very sparse understorey composed of Whitethorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*) and saplings of Hazel and Sessile Oak. Epiphytes are abundant on trees: Ivy (*Hedera helix*), Honeysuckle (*Lonicera periclymenum*) and bryophyte species such as *Isothecium myosuroides*. The ground flora is dominated by Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Ivy with abundant/scattered Lesser Celandine (*Ranunculus ficaria*), Wood Sedge (*Carex remota*) and Irish Spurge (*Euphorbia hyberna*). Goldilocks Buttercup (*Ranunculus auricomus*), a very rare plant in Co. Cork, has been recently recorded from this woodland.



Floating river vegetation is found along the length of the river and is dominated by Water-crowfoot (*Ranunculus* spp). Other aquatic plants found include Alternate Water-milfoil (*Myriophyllum alterniflorum*), Broad-leaved Pondweed (*Potamogeton natans*) and four Water-starwort species (*Callitriche* spp.). Mosses present on rocks and attached to tree roots include *Fontinalis antipyretica* in slack flow areas and *Fontinalis squamosa*, *Rhynchostegium riparioides* and *Amblystegium riparium* in moderate flows. The landward fringe of deep pools supports Yellow Water-lily (*Nuphar lutea*), Bogbean (*Menyanthes trifoliata*), Marsh Marigold (*Caltha palustris*), Water Mint (*Mentha aquatica*) and Fool's Water-cress (*Apium nodiflorum*). Shoreweed (*Littorella uniflora*) and Six-stamened Waterwort (*Elatine hexandra*) are two species of local importance which are found in the river. In moderate current flow below the Long Bridge, the larger stones are covered by the moss *Brachythecium rivulare* and the Liverwort *Chiloscyphus polyanthos* var. *polyanthos*. Boulders covered in *Nostoc* algae are probably of local occurrence in Ireland. The liverwort *Riccardia chamaedryfolia* and the moss *Fissidens crassipes* found under the Long Bridge are considered to be rare in Ireland.

Heath in mosaic with wet grassland, exposed rock, scrub and improved grassland covers up to 30% of the site north of Long Bridge. Typical heath plants growing in association with the rocks are abundant Western Gorse (*Ulex gallii*), Ling Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*E. tetralix*), Tormentil (*Potentilla erecta*), Heath Grass (*Danthonia decumbens*), Stonecrops (*Sedum* spp.), small amounts of St Patrick's Cabbage (*Saxifraga spathularis*) and many lichen species.

Some small areas of woodland occur within the site north of Long Bridge. Tree species such as Sessile Oak, Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Downy Birch are found with an understorey of Holly, Hazel, Rowan and Rusty Willow.

Two Red Data Book plant species have been recorded in the past from within or close to the site - Greater Broomrape (*Orobanche rapum-genistae*), a species that grows on the roots of legumes, and Small White Orchid (*Pseudorchis albida*), a species of upland pastures and heaths that is protected under the Flora Protection Order 1999.

The river below Long Bridge is an important inland site in Cork for Mute Swan and approximately 20 individuals are present throughout the year along this stretch. Several hundred Snipe use the site during the winter. Other birds seen regularly within the site are Grey Heron, Cormorant and Mallard, while low numbers of Lapwing and Teal visit during the winter.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Badger, Irish Hare, Daubenton's Bat and Pipistrelle. The two bat species can be seen feeding along the river and roosting under the old bridges.

Landuse at the site consists mainly of sheep grazing in the northern section and cattle grazing on improved grasslands below Lovers Leap and further south. In the area between Milleenanannig and Bealaboy Bridge land reclamation and drainage is taking

place. In the area of exposed rock on the higher terrain above Ardcahan Bridge some land reclamation and forestry is carried out.

This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

29.6.2001

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.2**

**3/6/09**

For inspection purposes only.  
Consent of copyright owner required for any other use.

<u>Dixon .Brosnan</u> environmental consultants	
Project title	Assessment of the ecological impacts of providing an upgraded Wastewater Treatment System at Dunmanway, Co. Cork
Client	T.J. O' Connor & Associates
Client ref.	-
D.B ref.	
Revision	0 Issue to client
Date	
approved by	Carl Dixon B. Sc. (Applied Ecology)
on behalf of Dixon.Brosnan	
Dixon.Brosnan, 6 Kilbrogan Street, Bandon, Cork, Ireland. Tel: (021) 4968 600 Fax: (021) 4968 210 Email: dixonbrosnan@eircom.net	

For inspection purposes only.  
Consent of copyright owner required for any other use.

## CONTENTS

Introduction	3
Existing sewerage scheme	3
Existing water quality	7
River flows	10
Assimilative capacity	11
Impact of discharge	13
Ecology	17
Fauna	20
Possible Impacts	22
Disposal options	23
Mitigation measures	25
Conclusions	26
Appendix 1 – Site synopsis	29
Appendix 2- Species list	31
Appendix 3-References	33
Appendix 4- Freshwater mussel survey	34

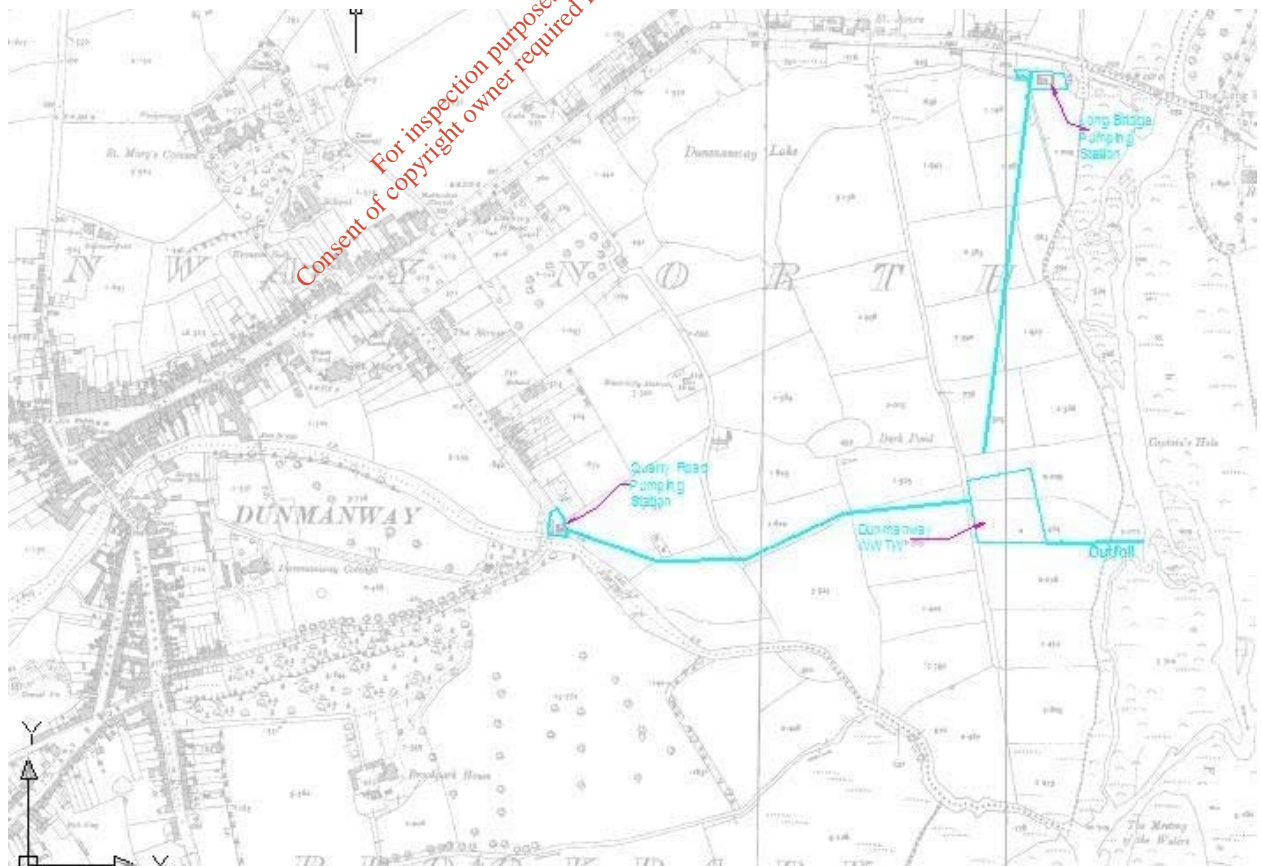
## 1. INTRODUCTION

Dixon.Brosnan environmental consultants were asked by T.J O'Connor & Associates to carry out an impact assessment in respect of an upgraded wastewater treatment plant to be constructed at Dunmanway, Co. Cork. An ecological assessment was requested by the Heritage section of the Department of Environment (Duchas).

The proposed development is below the threshold at which an Environmental Impact Assessment is required under the European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989), and accordingly this report does not purport to be an Environmental Impact Statement. However, the Environmental Protection Agency document *Advice notes on current practice in the preparation of Environmental Impact Statements (2000)* was consulted during the preparation of the report.

## 2. EXISTING SEWERAGE SCHEME

**Map 1 shows an outline of the current treatment system.**



Following flow and load surveys it was determined that the average load to the plant is approximately 2,370 PE at present. The total existing load to the treatment plant based on the population figures and estimates of the loads from non-domestic dischargers is 2,214 PE. This correlates rather well with the loads determined by flow and load surveys. For the purposes of comparison in this report a figure of 2,214 PE will be used.

### 2.1 Influent and Effluent Monitoring

The influent and effluent flows of the Dunmanway WWTP were monitored for approximately 5-6 times per year in accordance with the Urban Wastewater Treatment Directives. The results of this monitoring up until the year 2000 are presented below.

ADD flow and load figures from 2003

**Table 1 – Influent Concentrations**

Year	COD (mg/l)	BOD (mg/l)	SS (mg/l)
1996	-	142	465
1998	-	-	-
2000	-	-	-

**Table 2 – Effluent Concentrations**

Year	COD (mg/l)	BOD (mg/l)	SS (mg/l)
1996	-	17	23
1998	27	17	-
2000	206	46	138

The limited amount of influent data restricts the determination of the influent loads. Furthermore, the available data show large differences between the BOD and SS concentrations, which are out of the regular ranges. The effluent data show satisfactory results for 1996 and 1998. The effluent met the discharge standards as set by the UWWTD. In 2000, the effluent concentrations showed a substantial deterioration. The discharge standards were not met in 60-75% of the samples. To determine the treatment levels occurring at present further tests were conducted in May 2004 the results of which are detailed in Table 3:

**Table 3: Waste water treatment plant data 2004**

Date	Raw Effluent		Treated effluent	
	BOD (mg/l)	SS (mg/l)	BOD (mg/l)	SS (mg/l)
13/5/04			33	-
14/5/04			74	177

Composite sample 13-14/5/04	74	228		
-----------------------------	----	-----	--	--

Although it is noted that the data is very limited the most recent results suggest that treatment is presently very poor. The results suggest that BOD reduction is minimal and that the levels of suspended solids in the final effluent are elevated. A comparison with results from 2000 suggests that treatment efficiency has deteriorated in the intervening years.

## 2.2 Future Population

Cork County Council has drafted a County Development Plan in 2003, in which, among others, the objectives for future development are described. This plan states that Dunmanway is considered to be a key support settlement in the heart of West Cork. The overall strategy aims to improve Dunmanway's important commercial, administrative and institutional functions serving a wide area and to promote its potential as a rural industrial/enterprise location.

The Development Plan has proposed a new development boundary. This has been set to include all the areas that are the subject of specific zoning objectives. In addition, it includes relatively large areas of either established or proposed open space that form part of the structure of the town. For the design of the wastewater treatment plan, a horizon of about 20 years is in general taken as starting point.

## 2.3 Future Non-Domestic Loads

In the Development Plan, several zones have been designated for the provision of industries or a post primary school. With common-used design rules for the estimation of the flows and loads (17.4 ha; 28 m<sup>3</sup>/ha/day; 0.225 m<sup>3</sup>/PE/day), the possible contribution of these zones might allow for more than 2,000 PE. In accordance with the assumptions for the population growth, this might also be considered as the long-term estimate. For the design of the wastewater treatment plant, a figure of 500 PE is assumed to be appropriate. The total non-domestic load will hence be 1,080 PE.

## 2.4 Total Future Load

Based on the figure noted above the design load of the wastewater treatment plant is calculated as follows.

**Table 4 – Existing and Future Loads**

	Current PE	Increase in PE	Design PE
Domestic	1,632	648	2,280
Non-Domestic	580	500	1,080
Total	2,212	1,148	3,360



It is proposed to design the extended and upgraded wastewater treatment to cater for a population equivalent of 3,500 PE.

### 2.5 Nutrient loadings

The current load is estimated to be 2,214 PE. A discharge volume per person of 180l/day is usually considered appropriate when determining effluent flows. This will result in a total flow of 398.52 m<sup>3</sup> per day. The most recent BOD results for the treated effluent in May 2004 were 33 and 74 mg/l; giving an average of 53.5 mg/l. This would result in a total BOD discharge to the river of 21.32 kg/day. The level of suspended solids was recorded in May 2004 was 177mg/l. This will result in a total discharge of 70.54 kg/day to the Bandon River

It is assumed that within the next 20 years a population equivalent of 3,500 will be reached in Dunmanway; an increase of 58.1%. In the absence of upgrade and increased treatment efficiency this would result in a total BOD discharge of 33.71 kg/day and a total suspended solid discharge of 111.53 kg/day.

Based on the above, the current discharge of sewage would be expected to cause deteriorations in water quality. In the absence of an appropriate upgrade the increased in population in Dunmanway will lead to greater discharge of nutrients to the Bandon River.

## 3. PROPOSED SEWERAGE SCHEME

### 3.1 Treatment plant

Due to the increasing load on the plant and the need to provide a satisfactory effluent quality, it is proposed to upgrade the treatment plant to cater for the future increased loads. This plant will be designed to serve a population equivalent of 3,500 persons. The proposed treatment standards are shown in Table 5 and a comparison of treatment from the existing and upgraded treatment plants is shown in Table 6:

**Table 5: Proposed treatment standards.**

Parameter	Value	Unit
Design Capacity	3,500	p.e.
BOD	25	mg/l
COD	125	mg/l
Suspended Solids	35	mg/l
Total Phosphorus	1.5	mg/l

**Table 6 – A comparison of treatment efficiencies for SS and BOD**

	<b>Population equivalent 2214 180l/person/day BOD 53.5 mg/l SS 177 mg/l</b>	<b>Upgraded treatment plant. Predicted 3,500 PE 180l/person/day BOD 25mg/l, SS 35 mg/l</b>	<b>% reduction in total discharge</b>
BOD kg/day	21.32	15.75	26.13
SS kg/day	70.54	22.05	68.74

As detailed above the upgrade will significantly reduce the amount of nutrients reaching the river, despite the increase in population. It is also noted that the population size will increase incrementally; thus in the short term the amount of nutrients being discharged will be considerably lower.

#### 4. EXISTING WATER QUALITY

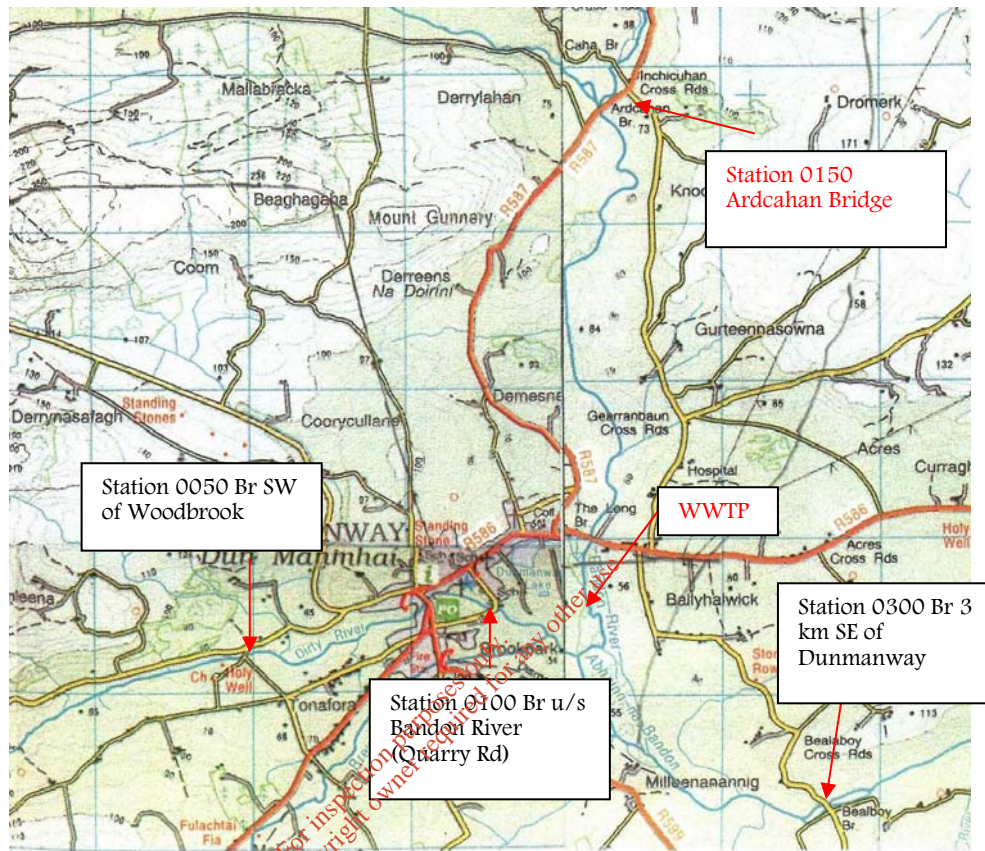
##### 4.1 Biological monitoring

Results for the EPA biological monitoring programme on the Bandon River are detailed in Table 7 and the locations of the most relevant sampling points are shown on Map 1.

**Table 7: Q values recorded at sampling stations on the Bandon river (1971-2003)**

Sampling Stations	Biological Quality Ratings (Q Values)										
No.	Location	1971	1976	1978	1982	1986	1989	1994	1997	2000	2003
0050	Br E of Keenrath House	~	~	~	~	~	4-5	4-5	4	4-5	4-5
0100	Br u/s Ardcahan Bridge	5	4-5	4-5	4-5	4	3-4	~	~	~	~
0150	Ardcahan Bridge	~	~	~	~	4-5	4	4	4	4	4
0200	Br near River View	~	~	4-5	4-5	4-5	4	~	~	~	~
0300	Br 3km SE of Dunmanway	5	4-5	4-5	4	4	4	4	4	3-4	3-4
0400	Manch Bridge	5	4-5	4	4	4	3-4	4	3-4	3-4	3-4
0550	Bridge S of Enniskean	~	~	~	~	~	4	4-5	4	3-4	4
0600	Br nr Desert Station	5	5	5	3-4	3-4	4	4-5	4	4	4
0700	Carhoon Bridge	5	4-5	4	3-4	4	3-4	4-5	4	4	4
0780	Bandon Bridge	~	~	~	~	~	3-4	~	~	~	~
0800	1.5km d/s Bandon Bridge	5	3	2-3	3	4	3	3-4	3	3	3
0850	French's Wood	~	~	~	~	~	3-4	~	~	~	~
0900	Bridge u/s Inishannon	5	4-5	4	4	4	3-4	4	4	4	4

**Map 2 showing the locations of the relevant EPA sampling points.**



Results indicate that for much of its length water quality in the Bandon River is satisfactory. However the deterioration in water quality at site 0300 Br 3km SE of Dunmanway which was assigned a Q value of 3-4, may be due to the existing outflow from the wastewater treatment plant. Similarly the deterioration downstream of Bandon at site 0800 is probably related to the Bandon wastewater treatment plant.

Generally water quality has declined over the sampling period; however this is probably due to changes in farm practices and population changes. The sites of most relevance to the current proposal are those located upstream of the existing discharge (0200 Ardcahan Bridge) and downstream of the existing discharge (0300 Br 3km SE of Dunmanway). At the upstream site (0200) water quality has been consistently satisfactory since sampling commenced. At the downstream site water quality was satisfactory until 2000 when a Q value of 3-4 was assigned. This value which is indicative of water quality in transition was also assigned in 2003. Based on the available results it would appear that the existing discharge is having a negative impact on water quality.

One of the contributors to the River Bandon is the Dirty River, which conflues with the River Bandon approximately 1 km southeast of Dunmanway. The overflow outfall from the Quarry Road Pumping Station discharges to the Dirty River. The two stations on the Dirty River are Station 050 at the bridge southwest of the Woodbrook Estate and Station 100 located at Quarry Bridge in Dunmanway. Overflows from the Quarry Road Pumping Station discharge to the Dirty between these two sites. A Q value of 4 assigned to the upstream site (050) 2000 whereas the downstream site (100) was assigned a Q value of 3-4. Based on these ratings it would appear that the overflow is having a negative impact on water quality.

#### 4.2 Chemical Monitoring

The results obtained from Cork County Council for the period 1998-2000 is shown in Table 8:

**Table 8: County Council Data 1998-2000**

Station No.	Dissolved Oxygen % Saturation				Dissolved Oxygen mg O <sub>2</sub> l <sup>-1</sup>				B.O.D mg O <sub>2</sub> l <sup>-1</sup>			
	No.	Min	Med	Max	No.	Min	Med	Max	No.	Min	Med	Max
0150	16	68	99	110	16	7.8	11.6	12.6	22	0.3	1.0	3.3
0300	12	67	94	112	12	7.3	11.0	12.6	14	0.7	1.0	1.6
0400	17	71	92	128	17	9.0	11.9	14.1	23	0.6	1.3	4.0
0500	17	64	94	122	17	8.3	11.2	13.9	21	0.7	1.2	5.9
0550	-	-	-	-	-	-	-	-	-	-	-	-
0600	14	63	91	102	14	8.4	10.8	12.3	15	0.7	1.1	1.9
0700	18	62	94	112	18	8.6	11.0	14.0	23	0.4	1.4	3.8
0770	8	91	99	110	8	9.1	11.0	12.6	13	0.3	1.2	2.2
0900	18	68	100	126	18	8.9	11.6	14.4	23	0.8	1.3	4.4

Station No.	Chloride mg Cl l <sup>-1</sup>				Total Ammonia mg N l <sup>-1</sup>				Un-Ionised Ammonia mg NH <sub>3</sub> l <sup>-1</sup>			
	No.	Min	Med	Max	No.	Min	Med	Max	No.	Min	Med	Max
0150	-	-	-	-	24	0.01	0.03	0.19	17	<0.001	<0.001	0.001
0300	-	-	-	-	13	0.02	0.03	0.15	10	<0.001	<0.001	<0.001
0400	-	-	-	-	23	0.02	0.03	0.11	16	<0.001	<0.001	<0.001
0500	-	-	-	-	23	0.02	0.06	0.19	17	<0.001	<0.001	0.001
0550	-	-	-	-	4	0.03	0.04	0.08	-	-	-	-
0600	-	-	-	-	16	0.02	0.04	0.13	12	<0.001	<0.001	0.001
0700	-	-	-	-	25	0.02	0.04	0.13	18	<0.001	<0.001	0.001
0770	-	-	-	-	17	0.01	0.03	0.14	11	<0.001	<0.001	0.001
0900	-	-	-	-	24	0.01	0.03	0.57	17	<0.001	<0.001	0.004

Station No.	Oxidised Nitrogen mg N l <sup>-1</sup>				Ortho-Phosphate mg P l <sup>-1</sup>				Colour Hazen			
	No.	Min	Med	Max	No.	Min	Med	Max	No.	Min	Med	Max
0150	15	0.4	0.8	1.6	23	<0.01	0.01	0.02	-	-	-	-
0300	11	0.6	1.6	2.7	13	0.01	0.01	0.03	-	-	-	-
0400	16	0.6	1.8	4.0	24	0.01	0.01	0.02	-	-	-	-
0500	14	0.9	2.3	3.6	23	0.01	0.02	0.06	-	-	-	-
0550	4	1.4	2.1	7.3	4	0.01	0.03	0.04	-	-	-	-
0600	13	1.1	2.7	4.1	15	0.01	0.03	0.06	-	-	-	-
0700	15	1.1	2.8	4.4	25	0.01	0.03	0.07	-	-	-	-
0770	8	1.0	2.8	3.1	18	<0.01	0.02	0.05	-	-	-	-
0900	18	1.7	3.7	5.5	25	0.01	0.03	0.09	-	-	-	-

The data available for the period 1998-2000 indicates that water quality is generally satisfactory in the Bandon River. The sites of most relevance to the current proposal are those located upstream of the existing discharge (0200 Ardcahan Bridge) and downstream of the existing discharge (0300 Br 3km SE of Dunmanway). No significant differences were noted in levels of total and un-ionised ammonia; however an increase in BOD, oxidised nitrogen and orthophosphate and a decrease in dissolved oxygen suggests that the existing discharge is causing a slight deterioration in water quality.

## 5. RIVER FLOWS

As there are no hydrometric gauging stations on this stretch of the River Bandon, there is no long-term historical record of flows available for this study. All analyses have therefore been based on river catchment characteristics, as described below.

