
5. GEOLOGY & HYDROGEOLOGY

This section of the EIS addresses geology and hydrogeology in the existing environment, identifies potential impacts of the proposed development and outlines measures to avoid, reduce and mitigate potential impacts. Residual impacts that can not be avoided are also identified and discussed.

5.1. Methodology

This section was prepared having regard to 'Geology in Environmental Impact Statements – A Guide', Institute of Geologists of Ireland, September 2002. It was prepared using available published literature and following a walkover survey of the site and a windscreen survey of the surrounding area. Intrusive investigations which were conducted as part of the original EIS in 2000 were reviewed as part of this assessment. The Geological Survey of Ireland (GSI) website was accessed for information such as depth to bedrock and aquifer vulnerability.

The literature reviewed included:

1. Geology of South Cork - Sheet 25 (GSI).
2. Groundwater Protection Scheme for South Cork (www.gsi.ie).
3. EIS and Waste Licence Application 2000 for Beaumont Quarry.

5.2. Existing Geology

The existing geology is described in terms of the bedrock geology, overburden geology and hydrogeology.

5.2.1. Overburden Geology

The soils in the Beaumont area are an association of acid brown earth with minor grey brown podzolics and gleys. This soil association has been derived from glacial drift of mixed Old Red Sandstone – Carboniferous limestone composition and is common to all of the east-west synclinal valleys that characterise Counties Cork and Waterford.

The principal soil is a well-drained acid brown earth of sandy loam texture. Clay content is about 15% while silt content is about 25%. The soil has a good structure and is very friable. Moisture holding content is good.

Underlying the acid brown earth is boulder clay subsoil from which the topsoil has been derived.

The subsoil is glacial in origin and is generally composed of Devonian sandstone and Carboniferous limestone.

In the vicinity of Beaumont, glacial deposits are thin, generally not greater than 2-3 metres. A drilling programme was undertaken in the vicinity of the quarry as part of the original EIS prepared in 2000. Drilling logs are provided in Appendix 4.

A geophysical survey was also undertaken during the preparation of the 2000 EIS to determine the depth to bedrock. The geophysical survey report is provided in Appendix 4. It was found that depth to bedrock is generally less than 3 m in depth but is approximately 5 m deep in the central area of the quarry. This material is soil that was stripped during the advancement of the quarry and re-deposited on the quarry floor.

5.2.2. Bedrock Geology

In general, the topography of the South Cork region reflects the underlying bedrock geology. A series of east-northeast to west-southwest valleys are separated by intervening ridges. The valleys tend to be floored by Carboniferous limestone whereas the ridges consist of sandstones and mudstones of the older Devonian 'Old Red Sandstone'. Regional bedrock geology is shown on Figure 5.1. Geological cross sections of the site are illustrated on Figures 5.2 and 5.3.

Bedrock underlying the site is Carboniferous in age and comprises two formations:

- The Cork Red Marble Formation
- The Little Island Formation

The contact between the two formations runs through the quarry.

The Cork Red Marble Formation comprises a sequence of grey cherty calcisiltites and crinoidal breccias and cherts. The red "marble" was extensively quarried in the 19th Century for use in public buildings.

Succeeding the Cork Red Marble Formation is the Little Island Formation. The contact between these two formations is located at the site. The Little Island Formation consists of a series of massive calcilutite limestones and crinoidal calcilutites. As with the Red Marble Formation, this bedrock was quarried extensively at Beaumont for use in the construction of many local landmarks including St. Finbarrs Cathedral in Cork City.

The Little Island Formation is karstic in nature as evidenced by the presence of caves at the quarry.

Table 5.1 summarises the results of the ground investigations.

Table 5.1: Summary of Ground Investigations (2000)

Borehole No.	Total Depth (m bgl)	Comments
MW1 (GW1)*	50	0.70 m of dark brown stiff clay overlying grey limestone
MW2 (GW2)*	31	5.80 m of dark brown stiff clay. Groundwater encountered at 28 m
MW3 (GW3)*	28	1.40 m of brown gravelly clay with sand. Groundwater encountered at 26 m
MW4 (GW4)*	18	3.25 m of brown gravelly clay with sand. Groundwater encountered at 16 m

* As per Figure 2.8

Mbgl = meters below ground level

5.3. Hydrogeology

5.3.1. Existing Hydrogeology

The hydrogeology of the area was assessed using available published literature and information collected from wells drilled as part of the original EIS (refer to Appendix 4).

According to the GSI report on the Geology of South Cork, the Little Island Formation and other limestones in the Cork, Youghal and Cloyne synclines, are considered as regionally important aquifers. These limestones, especially the cleaner ones, are prone to solution and the development of karst features. Well yields of between 200 m³/day and 1,500 m³/day are typical. Specific capacities range from 150 m³/day/m to 750 m³/day/m on average.

The site is located on a topographical high. From the February 2000 measurements (taken as part of the original EIS) it was interpreted that the site is located on a groundwater divide. However, data collected during March 2000, and again in July 2006 indicate groundwater flow to the Northeast. This apparent discrepancy is due to the slow response of MW1 in reaching its static level following drilling in 2000. The area is considered to be a recharge zone. Water level elevations were in the order of 2 mOD to 5 mOD in the February measurements and varied from 3 mOD to 5 mOD in the March measurements. Tables 5.2 summarises groundwater levels collected at the site in 2000 and 2006 respectively. Flow is through the bedrock with discharge to the River Lee to the north. A bedrock groundwater contour map is shown on Figure 5.4 using the March 2000 data (the most complete and accurate dataset). The groundwater is unconfined in this area. The measurement from July 2006 indicates that the summer time water table is approximately 1 m below the winter groundwater table.

Table 5.2 Summary of Groundwater Levels

Well ID	Measuring Point Elevation (mOD)	Depth to Water (mbgl)*			Groundwater Elevation (mOD)**		
		15-Feb-00	30-Mar-00	11-Jul-06	15-Feb-00	30-Mar-00	11-Jul-06
MW1 (GW1)	33.31	35.90	28.15	28.54	-2.59	5.16	4.77
MW2 (GW2)	30.82	25.87	26.65	-	4.95	4.17	-
MW3 (GW3)	19.75	15.96	16.62	16.89	3.79	3.13	2.86
MW4 (GW4)	15.55	11.30	11.83	12.25	4.25	3.72	3.30

*mbgl = metres below ground level
mOD = metres above Ordnance Datum

The area is serviced by mains water. A well search was conducted through the GSI groundwater section. Five wells were identified in the area; four in Ballintemple (i.e. within 1 km of the site boundary) and one in Ballyphillip to the south of the site. A door-to-door survey in 2000 of the older residence and facilities did not indicate any wells. The five wells identified in the record search could not be located.

Two exploratory wells were drilled by Cork City Council in the Mahon area to assess the aquifer potential as a drinking water supply (2000 EIS). Well locations are shown on Figure 5.4. The first well was drilled to the south of the site near Churchyard Lane. The estimated yield was 430 m³/day to 540 m³/day. A second well was drilled to the southeast of the site in the Cork City Council parks nursery. The potential estimated yield was 750 m³/day. These wells were not developed as drinking water supply sources.

Monitoring of groundwater quality at the site was conducted in February 2000 and again in July 2006. Four monitoring wells, MW1 - MW4 were sampled during the 2000 event. Only three wells, MW1, MW3 and MW4 were sampled in 2006. MW2 had been buried. The 2006 samples were analysed for the parameters listed in the EPA Landfill Monitoring Manual. The results of both monitoring event are outlined in Table 5.3.

Results in Table 5.3 are compared to the Interim Guideline Values (IGV) set out in the EPA Document 'Towards Setting Guidelines for the Protection of Groundwater in Ireland' (Interim Report, 2003).