For the purposes of estimating the required effluent discharge standards, low flows in the river are of particular importance. These are used for calculations of dilution, fully mixed contaminant concentrations and when combined with background water quality measurements, they provide an accepted basis for determining appropriate effluent discharge standards. For the purposes of the current study, a software package developed by the European Small Hydropower Association (*Hydra*) for use throughout Ireland, has been used to estimate low flows on the River Bandon. The package was developed by the Institute of Hydrology in the UK under a EU contract to provide the necessary hydrologic estimates for small scale hydropower projects in Ireland.

A widely accepted characterisation of low flows in rivers is the ninety-fifth percentile flow. This represents the value at which, statistically, flow in the river will be higher for 95% of the time. Table 8 below shows the output from the *Hydra* package, for the River Bandon at the outfall from the existing treatment works.

**Table 9 – River Bandon catchment characteristics and flow regime results**

<b>Catchment Characteristics</b>	
Total Area:	104.4 km <sup>3</sup>
Rainfall (average annual):	1,843 mm
Potential Evaporation (average annual):	509 mm
Runoff (average annual):	1,366 mm
<b>Flow Regime Results</b>	
Mean flow estimate:	4.50 m <sup>3</sup> /s
Q95 (% of mean):	11.6 %
Q95 (absolute):	0.52 m <sup>3</sup> /s

## 6. ASSIMILATIVE CAPACITY

### 6.1 Waste assimilative capacity

The waste assimilative capacity (WAC) of a watercourse is the mass of BOD, which the watercourse can healthily absorb in one day. The WAC is a function of the existing BOD in the watercourse, the maximum permissible BOD and the minimum flow rate. The WAC may be determined as follows:

$$WAC = (C_{\max} - C_{\text{back}}) \times F_{95} \times 86.4 \quad \text{Equation 27.1}$$

where WAC = waste assimilative capacity (kg BOD/day)

$C_{\max}$  = maximum permissible BOD (mg/l)

$C_{\text{back}}$  = background upstream BOD (mg/l)

$F_{95}$  = 95<sup>th</sup> percentile flow (= min. flow approx.) (m<sup>3</sup>/s)

86.4 = units conversion factor

Under the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988) the maximum BOD concentration in salmonid freshwaters should not exceed 5mg/l. This standard should be conformed to by 95% of samples over a period of 12 months. Although the Bandon River has not been designated as a salmonid river under these regulations this limit is considered appropriate given the importance of salmonid species within the river.

The median background BOD in the River Bandon upstream of the proposed outfall location at Station 0150 Ardcahan Bridge during the period 1998-2000 was 1mg/l. This figure was derived from the results of Cork County Council's monitoring programme during that period. Using the 95<sup>th</sup> percentile flow of 0.52 m<sup>3</sup>/s determined by the Hydra package for the discharge point the

WAC at this point was estimated to be 179.71kg BOD/day. An upgraded treatment plant serving 3,500 p.e with a BOD discharge of 25mg/l would result in a daily discharge of 15.75 kg/day. Thus, the waste assimilative capacity available, based on the total flow in the Bandon River, is considerably higher than the predicted daily discharge.

### 6.2 BOD- mass balance equation

Mass balance equations may be used to determine the concentration of a parameter in a watercourse downstream of its discharge. A typical equation is as follows:

$$T = (FC + fc) / (F + f)$$

where T = downstream pollutant concentration (mg/l)

F = upstream river flow (m<sup>3</sup>/s)

C = background pollutant concentration (mg/l)

f = effluent flow (m<sup>3</sup>/s)

c = effluent pollutant concentration (mg/l)

The Commission standards formed the basis for *Memorandum No. 1* (1978) issued by the Irish Department of the Environment Technical Committee on Effluent and Water Quality Standards. This notes that a discharge to a watercourse should not increase the BOD within the watercourse by more than 1mg/l. Using the mass balance equation and a final concentration of 25 mg/l BOD in the final wastewater discharge the downstream BOD concentration was calculated at 1.33mg/l. Thus the proposed treatment will not lead to excessively elevated levels of BOD downstream of the discharge.

### 6.3 Phosphorous – mass balance equation

Within the aquatic environment phosphorus will be present in a number of forms, both organic and inorganic, and within solution or bound in solids. All forms present are referred to as total phosphorus. A significant fraction of total phosphorus is available for biological metabolism and is termed orthophosphate. The analytical procedure used in the determination of orthophosphate is the molybdate-reactive method, which is used to derive the concentration of molybdate-reactive phosphate (MRP) in a sample. Although the MRP may slightly overestimate the level of orthophosphate present, the two expressions have become synonymous.

The target values specified in the Phosphorous Regulations were adopted on the basis of the empirical relationship between the biotic indices and orthophosphate concentrations in Irish waters as monitored extensively by the EPA. In practical terms Q values of 4 or more are taken to represent satisfactory water quality, where eutrophication is unlikely to be a problem.

Because annual median phosphate (P) values in such waters rarely exceed 30ug P/l, this concentration has been adopted as the target value to be achieved by 2007.

The median background BOD in the River Bandon upstream of the proposed outfall location at Station 0150 Ardcahan Bridge during the period 1998-2000 was 0.01mg/l. Using the mass balance equation and a final concentration of 1.13mg/l orthophosphate in the final wastewater discharge the downstream BOD concentration was calculated at 0.0156 mg/l. Thus the proposed treatment will not lead to excessively elevated levels of orthophosphate downstream of the discharge.

## 7. IMPACT OF THE EXISTING DISCHARGE

Currently the treatment plant discharges via a concrete pipe into a channel of the Bandon River. The river in this area is braided and forms a number of channels, which meander, through dense woodland. There are numerous backwaters and dead-end channels and the exact flow pattern will vary continuously depending on the volume of water flowing in the river. Upstream of the discharge point a large proportion of the available water is diverted into another channel, which is not affected by the discharge. The treated effluent discharges into a shallow pool, which is drained by two channels.

The river was visited during moderate flow conditions and during low flow conditions. The effect of the discharge can be determined by the silt deposition pattern. Based on this pattern it was determined that the discharge is diverted through the larger of the two channels (denoted channel "A" for the purposes of this report). Deep silt has built up along the bank for approximately 4m between the discharge point and the mouth of channel A. In places this layer of silt is up to 0.5m in depth. This pattern of silt deposition continues down channel, A which runs for 308m before rejoining the main channel. In the upper reaches of this channel there are obvious indications of the effect of the discharge with strong growth of sewage fungus on woody material in the stream. Sanitary products were also noted.

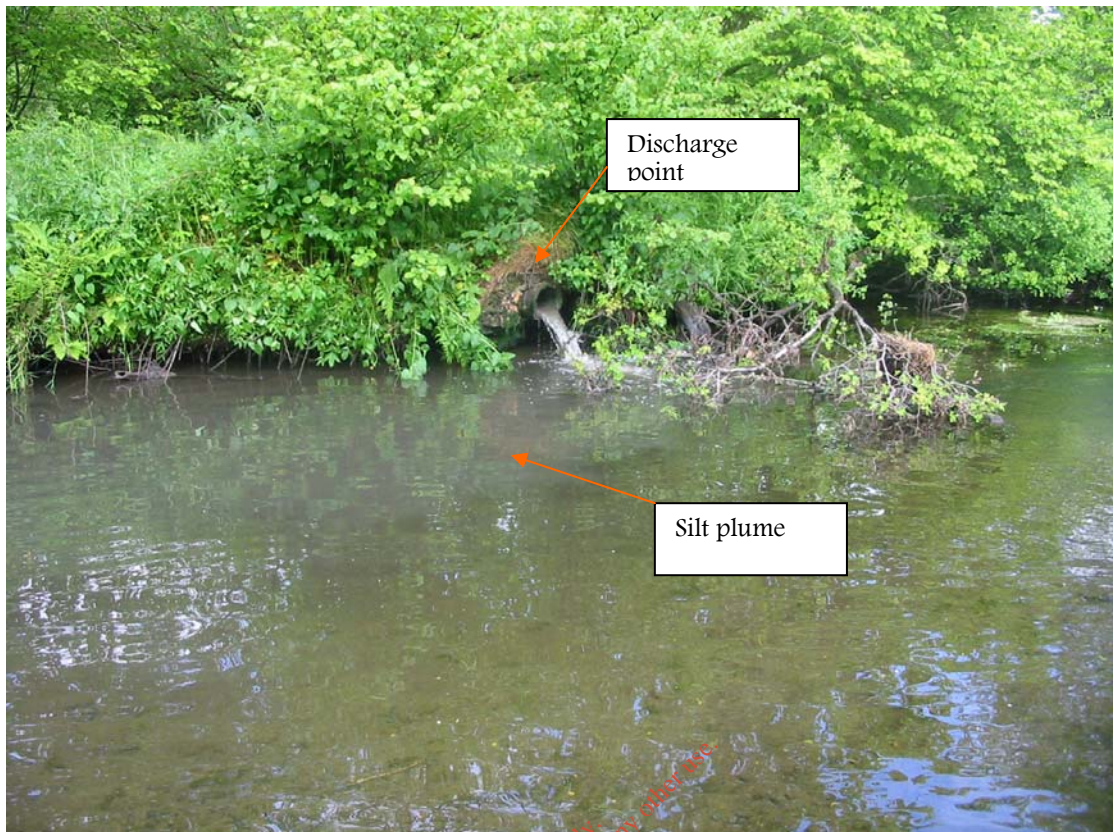
At moderate flows some of the water from this pond does discharge through a second smaller channel (denoted channel "B" for the purposes of this report). During low flows a spit of gravel is obvious which allows only minimal flow to channel B. The mouth of this channel is on the opposing bank of the pond from the discharge pipe. There is a short section of riffle with gravel giving way to deep slow-flowing pools with a soft substrate. None of the distinctive grey silt found in channel A is present within this channel and likewise no sewage fungus or sanitary products were noted in this channel.



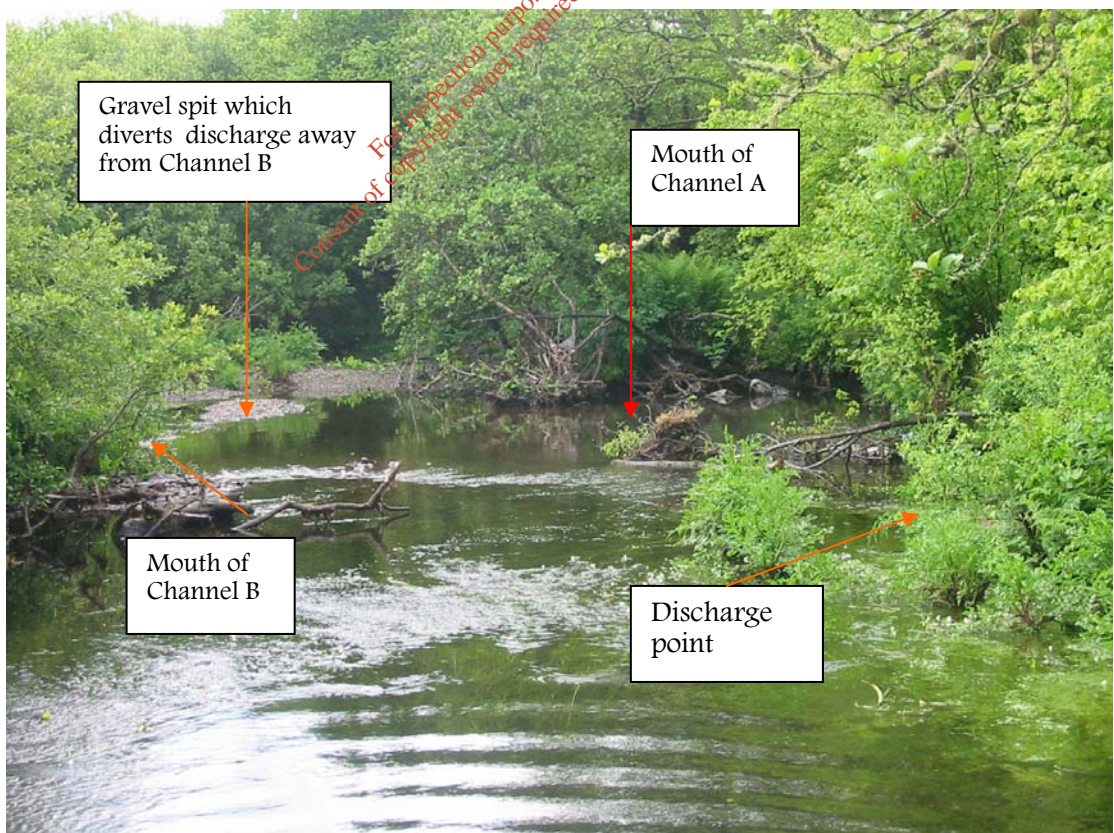
Based on the physical structure of the channel, the pattern of silt deposition and sewage fungus it seems improbable that any more than minimal amounts of treated effluent reach channel B at present.

The structure of the channel and silt plume at the discharge point is shown in Photography (I) & (II) and Map 4.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

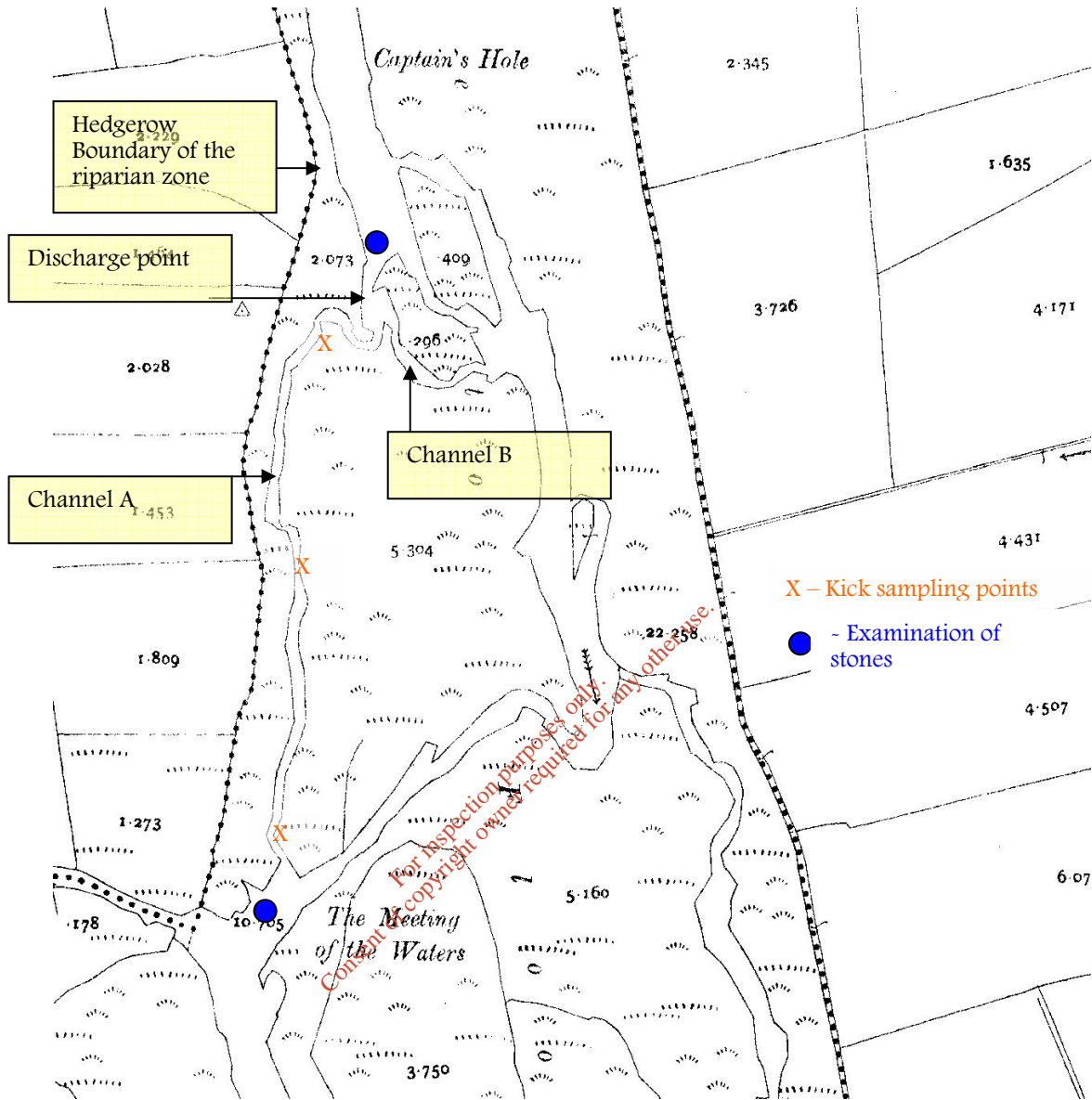


Photography (I) showing silt plume



Photography (II) showing structure of the channel at the discharge point.

**Map 4: Structure of the channel at the discharge point**



\* The structure of the river is continually changing. This map is therefore given to provide an overview and may not coincide exactly with conditions on the ground.

## 8. ECOLOGY

### 8.1 Site Designation

The section of the Bandon River into which the treatment plant discharges is a candidate Special Area of Conservation (cSAC 2171).

### 8.2 Habitats

A number of different habitat types are located at or close to the site of the proposed discharge pipe. site visits were conducted April 23<sup>rd</sup>, May 25<sup>th</sup>, and June 10<sup>th</sup> 2004. The initial visits were walkover surveys using Phase 1 methodology (JNCC 93) to identify habitat types. Species lists were compiled during subsequent site visits. All habitats were classified to level 3 of the classification scheme outlined in *A Guide to Habitats in Ireland* (Fossit, 2000) and a list of the species on which the habitat classifications are based is included in Appendix 2. It should be noted that some of the habitats are transitional and where this occurs they are placed in the category they most resemble

### 8.3 Aquatic Habitats

#### *Eroding River FW1/Depositing River FW2*

The site synopsis notes that this section of the Bandon River “contains a small though very important example of the Annex I priority habitat Alluvial Forest as well as good examples of another Annex I habitat - Floating River Vegetation”

Floating vegetation of the type mentioned in the site synopsis occurs immediately upstream of the discharge point on the smaller channel and approximately 300m downstream in the main channel. This type of vegetation is generally absent from the smaller channel. Primarily this is due to heavy shading by riparian vegetation within the woodland area and it is noticeable that where the canopy opens up the growth of aquatic flora increases.

Immediately upstream of the discharge there are examples of the type of vegetation referred to by the site synopsis. Water crowfoot is common and also noted were starwort, water milfoil and the moss *Fontinalis* sp. A dense stand of bogbean also occurs upstream of the discharge point on the same bank. Sections of the riverbank and wetter areas close to the river also contain aquatic or semi aquatic species including hemlock water dropwort, valerian, mint and marsh marigold (*Caltha palustris*).

Several aquatic plant species which are considered important or uncommon are noted in the site synopsis namely; Shoreweed (*Littorella uniflora*) and Six-stamened Waterwort (*Elatine hexandra*), a moss species *Brachythecium rivulare*, a liverwort *Chiloscyphus polyanthos* var.

*polyanthos*, an algae species *Nostoc*, a liverwort *Riccardia chamaedryfolia* and a moss *Fissidens crassipes*. None of these species were noted in channel A and given the absence of a diverse aquatic flora and the heavy shade/siltation the presence of any of these species in channel A is considered very unlikely.

#### 8.4 Macroinvertebrate Analysis

Due to the risks associated with disturbing juvenile mussels no kick sampling was carried out in the main channel where the survey was confined to examining larger stones. Due to absence of larger stones and following the determination by survey that freshwater mussels were absent kick-sampling was conducted at three sites on the side channel.

The distribution of macroinvertebrates shows a distinct pattern. Upstream of the discharge point heptageniid mayflies, which are highly sensitive to pollution, are common. Gravels in this area are clean with low silt levels and diversity appears good with species such as *Rhyacophila* sp., *Emphemerella* sp., and *Baetis* sp. also noted.

A kick sample taken 10m downstream of the discharge point indicates a sharp decline in water quality. The streambed at this location is heavily silted with dense growth of sewage fungus. Tubificid worms, which are highly tolerant of pollution, were the dominant taxa and *Chironomus* sp., which are similarly tolerant, were also noted. Minimal numbers of the uncased caddis *Hydropsyche* sp. and the freshwater shrimp *Gammarus* sp. were also noted. A Q value of 1-2 was assigned.

A second kick sample was taken approximately 150m downstream of the discharge point. Although some recovery of the biota was evident, reappearance of *Baetis* sp. in small numbers and increased numbers *Gammarus* sp. However tolerant species are still common and the most pollution species such as heptageniid mayflies are still completely absent. Although this sample was taken from a riffle area with lower shade than the previous site (60% approximately) high silt levels were again evident. A Q value of 2-3 was assigned.

A third kick sample was taken immediately upstream of the confluence of channel A and the main channel. Water movement was slow at this location with a soft substrate and high silt levels. The diversity and density of species at this location was broadly similar to those detected at the previous site. No heptageniid mayflies were detected. A Q value of 2-3 was assigned.

Finally an examination of stones was made in the main channel downstream of its confluence with channel A. Kick sampling was not carried out to prevent incidental damage to mussels. Heptageniid mayflies were noted in high numbers on the underside of larger rocks and diversity

generally was found to be higher. Silt levels were low. Dense growths of aquatic macrophytes (water crowfoot) were evident in the main channel at this location.

Based on the pattern of invertebrate distribution it would appear that the current discharge is severely impacting on water quality in channel A. This effect is particularly evident close to the discharge point. However notwithstanding the excessive shading and slow-flows which would naturally depress the diversity and density of macroinvertebrates it would appear that this effect continues for the length of the channel. However the additional flow available in the main channel downstream of the confluence would appear to provide sufficient dilution and no impact on water quality was detected.

### 8.5 Terrestrial habitats

The field in which the treatment plant is located contains similar semi-intensive grassland best categorised as *Dry calcareous and neutral grassland GS1*. Grass species include sweet vernal grass, Yorkshire fog, ryegrass (*Lolium perenne*), timothy (*Phleum pratense*) and meadow foxtail (*Alopecurus pratensis*). Herbaceous species include creeping buttercup (*Ranunculus repens*), plantain (*Plantago lanceolata*), clover (*Trifolium* sp.) and nettle (*Urtica dioica*). This habitat is not of particular conservation value.

At the discharge point the terrestrial habitats consist of a mixture of habitats including *Riparian woodland WN5*, *Hedgerows WL1*, *Scrub WS1* and *Dry meadows and grassy verges GS2*. The grassland area consists of a mixture of common grass species and herbaceous species. Growth is luxuriant reflecting limited grazing and periodic influxes of nutrients via flooding of the river. The grass species noted include cocks foot (*Dactylis glomerata*), sweet vernal grass (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), and meadow grass (*Poa* sp). Taller vegetation includes dock (*Rumex* sp.), hogweed (*Heracleum sphondylium*), nettle (*Urtica dioica*) and angelica (*Angelica archangelica*), sorrel (*Rumex acetosa*), mayflower (*Cardamine pratensis*).

The site synopsis refers to “contains a small, though very important example of the Annex I priority habitat *Alluvial Forest*”. The bulk of this type of habitat is located to the south of the discharge point. At the discharge point the riverbank and adjacent field has a mixture of hazel (*Corylus avellana*), willow (*Salix* sp.) alder (*Alnus glutinosa*) and blackthorn (*Prunus spinosa*). The bankside trees are important in maintaining the stability of the riverbanks and some of the older willow and hazel support dense growths lichens. Also noted was guelder rose (*Viburnum opulus*), ransoms (*Allium ursinum*), bluebell (*Endymion non-scripus*), wood avens (*Geum urbanum*), figwort (*Scrophularia nodosa*) and golden saxifrage (*Chrsoplenium oppositifolium*).

A hedgerow separates the riparian area and the field in which the treatment plant is located. The hedge is contiguous with areas of scrub and contains native willow (*Salix* sp.), hawthorn (*Crataegus minogyna*), willow (*Salix* sp.), holly (*Ulex europeaus*) and oak (*Quercus* sp.) and blackthorn.

None of the species noted are protected under the Wildlife Act (1976) and the Flora (Protection) Order, 1999. Although none of the species noted are rare the habitats in the vicinity of the discharge point are part of a much larger mosaic of watercourses, riparian woodland and scrub. This total area is of high conservation value and disturbance to riparian habitats should be minimised.

## 9. FAUNA

The following Annex II animal species Otter (*Lutra lutra*), Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) occur within the site.

### 9.1. Freshwater mussel

The pearl mussel is one of three species of large Unionacean bivalves found in Irish freshwaters. The species may occur in fast-flowing, oligotrophic, calcium deficient streams and rivers. The species is on the IUCN Invertebrate Red Data List and is protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). *Margaritifera* is also listed in Annex II and Annex V of the Habitats Directive (92/43/EEC) and is protected by law in Ireland under the 1976 Wildlife Act (Statutory Instrument No. 112, 1990). As noted in the site synopsis the populations of freshwater mussel at this location are thought to be of national importance.