Table 5.3: Summary of Groundwater Quality

	MW1 (GW1)		MW2 (GW2)	MW3 (GW3)		MW4 (GW4)		IGV
pH (pH units)	7.6	7.54	7.27	7.39	7.44	7.29	7.34	≥6.5 & ≤9.5
Electrical Conductivity (µS/cm)	829	718	484	549	593	547	1134	1000
Ammonia – N (mg/l)	0.02	0.2	0.02	0.07	<0.2	0.11	<0.2	0.15
Residue on evaporation	552.6	476	322.6	365.9	379	364.6	356	1000
Chloride (mg/l)	47.1	28	19.4	24.6	19	32.2	20	30
Potassium (mg/l)	11.9	7.9	3.62	6.08	4.1	1.23	0.4	5
Sodium (mg/l)	52.2	25.5	12.3	17	14.5	15.3	11	150
Total oxidised N(as N)	20.8	10.3	4.619	6.431	6.4	4.467	4.6	NAC
Organic carbon (mg/l)	5.29	3	0.99	1.41	3	2.11	<2	-
Sulphate (mg/l)	191	67	35	31	24	21	31	200
Total Phosphorous (mg/l)	-	<0.05	-	-	<0.05	-	<0.05	-
Ortho Phosphate (mg/l)	-	0.2	-	-	0.4	-	<0.03	0.03
Phosphate (mg/l)	0.099	-	0.059	0.323	-	0.122	-	-
Calcium (mg/l)	3,570	-	203	226	-	298	-	200
Alkalinity (mg/l)	3,377	-	413	520	-	554	-	NAC
Chromium (µg/l)	18.9	<1	4.99	12.8	1	8.22	<1	30
Cadmium (ug/l)	-	<1	-	-	<1	-	<1	5
Copper (µg/l)	206	-	5.46	32.7	-	18.1	-	30
Iron(µg/l)	4,560	<2	655	3,740	<2	1,480	<2	200
Lead (µg/l)	72.3	<1	81.7	143	<1	63.6	<1	-
Magnesium (mg/l)	43.9	-	3.87	5.06	-	3.81	-	50
Manganese (µg/l)	1,900	-	185	905	-	208	-	50
Nickel (µg/l)	66.7	<1	3.57	33.5	<1	22.2	<1	20
Mercury (µg/l)	0.122	-	0.174	1.77	-	2.32	-	1
Zinc (µg/l)	735	61	134	283	958	158	1	100
Arsenic (µg/l)	2.6	-	<1	2.18	-	1.18	-	10
Barium (mg/l)	0.132	-	0.027	0.146	-	0.083	-	0.1
Boron (µg/l)	86.6	-	23.4	155	-	19.4	-	1000
Fluoride (mg/l)	0.095	0.2	0.231	0.064	0.3	<0.05	0.1	1
Selenium (µg/l)	<1	-	<1	<1	-	<1	-	-
Silver (µg/l)	<1	-	<1	<1	-	1.83	-	-
Phenols (total)	<0.04	<0.01	<0.04	<0.04	<0.01	<0.04	<0.01	0.0005
Total 6 PAHs	-	<0.2	-	-	<0.2	-	<0.2	0.0001
Chemical Oxygen Demand (mg/l)	92	-	22	134	-	76	-	-
Cyanide (total)	0.01	<0.05	0.003	<0.002	<0.05	0.003	<0.05	0.01
Total Solids	-	474	-	-	395	-	291	-

Notes:

Light Blue: Initial round of sampling (15 February 2000)
 Light Brown: Second round of sampling (11 July 2006)

The initial round of sampling indicated high levels of metals at the site. However, this is not reflected in the later round of sampling, indicating that the high levels of metals may have been an artefact of drilling activities.

Two of the three wells sampled in 2006 had slightly elevated levels of orthophosphate and potassium, and one had elevated levels of both ammonical nitrogen and Total Oxidised Nitrogen (TON). These water quality indicators are typical of urban groundwater quality, which can be locally degraded by urban activities (e.g. disused septic treatment systems, industrial inputs, leaky sewerage systems, infiltration of contaminated). There is an improvement in water quality between the upgradient well (MW1) and the downgradient wells.

5.4. Potential Impacts on Geology & Hydrogeology

Groundwater vulnerability, as defined by the GSI, is the term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The factors used in assessing groundwater vulnerability include subsoil type and thickness and recharge type. The GSI methodology whereby groundwater protection is assessed is outlined in the EPA-GSI publication 'Groundwater Protection Schemes'. The methodology proposes a matrix, which relates vulnerability, source and resource such that a particular site is given a Response ("R") to specific activities (such as landfill). It must be noted however, that the response matrix is for hazardous and non-hazardous (i.e. for municipal waste) landfills. The proposed development at Beaumont is an inert landfill to which the GSI have not prepared a classification.

The site investigation indicated a hydraulic continuity between the overburden and the bedrock. The higher-ranked (i.e. more important) aquifer is therefore used to assess groundwater protection. The vulnerability of the site is extreme, according to both the site investigation and the GSI Groundwater Protection Scheme for South Cork. The conditions encountered at the site are highlighted in Table 5.4, illustrating how this vulnerability was determined.

Table 5.4: GSI Guidelines – Aquifer Vulnerability Mapping

VULNERABILITY RATING	Hydrogeological Conditions		
	Subsoil Permeability (Type) and Thickness		
	High Permeability (Sand/gravel)	Moderate Permeability (e.g. Sandy soil)	Low Permeability (e.g. Clayey subsoil, clay, peat)
Extreme (E)	0 - 3.0 m	0 - 3.0 m	0 - 3.0 m
High (H)	>3.0 m	3.0 -10.0 m	3.0 - 5.0 m
Moderate (M)	N/A	>10.0 m	5.0 - 10.0 m
Low (L)	N/A	N/A	>10 m

Notes:

1. N/A = Not Applicable
2. Precise permeability values cannot be given at present.
3. Release point of contaminants is assumed to be 1-2m below ground surface.

The GSI's Response Matrix for Municipal Landfills combines the aquifer vulnerability, and the classification of the aquifer (Rk), to give a response for site suitability for landfills.

In this case, the matrix response for the site is R4 (as highlighted in Table 5.5): i.e. not acceptable.

Table 5.5: GSI Guidelines - Response Matrix for Landfills

VULNERABILITY RATING	RESOURCE PROTECTION Aquifer Category					
	Regionally Important (R)		Locally Important (L)		Poor Aquifers (P)	
	Rk	Rf/Rg	Lm/Lg	LI	PI	Pu
Extreme (E)	R4	R4	R3 ²	R2 ²	R2 ²	R2 ¹
High (H)	R4	R4	R3 ¹	R2 ¹	R2 ¹	R1
Moderate (M)	R4	R3 ¹	R2 ²	R2 ¹	R2 ¹	R1
Low (L)	R3 ¹	R3 ¹	R1	R1	R1	R1

However, the guidelines also include additional notes on the siting of landfills on regionally important aquifers which state that, among other factors, they can be considered:

"Where the waste types are restricted and the waste acceptance procedures are in accordance with the criteria specified by the EPA."

Therefore, as the landfill at Beaumont Quarry will only receive inert waste, the site would be acceptable for landfill activities. In addition, as the GSI's classification refers to hazardous and non-hazardous landfills, it would be considered conservative in the context of the development of Beaumont Quarry.

A detailed description of the proposed development is provided in Section 2. The aspects of the proposed development that could impact on geology and hydrogeology are:

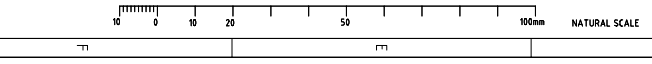
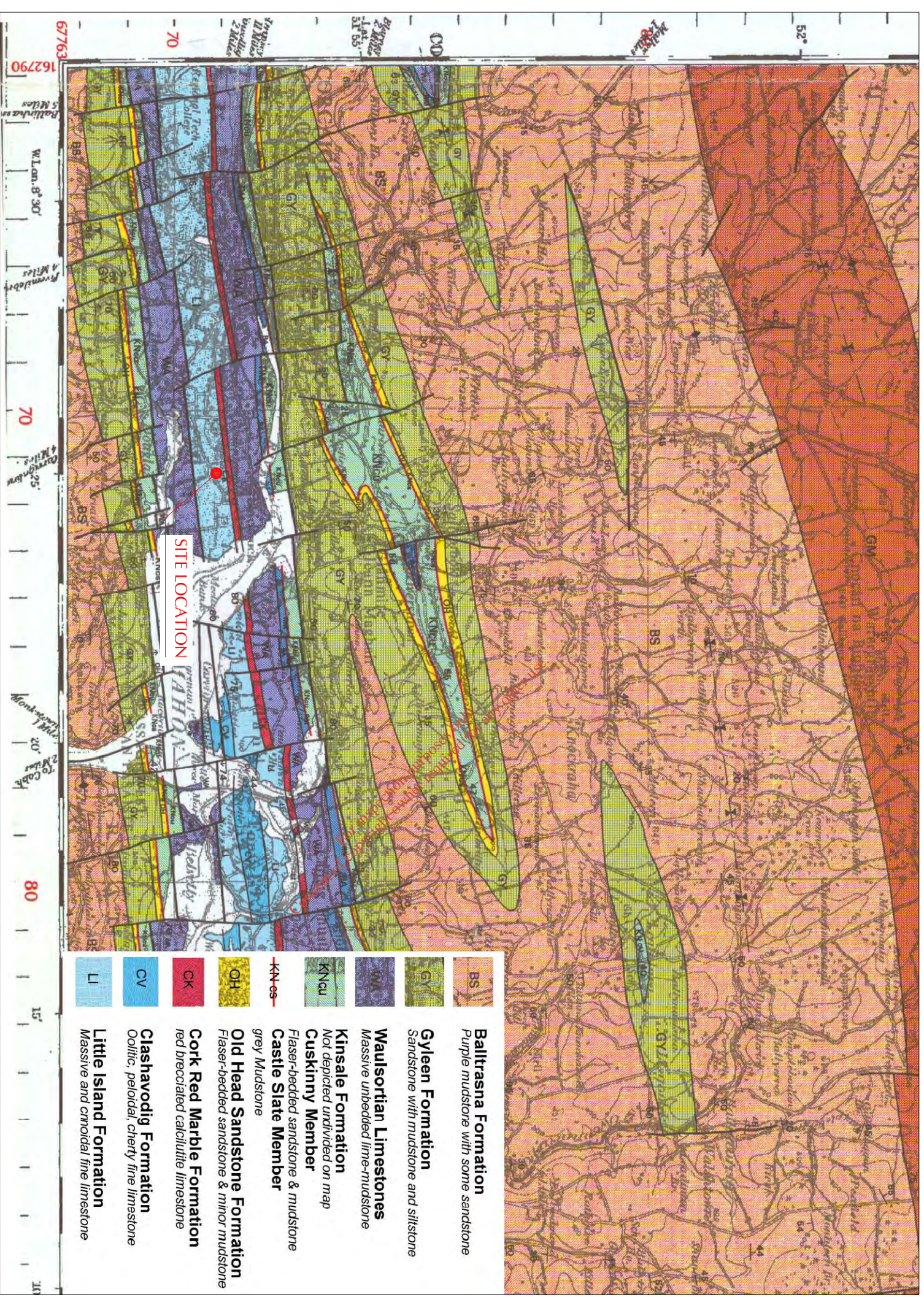
- The development of a waste management facility will require earthworks to construct site roads, cells and berms. It is proposed to import the required waste into the site. Soil balance and construction works are discussed in Section 2.
- Exposed soil will be subjected to erosion by stormwater. This could result in silting of nearby surface water bodies if unmanaged. However, as there are no water bodies within or adjacent to the site, this will not be an issue.
- The generation of foul-water from the site offices. This will be discharged directly to the local sewer and therefore will not impact on groundwater/hydrology.
- The development of the site will require products from local quarries (aggregate, concrete products and ready mix). This will have an indirect impact on those quarries.

5.5. Mitigation Measures

The following mitigation measures are proposed:

- Fuel will not be stored on-site. Fuel will be delivered to the site when required. Re-filling of machinery will be conducted on a hardstanding area. Run-off from this area will be collected and conveyed to the sewer.
- A landscape architect has been retained to design the final layout of the site to ensure that natural geological features are maintained and enhanced. Such features include rock faces/ledges and caves. The landscape plan is discussed in detail in Section 9.
- The waste imported to the site will be inert waste only. A sampling and analysis programme will be implemented to ensure the quality of the inert material being accepted at Beaumont Quarry for landfilling is in accordance with the criteria set out in Annex II of the Landfill Directive 91/33/EEC.
- Run-off from fill areas will be pumped to the on-site settling pond to remove suspended solids prior to discharge to the foul sewer.
- In the design, groundwater protection is achieved by the provision of 1 m thick layer of engineered boulder clay lining with a permeability of less than or equal to 1×10^{-7} m/sec. This mineral layer will be placed along the base and side walls of the filling areas.
- As only inert waste will be landfilled, it will not present a significant risk to groundwater quality. The quality of the inert waste to be accepted is discussed in Section 2.

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



BS	Balltrasna Formation Purple mudstone with some sandstone
GY	Gyleen Formation Sandstone with mudstone and siltstone
WLS	Waulsortian Limestones Massive unbedded lime-mudstone
KNS	Kinsale Formation Not depicted unbedded on map
CUS	Cuskinny Member Flaser-bedded sandstone & mudstone
FLA	Castle Slate Member grey Mudstone
OHS	Old Head Sandstone Formation Flaser-bedded sandstone & minor mudstone
CK	Cork Red Marble Formation red brecciated calcilite limestone
CLV	Clashavodig Formation Oolitic, peloidal, cherty fine limestone
LI	Little Island Formation Massive and crinoid fine limestone

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 Feihly Timoney & Company as copyright holder except as agreed for use in connection with the project for which it was prepared. If in doubt - Ask! Do not scale. Use figured dimensions only.

Rev	Drawn	Checked	App'd	Rev Origin	Description
A	1	1	1	14.05.07	ISSUE FOR PLANNING