Given the conservation value of this species, it was considered necessary to conduct a survey to determine if this species was present within channel A. This survey was conducted by Dr. Eugene Ross and the results and conclusions drawn from this survey are given in Appendix 3. The survey did not detect freshwater mussel within channel A.

### 9.2 Otters

Otters are found throughout the Bandon catchment and also occur within this general area.

The following are considered to be indicators of otter activity:

- 1-Spraints and anal glands
- 2-Footprints and sign heaps
- 3-Runs or paths
- 4- Feeding sites and prey item remains

The treatment plant is situated a considerable distance back from the river and works here are unlikely to have any significant impact on otters. The most likely source of disturbance to otters could arise to due bankside works at the discharge point. No signs of otter activity were noted at the discharge point or in its immediate vicinity. Any works in this area will be of limited duration. The area is generally overgrown with large amounts of cover available and no significant disturbance of otters is considered likely.

### 9.3 *Other Mammals*

Field mouse, brown rat and bank vole are extremely common in the Irish countryside and although no specialised survey was considered necessary there are almost certainly present with the vicinity of the discharge point. Rabbits are common in the general area and other species likely to be present include pigmy shrew, Irish hare and hedgehog. Evidence of both fox and badger was noted downstream of the discharge point but no evidence of either dens or setts were noted in the immediate vicinity of the discharge point. Bats are generally common in the types of habitat encountered and two bat species (Daubenton's Bat and Pipistrelle) are mentioned in the site synopsis. However the trees likely to be affected by the construction works are either of limited size and/or age and the likelihood of significant bat roosts being disturbed is considered very remote.

### 9.4 *Brook Lamprey*

The brook lamprey (*Lampetra planeri*) is non-migratory. It is found in sandy and gravelly river and streams and breeds where the gradient of the river is shallow. (Whilde,1993). No specialised survey was carried out for this species however a lamprey was noted immediately downstream of the confluence of channel A and the main channel. Although it was not captured or conclusively identified it seems likely that this individual was a brook lamprey.

Given the high silt levels and poor water quality in channel A it is unlikely that brook lamprey will occur within this channel. Overall this side channel in its current condition is considered to be of minimal value for this species.

### 9.5 *Salmonid Species*

Salmon, sea-trout and brown trout all occur within the Bandon catchment. Channel A does not provide suitable breeding habitat for any salmonid species due to slow flows, absence of suitable gravels and heavy siltation. Based on analysis of macroinvertebrates water quality in channel A is poor and would not support salmonids. Salmonid species may occur downstream however albeit in very small numbers. No suitable holding pools for adult salmon were noted. Overall this side channel in its current condition is considered to be of minimal value for salmonid species.



### 9.6 *Other fish species*

Other fish species found in the Bandon river include eel, stickleback and minnow. All three species are likely to be common in the main channel. These species may occur in limited densities in certain sections of channel A; however this channel is not expected to be of particular significance for these species.

### 9.7 *Birds*

Rivers support a number of specialised bird species including dipper, kingfisher, heron, mallard, moorhen and swans. These species are all likely to occur within the overall catchment of the Bandon River although only heron, mallard and moorhen were noted in immediate proximity to the discharge point. A moorhen was nesting very close to the discharge point at the time of the survey. A number of other bird species will occur within the undisturbed woodland habitat, which exists on the banks of the river. These species are generally common in a mixed agricultural landscape and species noted included wren, robin, long-tailed tit, song thrush and pigeon. Given that any impact will be of limited duration and a large area of similar habitat is located adjacent to the site no significant impacts on birds is considered likely.

## 10. POSSIBLE IMPACTS

### 10.1 *Impacts on Fish*

The Bandon supports important populations of salmonid fish and brook lamprey. These species are susceptible to deteriorations in water quality. Salmonid species breed in clean gravels and therefore breeding success can be affected by increased silt levels.

### 10.2 *Impacts on invertebrates.*

From conservation viewpoint the freshwater pearl mussel is the most important invertebrate species in the Bandon River. This species is susceptible to deteriorations in water quality and is particularly sensitive to large increases in suspended solids. The distribution of other macroinvertebrate species within the watercourse will be altered by changes in water quality however these impacts will be localised in extent.

### 10.3 *Impacts on aquatic vegetation*

Changes in nutrient levels will affect the distribution and density of aquatic plants. High levels may increase growth however the diversity of species may be significantly reduced. In these

circumstances water crowfoot may be dominant and where nutrients levels are extremely elevated algae and other fungal growths may be dominant.

#### *10.4 Noise Impact*

Noise impacts could occur during construction and from the everyday operation of the plant. The treatment plant itself is situated in an agricultural landscape where noises associated with farming are common and in this context works at the plant itself are unlikely to significantly impact on noise levels. The outfall laying works will be relatively short in duration and will take approximately 4 weeks to complete. Some impact on mammals and birds would be expected to occur due to noise generated by work on the pipeline. This impact will increase as the works get closer to the river. However given the limited duration of the works and the degree of cover available close to the discharge point this impact is expected to be of local significance only and no long-term impacts are expected. Following construction of the wastewater treatment plant it is recommended that noise levels do not exceed 55db during daylight hours and 45db at night. Under these circumstances no significant impacts are considered likely.

### 11. DISPOSAL OPTIONS

The following disposal options could conceivably be used:

- 1- Discharge on side channel A downstream of the current discharge point
- 2-Existing discharge point
- 3-Discharge to the main channel upstream or downstream of the current discharge point

#### *11.1 Discharge to channel A downstream of the current discharge point*

Based on the structure of the watercourse, the pattern of silt deposition and the distribution of invertebrates and macrophytes/algae it was determined that the discharge is already affecting channel A which obviously provides much lower dilution than the main channel. No impact was noted in the main channel. It is noted that although water quality in this smaller channel has obviously deteriorated this has helped to maintain suitable conditions for freshwater mussels elsewhere in the river. In particular this channel gives additional protection in the event of a catastrophic event such as complete failure of the treatment plant. Given the vulnerability and comparative rarity of freshwater mussel their protection is considered to be the highest priority. In these circumstances the negative effects on channel A are considered less important than the potential impacts on mussel habitat in the main channel.

An examination of channel A indicates that high levels of silt have been deposited within this channel and thus was prevented from reaching the main channel where conditions are more suitable for mussels. Given the length of the channel (310m) and low velocity flows during dry periods it is estimated that only a small proportion of the suspended solids derived from the

treatment plant may actually reach the main channel under these conditions. It is difficult to estimate how much of this deposited silt is remobilised during spate events. This is because of the braided and complex channel which makes it difficult to predict how much water will move down channel A in high flow conditions. A basic visual estimate of flows and depths at low water conditions suggests that approximately 10% of the total flow in the Bandon River moves through Channel A. However it is noted that if some of this silt is remobilised during spate events there will be a high level of dilution available which will minimise any impact.

It is noted that the reduction in nutrients reaching channel A will help to improve water quality and the diversity of macroinvertebrates may improve although heavy shading will naturally limit macrophyte development. However, even if all discharges into this channel were stopped it is uncertain that this channel would support significant mussel populations. In the short term the high levels of silt will preclude colonisation by this species and given the depth of this silt in some areas and the relatively low flows it is considered unlikely that this silt will clear within a short time frame.

In circumstances where a new pipe is required it would be preferable to move the discharge point downstream so that it discharges completely into channel A. The terrestrial and riparian habitats to be affected would not be significantly different to those existing at the discharge point and the exact route could be designed to avoid the more locally important habitats such as individual or groups of trees. Channel A flows in a south-westerly direction and by choosing a suitable location the distance from the external hedgerow to the channel can be minimised.

However the development of a new pipeline could lead to the deposition of high levels of silt and other substances if strict mitigation measures are not put in place.

### 11.2 Existing discharge point

The advantage of using the existing pipe and discharge point is that disturbance of the river and riparian habitats can be avoided. This would allow existing riparian habitats to be maintained. Also, under these circumstances, the deposition of additional high levels of silt from the construction process could be avoided. An examination of the pipe indicates that it may be possible to reuse it. If the pipe in its entirety cannot be used even the use of the last section of pipe could prevent damage to the river and the generation of silt. This is particularly important in respect of freshwater mussel populations.

However it is predicted that the flow from the treatment plant will increase by approximately 37% in line with the increase of population to 3,500 p.e. As noted earlier at low flows, a spit of gravel

diverts most of the effluent flow into channel A. However the higher predicted flows from the upgraded treatment plant and/or changes in the structure of what is an essentially unstable channel structure could result in the removal of this spit of gravel. This could conceivably cause some of the effluent to reach channel B and thereby constitute a risk to mussels known to exist downstream of this point.

*11.3 Discharge to the main channel upstream or downstream of the current discharge point*  
Discharge to the main channel of the Bandon River would result in greater dilution being available at the discharge point and based on mass balance equations and waste assimilative capacity calculations the increases in phosphorous and BOD levels would not cause serious deteriorations in water quality.

However the movement of the discharge point onto the main channel would expose habitats, which previously were pristine or marginally affected to increased levels of nutrients and suspended solids. A breakdown in treatment or the introduction of dangerous chemicals could have a serious impact on the main channel. There would also be high risks associated with the construction of a new discharge point, which could lead to siltation. In addition to possible impacts on freshwater mussels high levels of suspended solids could also impact on salmonid spawning gravels and increased nutrients could affect the diversity of aquatic plants.

*11.4 Preferred disposal option*  
Based on the information outlined above it is recommended that, provided certain mitigation measures are put in place, the preferred option is the provision of a new discharge pipe discharging to channel A downstream of the existing discharge point. The exact route of the pipe should be designed to as to provide minimum disturbance to riparian habitats and prevent any instability in the riverbank. The use of the existing discharge point is considered a secondary option and the use of a new discharge on the Bandon River should be considered as a last resort.

## 12. MITIGATION MEASURES

It is important that damage to the riparian zone is minimised and it is recommended therefore that large machinery is excluded from this area. Hand tools should be used in close proximity (within 10m) of the river. As a general guideline the hedge at the eastern end of the field in which the treatment plant is located should form a boundary beyond which heavy machinery should be excluded.

The new pipeline should be located as close as practically possible to the beginning of channel A. This maximises the length of channel A available downstream of the discharge point.

However the new discharge point must be located so as to minimise the risk of erosion of the riverbank. In particular the number of mature trees to be removed should be minimised and positioning of the pipe should give due regard to specific trees which are stabilising the riverbank.

Due to the risks of pollution associated with in-stream works, a precast concrete structure is preferable where stabilisation of the discharge point is required.

It is important that the land-take area is restricted to the minimum necessary to provide the new discharge pipe. Storage of materials and vehicles should only take place outside of the riparian zone.

Consultation with an ecologist is recommended both in the design of a suitable route and during the construction phase. This route should be carefully marked out and agreed with Duchas prior to commencement of works.

### 13. CONCLUSIONS

Water quality in the Bandon River is generally satisfactory, however water quality deteriorates slightly downstream of the discharge point. It would appear therefore that the discharge is having a slight impact on water quality.

Notwithstanding the predicted increase in population over the next twenty years the improvement in treatment standards will result in significantly reduced discharge of nutrients to the Bandon River.

An examination of the existing discharge indicates that most of the effluent is being discharged into a side channel (Channel A). The distribution of silt, sewage fungus and algae indicates that water quality has seriously deteriorated in this side channel.

A survey determined that freshwater mussel is not present in channel A and given the levels of silt and algae the presence of other sensitive species such as brook lamprey and salmon is considered very likely. Given that freshwater mussel are present in other channels in this section of the Bandon River a discharge to channel A would create the least risk to this species.

A survey of terrestrial habitats did not detect any rare species however the riparian habitats noted are part of a larger woodland habitat and disturbance should therefore be minimised.

Due to the predicted increase in population the flow from the treatment plant will increase. In addition the pool, which receives the current discharge, is inherently unstable. A new downstream discharge point on channel A is therefore recommended.

It is important that damage to habitats is minimised during construction and large machinery should therefore be excluded from the riparian zone. The specific route of the pipeline should be designed so as to minimise any possible impacts.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**APPENDIX 1: SITE SYNOPSIS****SITE NAME: BANDON RIVER****SITE CODE: 002171**

The site consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the Bandon takes an easterly course. The predominant rock formations are Old Red Sandstone to the north and Carboniferous Slate stretching south of Dunmanway. Soils in the northern section consist of peats, podzols and skeletal soils. The southern section consists of alluvial soils and Brown Podzolics.

The east-west exposure of Old Red Sandstone to the north of Dunmanway displays distinct ridgelines of bare rock with poor pasture and scrub. In this area around Lovers Leap the Bandon River cuts a narrow channel southwards, cascading over a series of rock steps through a narrow valley. Below this and above Long Bridge the river widens and meanders through a fertile floodplain. Immediately south of the Long Bridge the reduced flow gradient and broad, flat valley permit the main channel to split and extend into a network of braided streams forming islands.

The site is important for a number of reasons. It contains a small though very important example of the Annex I priority habitat Alluvial Forest as well as good examples of another Annex I habitat - Floating River Vegetation. The Annex II animal species Otter, Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) occur. The populations of the Mussel are thought to be nationally important. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. The river channels are well defined and the islands appear solid. Canopy dominants are Hazel (*Corylus avellana*) (multi-stemmed) and Sessile Oak (*Quercus petraea*), with scattered Downy Birch (*Betula pubescens*), Ash (*Fraxinus excelsior*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Alder (*Alnus glutinosa*). There is a very sparse understorey composed of Whitethorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*) and saplings of Hazel and Sessile Oak. Epiphytes are abundant on trees: Ivy (*Hedera helix*), Honeysuckle (*Lonicera periclymenum*) and bryophyte species such as *Isoetecium myosuroides*. The ground flora is dominated by Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Ivy with abundant/scattered Lesser Celandine (*Ranunculus ficaria*), Wood Sedge (*Carex remota*) and Irish Spurge (*Euphorbia hyberna*). Goldilocks Buttercup (*Ranunculus auricomus*), a very rare plant in Co. Cork, has been recently recorded from this woodland.

Floating river vegetation is found along the length of the river and is dominated by Water-crowfoot (*Ranunculus* spp). Other aquatic plants found include Alternate Water-milfoil (*Myriophyllum alterniflorum*), Broad-leaved Pondweed (*Potamogeton natans*) and four Water-starwort species (*Callitriche* spp.). Mosses present on rocks and attached to tree roots include *Fontinalis antipyretica* in slack flow areas and *Fontinalis squamosa*, *Rhynchostegium riparioides* and *Amblystegium riparium* in

moderate flows. The landward fringe of deep pools supports Yellow Water-lily (*Nuphar lutea*), Bogbean (*Menyanthes trifoliata*), Marsh Marigold (*Caltha palustris*), Water Mint (*Mentha aquatica*) and Fool's Water-cress (*Apium nodiflorum*). Shoreweed (*Littorella uniflora*) and Six-stamened Waterwort (*Elatine hexandra*) are two species of local importance which are found in the river. In moderate current flow below the Long Bridge, the larger stones are covered by the moss *Brachythecium rivulare* and the Liverwort *Chiloscyphus polyanthos* var. *polyanthos*. Boulders covered in *Nostoc* algae are probably of local occurrence in Ireland. The liverwort *Riccardia chamaedryfolia* and the moss *Fissidens crassipes* found under the Long Bridge are considered to be rare in Ireland.

Heath in mosaic with wet grassland, exposed rock, scrub and improved grassland covers up to 30% of the site north of Long Bridge. Typical heath plants growing in association with the rocks are abundant Western Gorse (*Ulex gallii*), Ling Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*E. tetralix*), Tormentil (*Potentilla erecta*), Heath Grass (*Danthonia decumbens*), Stonecrops (*Sedum* spp.), small amounts of St Patrick's Cabbage (*Saxifraga spathularis*) and many lichen species.

Some small areas of woodland occur within the site north of Long Bridge. Tree species such as Sessile Oak, Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Downy Birch are found with an understorey of Holly, Hazel, Rowan and Rusty Willow.

Two Red Data Book plant species have been recorded in the past from within or close to the site - Greater Broomrape (*Orobanchis rapum-genistae*), a species that grows on the roots of legumes, and Small White Orchid (*Pseudorchis albida*), a species of upland pastures and heaths that is protected under the Flora Protection Order 1999.

The river below Long Bridge is an important inland site in Cork for Mute Swan and approximately 20 individuals are present throughout the year along this stretch. Several hundred Snipe use the site during the winter. Other birds seen regularly within the site are Grey Heron, Cormorant and Mallard, while low numbers of Lapwing and Teal visit during the winter.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Badger, Irish Hare, Daubenton's Bat and Pipistrelle. The two bat species can be seen feeding along the river and roosting under the old bridges.

Landuse at the site consists mainly of sheep grazing in the northern section and cattle grazing on improved grasslands below Lovers Leap and further south. In the area between Milleenanannig and Bealaboy Bridge land reclamation and drainage is taking place. In the area of exposed rock on the higher terrain above Ardcahan Bridge some land reclamation and forestry is carried out.

This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.



## APPENDIX 2: SPECIES LIST PLANTS

<i>Alnus glutinosa</i>	Alder
<i>Agrostis spp.</i>	Bent grass
<i>Ajuga reptans</i>	Bugle
<i>Alisma plantago-aquatica</i>	Water plantain
<i>Alopecurus geniculatus</i>	Marsh Foxtail
<i>Alopecurus pratensis</i>	Meadow foxtail
<i>Angelica archangelica</i>	Angelica
<i>Anthoxanthum odoratum</i>	Sweet vernal grass
<i>Anthriscus sylvestris</i>	Cow parsley
<i>Apium nodiflorum</i>	Fools watercress
<i>Asplenium scolopendrium</i>	Hartstongue Fern
<i>Athyrium filix-femina</i>	Ladies Fern
<i>Bellis perennis</i>	Ribwort Plantain
<i>Betula pubescens</i>	Downy Birch
<i>Blechnum spicant</i>	Hard Fern
<i>Callitriche sp.</i>	Starwort
<i>Calstegia sepium</i>	Hedge Bindweed
<i>Caltha palustris</i>	Marsh Marigold
<i>Capsella bursa-pastoris</i>	Shepards Purse
<i>Cardamine pratensis</i>	Mayflower
<i>Carex flacca</i>	Carnation Sedge
<i>Carex remota</i>	Remote sedge
<i>Carex rostrata</i>	Bottle Sedge
<i>Carex spp.</i>	Sedge
<i>Centuarea nigra</i>	Lesser Knapweed
<i>Chrysplenium oppositifolium</i>	Golden Saxifrage
<i>Cirsium arvenesis</i>	Creeping thistle
<i>Cirsium palustre</i>	Marsh Thistle
<i>Cirsium spp.</i>	Thistle
<i>Conopodium majus</i>	Pignut
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Cynosuros cristatus</i>	Crested dogs tail
<i>Dactylis glmerata</i>	Cocksfoot
<i>Digitalis purpurea</i>	Foxglove
<i>Dryopteris affinis</i>	Scaly Male Fern
<i>Dryopteris filix-mas</i>	Male Fern
<i>Eleocharis palustris</i>	Common spike rush
<i>Endymion non-scriptus</i>	Bluebell
<i>Eymus repens</i>	Couch Grass
<i>Filiendula ulmaria</i>	Meadow sweet
<i>Fontinalis sp.</i>	Moss
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Goose grass
<i>Geraium robertianum</i>	Herb Robert
<i>Geranium dissectum</i>	Cut leaved cranesbill
<i>Geum urbanum</i>	Wood avens

<i>Helix hedera</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Ilex aquifolium</i>	Holly

## APPENDIX 2: SPECIES LIST PLANTS CONTINUED

<i>Iris psuedocorus</i>	Yellow Flag
<i>Juncus spp.</i>	Rush
<i>Lecanthemum vulgare</i>	Oxeye Daisy
<i>Lepidiumheterophyllum</i>	Smiths cress
<i>Ligustrum vulgare</i>	Privet
<i>Lolium perenne</i>	Rye grass
<i>Lonicera periclymenuem</i>	Honeysuckle
<i>Lysimachia nemorum</i>	Yellow pimpernel
<i>Mentha aquatica</i>	Water mint
<i>Menyanthes trifoliata</i>	Bog bean
<i>Myosotis arvensis</i>	Forget-me-knot
<i>Nasturtium officinale</i>	Watercress
<i>Nyphaea alba</i>	Water lily
<i>Plantage lanceolata</i>	Ribwort Plantain
<i>Plantago major</i>	Greater plantain
<i>Poa sp.</i>	Meadow grass
<i>Potamogeton spp.</i>	Pondweed
<i>Potentilla anserina</i>	Silver weed
<i>Primula vulgaris</i>	Primrose
<i>Prunella vulgaris</i>	Self heal
<i>Prunus spinosa</i>	Blackthorn
<i>Pteridium aquilium</i>	Bracken
<i>Quercus sp.</i>	Oak
<i>Ranunculus flammula</i>	Lesser spearwort
<i>Ranuculus acris</i>	Meadow Buttercup
<i>Ranunculus sp.</i>	Water crowfoot
<i>Ranunculus repens.</i>	Creeping Buttercup
<i>Rosa sp.</i>	Dog rose
<i>Rubus fruitocosus</i>	Bramble
<i>Rumex acetosa</i>	Common sorrel
<i>Rumex spp.</i>	Dock
<i>Salix spp.</i>	Willow
<i>Senecia jacobaea</i>	Ragweed
<i>Senecia vulgaris</i>	Groundsel
<i>Sonchus spp.</i>	Sowthistle
<i>Taraxacum officinale</i>	Dandelion
<i>Trifolium repens</i>	White clover
<i>Urtica dioica</i>	Nettle
<i>Valeriana officinalis</i>	Common valerian
<i>Veronica sp.</i>	Speedwell

### APPENDIX 3: REFERENCES

- Curtis T.G.F. & McGough H.N. (1988) Irish Red Data Book Irish Wildlife Service
- EPA (2003) Advice notes on current practice in the preparation of Environmental Impact Statements
- EPA (2002). Guidelines on the information to be contained in Environmental Impact Statements
- Ferguson-Lees J., Willis I. & Sharrock J.T.R. (1983) Shell Guide to the Birds of Britain & Ireland Michael Joseph
- Fitter R., Fitter A. & Blamey M. (1974) The Wild Flowers of Britain & Northern Ireland Collins ISBN 0-00-211278-7
- Fitter R., Fitter A. & Farrer A. (1984) Grasses, Sedges, Rushes & Ferns of Britain & Northern Europe HarperCollins
- Fossit J.A. (2000) A Guide to Habitats in Ireland. The Heritage Council.
- Jahns H.M. (1980) Ferns, Mosses & Lichens of Britain HarperCollins
- JNCC (1993) Handbook for Phase I habitat survey. JNCC
- Pilcher J. & Hall (2001) Flora Hibernica; the Wild Flowers, Plants and Trees of Ireland The Collins Press
- Stace C. (1999) Field Flora of the British Isles Cambridge University Press
- Webb D.A., Parnell J. & Doogue D. (1943) An Irish Flora Dundalgan
- Whilde A. (1993) Threatened Mammals, Birds, Amphibians & Fish in Ireland Dept. of the Environment for Northern Ireland/OPW

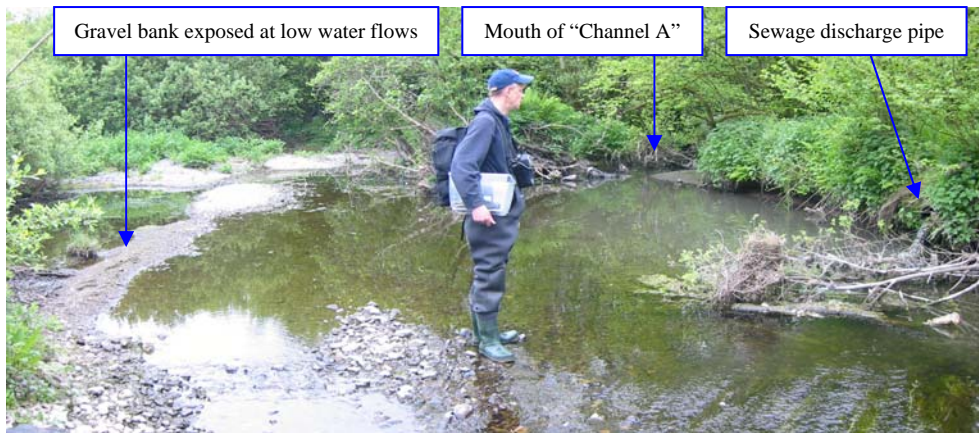
For inspection purposes only.  
Consent of copyright owner required for any other use.



Photograph 5. A view of the substrate in the downstream half of "Channel A", showing the accumulation of sediment and a layer of filamentous green algae.



Photograph 6. High levels of suspended solids in the water and a layer of sewage fungus coating the substrate close to the sewage effluent discharge point.



Photograph 7. A view downstream showing the location of the sewage discharge point, the mouth of "Channel A", and the low bank of gravel exposed during low water conditions, separating "Channel A" from adjacent channels.



Photograph 8. A view of "Channel A" habitat approximately 100m downstream of the sewage effluent discharge point. Note the high turbidity of the water.



Photograph 9. A view of "Channel A" habitat approximately 190m downstream of the sewage effluent discharge point. Note the substrate consisting of soft sediment and the developing layer of filamentous green algae.

For inspection purposes only.  
Consent of copyright owner required for any other use.

## APPENDIX 4: FRESHWATER MUSSEL SURVEY

**An investigation of the status of *Margaritifera margaritifera* (L.)  
in the side channel of the Bandon River receiving effluent from the  
Dunmanway Sewage Treatment Plant.**

Carried out on behalf of:  
**Dixon Brosnan**  
Environmental consultants

For inspection purposes only.  
Consent of copyright owner required for any other use.

Report by:

Dr. Eugene Ross,

Freshwater Bivalve Investigations.

Chestnut Drive, Oakpark, Tralee, Co. Kerry.

Submitted: June, 2004.

## Contents

<i>Introduction</i>	<i>Page 1</i>
<b>Study area and methods</b>	<b>Page 1</b>
<b>Results</b>	<b>Page 2</b>
<b>Discussion</b>	<b>Page 4</b>
<b>Recommendations</b>	<b>Page 5</b>
<b>References</b>	<b>Page 6</b>
<b>Photographs</b>	<b>Page 7</b>

For inspection purposes only.  
Consent of copyright owner required for any other use.



## Introduction

The sewage treatment plant in Dunmanway, Co. Cork is to be upgraded. The existing treatment plant is located east of the town within 100m of the Bandon River. Effluent from the treatment plant is discharged by pipe (Photograph 1) into the Bandon River at a point where a small side channel diverges from the western side of the river (Photograph 2). This part of the Bandon River and adjacent lands have been designated as a Special Area of Conservation. The area contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel.

The pearl mussel is one of three species of large Unionacean bivalves found in Irish freshwaters. The species may occur in fast-flowing, oligotrophic, calcium deficient streams and rivers, where it can grow to lengths of 159mm (Jackson 1925) and live to ages well in excess of 100 years (Ross 1984). *Margaritifera* has been recorded in most parts of Ireland with the exception of the central limestone plain but several studies have confirmed that a significant decline has occurred in some Irish populations, notably in northern and eastern areas (Ross 1988, Moorkens and Costello 1994, Beasley and Roberts 1996). Such declining populations are usually characterised by a predominance of older mussels and an absence of juvenile recruitment (Bauer 1983).

Although very widely distributed across northern Europe, Eurasia and North America, *Margaritifera* is declining throughout its range and is extinct or seriously threatened in many parts of Europe (Wells et al. 1983). The main cause of this decline is deteriorating river water quality although a variety of other factors are also implicated (Moorkens 1999). The species is on the IUCN Invertebrate Red Data List and is protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). *Margaritifera* is also listed in Annex II and Annex V of the Habitats Directive (92/43/EEC) and is protected by law in Ireland under the 1976 Wildlife Act (Statutory Instrument No. 112, 1990).

The objectives of this investigation were to determine if *Margaritifera* was present in the side channel receiving the effluent from the Dunmanway sewage treatment plant, and if so, to quantify the number of mussels present, and to advise on the best means of minimising the impact of the proposed work on the *Margaritifera* population in that part of the Bandon River.

## Study area and methods

The existing sewage effluent discharge point is located on the western bank of the Bandon River, at the downstream end of "The Captains Hole". Eight metres downstream from the discharge point a small side channel, hereafter referred to as "Channel A", diverges from the main channel (Figure 1, Photograph 2) having received the sewage effluent. "Channel A" then flows in a southerly direction before rejoining the main river channel at "The Meeting of the Waters"(Photograph 3). The site was visited on three occasions (April 23<sup>rd</sup>, May 18<sup>th</sup> and May 25<sup>th</sup>, 2004) and observed under normal and low water flow conditions. The entire length of "Channel A" was carefully searched for *Margaritifera margaritifera* by visual examination, and by examining the stream substrate using a viewing device while wading. Due to significant health and safety considerations relating to the highly contaminated nature of the effluent present, no attempt was made to search "Channel A" for mussels by

snorkelling. Representative photographs of “Channel A” habitat were taken and its length was measured using a surveying tape. The work was carried out under licence issued by the National Parks and Wildlife Service.

## Results

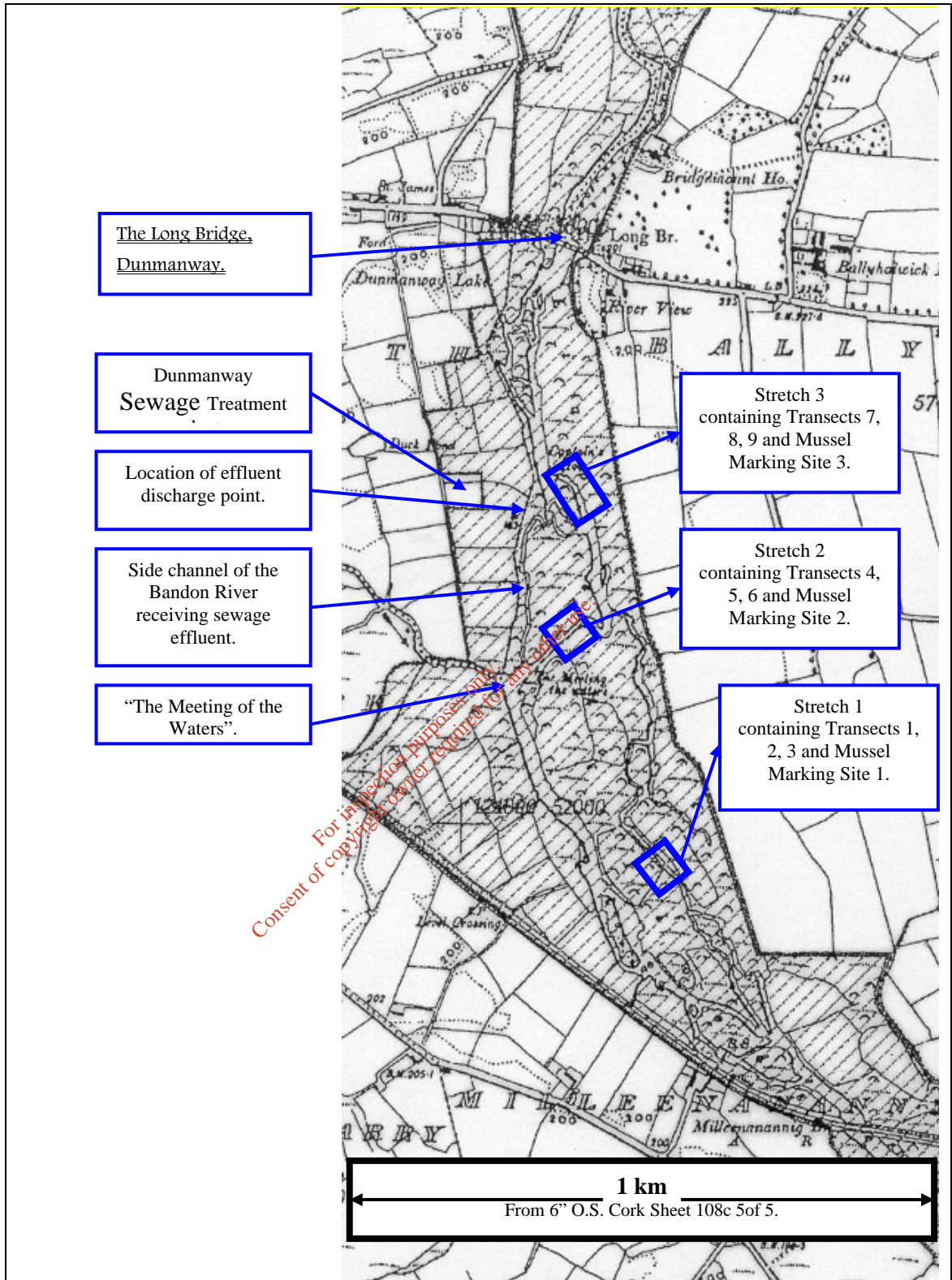
On each of the three days that the site was examined, weather conditions were ideal, with generally bright sunlight and excellent underwater visibility in the main river channel. All the sewage effluent emanating from the discharge pipe appeared to be flowing into “Channel A”, which diverged from the main channel just below the effluent discharge point. “Channel A” was 310m in length and generally 3-5m in width, reaching a maximum of 8m. Water depth in “Channel A” was generally shallow and varied from a few centimetres in riffle areas to a maximum observed depth of 54cm.

The substrate of the upstream section of “Channel A” was covered in a layer of sewage fungus (Photograph 4), and in non-riffle areas a deep layer of foul smelling sediment had accumulated. In the downstream half of “Channel A” the non-riffle areas of substrate also had a deep layer of sediment, which was often covered with a layer of filamentous green algae (Photographs 5 and 9). A pronounced smell of sewage was evident all along “Channel A” and this increased as one approached the effluent discharge point.

On April 23<sup>rd</sup>, the water level was normal, and underwater visibility was poor in “Channel A” close to the sewage outfall, with pronounced turbidity and very high levels of suspended solids due to the sewage effluent (Photograph 6). However, conditions were adequate for searching the substrate for *Margaritifera* along most of the length of “Channel A”. No mussels were observed.

On May 18<sup>th</sup> the water level had dropped significantly after a prolonged dry spell and visibility was very poor in the 50-80m stretch of “Channel A” immediately downstream of the effluent discharge point. No mussels were observed in “Channel A”, although mussels were observed in the main river channel within 30m of the effluent discharge point and within 30m of the point where “Channel A” rejoined the main river channel at “The Meeting of the Waters”. It was noted that due to the low water levels, a low bank of gravel extended several metres upstream of the effluent discharge point, completely separating “Channel A” and the sewage effluent from adjacent channels (Photograph 7)

On May 25<sup>th</sup> the water level had risen slightly after overnight rain and visibility was again poor in the upper part of “Channel A”, which seemed to be receiving an increased volume of sewage effluent than that observed on the previous two visits. Once again no mussels were observed in “Channel A”.



**Figure 1. Map of the Bandon River in the area of alluvial woodland downstream of the Long Bridge (Dunmanway, Co. Cork). The locations of the Dunmanway Sewage Treatment Plant, the sewage effluent discharge point, “Channel A” receiving the effluent, and the three river stretches where a long term monitoring program of the Bandon River population of *Margaritifera margaritifera* is ongoing, are also indicated.**

## Discussion

The habitat conditions observed in “Channel A”, which receives the effluent from the Dunmanway sewage treatment plant were absolutely inimical to the presence of *Margaritifera margaritifera*.

The species normally occurs in a narrow range of habitat types, with the main prerequisites being clean, oligotrophic, well-oxygenated waters with little sedimentation and a firm substrate of gravels and sand. Unfortunately none of these conditions were present in “Channel A” during the current investigation. The species is abundant in other side channels and in parts of the main channel of the Bandon River adjacent to “Channel A”, where suitable conditions do exist (Ross 2001).

*Margaritifera* uses its gills for respiration and filter feeding. The very high levels of suspended organic solids observed (Photograph 6) downstream of the effluent discharge pipe would very quickly clog up the gills of any mussels present, greatly reducing their ability to respire and feed. Prolonged exposure to such high levels of suspended solids would result in starvation of the mussels or respiratory stress leading to asphyxiation. During the warm summer months these problems would be further exacerbated because *Margaritifera* uses its outer gills as brood pouches for the developing Glochidia larvae, thereby further reducing their respiratory and feeding efficiency, at a time when oxygen levels can be at their lowest.

Recolonisation of the habitat by juvenile mussels, that normally spend several years buried in coarse sand and gravel substrates, would also be prevented by the conditions observed in “Channel A”. The juveniles require a constant flow of oxygen down into the substrate interstices, and the observed accumulation of sediment (particularly organic sediment) and layers of filamentous algae on top of the substrate would prevent oxygen reaching the juveniles below, and result in their death.

The habitat conditions in “Channel A” render it impossible for pearl mussels to survive there for any significant period of time. The upgrading of the sewage treatment plant should result in an improvement in the habitat quality, both in “Channel A”, and further downstream in the main Bandon River channel where *Margaritifera* also occurs (F. McMahon, pers. comm.).

On the three occasions when the site was visited, all the sewage effluent appeared to be entering “Channel A”, with no apparent entry of effluent into the other channels. During the very low flow conditions observed on May 18<sup>th</sup>, 2004, the low bank of gravel (Photograph 7) exposed by the falling water levels acted as a physical barrier, preventing any possibility of effluent entering other adjacent channels. However, it is likely that this gravel bank is not a permanent feature and may change in height or extent, or even disappear after periods of high flow/spate. The site was observed only under normal and low flow conditions, and it is possible that under conditions of higher flow, some effluent

could be carried into other channels adjacent to "Channel A" which do contain mussels. This possibility could be prevented by moving the discharge point downstream so that the effluent discharged directly into "Channel A" after it had diverged from the main channel, thus removing any risk to mussels in the adjacent channels. However this option should only be considered if the necessary works could be carried out without significant negative impact to the streambed, the bank or the adjacent riparian areas.

### Recommendations

In order to minimise or avoid any negative impacts associated with the proposed upgrading of the Sewage Treatment Plant, the following measures should be adopted:

1. The discharge point could be moved downstream to ensure that all effluent enters directly into "Channel A", thereby preventing the possibility of effluent entering other channels containing mussels, during high water flow conditions. This course of action should only be considered if the required works can be carried out without disturbance of the streambed, or significant negative impact on the bank or the adjacent riparian areas.
2. If the works required to complete option 1. above cannot be undertaken without significant negative impact, then the existing effluent discharge point should be retained.
3. Works involving any disturbance to the streambed or bank of "Channel A" should be avoided if possible, but if absolutely necessary, they should be carried out by hand in order to reduce disturbance or damage to "Channel A" and the riparian area.
4. Entry of machines into the riparian area or any river channel should be prevented.
5. Any activity resulting in the introduction of soil, sediment, fuel, hydraulic fluid, or other pollutants into the river as a result of the proposed works should be prevented.
6. Any disturbance of the riparian area should be minimised and made good immediately by removal of loose soil and replanting with suitable species.

## References.

- Bauer, G. (1983). Age structure, age specific mortality rates and population trend of the freshwater pearl mussel (*Margaritifera margaritifera*) in North Bavaria. *Archiv fur Hydrobiologie* **98**: 523-532.
- Jackson, J.W. (1925). The distribution of *Margaritifera margaritifera* in the British Isles. *Journal of Conchology* **17**, 195-211.
- Beasley, C.R., Roberts. D. (1996). The current distribution of the freshwater pearl mussel *Margaritifera margaritifera* L. 1758 in north-west Ireland . *Aquatic Conservation: Marine and Freshwater Ecosystems* **6**: 169-177.
- Moorkens, E.A. and Costello, M.J. (1994). Imminent extinction of the Nore freshwater pearl mussel *Margaritifera durrovensis* Phillips: a species unique to Ireland. *Aquatic Conservation: Marine and Freshwater Ecosystems* **4**, 363-365.
- Moorkens, E.A. (1999). Conservation management of the freshwater pearl mussel *Margaritifera margaritifera*. Part 1: Biology of the species and its present situation in Ireland. *Irish Wildlife Manuals*, No. **8**. Duchas, The Heritage Service, Department of Arts, Heritage, Gaeltacht and the Islands, Dublin.
- Ross, E.D. (1984). Studies on the biology of freshwater mussels (Lamellibranchia : Unionacea) in Ireland. Unpublished M.Sc. Thesis, University College Galway.
- Ross, E.D. (1988). The reproductive biology of freshwater mussels in Ireland, with observations on their distribution and demography. Unpublished Ph.D. Thesis, University College Galway.
- Ross, E.D. (2001). A report on the commencement of a monitoring program for pearl mussels [*Margaritifera Margaritifera* (L.)] in the Bandon River, downstream of the Long Bridge at Dunmanway, County Cork, as part of the mitigation measures associated with the Bandon River (Dunmanway) Drainage Scheme. Unpublished report to the Office of Public Works.
- Wells, S.M., Pyle, R.M. and Collins, N.M. (1983). The I.U.C.N. Invertebrate Red Data Book. International Union for the conservation of Nature and Natural Resources, Gland (Switzerland), 145-156.

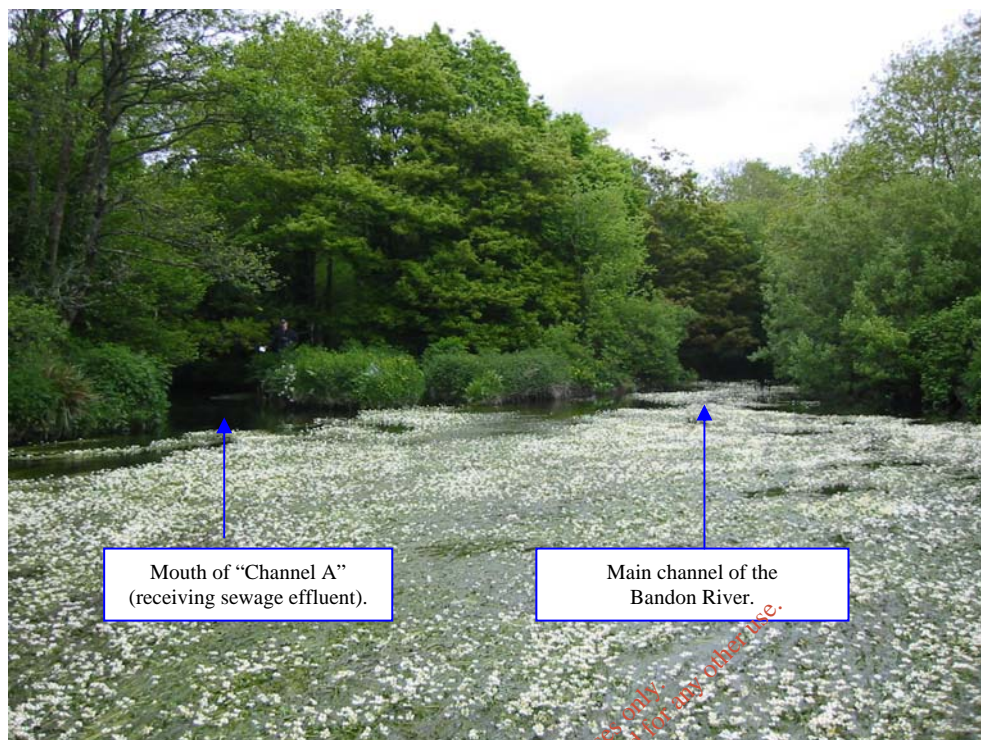
## Photographs.



Photograph 1. The site of the sewage effluent discharge pipe into "Channel A" of the Bandon River at Dunmanway Co. Cork.



Photograph 2. A view upstream from the point where “Channel A” diverges from the main channel of the Bandon River. The sewage effluent discharge pipe is visible on the western bank.



Photograph 3. A view looking upstream along the Bandon River. The point where “Channel A” rejoins the main river channel is visible on the left hand side of the picture.





Photograph 4. Sewage fungus present on the substrate in the upstream section of "Channel A".

For inspection purposes only.  
Consent of copyright owner required for any other use.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.3**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

Comhairle Chontae Chorcaí

**CORK COUNTY COUNCIL**  
**(WESTERN DIVISION)**  
**(Projects Section)**



**Dunmanway Sewerage Scheme**

**Determination whether Dunmanway  
Sewerage Scheme would or would not be  
likely to have significant effects on the  
environment**

August 2004

Prepared By: Niall O'Mahony, Senior Engineer.

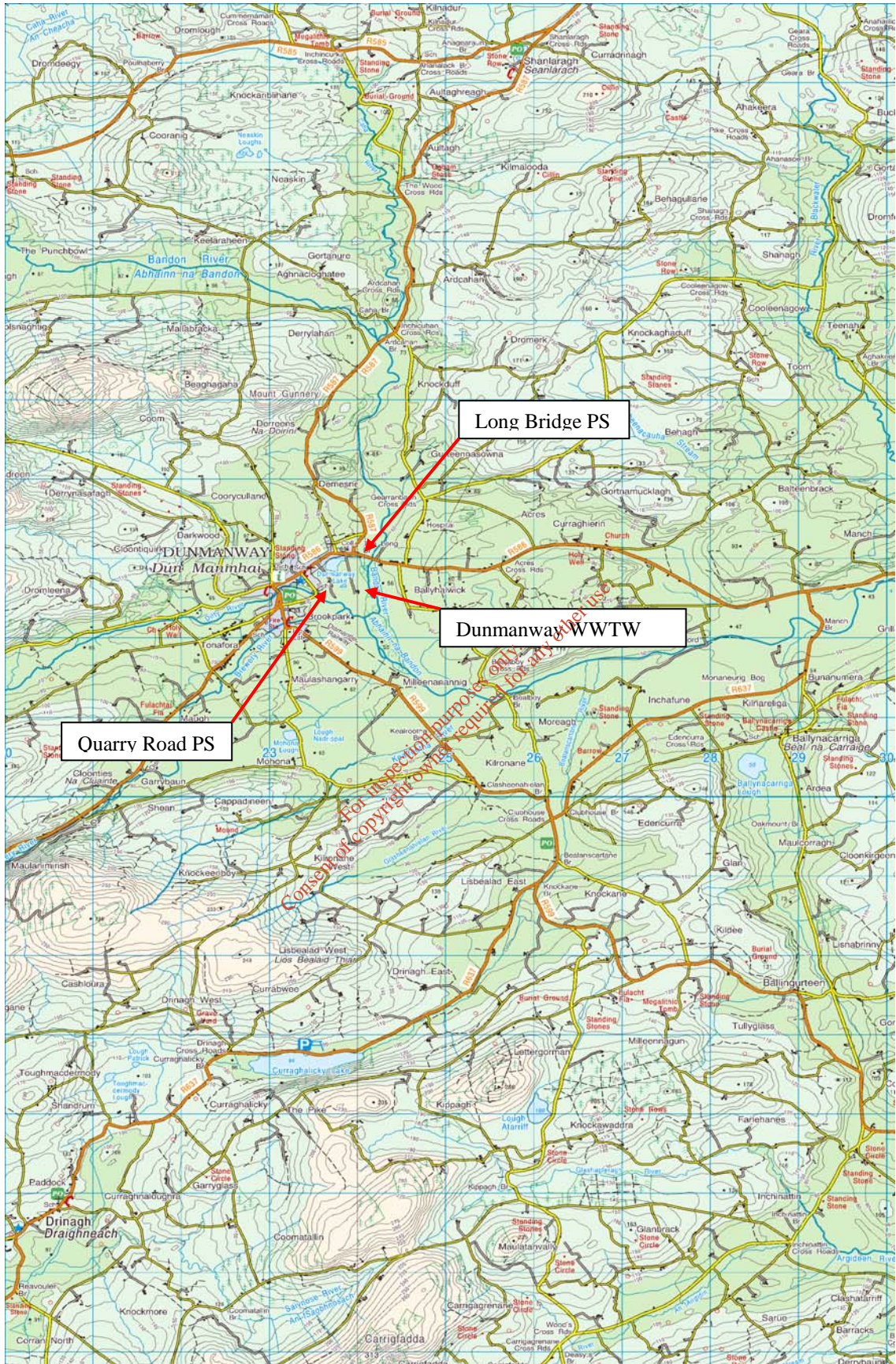


Figure 1 : Location Map.

# Determination whether Dunmanway Sewerage Scheme would or would not be likely to have significant effects on the environment

## Dunmanway Wastewater Treatment Plant

### **Description of the works**

The existing collection system, including pumping stations at the Quarry Road and at Long Bridge, collects wastewater from Dunmanway and its environs. The pumping stations pump the collected wastewater to the treatment plant. An Imhoff tank provides primary treatment for the sewage followed by secondary treatment in two percolating filters.. The treated effluent discharges via a 225 mm outfall to the Bandon River. Excess flows are overflowed at the pumping stations to the adjacent rivers.

Due to the increasing load on the existing plant and the need to provide a satisfactory effluent quality, it is proposed to upgrade and expand the existing wastewater treatment plant to cater for the future increased loads. This proposal is in accordance with the County Cork Development Plan 2003 and with the Preliminary Report on the Dunmanway Sewerage Scheme prepared by M.C. O'Sullivan's in July 2001 and subsequent amendments to this report by T.J. O'Connor & Associates in 2004. This plant will be designed to serve a population equivalent of 3,500 persons. This will cater for population growth and development demand for the next twenty years. It is proposed to expand the existing treatment plant site since it is of limited area. The wastewater treatment plant will be screened to reduce its visual intrusion. It is intended that there will be green space between the boundaries of the works and the nearest dwellings or business premises in accordance with County Development Plan guidelines.