Name of Client
CORK CITY COUNCIL

Name of Job
EIS FOR
BEAUMONT QUARRY

Title of Drawing
BEDROCK
GEOLOGY
MAP

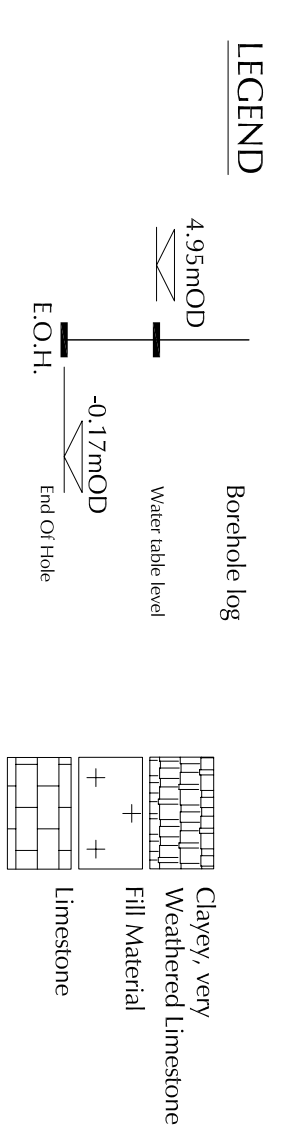
Drawg. No.	Rev.
2006-011-09-Fig 5.1	A

**CONSULTANTS IN
ENGINEERING &
ENVIRONMENTAL
SCIENCES**

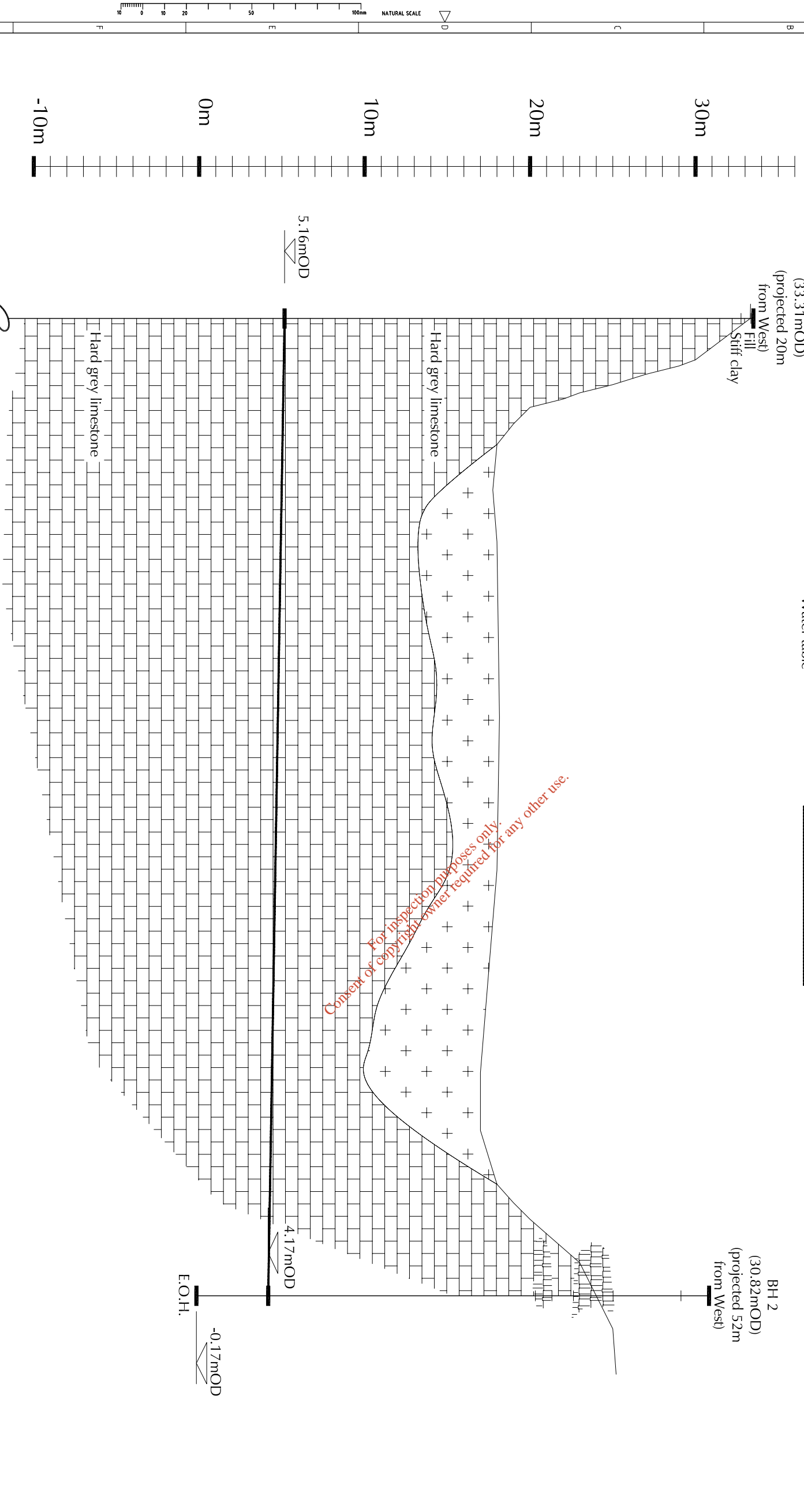
**FEHLY
TIMONEY
& COMPANY**

Care House, Pouladuff Rd, Cork, Ireland.
T: +353-21-494133 F: +353-21-494444
Mill House, Ashown Gate, Navan Rd, Dublin 15, Ireland.
T: +353-1-4585500 F: +353-1-4585501
W: www.feihlytimoney.ie E: info@fco.ie

No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the written permission of Feihly Timoney & Company as copyright holder except as agreed for use in connection with the project for which it was prepared. If in doubt - Ask! Do not scale. Use figured dimensions only.



Legend
mOD = Metres Above Ordnance Datum



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

**GEOLOGICAL CROSS SECTION OF SITE
NORTH TO SOUTH**

Rev.	Drawn	Chkd	App'd	Rev. Origin	Description
A	KL	WE	WC	14.05.07	ISSUE FOR PLANNING

Name of Client:
CORK CITY COUNCIL

Name of Job:
EIS FOR
BEAUMONT QUARRY

Title of Drawing:
GEOLOGICAL CROSS
SECTION OF SITE
NORTH TO SOUTH

Scales Used:
N.T.S.

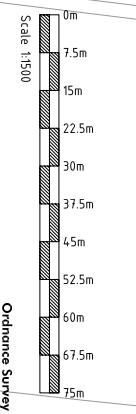
Dwg. No.:
2006-011-09-FIG5.3

Rev. A

**CONSULTANTS IN
ENGINEERING &
ENVIRONMENTAL
SCIENCES**

**FEHLY
TIMONEY
& COMPANY**

Care House, Pouladuff Rd, Cork, Ireland.
T: +353-21-4941133 F: +353-21-494444
Mill House, Ashown Gate, Navan Rd, Dublin 15, Ireland.
T: +353-1-4583500 F: +353-1-4583501
W: www.feihlytimoney.ie E: info@fko.ie



No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the written permission of Fehily Timoney & Company as copyright holder except as approved for use by the client. This document is the property of Fehily Timoney & Company. If it is to be used for any other purpose, the user must obtain the written permission of Fehily Timoney & Company. Use of this document is limited to the project for which it was prepared. Use of this document for any other purpose is prohibited.

LEGEND

- MW 1 (5.15m OD) Monitoring Well, Ref. No. and Bedrock Groundwater Elevation (m OD)
- Line of Equal Groundwater Elevation (m OD) Dashed Where Inferred
- Estimated Groundwater Flow Direction

Rev.	Drawn	Checked	Approved	Rev. Origin	Date	Description
A	KL	ME	CM	Cork	14.05.07	ISSUE FOR PLANNING

Name of Client	CORK CITY DOUNCIL
Name of Job	BEAUMONT QUARRY EIS
Title of Drawing	GROUNDWATER CONTOUR MAP
Scales Used	A3-1:1500
Dwg. No.	2006-011-09-FIGS.4
Rev.	A

FEHILY TIMONEY & COMPANY

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

Care House, Pouladuff Rd, Cork, Ireland.
 T: +353-21-494133 F: +353-21-494144
 Mill House, Ashown Glen, Nenagh Rd, Dublin 15, Ireland.
 T: +353-1-4585500 F: +353-1-4585501
 W: www.fehilytimoney.ie E: info@fhe.ie

6. HYDROLOGY

This section addresses hydrology and surface water runoff in the existing environment, identifies potential impacts of the proposed development and outlines measures to avoid, reduce and mitigate potential impacts. Residual impacts that can not be avoided are also identified and discussed.

6.1. Hydrology in the Existing Environment

The site is located in a disused limestone quarry. There are no streams, rivers or lakes within 500 m of the site.

The site lies on a surface water divide between the surface water catchment areas of the River Lee (to the north) and the Douglas River (to the south). At present, there is no surface water from the site. Any precipitation falling within the site percolates through the soil and bedrock to the groundwater.

6.2. Potential Impacts from the Proposed Development

The proposed development will not have any direct impact on the surface water bodies as there will be no direct or diffuse discharge to surface water bodies.

The potential impacts of the proposed development will be on the overall site drainage. The activities to be conducted at the site that could potentially impact upon surface water are as follows:

1. Generation of surface water during the construction and operation of the facility
2. Storm water from the restored site
3. Increased surface water runoff from roof and hardstanding areas. The total hardstanding area is approximately 0.12 ha.

6.3. Mitigation Measures

Surface water generated at the various stages and locations will be managed as follows:

1. A temporary settlement pond will be located to the north of the site and will be established in Phase 1 (Refer to Section 2). During the operation of the facility, effluent collected at this low point within the site will be pumped to the nearby sewer. From here, the effluent will be treated at the waste water treatment plant at Carrigrennan.

2. Once the site has been backfilled and restored a permanent attenuation facility shall be installed to attenuate peak flow . This facility shall consist of an underground tank or proprietary cell configuration. Surface water from the capped facility will discharge via swales to this attenuation facility. The attenuation facility will discharge by gravity to the adjacent public sewer via silt traps.

The permanent attenuation facility will be designed to attenuate the critical storm event for a 1 in 30 year return period. The discharge rate from the permanent facility to the nearby sewer will be at a rate of 2 l/s (as agreed with the Cork City Council).

Settlement of suspended solids is not anticipated to be an issue in the permanent situation, following restoration. However, provision shall be made for any residual suspended solids removal by installation of a silt trap in series with the attenuation facility.

3. Where possible, stormwater runoff from hardstanding areas will be collected by gullies and discharged to the temporary settlement pond/permanent attenuation facility. from the roof of the site office will be discharged to the same collection system.

In addition, all surface water arising from the landfill including the access ramp will be collected by temporary drains and directed to the temporary stormwater settlement pond. During landfilling, surface water will be managed by the use of temporary bunds and swales. Appropriate erosion and sediment control measures will be employed to remove silt from surface water generated on-site.

6.4. Conclusions

There are no surface water bodies within or in the vicinity of Beaumont Quarry, and therefore there is no potential risk to hydrological features in the area.

In accordance with the EPA's Landfill Design Manual, surface water from fill areas will be diverted to on-site surface water management system which will discharge to the nearby sewer. Once the site has been completed and landscaped to a public park, a permanent surface water management system will be installed at the site.

7. ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL HERITAGE

7.1. Introduction

This section assesses the impacts, if any, of the proposed development on the archaeological, historical and cultural environment in the vicinity of the site. This section will also propose mitigation measures to safeguard any monuments, features or finds of antiquity if required.

The objective of this section is to:

- Identify all known features of archaeological and cultural heritage importance in the vicinity of the proposed development
- Determine any potential impacts of the proposed development on archaeology and cultural heritage
- Identify measures to mitigate any potential impacts of the development on archaeology and cultural heritage.

7.2. Architectural, Archaeological and Cultural Heritage in the Existing Environment

A desk based assessment of archaeological features within 1 km of the proposed development site was undertaken. The following information sources were consulted:

- The Archaeological Survey of Ireland's Sites and Monuments Record Database
- The original Environmental Impact Statement (2000)
- The Cork City Development Plan 2004

The purpose of this assessment was to identify any archaeological constraints associated with the development of the disused quarry.

7.2.1. Sites and Monuments Record

The Archaeological Survey of Ireland Sites and Monuments Database identify:

- All known upstanding monuments
- The original site location of monuments (i.e. destroyed monuments)
- The location of possible sites identified by aerial photography.

An area of interest is noted around each archaeological site. The area of interest is a zone of archaeological potential around the known remains in which archaeological features could potentially occur.

Archaeological features within 1 km of the proposed site are illustrated in Figure 7.1 and are listed in Table 7.1.

Table 7.1: List of National Monuments and Places within 1 km of Beaumont Quarry

Monument Number	National Grid Coordinates	Townland	Classification
CO074-050	17126 07107	Dundanion	Quarry
CO074-064	16955 07132	Ballintemple	Souterrain
CO074-065	17024 07112	Ballintemple	Graveyard
CO074-066	17017 07044	Ballinlough	Standing Stone
CO074-099	17124 07164	Dundanion	Graveyard
CO074-120	17120 07160	Dundanion	Railway Station

There are no recorded archaeological features within the site's footprint. Beaumont quarry (also known as Carrigmore Quarry) was mined extensively throughout the 19th and the 20th Century for limestone rock. The particular high grade of limestone associated with this quarry meant it was widely used in the construction of quay walls, bridges, churches, banks and other public buildings within Cork City. Although often considered as 'scars' on the landscape, this old quarry now forms part of the cultural heritage of the area.

Beaumont Quarry stands within the footprint of the former Beaumont House and gardens. This mansion house, that has long since been demolished, was built circa 1790 by William Beamish. A year later he formed a partnership with William Crawford and purchased a brewery at South Main Street from the Allen family. The mansion house continued to have an association with the Beamish family until the 1850s. The house was eventually demolished and since 1968 Beaumont National boy's and girl's school (Scoil Barra Naofa) stands on its site.

An Ordnance Survey 1st Edition (1850s) of the area shows the presence of an ice house in the northern quadrant of the quarry. This feature was destroyed during quarrying activities.

The closest recorded archaeological feature, a burial ground, is located to the north of the site boundary. This site (CO074-065) is approximately 50 metres from the site boundary. The burial ground (known locally as Ballintemple Graveyard or Templehill Graveyard) is an almost square graveyard measures approximately 40 m (E-W) by 35 m (N-S) and is enclosed by a high stone wall. It is thought that the graveyard was established sometime in the early 18th century. Within the graveyard walls are many uninscribed and inscribed headstones. The earliest of the inscribed headstones dates from the beginning of 18th century.

There is a standing stone or pillar stone (CO074-066) located approximately 400 m south west of the site. According to local folklore the limestone pillar is a memorial to a local chieftain who was killed in an ancient battle. Prominent archaeologists have examined the stone over the years and the general opinion seems to be that the stone represents a territorial boundary marker.

A pre-historic souterrain (CO074-064) lies to the North West approximately 715 m from the quarry. It has a stone built chamber approximately 2.5 m long x 1.5 m high and an entrance tunnel measuring approximately 1.25 m long x 0.5 m wide and a 0.5 m high. Archaeologists have been unable to date the ancient monument but it is thought to be somewhere between 800 and 1,200 years old.

7.2.2. Cultural Heritage

Place Names

Historically the place-name of Ballintemple has been suspected of having direct links with the Knights Templar. Some historians believe there was an ancient church erected by the Knights Templar in close proximity to the graveyard in 1292. Some scholars argue that although several places with the 'Temple' prefix denote Templar holdings, such as Templetown, Co. Wexford, and Templehouse, Co. Sligo, many other place-names around the country with this prefix are so named due to their links with a church (a Gaelic word for church is 'teampal') rather than any connection with the ancient Order. It is known that the Knights Hospitaller of St. John of God settled in Cork sometime in the late 12th century. Their main foundation was on present day George's Quay in Cork City. They exercised a ministry to the sick. They owned lands within Ballinlough, Ballintemple and Ballinure. They rented these lands to tenants and used the proceeds to fund their care of the sick and their own monastery in Cork City. However, the Knights Hospitaller was one of the religious orders suppressed in the Reformation and they lost ownership of these lands. The place-name Boreenmanna is an anglicised version of the Gaelic name Boithrin na Manach meaning the 'The Monks' Road'. It is believed that this road is named after Knights Hospitaller.

In his book 'East of Mahon' historian Richard Henchion comments that the junction of Churchyard Land and Boreenmanna Road is thought to be the most likely setting for the first concentration of people in the Ballintemple area and therefore a logical location for a church. However the Black Death plague reached this area in the 1340s and 1360s wiping out much of the population of the area and may explain the demise of the church at this location.

A Cork Historian, Michael Murphy, recorded in 1912 that the church of Ballintemple stood adjacent to the graveyard and that its ruins were still visible. However, no archaeological survey was conducted at the time to investigate the origins of the ruins and the site was later cleared for a housing development.

Cave Network

There is quite an extensive network of caves at the eastern face of the quarry. These caves were first explored in the 1960s by the Cork Speleological Group and a further survey was conducted by the British Cave Research group in the early 1970s. Some of the cave wall passages were found to be abundant in lower carboniferous fossil sea shells and crinoid stems.

The caves have continued to be popular over the years with local mountaineering groups and the civil defence for practicing their rock climbing and abseiling skills. In more recent times some of the larger cave entrances have been used for antisocial behaviour.

Townlands & Townland Boundaries

Beaumont Quarry stretches across the two townlands of Ballinlough and Ballintemple. The boundary line separating Ballintemple from Ballinlough passes through the area occupied by Beaumont Quarry.

Due to the extensive quarrying of the site throughout the eighteen and nineteenth century there is no physical evidence of the remains of a boundary line marking the junction where Ballinlough ends and Ballintemple begins.

These neighbouring townlands have a strong sense of cultural heritage and local history. These areas were thriving commercial centres right through the 18th and 19th centuries. Ballinlough had an abundance of small market gardens producing fresh fruit and vegetables, dairy farms, stone quarries and sandpits. Access to both domestic and international markets via the Port of Cork, roads and later rail helped to ensure the commercial vibrance of these townlands. Ballintemple was popular among the more affluent members of Cork society and many mansion houses sprung up in the townland as the wealthy citizens of Cork moved out of the congested city in favour of the more spacious suburbs. Ballintemple was one of few townlands within the country that experienced a population increase during the Great Famine of the mid 1840s.

7.3. Potential Impacts of the proposed Development on Architectural, Archaeological and Cultural Heritage

The existing site has been extensively quarried. There are no known archaeological features within the site. The nearest archaeological feature is 50 m from the site and will not be impacted by the development.

There are no protected structures listed in Cork City Development Plan within the site boundaries. Any protected structures within the locality of Ballinlough, Ballintemple or Blackrock will not be affected by the proposed development at Beaumont Quarry.

The quarry itself, which now forms part of the local cultural heritage, will be landscaped and developed for use as a public amenity park following the proposed infilling operations. This is considered to be a positive impact.

7.4. Mitigation Measures

Avoidance of known archaeology/cultural heritage is the favoured option where possible. There are no known archaeological features, architectural, or other features of cultural heritage, within the site boundary. As there will be no excavation of material from the site, no further mitigation measures are proposed.