The Department of the Environment, Heritage and Local Government has directed that the wastewater treatment works be procured through a Design, Build and Operate form of contract in conjunction with a number of other schemes in West Cork. The scope of works for the scheme will include the construction of new pumping stations and stormwater holding tanks at Quarry Road and Long Bridge and replacement of the rising mains from these pumping stations to the wastewater treatment plant.. An **indicative** layout of the works is included in Dwg. No. 1339-3(DY)-P01 and sections through the proposed WWTP Site are shown on Dwg. No. 1339-3(DY)-. P02. Indicative layouts of the two pumping stations are shown on Dwg. No. 1339-3(DY)-. P03. The final layout of each of the sites will be governed by the contractor's proposals for the project.

It is proposed to discharge the treated effluent to the Bandon River by gravity via a new outfall situated approx 10m downstream of the existing outfall.

The new wastewater treatment plant will consist of preliminary and secondary treatment and nutrient removal or their equivalent, to achieve a final effluent of 25

mg/l BOD; 35 mg/l SS; 125 mg/l COD; 1.5 mg/l TP. Mitigation measures will be installed to maintain noise and odour emissions within recognised and acceptable limits at the site boundary. Standby power generation will be available on site in case of power failure. Thickened sludges will be transported by tanker or skip off site for further treatment or disposal in accordance with the County Sludge Management Plan. Screenings arising from the preliminary treatment stage will be disposed of to the Cork Co. Co. Landfill site.

The control house and any other building which may be located at the treatment works site will be constructed in blockwork with render finish, incorporating masonry panels using locally quarried stone, and slated pitched roofs. The appearance of the buildings will reflect the local traditional building styles. The paved areas will consist of concrete pavement and macadam. A 2.2 m high palisade fence will enclose the treatment works with stockproof fencing providing protection to the screen planting which will be provided to the external boundaries. The access road to the treatment works will be surfaced in macadam.

The layout for the wastewater treatment works shown on Dwg. No.1339-3(DY)-P01 is indicative of the layout type which will be proposed by the successful tenderer for the construction of the works. The Design Build Operate form of Contract provides for the Contractor to prepare the detailed design of the Works in order to achieve savings in construction costs and in order to obtain the most technologically advanced treatment processes. The final design and layout proposed by the successful tenderer may not resemble the indicative layout in every detail. However, the tenderers for the scheme will be obliged to ensure that the visual and other impacts of the final scheme layout and processes will not be any greater than those of the plant layout shown in the drawings.

The existing treatment works is served with a connection from the Dunmanway water supply scheme. This connection may have to be upgraded to meet the requirements of the upgraded treatment facilities. Additional power supply, if required, will be brought to the site from the nearest available location in accordance with the requirements of the Electricity Supply Board.

## **Long Bridge Pumping Station, Dunmanway**

### **Description of the works**

It is proposed to replace the Long Bridge pumping station which is located to the west of the River Bandon south of the Long Bridge in Dunmanway. The new pumping station will have stormwater storage facilities to limit the likelihood of overflow of untreated effluent to the river. The pump control and metering equipment panels will be housed in a control house situated on top of the valve chamber of the pumping station. Mitigation measures will be taken to maintain noise and odour emissions within recognised and acceptable limits at the site boundaries. This pumping station will transfer the wastewater from the Dunmaway Sewerage Scheme collection system to the upgraded wastewater treatment plant situated 450m south of the Long Bridge.

The Department of the Environment, Heritage and Local Government has directed that the pumping station be procured through a Design, Build and Operate form of contract in conjunction with a number of other schemes in West Cork. The scope of works for the scheme will include the upgrading and expansion of the existing wastewater treatment works and construction of new pumping station at the Quarry Road and Long Bridge. An **indicative** layout of the pumping station is included in Dwg. No. 1339-3(DY)-P03. The final layout of the site will be governed by the contractor's proposals for the site.

The control house will be constructed in blockwork with render finish, incorporating masonry panels using locally quarried stone, and a slated pitched roof. The appearance of the buildings will reflect the local traditional building styles. The paved areas will consist of concrete pavement and macadam. A 2.2 m high palisade fence will enclose the pumping station site with stockproof fencing providing protection to the screen planting which will be provided to the external boundaries. The access road to the pumping station will be surfaced in macadam.

The layout for the pumping station shown on Dwg. No.1339-3(DY)-P03 is indicative of the layout type which will be proposed by the successful tenderer for the construction of the works. The Design Build Operate form of Contract provides for the Contractor to prepare the detailed design of the Works in order to achieve savings in construction costs and in order to obtain the most technologically advanced treatment processes. The final design and layout proposed by the successful tenderer may not resemble the indicative layout in every detail. However, the tenderers for the scheme will be obliged to ensure that the visual and other impacts of the final scheme layout and processes will not be any greater than those of the plant layout shown in the drawings.

The existing pumping station is served with a connection from the Dunmaway water supply scheme. This connection may have to be upgraded to meet the requirements of the upgraded pumping facilities. Additional power supply, if required, will be

brought to the site from the nearest available location in accordance with the requirements of the Electricity Supply Board.

## **Quarry Road pumping station, Dunmanway**

### **Description of the works**

It is proposed to replace the Quarry Road pumping station which is located on the north bank of the Dirty (Sally) River east of the Quarry Road Bridge in Dunmanway. The new pumping station will have stormwater storage facilities to limit the likelihood of overflow of untreated effluent to the river. The pump control and metering equipment panels will be housed in a control house situated on top of the valve chamber of the pumping station. Mitigation measures will be taken to maintain noise and odour emissions within recognised and acceptable limits at the site boundaries. This pumping station will transfer the wastewater from the Dunmaway Sewerage Scheme collection system to the upgraded wastewater treatment plant situated 450m south of the Long Bridge.

The Department of the Environment, Heritage and Local Government has directed that the pumping station be procured through a Design, Build and Operate form of contract in conjunction with a number of other schemes in West Cork. The scope of works for the scheme will include the upgrading and expansion of the existing wastewater treatment works and construction of new pumping station at the Long Bridge and Quarry Road. An **indicative** layout of the pumping station is included in Dwg. No. 1339-3(DY)-P03. The final layout of the site will be governed by the contractor's proposals for the site.

The control house will be constructed in blockwork with render finish, incorporating masonry panels using locally quarried stone, and a slated pitched roof. The appearance of the buildings will reflect the local traditional building styles. The paved areas will consist of concrete pavement and macadam. A 2.2 m high palisade fence will enclose the pumping station site with stockproof fencing providing protection to the screen planting which will be provided to the external boundaries. The access road to the pumping station will be surfaced in macadam.

The layout for the pumping station shown on Dwg. No.1339-3(DY)-P03 is indicative of the layout type which will be proposed by the successful tenderer for the construction of the works. The Design Build Operate form of Contract provides for the Contractor to prepare the detailed design of the Works in order to achieve savings in construction costs and in order to obtain the most technologically advanced treatment processes. The final design and layout proposed by the successful tenderer may not resemble the indicative layout in every detail. However, the tenderers for the scheme will be obliged to ensure that the visual and other impacts of the final scheme layout and processes will not be any greater than those of the plant layout shown in the drawings.

The existing pumping station is served with a connection from the Dunmaway water supply scheme. This connection may have to be upgraded to meet the requirements



of the upgraded pumping facilities. Additional power supply, if required, will be brought to the site from the nearest available location in accordance with the requirements of the Electricity Supply Board.

## DETERMINATION

Schedule 7 attached to article 120 of the Planning & Development Regulations 2001 states that the Council should have regard to the following criteria:

1. **Characteristics of Dunmanway Sewerage Scheme** and in particular to:

- **Size of the proposed scheme** – the scheme and hence the pumping stations, pipelines and Wastewater Treatment Plant (WWTP) is designed to cater for sewage and combined stormwater from the built up area of Dunmanway. Much of the sewer network, constructed in the early 1960's, is over 40 years old and so sections will require rehabilitation along with the construction of new foul, storm, combined sewers, and rising mains. The site for the WWTP is 1.812 acres. The ultimate population equivalent is 3,500, which is consistent with other agglomerations of this size and development. The P.E. is substantially below the threshold of 10,000 P.E. outlined in Part 2 (11) of Schedule 5 of the Planning & Development Regulations 2001 & Article 2, point (6), of Directive 91/271/EEC not included in Part 1 of this schedule.
- **The cumulation with other proposed development** – the scheme is designed to cater for the sewage needs of the majority of the immediate area. The nearest other sewerage schemes or sources of discharge of effluent to the Bandon River are Ballineen WWTP (secondary treatment), 11 km to the East, and Carbery Milk Products WWTP (Secondary treatment), also 11km to the East. There is no evidence of any present or future cumulative problems arising from these schemes. The proposed works will cater for sewage flows from all development within the catchment area of the Dunmanway Sewerage Scheme.
- **The use of natural resources** – the WwTP will be powered by mains electricity and the water supply will be from the existing public water supply. The demands for both electricity and public water supplies will not be significant in the context of the available supplies. The assimilative capacity of the Bandon River will be used to dilute and disperse the final effluent, see below for further details.
- **The production of waste** – treated effluent from the WWTP will discharge to the Bandon River. Storm overflows from the stormwater holding tank at the Long Bridge pumping station will

occasionally discharge 6mm screened sewage to the Bandon River, also storm overflows from the stormwater holding tank at the Quarry Road pumping station will occasionally discharge 6mm screened sewage to the Dirty River (this is dealt with in more detail below). The only other waste products produced are screenings from the pumping stations and WWTP inlet works, and sewage sludge. The screenings will be bagged and collected for transportation to the nearest licenced landfill site. The ultimate predicted volume of sludge is 57 tonnes dry solids per annum and this will be transported off site for treatment according to the Sludge Management Plan for County Cork.

- Pollution & nuisance** - the existing combined sewerage network has one main outfall at the existing WWTP and a number of emergency/combined stormwater outfalls, the outfall at the WWTP is discharging secondary treated sewage to the Bandon River, the other emergency/combined stormwater outfalls discharge dilute raw sewage to both the Bandon and Dirty Rivers during power outages and storm events. The proposed upgraded WWTP will provide secondary treatment to all sewage collected throughout the sewerage network. Stormwater holding tanks will be provided at the pumping station sites to minimise the frequency of sewage overflows to the Bandon and Dirty Rivers.
 

Recent (May 2004) BOD/SS/COD analysis on the treated effluent discharge from the WWTP gave results of 53.5 mg/l BOD (average), 177 mg/l SS and 217 mg/l COD (average). These figures are in excess of the limits stated in Urban Wastewater Treatment Regulations, 2001. They also breach the Royal Commission Standards under which the WWTP was originally designed. This has lead to some pollution of both rivers. The existing P.E. being treated at the WWTP is estimated to be 2,370. This figure is based on flow & load surveys undertaken in Nov/Dec 2003. The ultimate design P.E. (20 year) for the proposed upgraded WWTP is 3500. This is an increase of 48%.

	Existing WWTP	Upgraded WWTP	% Reduction in total discharge
	P.E. 2370 180 l/h/d BOD 53.5mg/l (average) SS 177 mg/l	P.E. 3500 180 l/h/d BOD 25mg/l (average) SS 35 mg/l	
<b>BOD kg/day</b>	22.82	15.75	31.0
<b>SS kg/day</b>	75.51	22.05	70.80

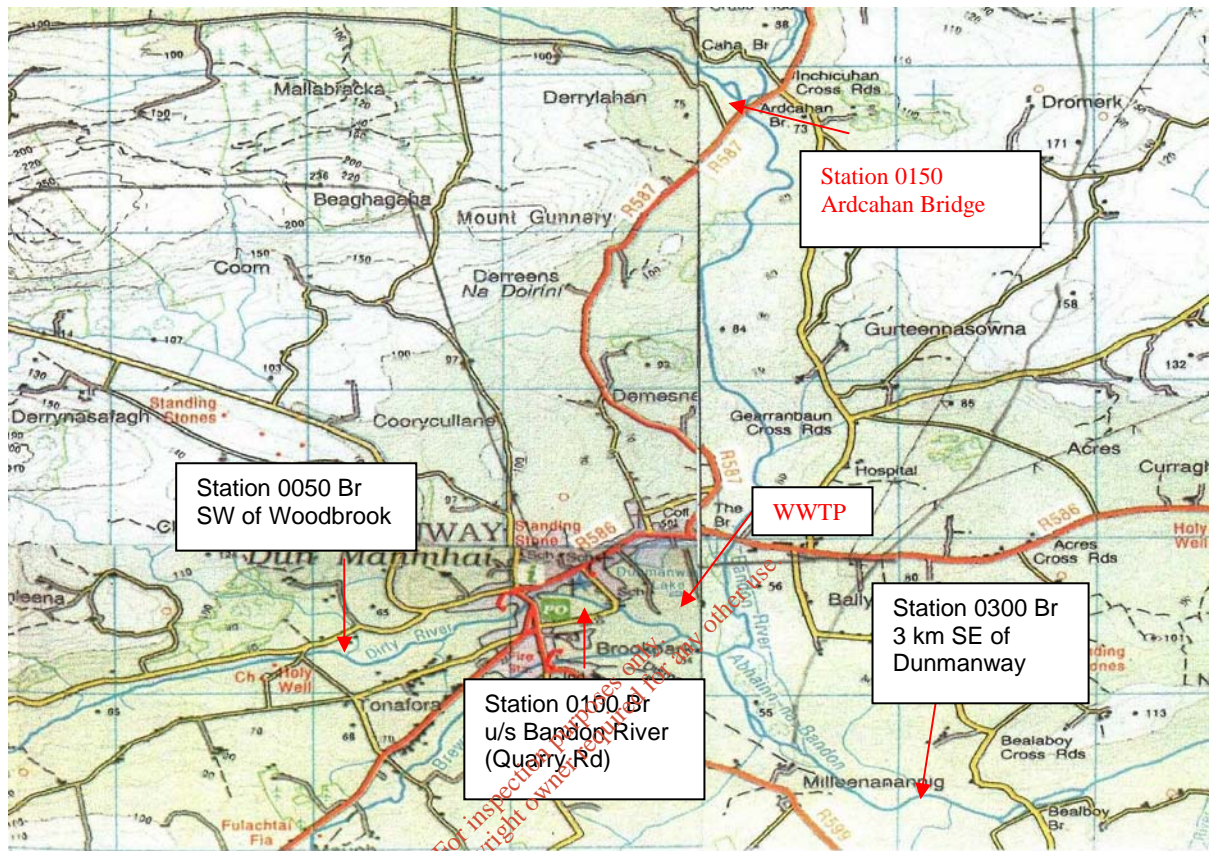
**Table 1. Comparison of treatment efficiencies for SS and BOD**

Results of biological monitoring in the Bandon River indicate that for much of its length water quality in the river is satisfactory. However the deterioration in water quality at site 0300 Br 3km SE of Dunmanway which was assigned a Q value of 3-4, may be due to the existing outflow from the wastewater treatment plant. Generally water quality has declined over the sampling period (1971-2003); however this is probably due to changes in farm practices and population changes. The sites of most relevance to the current proposal are those located upstream of the existing discharge (0200 Ardcahan Bridge) and downstream of the existing discharge (0300 Br 3km SE of Dunmanway). At the upstream site (0200) water quality has been consistently satisfactory since sampling commenced. At the downstream site water quality was satisfactory until 2000 when a Q value of 3-4 was assigned. This value which is indicative of water quality in transition was also assigned in 2003. Based on the available results it would appear that the existing discharge is having a negative impact on water quality. The overflow outfall from the Quarry Road Pumping Station discharges to the Dirty River. The two stations on the Dirty River are Station 050 at the bridge southwest of the Woodbrook Estate and Station 100 located at Quarry Bridge in Dunmanway. Overflows from the Quarry Road Pumping Station discharge to the Dirty between these two sites. A Q value of 4 was assigned to the upstream site (050) in 2000 whereas the downstream site (100) was assigned a Q value of 3-4. Based on these ratings it would appear that the overflow is having a negative impact on water quality. However other influences associated with Dunmanway Town i.e. road run-off, small direct discharges etc. may also be impacting on water quality.

The new WWTP and Pumping Stations will comply with the Urban Wastewater Treatment Regulations, 2001 and will consist of preliminary treatment, secondary treatment, and nutrient removal or their equivalent, to achieve a final effluent of 25 mg/l BOD; 35 mg/l SS; 125 mg/l COD; 1.5 mg/l TP.

Mitigation measures will be installed at the WWTP and pumping stations so that odour concentrations should not exceed 2 o.u./m<sup>3</sup> at the site boundary at a 98 percentile probability of occurrence or it should not exceed this limit for more than 2 % of the year whichever is the lesser and odour concentration should not exceed 5 o.u./m<sup>3</sup> at the site boundary at a 99 percentile probability of occurrence or that it should not exceed this level for more than 1 % of the year, whichever is the lesser. The WWTW and PS's shall be designed to ensure that the maximum noise level of 45 dB(A) as the maximum allowable 15 minute Leq at the site boundary due to operations within the site during daytime (8 am to 8 pm) and 40 dB(A), 15 minute Leq at night (8 pm to 8 am) and at weekends, when all equipment installed is being operated, is complied with and there shall be no discrete tones or impulses. In addition, the noise level at a distance of 1 m of each sound producing mechanical item of

equipment shall not exceed 85 dB(A) except in the case of internal combustion engines in which case the noise level of 85 dB(A) shall apply to a distance of 1 m from the building in which they are housed.



The Pumping Stations will have dual pumping, emergency storage facilities and screened emergency overflow pipe to cater for power failure or extreme storm events. The provision of the new WWTP, pumping stations and sewers and the rehabilitation of the existing collection system will have a positive effect on both the Bandon & Dirty Rivers.

- **The risk of accidents**, having regard to substances or technologies used – any chemicals used will be stored in bunded areas. The site will be fenced all around by 2.2m high security fencing. Access to the site will be via a 2.2m high access gate that will be normally locked. The work practices will comply with the Safety, Health & Welfare at work (Construction) Regulations 1995 (S.I. No. 138 of 1995).

2. **Location of Dunmanway Sewerage Scheme** and in particular the environmental sensitivity of geographical areas likely to be affected by the proposed Sewerage Scheme, having regard in particular to:

- **The existing land use** – The existing WWTP is located on the flood plain 450m South of the Long Bridge. The surrounding land use here is agricultural. This area has not been given any specific zoning in the 2003 Cork County Development Plan. The upgraded WWTP is to be constructed around the existing WWTP, thus any change to the existing land use characteristics should be minimal. The site boundary of the upgraded WWTP will be 165 m from the nearest dwelling house.

The new pumping station at the Long Bridge is on the dry side of the flood embankment. This area has not been given any specific zoning in the 2003 Cork County Development Plan. The new pumping station is to be constructed adjacent to the existing pumping station, thus any change to the existing land use characteristics should be minimal. The surrounding land use here is a mix of agricultural, commercial, and residential.

The new pumping station at the Quarry Road is to be constructed adjacent to the existing pumping station, thus any change to the existing land use characteristics should be minimal. This area has been zoned for residential development in the 2003 Cork County Development Plan. The surrounding land use here is a mix of agricultural, municipal, and residential.

- **The relative abundance, quality and regenerative capacity of natural resources in the area** – the trees and shrubs within the existing WWTP and pumping stations and on the existing boundaries will be preserved as much as possible. New planting will also be provided to screen the treatment units. The assimilative capacity of the receiving waters (Bandon River) was examined in the "Assessment of the ecological impacts of providing an upgraded Wastewater Treatment System at Dunmanway, Co. Cork". The Following extract should be noted :

*"Based on the structure of the watercourse, the pattern of silt deposition and the distribution of invertebrates and macrophytes/algae it was determined that the discharge is already affecting channel A which obviously provides much lower dilution than the main channel. No impact was noted in the main channel. It is noted that although water quality in this smaller channel has obviously deteriorated this has helped to maintain suitable conditions for freshwater mussels elsewhere in the river. In particular this channel gives additional protection in the event of a catastrophic event such as complete failure of the treatment plant. Given the vulnerability and comparative rarity of freshwater mussel their protection is considered to be the highest priority. In these circumstances the negative effects on channel A are considered*

*less important than the potential impacts on mussel habitat in the main channel.*

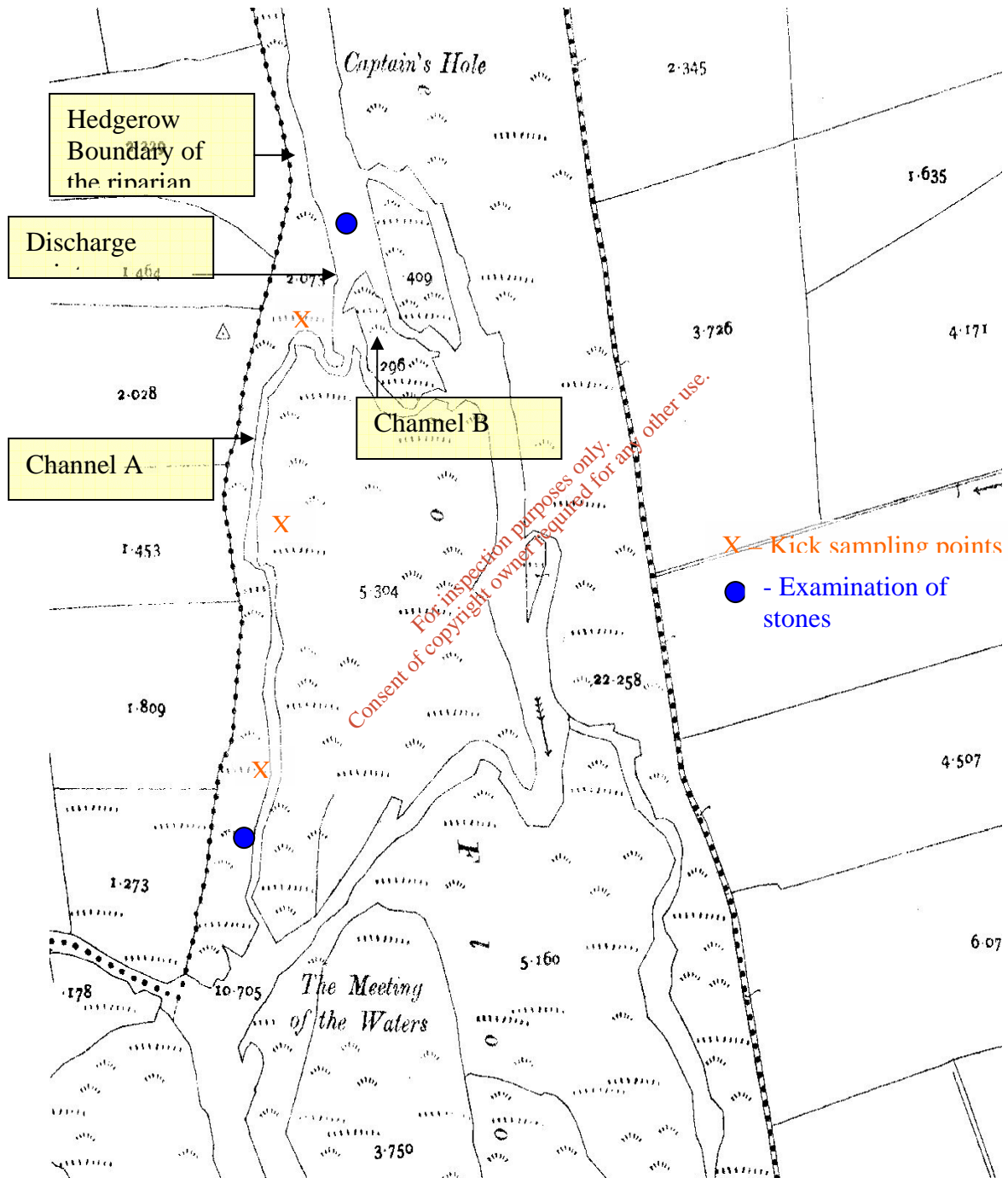
*An examination of channel A indicates that high levels of silt have been deposited within this channel and thus was prevented from reaching the main channel where conditions are more suitable for mussels. Given the length of the channel (310m) and low velocity flows during dry periods it is estimated that only a small proportion of the suspended solids derived from the treatment plant may actually reach the main channel under these conditions. It is difficult to estimate how much of this deposited silt is remobilised during spate events. This is because of the braided and complex channel which makes it difficult to predict how much water will move down channel A in high flow conditions. A basic visual estimate of flows and depths at low water conditions suggests that approximately 10% of the total flow in the Bandon River moves through Channel A. However it is noted that if some of this silt is remobilised during spate events there will be a high level of dilution available which will minimise any impact.*

*It is noted that the reduction in nutrients reaching channel A will help to improve water quality and the diversity of macroinvertebrates may improve although heavy shading will naturally limit macrophyte development. However, even if all discharges into this channel were stopped it is uncertain that this channel would support significant mussel populations. In the short term the high levels of silt will preclude colonisation by this species and given the depth of this silt in some areas and the relatively low flows it is considered unlikely that this silt will clear within a short time frame.*

*In circumstances where a new pipe is required it would be preferable to move the discharge point downstream so that it discharges completely into channel A. The terrestrial and riparian habitats to be affected would not be significantly different to those existing at the discharge point and the exact route could be designed to avoid the more locally important habitats such as individual or groups of trees. Channel A flows in a south-westerly direction and by choosing a suitable location the distance from the external hedgerow to the channel can be minimised.*

*However the development of a new pipeline could lead to the deposition of high levels of silt and other substances if strict mitigation measures are not put in place".*

## Map showing structure of the channel at the discharge point



- **The absorption capacity of the natural environment**, paying particular attention to the following areas –

- (a) Wetlands – Although the areas to the East of the WWTP and the Long Bridge pumping station area in a flood plain, no significant wetland areas occur.
- (b) Coastal zones – Dunmanway is an inland town and is not significantly close to any coastal zone. The nearest coastline is some 18km away.
- (c) Mountain & forest areas – Geographically Dunmanway is situated in a basin and thus no mountain areas will be affected by this development.

The discharge from the WWTP is to a cSAC (site code : 002171) and a pNHA (site code : 0101). This site contains a small though very important example of Alluvial Forest. Alluvial Forests are listed on annex 1 of the E.U. Habitats Directive. It is very unlikely that the treated effluent discharge will have any significant effects on the alluvial forests. However, there may be some disturbance to the riverbank and flood plain during construction of the outfall pipe. Every effort will be made to minimise disturbance.

- (d) Nature reserves & parks – No nature parks or reserves will be affected by Dunmanway sewerage scheme.
- (e) Areas classified or protected under legislation, including special protection areas designated pursuant to Directives 79/409/EEC and 92/43/EEC – The Bandon River into which the treatment plant will discharge is a pNHA (site code 0101) and a cSAC (site code 002171). The treatment works site boundary is to extend into the cSAC by approx 20m. As detailed in the site synopsis (attached to this report) two habitats listed in Annex 1 of the EU Habitats Directive, i.e. Alluvial Forests and Floating River Vegetation. Four Annex 2 species are also found in this cSAC - Otter, Salmon, Brook Lamprey, and Freshwater Pearl Mussel.

The "Assessment of the ecological impacts of providing an upgraded wastewater treatment system at Dunmanway, Co. Cork" was completed by Dixon.Brosnan Environmental Consultants. This assessment considered the existing and proposed treatment arrangements, the conservation site designation, the topography, aquatic and terrestrial ecology, mammals, birds, possible impacts and mitigation measures.

The Dixon.Brosnan report concludes:



*"Water quality in the Bandon River is generally satisfactory, however water quality deteriorates slightly downstream of the discharge point. It would appear therefore that the discharge is having a slight impact on water quality.*

*Notwithstanding the predicted increase in population over the next twenty years the improvement in treatment standards will result in significantly reduced discharge of nutrients to the Bandon River.*

*An examination of the existing discharge indicates that most of the effluent is being discharged into a side channel (Channel A). The distribution of silt, sewage fungus and algae indicates that water quality has seriously deteriorated in this side channel.*

*A survey determined that freshwater mussel is not present in channel A and given the levels of silt and algae the presence of other sensitive species such as brook lamprey and salmon is considered very unlikely. Given that freshwater mussel are present in other channels in this section of the Bandon River a discharge to channel A would create the least risk to this species.*

*A survey of terrestrial habitats did not detect any rare species however the riparian habitats noted are part of a larger woodland habitat and disturbance should therefore be minimised.*

*Due to the predicted increase in population the flow from the treatment plant will increase. In addition the pool, which receives the current discharge, is inherently unstable. A new downstream discharge point on channel A is therefore recommended.*

*It is important that damage to habitats is minimised during construction and large machinery should therefore be excluded from the riparian zone. The specific route of the pipeline should be designed so as to minimise any possible impacts".*

The South Western Regional Fisheries Board have been consulted and they have indicated that they are supportive of the proposals. The Heritage and Planning Division of the Department of the Environment, Heritage and Local Government were contacted in Sept 2003 and advised of the proposed development, requesting their recommendation in respect of conservation issues.

There are no Designated Areas under the Quality of Bathing Waters Regulations 1992 in the area. The area is not designated under the Quality of Salmonid Waters Regulations 1988.

- (f) Areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded – Discharges to the Bandon River from the existing WWTP and

pumping stations are in excess of the allowable standards in the EU Wastewater Directive. The upgrading of the sewerage scheme will bring these discharges in line with EU legislation.

- (g) Densely populated areas – the area around the proposed outfall in the Bandon River is an area in the hinterland of Dunmanway and is not densely populated.

The location of the WWTP is on the South Eastern fringe of the town in an area that is surrounded agricultural land.

Both the Long Bridge pumping station and the Quarry Road pumping station are in areas of medium/low density residential/municipal areas. As there are existing treatment facilities at these locations the environmental sensitivity of the geographical areas will not be significantly impacted upon.

- (h) Landscape of historical, cultural or archaeological significance – An archaeological assessment (attached) has been carried out by The Archaeological Services Unit of UCC. This Assessment concludes that there will be no impact on the recorded archaeological monuments within the vicinity of the development, however, as yet unknown archaeological monuments in the development zone may be impacted upon by ground disturbance and thus a number of mitigating strategies are recommended. These mitigation strategies will be considered during the preparation of the contract documents.

It is likely that during construction there will be some temporary disturbance to the natural landscape, however, when construction has been completed there should be little or no long-term significant effects to the natural landscapes.

### 3. **Characteristics of potential significant effects** of the proposed Sewerage Scheme and in particular to:

- **The extent of the impact** (geographical area and size of affected population) – the Dunmanway Sewerage Scheme is designed to cater for the existing and proposed population for the town of Dunmanway.
- **The transfrontier nature of the impact** – Dunmanway is not within a significant distance of any relevant frontier.
- **The magnitude and complexity of the impact** – the proposed Dunmanway Sewerage Scheme is a conventional scheme using proven technology dealing with wastewater from within its own catchment. Potential impacts have been identified in respect of some of the various environmental topics normally considered in the scoping and preparation of an environmental impact assessment (Schedule 6, section 2(b) Planning & Development Regulations 2001). These topics include human beings; flora; fauna; soils water; air; climatic factors; the landscape; material

assets, including architectural and archaeological heritage and cultural heritage; and the interaction of the above factors. In summary, the potential and actual impacts of the development include the following:

- a) Emissions to air, soil and water could result in significant environmental impact but given the small scale of the development and the consequent small scale of emissions and the level of treatment and mitigation measures proposed it is not anticipated that there will be any significant impact from the proposed development.
  - b) Ecological assessments have established that aquatic habitats will be affected by the construction of the outfall pipeline. However, these studies further noted that none of the terrestrial habitats and species noted are of particular conservation value and no significant impact is expected to occur.
  - c) The Ecological assessment has recommended the optimum location for the outfall to be a location just down stream of its existing location at which point the effects to the River flora and fauna are minimised.
  - d) Odour and noise emission limits are proposed which will ensure that the potential impact of any noise or odour nuisance will be minimised.
  - e) The overflows from the pumping stations will be upgraded and will incorporate screening to eliminate discharge of visible sewage solids to the rivers. The use of storm water holding tanks at the pumping station sites will reduce the frequency of stormwater overflow events in line with the requirements of the Urban Wastewater Directive.
  - f) The proximity of treatment units to existing housing conforms to the recommendations of the draft EPA Wastewater Treatment Manual for Small Communities, Business, Leisure Centres and Hotels.
- **The probability of the impact** – the positive impact of effluent treatment on an area is well recorded and documented and no unpredicted impacts should arise.
  - **The duration, frequency and reversibility of the impact** – the proposed Dunmanway Sewerage Scheme will operate continuously.

## CONCLUSION

Taking account of the determination above and the guidance provided in “Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development” issued by the DoEH&LG, dated August 2003 and the “EPA Advice Notes on Current Practice in the preparation of Environmental Impact Statements”, I am satisfied that **the proposed Dunmanway Sewerage Scheme is unlikely to have significant effects on the environment.**

**Signed:**

---

**Niall O’Mahony  
Senior Engineer  
(Projects Section)**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**List of attachments:**

Dwg. No. 1339-3(DY)-P01 – Dunmanway - Indicative Site Layout of the proposed Wastewater Treatment Works.

Dwg. No. 1339-3(DY)-. P02 –Sections through Proposed Dunmanway WWTP Site.

Dwg. No. 1339-3(DY)-. P03 – Pumping Station Indicative Layout Plans – Long Bridge and Quarry Road.

Preliminary Report on The Upgrading of Dunmanway Sewerage Scheme prepared by MCOS dated July 2001.

Review of the Preliminary Report on The Upgrading of Dunmanway Sewerage Scheme, prepared by TJOC dated **September 2004**.

Assessment of the Ecological impacts of providing an upgraded wastewater treatment system at Dunmanway, Co. Cork prepared by Dixon.Brosnan, Environmental Consultants.

Archaeological Assessment of Sewerage Scheme at Dunmanway, Co. Cork prepared by The Archaeological Services Unit of UCC dated March 2004.

Extracts from Cork County Development Plan 2003.

For inspection purposes only.  
Consent of copyright owner required for any other use.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.4**

**3/6/09**

For inspection purposes only.  
Consent of copyright owner required for any other use.

Water Dept

AN ROINN COMHSHAOIL,  
OIDHREACHTA AGUS  
RIALTAIS ÁITIÚIL

6 December 2004

DEPARTMENT OF THE  
ENVIRONMENT, HERITAGE AND  
LOCAL GOVERNMENT

Our Ref: DAU-2004-CO CO-Part VIII

Director of Services,  
Water Services Section  
Cork County Council,  
The Courthouse,  
Skibbereen,  
Co. Cork.

DÚN SCÉINE  
LÁNA FHEARCAIR  
BAILE ÁTHA CLIATH 2

**Re: Planning Application Part VIII by Cork County Council for permission for proposed upgrading and expansion of wastewater treatment plant, pumping stations and rising mains at Dunmanway North Dunmanway, Co. Cork.**

A Chara,

DÚN SCÉINE  
H. MURPHY LANE

We refer to the Council's notification in relation to the above-proposed development. Outlined below are the nature conservation recommendations of the Department of the Environment, Heritage and Local Government.

DUBLIN 2

Although the deadline for this application has passed, we would like to submit the following design recommendation for consideration.

Tel: +353 1 411 7109  
Fax: +353 1 411 7120


The Wastewater Treatment Plant (WWTP), and the proposed upgrade, is located beside a grass field with a shallow surface run-off ditch. This field separates the WWTP from the alluvial habitats of the Bandon River candidate Special Area of Conservation (cSAC) Site No. 002171. A site synopsis outlining the species and habitats within this area is attached for your information. Both the existing and proposed effluent pipe discharge into part of the river within the cSAC, and this pipe runs through the above field.

It is recommended that consideration be given to creating a constructed wetland in the field between the WWTP and the alluvial part of the river, into which the effluent is first discharged before being subsequently discharged to the channel of the River Bandon. This would encourage the natural restoration of the river channel currently adversely affected by WWTP effluent discharge.

Kindly forward Any further information available/received or in the event of a decision being made, please forward a copy to the following address as soon as it issues:

The Manager,  
Development Applications Unit,  
Department of the Environment, Heritage and Local Government,  
Dun Sceine,  
Harcourt Lane,  
Dublin 2.

Mise le meas,

  
Teresa Halloran,  
Development Applications Unit.

For inspection purposes only.  
Consent of copyright owner required for any other use.



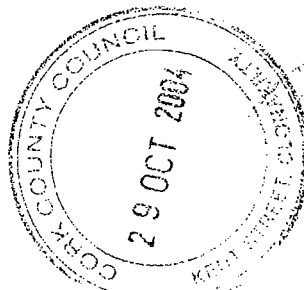
Refer To/  
P.J. LEAHY  
S.E. County, West Cork  
Copy To/  
with, sub, work office

26<sup>th</sup> October 2004

florall  
27.10.2004

Our Ref: DAU-2004-CO-CO-Part 8

County Secretary,  
Cork County Council,  
Model Business Park,  
Model Farm Road,  
Cork.



**Re: Dunmanway Waste Water Treatment Works -Part VIII**

A Chara,

We refer to the Council's notification in relation to the above-proposed development. Outlined below are the archaeological recommendations of the Department of the Environment, Heritage and Local Government.

We recommend that an underwater assessment (riverine and river bank survey) be undertaken. No works should be sanctioned until this report had been received and reviewed.

The underwater archaeological assessment should take the form of:

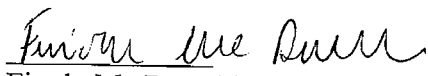
- A detailed desktop study
- Intra-riverine diver and wading survey
- Metal detection survey
- Survey of associated river-banks
- The underwater survey should be licensed to the Department of Environment, heritage and Local Govt. and should be undertaken by a suitably qualified underwater archaeologist.
- It should be noted that all diving should be undertaken in accordance with the Health and Safety Authority's Safety in Industry (Diving at Work) Regulations 1981, SI 422. As such the developer engaging the necessary archaeological personnel should ensure that all dive equipment used and dive team personnel qualifications are properly certified and that the correct commercial dive insurance is in place.
- It should also be noted that avoidance and preservation *in situ* of archaeology is the preferred option of the Minister of the Environment, Heritage and Local Government, therefore, should archaeology be discovered during the monitoring, works, preservation by record, excavation or avoidance/preservation *in situ* may be recommended.

Kindly forward to this office any Further Information or documentation received by the Council or in the event of a final decision being made please forward a copy of same to the following address as soon as it issues:

The Manager  
Development Applications Unit  
Department of the Environment, Heritage and Local Government  
4<sup>th</sup> Floor  
Dún Scéine  
Harcourt Lane  
Dublin 2

In addition, please acknowledge receipt of this letter (as required under the Planning & Development Regulations 2001) and forward the relevant receipt to the address above.

Mise le meas,

  
Finola Mc Donald  
Development Applications Unit

For inspection purposes only.  
Consent of copyright owner required for any other use.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.5**

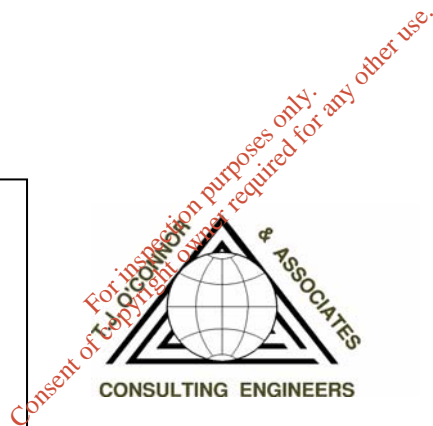
**3/6/09**

For inspection purposes only.  
Consent of copyright owner required for any other use.

# DUNMANWAY SEWERAGE SCHEME

## Report on Submissions received as part of Public Consultation phase of Part 8 Planning

Mr. Jack Matson,  
Director of Services,  
Environmental Protection &  
Water Services  
Cork County Council,  
Clonakilty  
Co. Cork.



T.J. O'Connor and  
Associates,  
Corrig House,  
Corrig Road,  
Sandyford,  
Dublin 18.  
Jan 2005

## Table of Contents

### Section 1 Comments on the planning submissions

1. South Western Fisheries Board
2. DoEHLG, Development Applications Unit (Archaeology)
3. DoEHLG, Development Applications Unit (Nature Conservation)

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## Submission no. 1 by: South Western Fisheries Board

### Issues

1. With respect to the proposed pumping station it is stated that the pumping stations will each have an overflow pipe discharging to adjacent freshwater to cater for power failure or extreme storm events. That it would be more appropriate to provide a back-up power supply and the separation of storm water from sewer system, to avoid the need for an overflow.
2. The Board would ask that consideration be given to the manner in which all construction works and particularly those close to surface water channels are carried out with a view to minimising suspended solids pollution.

### Comments

1. A portable back-up power supply (generator) will be provided at the wastewater treatment plant less than 500 m away. The generator can be hardwired to or moved to the pumping station, if power failure has occurred. Thus power to the pumping stations will be maintained.

The collection system was studied to identify the existing storm water problems. Several problem areas were identified. Proposals have been drawn up to address the entry of storm water into the collection system. It is proposed to undertake these works as part of this contract.

In addition to the above, it is proposed to provide large storage facilities to store excess flows in the case of a significant rainfall event, such that the Quarry Road Pumping Station pumps and storage tank will be designed to cater for 12 DWF for up to 2 hours. The Long Bridge Pumping Station pumps and storage tank will be designed to cater for 7 DWF for up to 2 hours. Storage facilities will be provided at the treatment plant to cater for flows in excess of 3DWF from Long Bridge Pumping Station for up to 2 hours. Overflows will only occur if these capacities are exceeded. The overflows will be screened to reduce the likelihood of solids being discharged.

2. Excavation of a trench along the riverbank may tend to give rise to increased silt levels in the adjoining river. The Contractor will be obliged to submit a method statement for approval by the Engineer detailing the manner in which he proposes to undertake the proposed works without generating high levels of silt. A clause can be included in the contract in which it will be stated that there is a preference for operations which will not give rise to high levels of silt. The provision of a bund alongside the open trenches and minimising the length of excavation open at any time are some means to reduce the amount of silt.

Submission no. 2 by: DoEHLG, Development Applications Unit  
(Archaeology)

### Issues

1. That an underwater archaeological assessment (riverine and riverbank survey) be undertaken. This survey should include a detailed desktop survey, an intra-riverine diver and wading survey, a metal detection survey and a survey of the associated river banks.
2. It should be noted that all diving should be undertaken in accordance with the Health and Safety Authority's Safety in Industry (Diving at Work) Regulations 1981, SI 422. As such the developer engaging the necessary archaeological personnel should ensure that all dive equipment used and dive team personnel qualifications are properly certified and that the correct commercial dive insurance is in place.
3. It should be noted that avoidance and preservation in-situ of archaeology is the preferred option of the Minister of the Environment, Heritage and Local Government, therefore should archaeology be discovered during the monitoring works, preservation by record, excavation or avoidance / preservation in situ may be recommended.

### Comments

1. An archaeological assessment of the scheme was undertaken by the Archaeological Services Unit, UCC. This report found that none of the known sites around the town will be directly affected by the development. However, it recommended that all topsoil removal should be monitored by a suitably qualified archaeologist. The assessment did not include the river bank where the proposed outfall is to be laid. The report can be amended to include for the outfall works between the field boundary and the riverbank. As there are no proposed works to take place in the river, it is not proposed to undertake an underwater archaeological assessment.
2. Any new archaeological findings of interest will be considered, and the location of the works will be reviewed to see if it is possible to retain the newly found site.

Submission no. 3 by: DoEHLG, Development Applications Unit (Nature Conservation)

### Issues

1. That consideration be given to creating a constructed wetland in the field between the WWTP and the alluvial part of the river, into which the effluent is first discharged before being subsequently discharged to the channel of the River Bandon. This would encourage natural restoration of the river channel currently affected by WWTP discharge.

### Comments

1. The ecology of the river and the receiving channel were studied and reported on in the report "Assessment of the ecological impacts of providing an upgraded Wastewater Treatment System at Dunmanway, Co. Cork." It was found that the poor quality of effluent currently being discharged has had a detrimental effect on the quality of the channel, with extensive siltation occurring. However, it was found that a treatment standard of 35 mg/l Suspended Solids would be sufficient to facilitate natural restoration of the channel.

The site under purchase by Cork County Council is extensive and extends from the laneway to the field boundary not far from the riverbank. The function of the proposed constructed wetland is not specified, but one would presume that the main purpose of such would be to further reduce the suspended solids concentration prior to discharge. It is possible to construct such a wetland in this location, though the level of the perimeter bunding will have to be well below the peak flood levels to permit flood storage and flood flows. The cost of the wetland could be reduced by excluding the use of an engineered liner. A wetland at this location would maximise the use of the site. The principal soil type in this location is gravel, overlaid by clay. A performance specification or standard details will have to be provided as part of the contract tender documents, so that such a facility can be priced by the tenderers.

The purpose of the DBO type of contract is to allow Contractors to design the plant to meet a performance specification. This form of contract is intended to provide more value for money to the client than the traditional form of contract. By specifying certain works, the Contractor has less opportunity to do a design to suit his resources.



**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**ATTACHMENTS F.1.6**

**3/6/09**

For inspection purposes only.  
Consent of copyright owner required for any other use.

# Comhairle Chontae Chorcaí Cork County Council

County Hall,  
Cork, Ireland.

Tel. No: (021) 4276891

Fax No: (021) 4276321



Web: <http://www.corkcoco.com/>

Mr. Niall O'Mahony,  
Senior Engineer,  
Cork County Council,  
Courthouse,  
Skibbereen,  
Co. Cork.

*Direct Dial: 021-4285454*

*Fax: 021-4345425*

*Email: [corporate.affairs@corkcoco.ie](mailto:corporate.affairs@corkcoco.ie)*

15<sup>th</sup> February, 2005.

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

**Dunmanway Sewerage Scheme**

I refer to your letter dated 4<sup>th</sup> February, 2005, in connection with the above.

At the meeting of Cork County Council held on 14<sup>th</sup> February, 2005, the recommendation of the Western Committee was approved.

MAURICE MANNING,  
A/HEAD OF CORPORATE AFFAIRS.



Recycled

Comhairle Chontae Chorcaí

**CORK COUNTY COUNCIL**  
**(WESTERN DIVISION)**



*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**Dunmanway Sewerage Scheme**

**PLANNING AND DEVELOPMENT ACT 2000**

**County Manager's Report on the Dunmanway  
Sewerage Scheme in accordance with the  
provisions of Part 8 of the Planning and  
Development Regulations 2001.**

PROJECTS SECTION  
WESTERN DIVISION

January 2005

# 1 DESCRIPTION OF THE NATURE AND EXTENT OF THE SCHEME

The existing collection system, including pumping stations at the Quarry Road and at Long Bridge, collects wastewater from Dunmanway and its environs. The pumping stations pump the collected wastewater to the treatment plant. An Imhoff tank provides primary treatment for the sewage followed by secondary treatment in two percolating filters. The treated effluent discharges via a 225 mm outfall to the Bandon River. Excess flows are overflowed at the pumping stations to the adjacent rivers.

Due to the increasing load on the existing plant and the need to provide a satisfactory effluent quality, it is proposed to upgrade and expand the existing wastewater treatment plant to cater for the future increased loads. This proposal is in accordance with the County Cork Development Plan 2003 and with the Preliminary Report on the Dunmanway Sewerage Scheme prepared by M.C. O'Sullivan's in July 2001 and subsequent amendments to this report by T.J. O'Connor & Associates in 2004. This plant will be designed to serve a population equivalent of 3,500 persons. This will cater for population growth and development demand for the next twenty years. It is proposed to expand the existing treatment plant site since it is of limited area. The wastewater treatment plant will be screened to reduce its visual intrusion. It is intended that there will be green space between the boundaries of the works and the nearest dwellings or business premises in accordance with County Development Plan guidelines.

The Department of the Environment, Heritage and Local Government has directed that the wastewater treatment works be procured through a Design, Build and Operate form of contract in conjunction with a number of other schemes in West Cork. The scope of works for the scheme will include the construction of new pumping stations and stormwater holding tanks at Quarry Road and Long Bridge. An **indicative** layout of the works is included in Dwg. No. 1339-3(DY)-P01. The final layout of the site will be governed by the contractor's proposals for the site.

It is proposed to discharge the treated effluent to the Bandon River by gravity via a new outfall situated approx 10m downstream of the existing outfall.

The new wastewater treatment plant will consist of preliminary and secondary treatment and nutrient removal or their equivalent, to achieve a final effluent of 25 mg/l BOD; 35 mg/l SS; 125 mg/l COD; 1.5 mg/l TP. Mitigation measures will be installed to maintain noise and odour emissions within recognised and acceptable limits at the site boundary. Standby power generation will be available on site in case of power failure. Thickened sludges will be transported by tanker or skip off site for further treatment or disposal in accordance with the County Sludge Management Plan. Screenings arising from the preliminary treatment stage will be disposed of to the Cork Co. Co. Landfill site.

The control house and any other building which may be located at the treatment works site will be constructed in blockwork with render finish, incorporating masonry panels using locally quarried stone, and slated pitched roofs. The appearance of the buildings will reflect the local traditional building styles. The paved areas will consist of concrete pavement and macadam. A 2.2m high palisade fence will enclose the treatment works with stockproof fencing providing protection to the screen planting which will be provided to the external boundaries. The access road to the treatment works will be surfaced in macadam.

The layout for the wastewater treatment works shown on Dwg. No.1339-3 (DY)-P01 is indicative of the layout type, which will be proposed by the successful tenderer for the construction of the works. The Design Build Operate form of Contract provides for the Contractor to prepare the detailed design of the Works in order to achieve savings in construction costs and in order to obtain the most technologically advanced treatment processes. The final design and layout proposed by the successful tenderer may not resemble the indicative layout in every detail. However, the tenderers for the scheme will be obliged to ensure that the visual and other impacts of the final scheme layout and processes will not be any greater than those of the plant layout shown in the drawings.