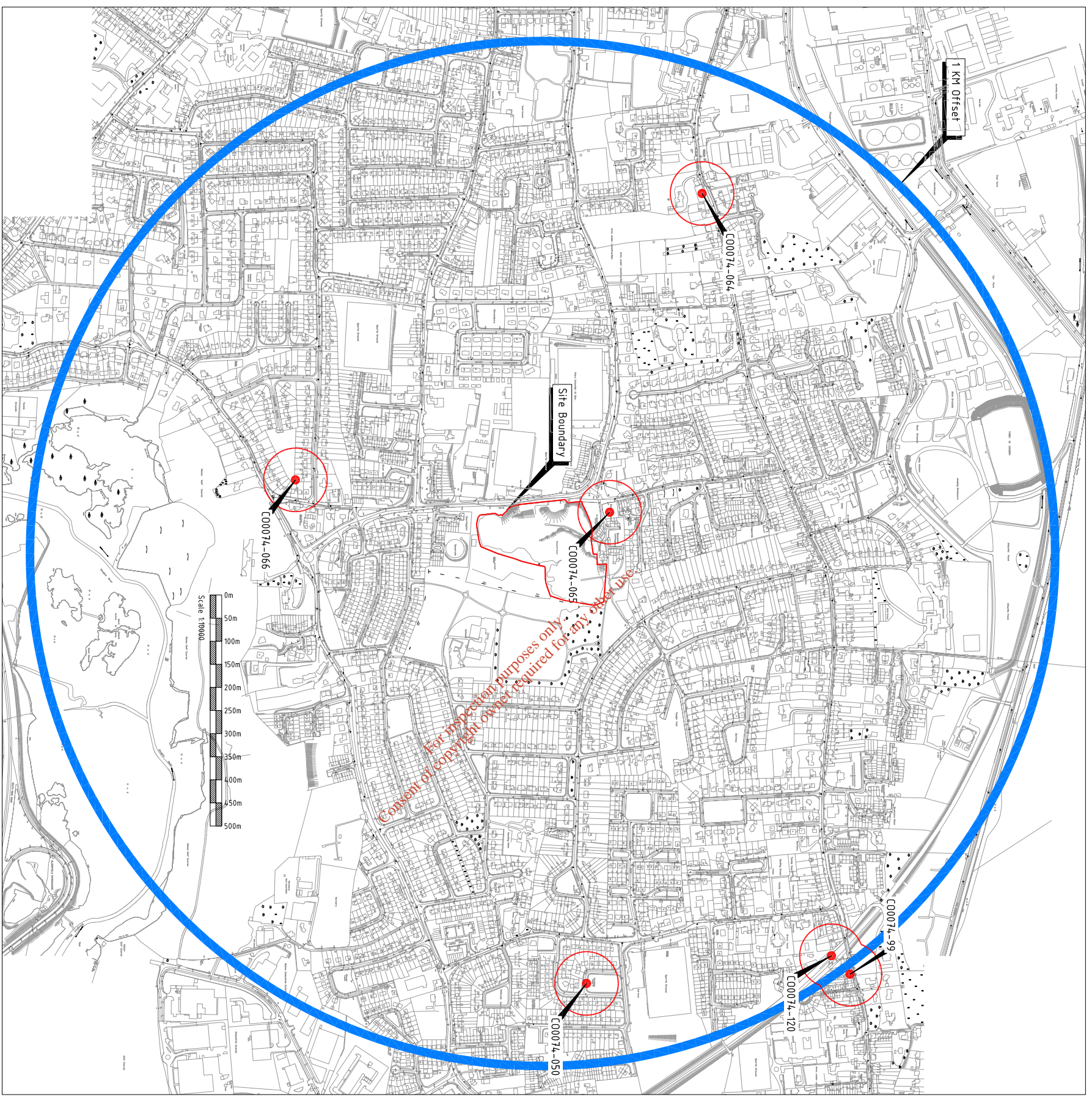
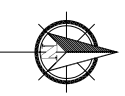
The restoration of the quarry will be conducted to the specifications and design of a landscape architect with input from the local community. Consideration will be given to the attractive and striking features within the quarry such as the rock ledges and caves, and these will be enhanced. It is intended to erect a monument to be placed at a focal point in the quarry in commemoration of those who worked the quarry throughout the 19th and 20th centuries. The restoration of the quarry will encourage an increased positive use of this space. It is also proposed to create a feature that will mark-out the old boundary line between the two adjoining townlands.

In addition, it is the intention of the City Council to continue to provide access to Beaumont Caves for use as research or by local clubs. The entrance to the Caves will be fenced and access to them will be controlled by the Council.

7.5. Conclusions

The archaeology, architecture or the cultural heritage of the locality will not be negatively impacted by the proposed development. As the final use of the development will be a landscaped public amenity it will encourage people in the area to visit the quarry.

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



No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the written permission of Feihly Timoney & Company as copyright holder except as agreed for use in writing. For more information, please contact the copyright holder. If in doubt - Ask! Do not scale. Use figured dimensions only.

Legend:
 Structures & Monuments Record (Protected Structures)

Rev.	Drawn	Checked	App'd	Rev. Origin	Description
A	KL	WE	WC	14.05.07	ISSUE FOR PLANNING

Name of Client
 CORK CITY COUNCIL

Name of Job
 EIS
 BEAUMONT QUARRY

Title of Drawing
 ARCHAEOLOGICAL & CULTURAL
 HERITAGE FEATURES
 WITHIN 1KM OF PROPOSED SITE

Scales Used
 1:10000 A3
Dwg. No.
 2006-011-09-FIG.1
Rev.
 A

**CONSULTANTS IN
 ENGINEERING &
 ENVIRONMENTAL
 SCIENCES**

**FEHLY
 TIMONEY
 & COMPANY**

Care House, Pouladuff Rd, Cork, Ireland.
 T: +353-21-494133 F: +353-21-494444
 Mill House, Ashown Gate, Newry Rd, Dublin 15, Ireland.
 T: +353-1-4583500 F: +353-1-4583501
 W: www.feihlytimoney.ie E: info@fco.ie

8. ECOLOGY

This section details the assessment of the flora and fauna at Beaumont Quarry. The quarry is the site of a proposed landfill for inert waste with subsequent development of a public amenity. This section assesses the potential impact of the planned site use on the local ecology and suggests suitable mitigation measures to minimise any potential negative effects of this proposed development.

8.1. Background

The site of the proposed development is an inactive quarry in Ballintemple in Cork city. Beaumont quarry has been in disuse since the 1960's and has become substantially revegetated in the intervening period. It has a number of deep crevices and caves in the steep rock-faces that rise above the site in several locations. There are no surface water features on the site.

Available published information on regional (or local) distribution and abundance of plants and animals were examined to augment the data collected during the field study. Very little ecological information specific to the site exists, although there have been a number of published botanical records (O'Mahony pers. comm.). However, other sources of data on the local flora and fauna were consulted to augment the data collected in the field study. Additional information on the avian species found in the area was gathered from the previous environmental impact assessment (FTC, 2000), British Trust for Ornithology (BTO) Breeding and Winter Bird Atlases (Gibbons *et al.*, 1993; Lack, 1986).

Identification of plants and animals was assisted by the use of appropriate field guides such as Wildflowers of Britain & Ireland (Blamey *et al.*, 2003) and Animal Tracks and Signs (Bang & Dahlstrom, 2001).

8.2. Methods

The site was visited on three occasions in July-August 2006. In July two visits were made: the first aimed at assessing the range of habitats present and the local topography. The second was a night-time visit that recorded the bat activity at the site. The third survey visit was to conduct a baseline ecological assessment of flora and fauna. The different ecological census techniques used in this process are detailed in the following sections. Photographs and field notes were used to help record observations in the field and records of note were positioned using a handheld GPS unit (Garmin GPSMAP 60CSx) and large scale (1:5,000) field map.

8.2.1. Avian Survey Methodology

The site was visited on two occasions to assess the local avian community – 21st July and 13th August 2007. The weather during the survey days was excellent: dry with sunny spells and with excellent visibility. The conditions were all comfortably within the acceptable range for conducting an avian survey (Bibby *et al.*, 1992).

A standard avian transect technique analogous to the Countryside Bird Survey (CBS) methodology was used to assess the avifauna that use and that might potentially occur at the site:

1. An effort was made to closely approach every point within the site
2. All species encountered (seen or heard) were recorded and where possible their abundance was noted
3. In addition to casual observations seven linear transects of 200 metres in length were walked in order to survey all of the habitats present within the site boundaries. Distances were measured with the aid of a handheld GPS receiver
4. Birds observed flying over, or near, the site were recorded
5. Binoculars were used to scan the area (in particular the sky, open grassland, patches of trees and dense shrub-layer, and nearby buildings) to seek additional avian records.
6. Note was taken of the habitat composition of the local landscape to better assess the avian community in the wider locality

In this manner, a taxa list of the birds present in the area, as well as their relative abundance and behaviour, and their association with various habitats, was generated. In addition species not encountered, but likely to use the available range of habitats during the year, were assessed.