The existing treatment works is served with a connection from the Dunmanway water supply scheme. This connection may have to be upgraded to meet the requirements of the upgraded treatment facilities. Additional power supply, if required, will be brought to the site from the nearest available location in accordance with the requirements of the Electricity Supply Board.

Drawings Accompanying This Application:

*Dwg. No. 1339-3(DY)-P01* – Dunmanway - Indicative Site Layout of the proposed Wastewater Treatment Works.

*Dwg. No. 1339-3(DY)- P02* –Sections through Proposed Dunmanway WWTP Site.

*Dwg. No. 1339-3(DY)- P03* – Pumping Station Layout Plans – Long Bridge and Quarry Road.

## 2 PLANNING EVALUATION

### (a) Development Control: -

See attached report by Senior Planner in appendix 1. The proposed development is consistent with the proper planning and sustainable development of the area.

### (b) Development Plan: -

The proposed development is consistent with the overall strategy and main policy as outlined in chapter 5 (Transport & Infrastructure) of Volume 1 of the Cork County Development Plan 2003, which states that:

- *Investment in the county's infrastructure should be made in a sustainable and efficient manner in order to promote the social and economic well being of the county and its population.*

The proposed development is consistent with the objective for Sewerage Infrastructure as outlined in section 5.2 (Water Supplies, Sewerage and Drainage), which states that (INF 2-5):

- *It is an objective generally to provide support for the funding of sewerage infrastructural requirements as identified by the County Council in order to accommodate the planned levels of growth expected for the county.*
- *It is an objective generally to improve and extend the sewerage infrastructure to serve the planned levels of growth, during the lifetime of this plan, in order to facilitate development.*

The proposed development is adjacent to pNHA-1035 (Bandon Valley South of Dunmanway) and partly within cSAC-2171 Bandon River and is consistent with the Specific Objectives (Heritage and Amenity) as outlined in chapter 3 Volume 2, which states that (ENV 2-5 & ENV 2-6):

- *It is an objective to maintain the conservation value of all Natural Heritage Areas proposed for designation by Duchas the Heritage Service, either before or during the lifetime of this plan.*
- *It is an objective to maintain the conservation value of those sites identified by Duchas the Heritage Service as candidate Special Areas of Conservation as well as any other sites that may be so identified during the lifetime of this plan.*

The proposed development is not visible from any Scenic Route as outlined in Chapter 4, Volume 2.

The proposed development is consistent with the Specific Zoning Objectives (Main Settlements) outlined in Settlement 13 Dunmanway in Volume 3 of the Cork County Development Plan 2003, which state that:

- Key Planning Consideration 13.1.7 *"The waste water treatment plant, discharges to the River Bandon and is presently overloaded. The upgrading of the plant is in the planning stage"*.
- Objective No. R-04 Specific Zoning Objective for "low density residential development individual sites" is close to existing Wastewater Treatment Plant.
- Objective No. R-07 Specific Zoning Objective for "medium density residential development, to include a mix of houses types and sizes with amenity walk along northern boundary of site. Provision for nursing home" is adjoining to existing Sackville Street Pumping Station.
- Objective No. U-02 Specific Zoning Objective for "local access road" is close to existing Wastewater Treatment Plant.
- Objective No. U-03 Specific Zoning Objective to "provide pedestrian walkways connecting open space to town centre and Dunmanway Lake" is close to existing Sackville Street Pumping Station.

For inspection purposes only.  
Consent of copyright owner required for any other use.

### 3 SUBMISSIONS RECEIVED

Submissions were received from the following:

	Name	Address	Date
1	South Western regional Fisheries Board	1 Nevilles Terrace, Masseytown, Macroom.	27-Oct-04
2	DEHLG (Archaeology)	Harcourt Lane, Dublin2	29-Oct-04
3	DEHLG (Nature Conservation)	Harcourt Lane, Dublin2	9-Dec-04

## 4 SUMMARY OF ISSUES IN SUBMISSIONS

Our Consulting Engineer, T.J. O'Connor & Associates and ourselves have considered the issues and our detailed responses to each of the submissions are contained in appendix 2. A summary of the issues and responses is outlined below:

1. With respect to the proposed pumping stations (Quarry Road & Long Bridge) it is stated that the pumping stations will each have an overflow pipe discharging to adjacent freshwater to cater for power failure or extreme storm events. That it would be more appropriate to provide a back-up power supply and the separation of storm water from sewer system, to avoid the need for an overflow – Backup power generation will be provided. The problem of excessive stormwater entering the network of sewers has been examined and will be addressed as part of a separate network contract.
4. The Board would ask that consideration be given to the manner in which all construction works and particularly those close to surface water channels are carried out with a view to minimising suspended solids pollution - The Contractor will be obliged to submit a method statement for approval by the Engineer detailing the manner in which he proposes to undertake the proposed riverside works without generating high levels of silt.
3. That an underwater archaeological assessment (riverine and riverbank survey) be undertaken. This survey should include a detailed desktop survey, an intra-riverine diver and wading survey, a metal detection survey and a survey of the associated river banks - As there are no proposed works to take place in the river, it is not proposed to undertake an underwater archaeological assessment.
4. That consideration is given to creating a constructed wetland in the field between the WWTP and the alluvial part of the river, into which the effluent is first discharged before being subsequently discharged to the channel of the River Bandon. This would encourage natural restoration of the river channel currently affected by WWTP discharge – The Design Build and Operate contract will be based on performance parameters including those related to effluent quality. If the successful contractor feels that the construction of a wetland between the works and the river bank will be of benefit in achieving these parameters then due consideration will be given to their proposals.



## 5 MODIFICATIONS

No modifications to the Part 8 documentation are recommended. Some conditions in the proposed Design Build & Operate Contract may be modified or strengthened to take on board some of the issues outlined above.

## 6 RECOMMENDATION

I recommend that the proposed upgrading of the Wastewater Treatment Works, access roads, pumping stations and associated foul sewage rising mains and outfalls at Dunmanway North, Dunmanway, be proceeded with as recommended in this report.

Signed: -

\_\_\_\_\_  
County Manager

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

# Appendix 1

For inspection purposes only.  
Consent of copyright owner required for any other use.

# Comhairle Chontae Chorcaí Cork County Council

Planning Section  
Cork Road  
Skibbereen  
Co. Cork



Tel: (028) 40340  
Fax: (028) 21660

web: <http://www.corkcoco.com/>

Mr. Niall O'Mahony  
Senior Engineer  
Cork County Council  
The Courthouse  
Skibbereen  
Co. Cork

Date: 21<sup>st</sup> January 2005

## Dunmanway Water Supply Scheme

I refer to the above-mentioned Part VIII proposals that were forwarded to this office.

I have examined the proposals and I am satisfied that they are generally in accordance with the proper planning and sustainable development of the area and, in particular, with the County Development Plan objectives for improving and extending water and sewerage infrastructure in the county to accommodate planned levels of growth.

Yours faithfully,



**Brendan O'Sullivan**  
Senior Planner

For inspection purposes only  
Consent of copyright owner required for any other use

## Appendix 2

For inspection purposes only.  
Consent of copyright owner required for any other use.

**CORK COUNTY COUNCIL**

**WESTERN DIVISION**

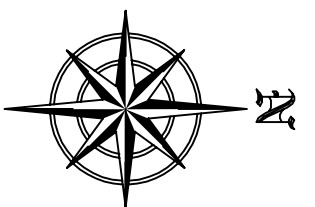
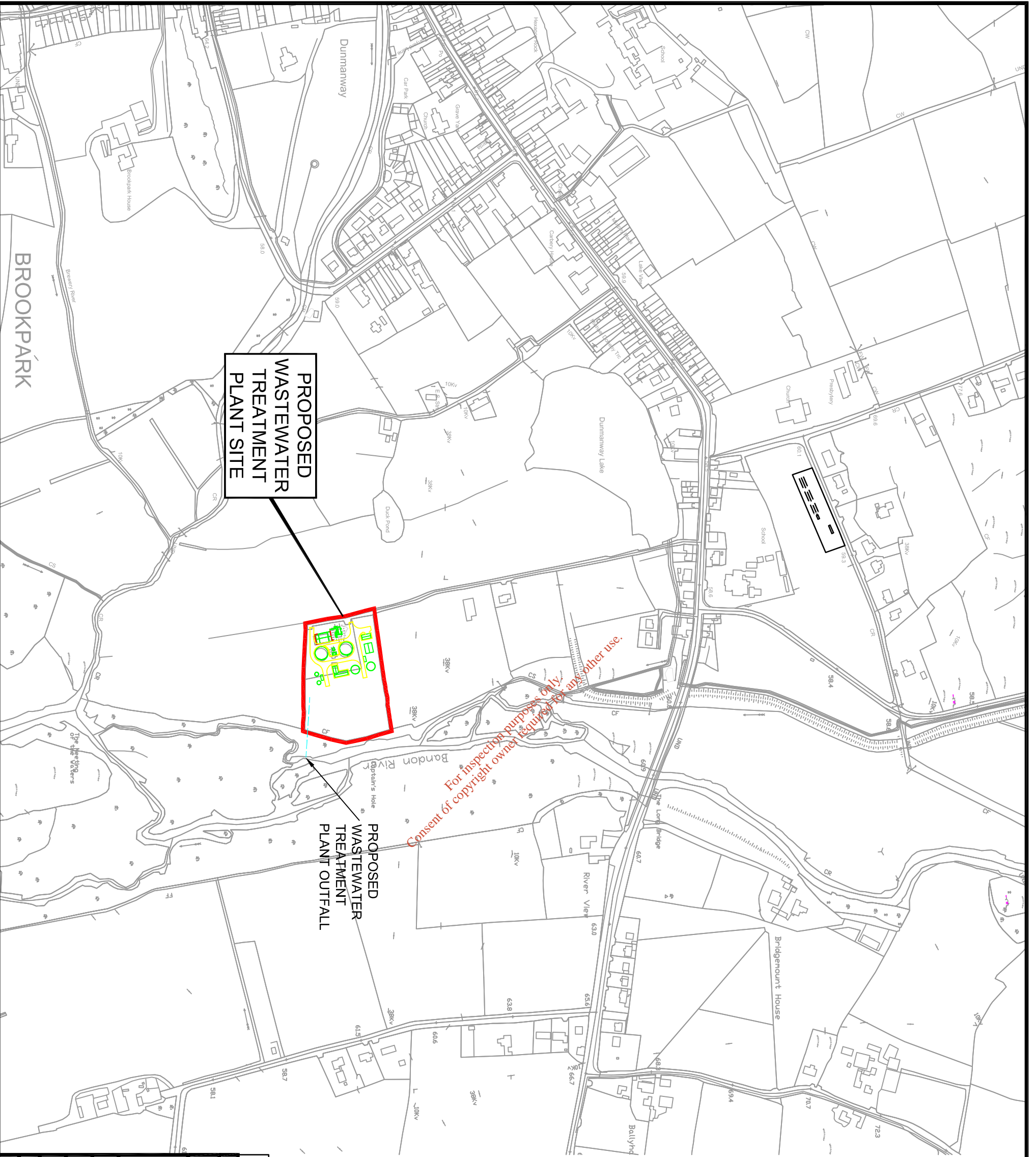
**DUNMANWAY WASTE WATER DISCHARGE  
LICENCE APPLICATION**

**REPLY TO REGULATION 18(3)(b) NOTICE**

**DRAWINGS**

**3/6/09**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)

REVISION	DETAILS	DATE
R1	REVISION DRAWING	3/6/09

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS  
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

**PROJECT:**  
DUNMANWAY EPA DISCHARGE LICENSE APPLICATION

**CLIENT:**  
CORK COUNTY COUNCIL

**DRAWING TITLE:**  
ATTACHMENT A.1R - LAYOUT OF DUNMANWAY WTRP (PROPOSED)

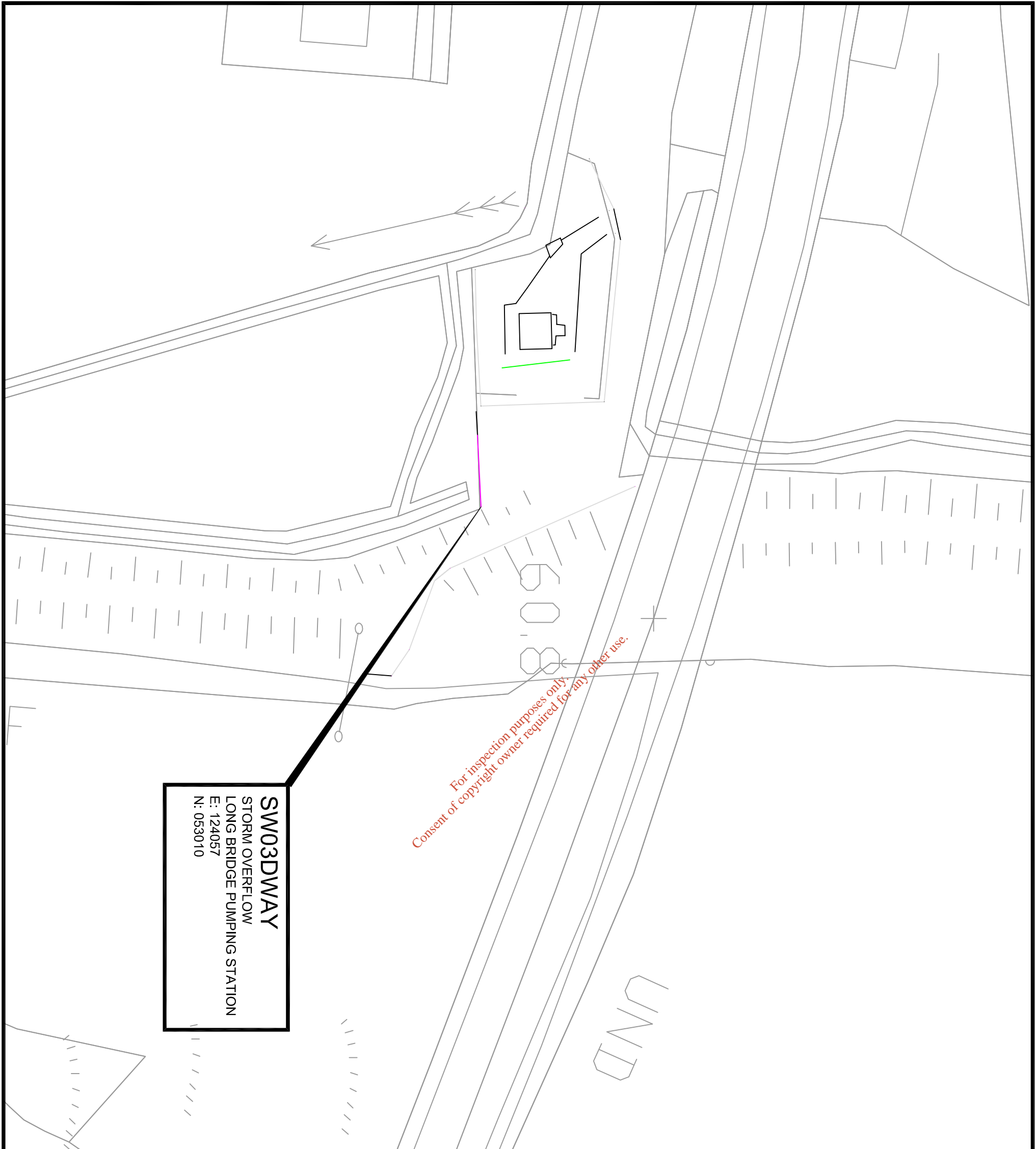
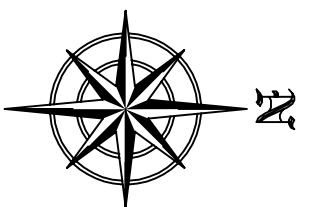
**SCALE:** 1:5000

**DATE:** 28/08/08

**DRAWN BY:** JH

**JOB NO:** 2846

**DRAWING NO:** DUNMANWAY\_A1\_02R



**SW03DWAY**  
STORM OVERFLOW  
LONG BRIDGE PUMPING STATION  
E: 124057  
N: 053010

MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)

AMENDMENT DETAILS	DATE
REG 18(3)(b) DRAWING	3/6/09

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS  
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

**PROJECT:**  
DUNMANWAY EPA DISCHARGE LICENSE APPLICATION

**CLIENT:**  
CORK COUNTY COUNCIL

**DRAWING TITLE:**  
ATTACHMENT B.5 - LOCATION OF STORM OVERFLOW POINTS (EXISTING)

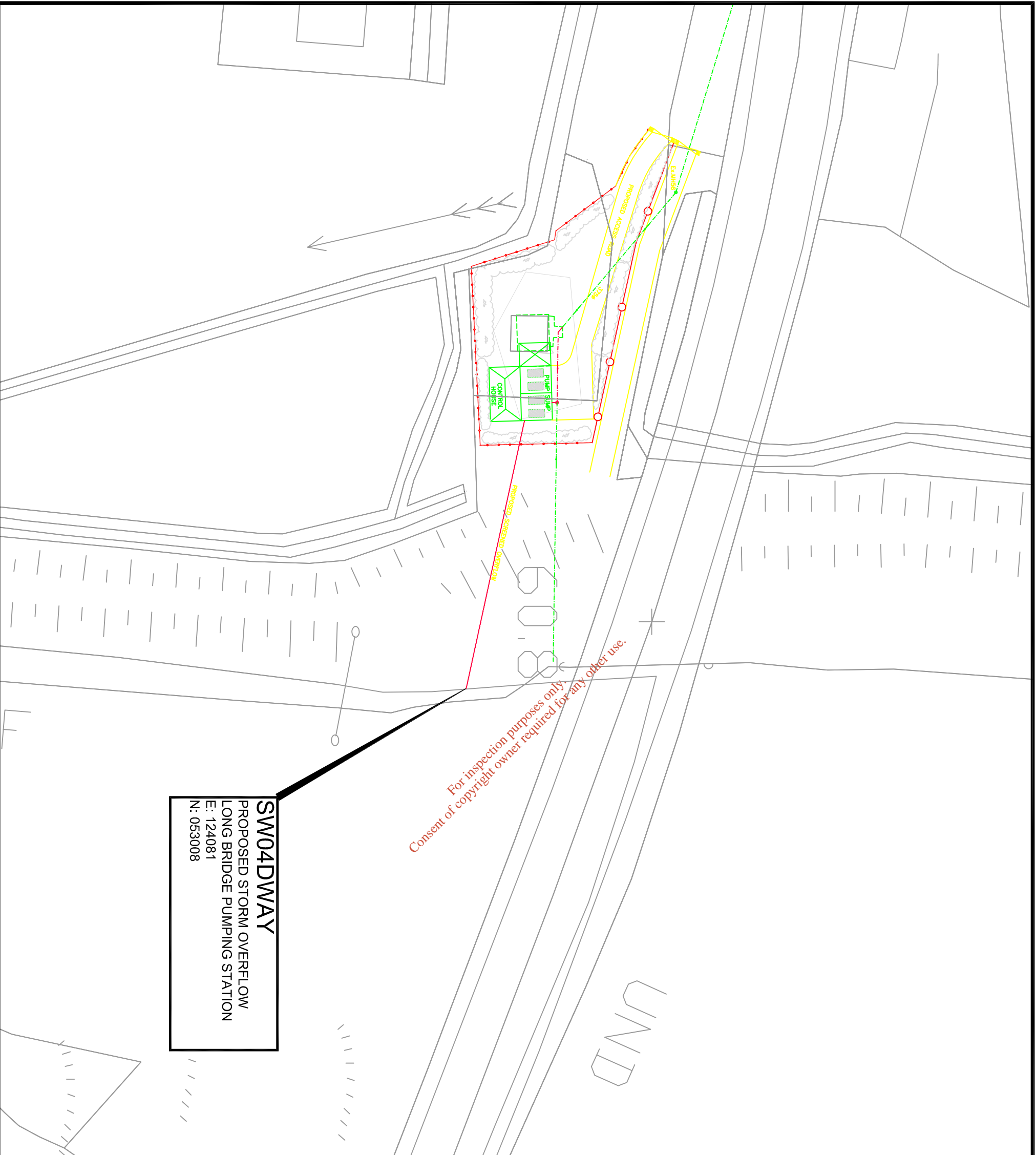
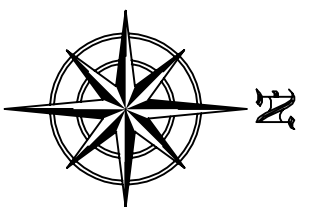
**SCALE:** 1:500

**DATE:** JUL 08

**DRAWN BY:** JH

**JOB NO:** 2846

**DRAWING NO:** DUNMANWAY\_BS\_14



**SW04DWAY**  
 PROPOSED STORM OVERFLOW  
 LONG BRIDGE PUMPING STATION  
 E: 124081  
 N: 053008

MAP REPRODUCED BY PERMISSION OF  
 ORDNANCE SURVEY IRELAND  
 (CORK CCMA 9802)

REG	AMENDMENT DETAILS	DATE
18(3)(b)	DRAWING	5/6/09

**T.J.O'CONNOR & ASSOCIATES**  
 CONSULTING ENGINEERS  
 CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
 Tel: 295 2321 Fax: 295 4541

**PROJECT:**  
 DUNMANWAY EPA DISCHARGE LICENSE APPLICATION

**CLIENT:**  
 CORK COUNTY COUNCIL

**DRAWING TITLE:**  
 ATTACHMENT B.5 - LOCATION OF STORM OVERFLOW POINTS (PROPOSED)

**SCALE:** 1:500

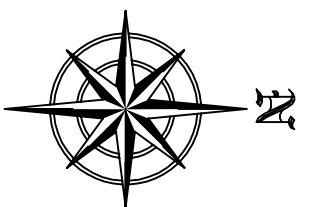
**DATE:** JUL 08

**DRAWN BY:** JH

**JOB NO:** 2846

**DRAWING NO:** DUNMANWAY\_BS\_15





59.0

6020

CR

For inspection purposes only.  
Consent of copyright owner required for any other use.

**SW05DWAY**  
STORM OVERFLOW  
QUARRY ROAD PUMPING STATION  
E: 123566  
N: 052546

MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)

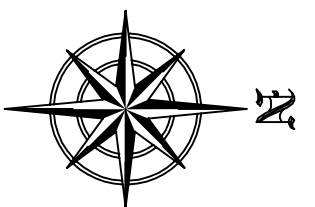
AMENDMENT DETAILS	DATE
REG 18(3)(b) DRAWING	June 09

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS

CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

PROJECT:  
DUNMANWAY EPA DISCHARGE LICENSE APPLICATION  
CLIENT:  
CORK COUNTY COUNCIL

DRAWING TITLE:  
ATTACHMENT B.5 - LOCATION OF STORM OVERFLOW POINTS (EXISTING)  
SCALE: 1:500  
JOB NO: 2846  
DRAWING NO:  
DATE: JUL 08 DRAWN BY: JH DUNMANWAY\_B5\_18

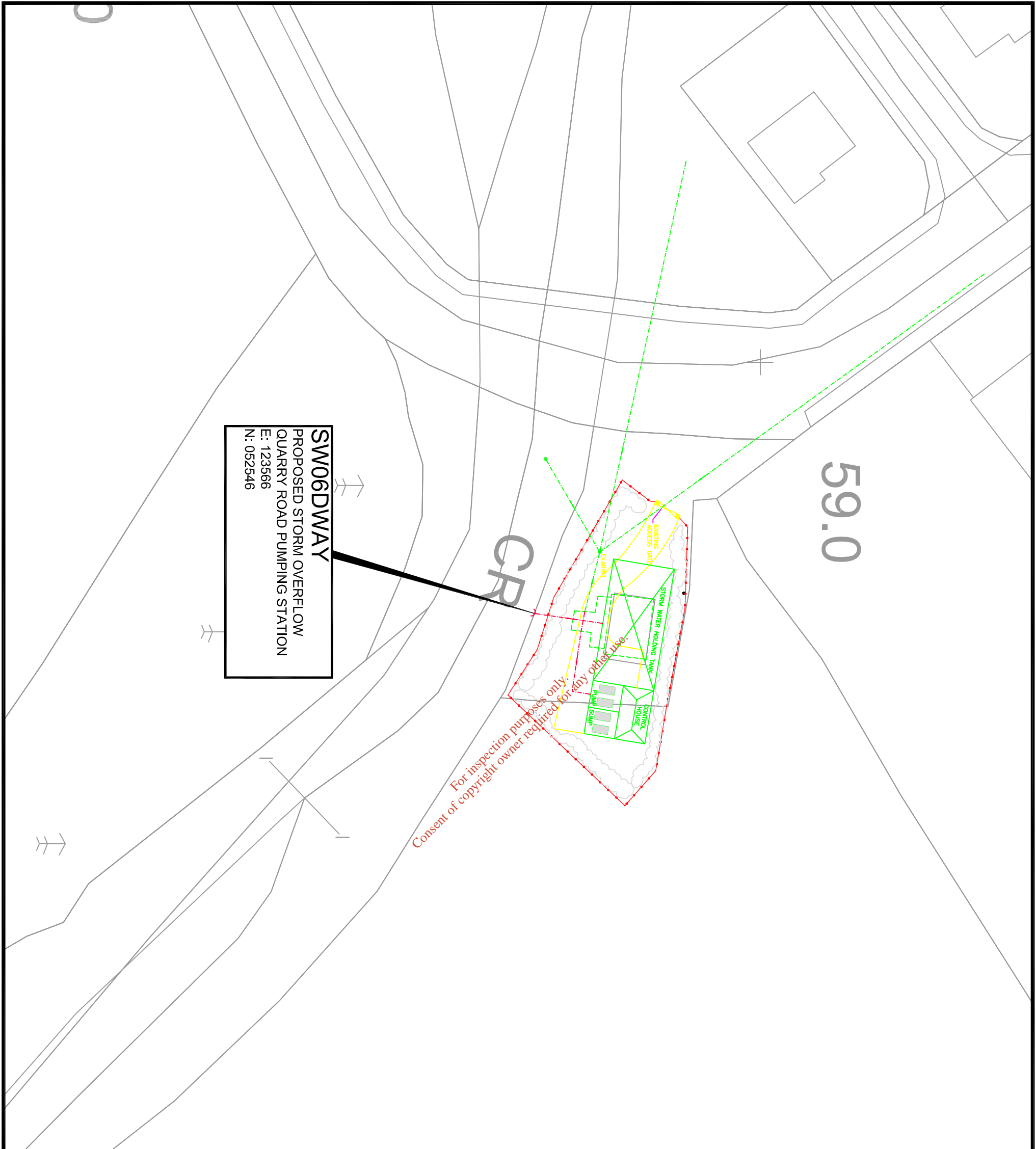


59.0

CR

For inspection purposes only.  
Consent of copyright owner required for any other use.