8.2.2. Mammal Survey Methodology

The site of the proposed development was carefully walked during the August 2006 ecological survey to assess signs of the presence of mammal species. Mammal signs, such as dwellings, feeding traces or droppings - usually indicate their presence although direct observations are also occasionally made. The methods used to identify the presence of mammals in the survey area followed international best practice (Lawrence & Brown, 1973; Clark, 1990; Smal, 1995; Sargent & Morris, 2003; Bang & Dahlstrom, 2004; JNCC, 2004). A specific bat survey was carried out given the amount of suitable habitats for foraging and roosting bats at and in the vicinity of the site.

8.2.3. Bat Survey & Recordings Analysis

The purpose of the bat survey was to:

- a) Identify bat species feeding and/or roosting in the vicinity of the proposed development
- b) Quantify the relative abundances of the species encountered
- c) To make digital recordings for later confirmation of species identification
- d) Assess in particular, the caves on-site (Beaumont Caves) for evidence of roost emergence

The site was visited by two fieldworkers on the night of the 25-26 July, 2006. The weather was dry and mild with a light breeze – all comfortably within the acceptable range for conducting a bat survey as per the Bat Workers' Manual (JNCC, 2004).

Bats emit rapid ultrasonic pulses and process information in the echoes (or returned signals) to orientate themselves and to detect prey in their environment. Ultrasound is effective in prey detection as the wavelengths of lower frequencies are longer than the body length of most insects. Bats have distinct activity patterns – usually showing a peak at dusk and another just prior to dawn. The most commonly used methods of bat monitoring involve the use of a bat detector.

Bat detectors transform the ultrasound emitted by bats into audible sound. In this survey a BatBox Duet (Stag Electronics) was employed. This is a combination heterodyne and frequency division bat detector. This detector has a frequency range of 17-125 kHz. In addition, the sounds output when bat activity was detected were saved as a digital file on an Olympus Digital Recorder.

A number of points within the site were first positioned with the aid of the GPS receiver. These were selected to survey a range of the habitats present, concentrating in the early part of the night on areas around the caves to assess their potential as roost sites.

Many bats have distinctive echolocation calls (when heard on a heterodyne bat detector) that are recognisable to experienced bat workers even without sonogram analysis. When the bats are visible in the field other characteristics are also useful as identification aids: these include flight height, size, speed, habitat preference and general appearance on the wing (sometimes called 'jizz').

However, post-survey analysis of field recordings can be a very useful tool for identification of bats to species level. The process of making recordings and producing clear sonograms is complex and requires a basic understanding of sound theory. The subject is explained in detail in Tupinier (1997).

In recent year's specialist software for the analysis of echolocation calls have been developed. In the analysis of the field recordings made at Beaumont FTC used BatScan (v.8.7, Stag Electronics 2003) a specially developed PC application for the analysis of recordings made from the Duet bat detector. Analysis follows methods outlined in Briggs & King (1998).

Once an interesting bat call has been captured in a spectrogram image, a spectrum plot can be created at any point in time to show details of the frequency-division spectrum. A plot will be created showing the detailed power spectrum at that point in time. The peak frequency in the pulse of a bat call can also be a reliable indicator of the bat species, especially where bats of the same genus are differentiated most easily by their sonar calls. Also, where several bat species are flying together they can easily be spotted and separated on the spectrogram.

In addition to on-site monitoring, Mr. Conor Kelleher (Cork Bat Group & Bat Conservation Ireland) was contacted to ascertain whether there were any bat records available from the site.

8.2.4. Macroinvertebrate Survey Methodology

Pollard (1977) developed the use of a transect method for monitoring butterfly numbers that is still used in national surveys in Ireland and Britain. In a similar fashion, the transect technique can be used to simultaneously record observations of other macroinvertebrates such as moths, damselflies and dragonflies. In this survey a number of Pollard-walk transects were used to record the macroinvertebrate species present at the site. These transects were each approximately 200 metres in length and were positioned with the aid of a handheld GPS unit and a large scale field map (1:5000 OSI). These transects were walked on the 3rd August and followed the same routes as the avian survey transects.

8.2.5. Additional recording

The presence of any other species encountered was recorded during the taxa-specific surveys. Special note was taken of the habitats in which these species were observed or might potentially occur.

8.2.6. Habitat Recording/Mapping

The habitats present were examined and categorised in accordance with Fossitt (2000) and the Heritage Council (2005) each of which uses a classification system similar to that employed by the Joint Nature Conservation Committee in the UK (JNCC, 1990).

The aim of this type of *Phase 1* habitat survey is to provide relatively rapidly a record of the semi-natural vegetation and wildlife habitats present in potentially large and varied survey areas. The methodology is robust and is commonly applied to specific studies as well as more general large-scale studies of habitat. The classification system is based principally on the vegetation types present, augmented by reference to topographic and substrate features.

In addition to the mapping of the principal habitats observed at the site the dominant plant species present were identified.

Cognisance was also taken of the local land use and any habitats of conservation importance e.g. Special Areas of Conservation (SAC's) in the wider locality. In addition, the Cork County Plant recorder (Mr. Tony O'Mahony) was contacted to discuss historical plant records from the area.

8.3. Survey Constraints

A constraint that is common to all ecological surveys conducted over a single period of the year is that many flora and fauna are only present and/or readily detectable for certain parts of their annual cycle. However, many of these gaps in knowledge are filled to a greater or lesser degree by reference to the published and unpublished sources of ecological data for that area.

8.4. Results

The following sections summarise and present the results of the ecological survey.

8.4.1. Avian Survey Results

Table 8.1 shows the bird species recorded during the survey – transects plus casual recording. In total 22 species were encountered representing a fairly typical bird species assemblage for a site of this type. Of the species recorded 21 were observed during the survey transects with the remaining species being encountered during the site walk-through: Racing Pigeon, *Columba livia*.

Table 8.2 shows the species distribution by transect presence or absence. No species was recorded on all seven of the survey transects. Woodpigeon, *Columba palumbus* and Swallow, *Hirundo rustica* were recorded on 6 of seven survey transects. However, over a quarter of species recorded (6) were only found on one survey transect. Many of the birds encountered were found in small numbers with only single individuals of Pied Wagtail, *Motacilla alba* and Coal Tit, *Parus ater* noted. In contrast, Rook, *Corvus frugilegus*, Woodpigeon and Swallow were all relatively common. Table 8.3 shows the ten most abundant species recorded during the survey.

The five most abundant species nationally - as per the Countryside Bird Survey (BirdWatch Ireland CBS www.birdwatchireland.ie), Rook, Wren, *Troglodytes troglodytes*, Woodpigeon, Blackbird, *Turdus merula* & Robin, *Erithacus rubecula* were all among the ten most common birds at the Beaumont Quarry site. In addition, the five most widely recorded species in the CBS survey were also among the ten most common birds at the site: Wren, Robin, Chaffinch, *Fringilla coelebs*, Blackbird and Woodpigeon.

There were no locally, nationally or internationally scarce or rare avian species found on the site. No raptor species was recorded at the site. There is too much human disturbance currently at the site for it to be attractive as a nesting site for Peregrine Falcon, *Peregrinus falco*, a species typical of disused quarries. It is likely however that birds of prey such as Kestrel, *Falco tinnunculus* and Sparrowhawk, *Accipiter nisus* may frequent occasionally the site to forage.

BirdWatch Ireland and the RSPB (Northern Ireland) have agreed a list of priority bird species for conservation action in the whole of Ireland. These *Birds of Conservation Concern in Ireland* are published in a list known as the BoCCI List (BirdWatch Ireland www.birdwatchireland.ie). In this BoCCI List, birds are classified into three separate lists (*Red*, *Amber* and *Green*), based on the conservation status of the bird and hence conservation priority. These conservation designations take into account the dangers faced by bird species that occur in Ireland.

Red-listed species are of highest conservation concern and *Amber-listed* species are of medium conservation concern; 18 species are currently *Red-listed*, while a further 77 are considered *Amber-listed*. *Green-listed* species are considered of no particular conservation concern.