**SW06DWAY**  
PROPOSED STORM OVERFLOW  
QUARRY ROAD PUMPING STATION  
E: 123566  
N: 052546



MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)

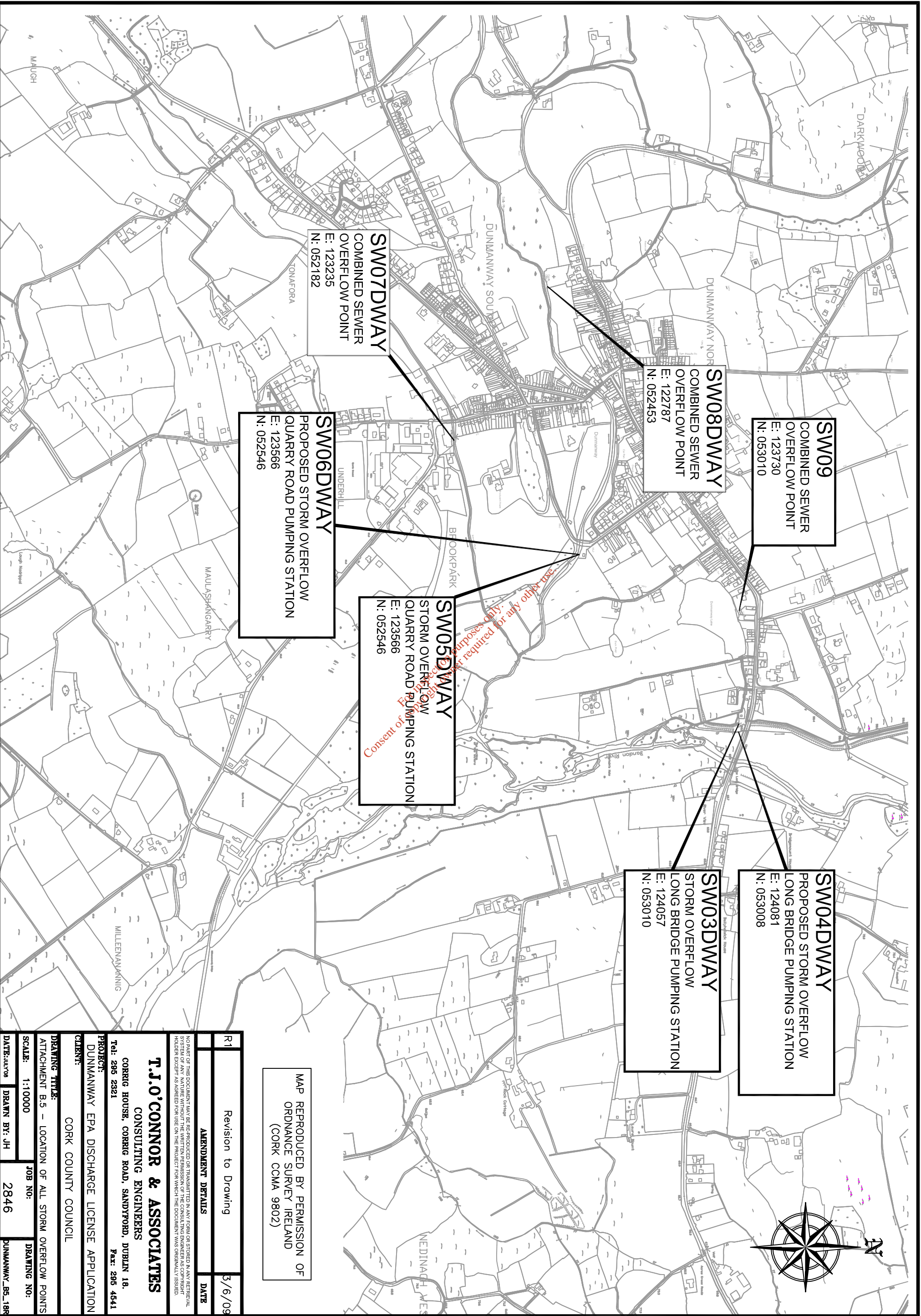
REG 18(3)(b) DRAWING	5/6/09
AMENDMENT DETAILS	DATE

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS  
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

PROJECT:  
DUNMANWAY EPA DISCHARGE LICENSE APPLICATION

CLIENT:  
CORK COUNTY COUNCIL

DRAWING TITLE: ATTACHMENT B.5 - LOCATION OF STORM OVERFLOW POINTS (PROPOSED)	
SCALE: 1:500	JOB NO: 2846
DATE: JUL'08	DRAWN BY: JH
DRAWING NO: DUNMANWAY_BS_17	



**SW09**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 123730  
 N: 053010

**SW08DWAY**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 122787  
 N: 052453

**SW05DWAY**  
 STORM OVERFLOW  
 QUARRY ROAD PUMPING STATION  
 E: 123566  
 N: 052546

**SW06DWAY**  
 PROPOSED STORM OVERFLOW  
 QUARRY ROAD PUMPING STATION  
 E: 123566  
 N: 052546

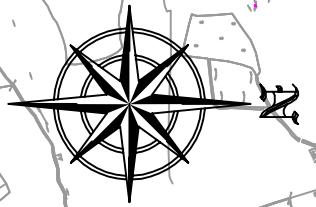
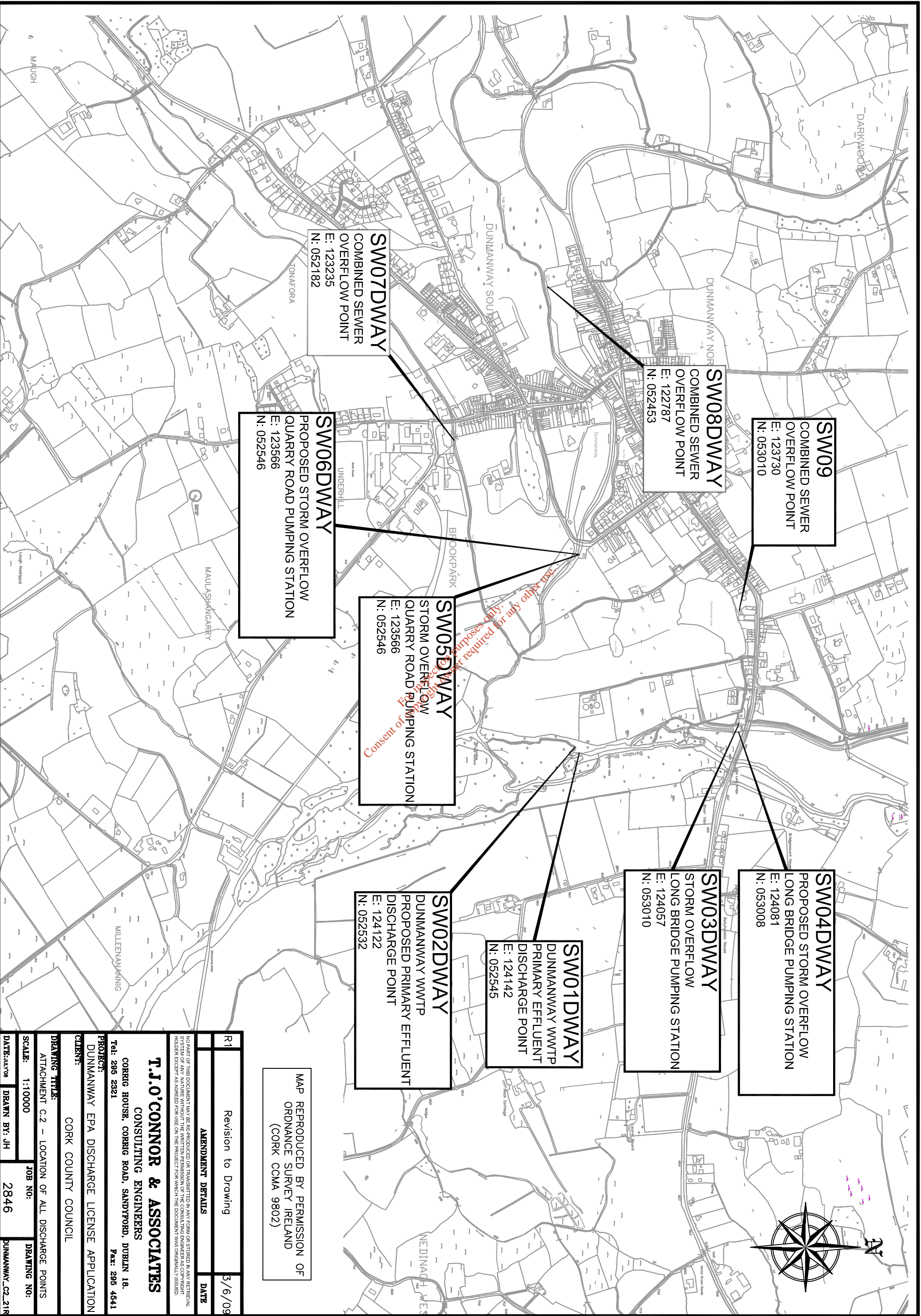
**SW07DWAY**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 123235  
 N: 052182

**SW04DWAY**  
 PROPOSED STORM OVERFLOW  
 LONG BRIDGE PUMPING STATION  
 E: 124081  
 N: 053008

**SW03DWAY**  
 STORM OVERFLOW  
 LONG BRIDGE PUMPING STATION  
 E: 124057  
 N: 053010

MAP REPRODUCED BY PERMISSION OF  
 ORDNANCE SURVEY IRELAND  
 (CORK CCMA 9802)

R1	Revision to Drawing	5/6/09
<b>AMENDMENT DETAILS</b>		
<small>NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF THE CONSULTING ENGINEER AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.</small>		
<b>T.J.O'CONNOR &amp; ASSOCIATES</b>		
CONSULTING ENGINEERS		
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.		
Tel: 295 2321 Fax: 295 4541		
PROJECT: DUNMANWAY EPA DISCHARGE LICENSE APPLICATION		
CLIENT: CORK COUNTY COUNCIL		
DRAWING TITLE: CORK COUNTY COUNCIL		
ATTACHMENT B.5 - LOCATION OF ALL STORM OVERFLOW POINTS		
SCALE: 1:10000	JOB NO: 2846	DRAWING NO:
DATE: 5/6/09	DRAWN BY: JH	DUNMANWAY_B5_18R



**SW09**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 123730  
 N: 053010

**SW08DWAY**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 122787  
 N: 052453

**SW07DWAY**  
 COMBINED SEWER  
 OVERFLOW POINT  
 E: 123235  
 N: 052182

**SW06DWAY**  
 PROPOSED STORM OVERFLOW  
 QUARRY ROAD PUMPING STATION  
 E: 123566  
 N: 052546

**SW05DWAY**  
 STORM OVERFLOW  
 QUARRY ROAD PUMPING STATION  
 E: 123566  
 N: 052546

**SW04DWAY**  
 PROPOSED STORM OVERFLOW  
 LONG BRIDGE PUMPING STATION  
 E: 124081  
 N: 053008

**SW03DWAY**  
 STORM OVERFLOW  
 LONG BRIDGE PUMPING STATION  
 E: 124057  
 N: 053010

**SW01DWAY**  
 DUNMANWAY WWTP  
 PRIMARY EFFLUENT  
 DISCHARGE POINT  
 E: 124142  
 N: 052545

**SW02DWAY**  
 DUNMANWAY WWTP  
 PROPOSED PRIMARY EFFLUENT  
 DISCHARGE POINT  
 E: 124122  
 N: 052532

MAP REPRODUCED BY PERMISSION OF  
 ORDNANCE SURVEY IRELAND  
 (CORK CCMA 9802)

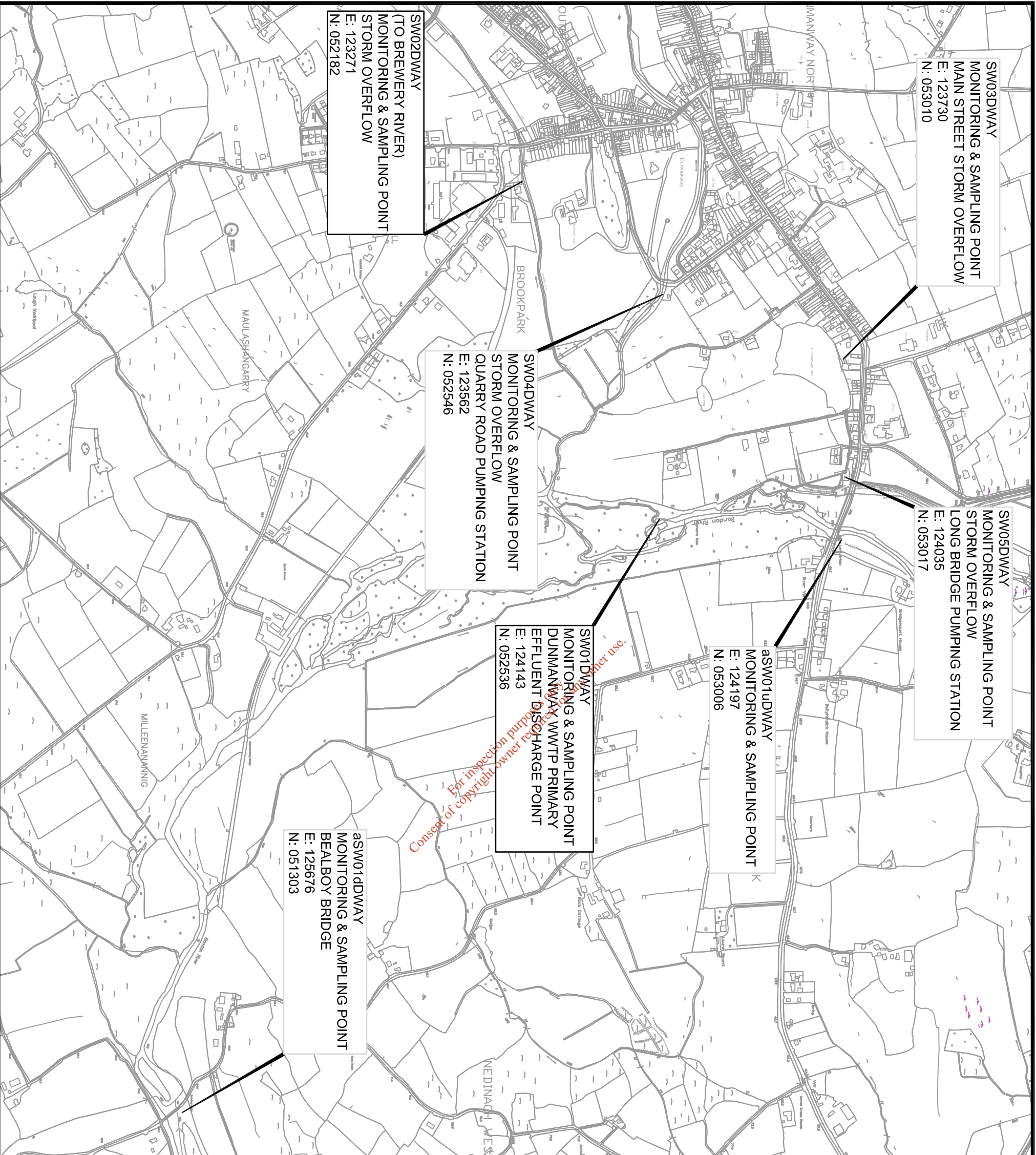
REVISION	AMENDMENT DETAILS	DATE
R1	Revision to Drawing	5/6/09

NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR STORED IN ANY RETRIEVAL SYSTEM OF ANY NATURE WITHOUT THE WRITTEN PERMISSION OF THE CONSULTING ENGINEER AS COPYRIGHT HOLDER EXCEPT AS AGREED FOR USE ON THE PROJECT FOR WHICH THE DOCUMENT WAS ORIGINALLY ISSUED.

**T.J.O'CONNOR & ASSOCIATES**  
 CONSULTING ENGINEERS  
 CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
 Tel: 295 2321 Fax: 295 4541

PROJECT: DUNMANWAY EPA DISCHARGE LICENSE APPLICATION  
 CLIENT: CORK COUNTY COUNCIL

DRAWING TITLE: CORK COUNTY COUNCIL  
 ATTACHMENT C.2 - LOCATION OF ALL DISCHARGE POINTS  
 SCALE: 1:10000 JOB NO: DRAWING NO:  
 DATE: 5/6/09 DRAWN BY: JH 2846 DUNMANWAY\_C2\_21R



SW03DWAY  
MONITORING & SAMPLING POINT  
MAIN STREET STORM OVERFLOW  
E: 123730  
N: 053010

SW02DWAY  
(TO BREWERY RIVER)  
MONITORING & SAMPLING POINT  
STORM OVERFLOW  
E: 123271  
N: 052182

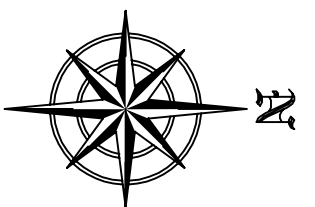
SW04DWAY  
MONITORING & SAMPLING POINT  
STORM OVERFLOW  
QUARRY ROAD PUMPING STATION  
E: 123562  
N: 052546

SW05DWAY  
MONITORING & SAMPLING POINT  
STORM OVERFLOW  
LONG BRIDGE PUMPING STATION  
E: 124035  
N: 053017

SW01DWAY  
MONITORING & SAMPLING POINT  
DUNMANWAY WWTP PRIMARY  
EFFLUENT DISCHARGE POINT  
E: 124143  
N: 052536

aSW01dDWAY  
MONITORING & SAMPLING POINT  
E: 124197  
N: 053006

aSW01dDWAY  
MONITORING & SAMPLING POINT  
BEALBOY BRIDGE  
E: 125676  
N: 051303



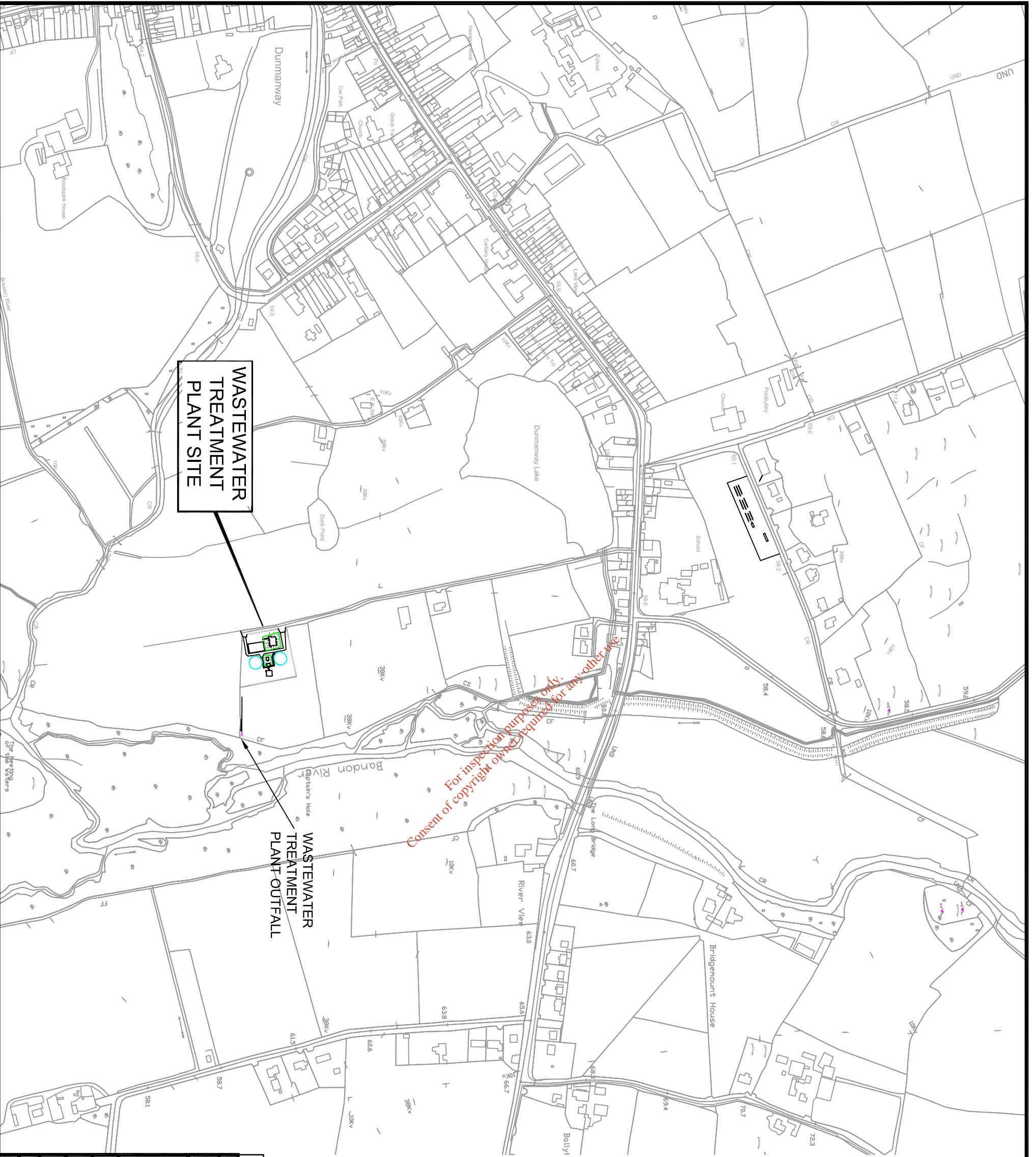
MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)

REVISION	DATE
R1	5/6/09

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS  
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

PROJECT: DUNMANWAY EPA DISCHARGE LICENSE APPLICATION  
CLIENT: CORK COUNTY COUNCIL

DRAWING TITLE: ATTACHMENT E.2 - SAMPLING & MONITORING POINTS  
SCALE: 1:10000  
JOB NO: 2846  
DRAWING NO: DUNMANWAY\_E2\_228  
DATE: JUL 08  
DRAWN BY: JH

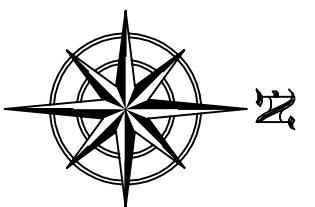


WASTEWATER  
TREATMENT  
PLANT SITE

WASTEWATER  
TREATMENT  
PLANT OUTFALL

For inspection purposes only.  
Consent of copyright owner required for any other use.

MAP REPRODUCED BY PERMISSION OF  
ORDNANCE SURVEY IRELAND  
(CORK CCMA 9802)



REVISION	AMENDMENT DETAILS	DATE
R1	REVISION DRAWING	3/6/09

**T.J.O'CONNOR & ASSOCIATES**  
CONSULTING ENGINEERS  
CORRIG HOUSE, CORRIG ROAD, SANDYFORD, DUBLIN 18.  
Tel: 295 2321 Fax: 295 4541

PROJECT:  
DUNMANWAY EPA DISCHARGE LICENSE APPLICATION

CLIENT:  
CORK COUNTY COUNCIL

DRAWING TITLE:  
ATTACHMENT A.1R - LAYOUT OF DUNMANWAY WWTP

SCALE: 1:5000

DATE: JUL 08

JOB NO: 2846

DRAWN BY: JH

DRAWING NO: DUNMANWAY\_A1\_01R