Table 8.1 also shows the conservation status of the species recorded at the site. No species of high conservation concern was recorded in this survey. Only one species of medium conservation concern were encountered: Swallow, *Hirundo rustica*. Swallows are considered of European conservation concern because of threats to the species on passage to and from their African wintering grounds. Their breeding success in Ireland remains relatively stable and their status is largely dictated by extraneous factors such as weather on passage and at their wintering grounds.

The results of the avian survey are in close agreement with those reported in the previous EIS from the site (FTC, 2000). In that survey, fewer species were recorded but several birds not found in the current study were reported: Mistle Thrush, *Turdus viscivorus* and House Sparrow, *Passer domesticus*. It is likely given the habitats present that additional species also occur at the site from time to time: e.g. Starling, *Sturnus vulgaris* and Stonechat, *Saxicola torquata*. The lack of surface water features at the site probably means that few species associated with riparian and/or costal habitats frequent the site. In the winter the site is likely to have a fair number of Redwing *Turdus iliacus*, a common migrant thrush species.

8.4.2. Mammal Survey Results

Several mammal sightings were made. Rabbit, *Oryctolagus cuniculus* droppings were found widely throughout the site. No burrows were located within the site boundaries.

Tracks and signs were frequently recorded for Brown Rat, *Rattus norvegicus*. These were especially common around areas where food sources were available.

An adult Fox *Vulpes vulpes*, in the company of a sub-adult was observed within the site at the southern end. Both appeared to traversing the site from east to west and disappeared from view towards Churchyard Lane.

Many small mammals such as Wood Mouse, *Apodemus sylvaticus* and Pygmy Shrew, *Sorex minutus* are also likely to occur but are usually not seen on survey. The type of habitat present also makes it less likely that their tracks and signs would be located.

No Badger, *Meles meles* setts or Fox dens were present. The shallowness of the soil probably makes the site unattractive for these large burrowing animals.

Irish Stoat, *Mustela erminea hibernica* has been recorded in the locality (pers. obs) but was not encountered during this survey. It is likely that local Stoats do occur on the site to forage – particularly for rats. The wooded slopes of the west and south of the site make it possible that Grey Squirrel, *Sciurus carolinensis*, may be recorded at the site from time to time. However, no tracks, signs or dreys were found during this study.

There is a large amount of suitable habitat locally for Hedgehog, *Erinaceus europaeus* and the species are known to be common in this part of Ireland (e.g. D'Arcy, 1988). However, no sightings or an indication of the presence of this species was observed during the mammal survey.

Tracks and signs of domestic Dog, *Canus familiaris* and Cat, *Felis domesticus*, were observed at several points within and in the vicinity of the site and not just associated with human dwellings.

Domestic animal tracks make up over 90% of the observed tracks one encounters at a typical field site (Sargent & Morris, 2003). Domestic cats were especially common on all the visits to Beaumont Quarry. They are significant predators of nesting birds and small mammals.

The previous EIS report did not identify any mammal species on site but mentioned that local residents occasionally saw Foxes in the vicinity.

The conservation status and designation of Irish mammal species is detailed in Appendix 5.

8.4.3. Bat Survey Results

The most striking result of the bat survey was the relative dearth of bat activity at the site. Given the amount of suitable foraging habitat and the presence of potential roost sites e.g. caves, it was expected that there would be a considerable amount of foraging activity throughout the night. There are no available records of bat activity at the site (Kelleher, pers. comm.).

The survey began at 21:30 (BST) on the 25th July 2006 well before dusk. At 22:00 a recording was made on the heterodyne bat detector of a small group of Leisler's bats, *Nyctalus leisleri*, in strong commuting flight. This identification was later confirmed by sonogram analysis. Leisler's bats were detected again at 22:16 and this was the last confirmed record for the species for the entire survey night.

Parts of the survey area are lit by municipal lighting and it was possible to clearly observe some bats foraging in these areas throughout the survey night. During the crepuscular period it was also possible to see the bats quite clearly and tentatively identify the species by general field characteristics. The bat detector indicated the presence of two pipistrelle species Common Pipistrelle, *Pipistrellus pipistrellus* and Soprano Pipistrelle, *Pipistrellus pygmaeus*. This was borne out by the behaviour and flight characteristics of the bats observed.

There was no evidence of there being any roost of appreciable size at the site. The caves which might have potential for roosting bats did not have any obvious emergence or return pattern that might indicate the presence of roosting bats. In addition, the numbers of bats detected in the area and on transit were relatively low.

It was apparent, even without sonogram analysis, that the most common bat locally was the Common Pipistrelle (combination of sightings and recognition of heterodyne emissions). There was no evidence of a bimodal distribution of bat activity throughout the night. This is a typical pattern of activity coinciding with roost emergence and at dawn the return of bats to the roost site. In this area bat activity appeared to be spread throughout the night, peaking sporadically but with no apparent pattern that would indicate the presence in the locality of a roost of any significant size. In general the area of greatest bat activity was along the woodland patches at the north and east of the site. There were also several occasions when concentrations of Common Pipistrelles were observed feeding around street-lights e.g. on Churchyard Lane.

Sonogram analysis did indeed confirm that three species had been recorded in the survey area. The sonogram/spectral analysis confirmed that the vast majority of bats encountered (c. 80% of sonograms analysed) were Common Pipistrelle.

Next most common was the Soprano Pipistrelle (known as Soprano because the peak of its power spectrum occurs higher than the Common Pipistrelle at around 55 kHz).

The third species, Leisler's Bat as described previously was far less commonly recorded during this survey and appeared to be recorded only when commuting through the area.

There was no clear pattern of distribution or habitat relationships of the bats recorded during the survey. Small numbers of bats appeared to be present throughout the site with a slightly greater detection rate at the northern end of the site.

Screen captures of the sonogram and power spectrum analysis for Common Pipistrelle and Soprano Pipistrelle are shown in Figures 8.3 and 8.4 respectively.

8.4.4. Terrestrial Macroinvertebrate Survey Results

The Pollard-walk transects recorded several terrestrial macroinvertebrates. Many of these were identified to species level.

In total, eight species of Butterfly were encountered on the wing. Peacock, *Inachais io*, Large White, *Pieris brassicae*, Small Tortoiseshell, *Aglais urticae*, Meadow Brown, *Maniola jurtina*, Green-veined White, *Pieris napi*, Common Blue, *Polyommatus icarus*, Red Admiral, *Vanessa atalanta* and Speckled Wood, *Pararge aegeria*. Most abundantly recorded was Meadow Brown although Peacock and Green-veined White were also frequently seen on transect.

Peacocks are one of the most striking butterfly species with iridescent eye spots that make the species easily recognisable. Adults may be seen throughout the year (pers. obs.) but usually emerge from hibernation in March, laying their eggs about a month later. These eggs are laid in dense clusters, often on nettles (Lewington, 2003). The Peacock is common in gardens but is frequently recorded in woodland glades, meadows and downs where they feed from plants such as knapweeds and thistles (*loc cit.*).

A distinctive and well-known butterfly species, the Large White, is another habitat generalist. It is common and widespread throughout Ireland (Asher *et al.*, 2001). It lays its eggs most commonly on brassicas, leading to problems for farmers and gardeners, as the caterpillars can be a significant pest. The adults are typically on the wing from April until September.

Small Tortoiseshell is common and widespread throughout the country (Asher *et al.*, 2001). Adults emerge from hibernation in March and eggs are laid – often on nettles – from April onwards. The emerging adults favour willow catkins and dandelions, *Taraxacum officinale*, to feed (Lewington, 2003).

Green-veined Whites are common and widespread in Ireland with adults on the wing from April to October. The Common Blue is frequent in woodland rides and urban areas such as uncultivated waste ground (Lewington, 2003).

Red Admirals are migrant butterflies arriving from Africa and southern Europe in May-June with peak numbers on the wing in August.

Two species of Bumblebee were recorded *Bombus rupestris* (Appendix 6; Plate 8.1) and *Bombus lucorum*. *Bombus rupestris* is a cuckoo bumblebee that takes over the nests of *Bombus lapidarius*. It was until recently considered to have a scarce and restricted distribution in Ireland but is believed to be increasing here and in Britain (Edwards & Jenner, 2005).

Honey Bees, *Apis mellifera*, were observed in small numbers throughout the survey area. Additional occasional records were gathered of Trichoptera and Orthopteran species and of course Chironomidae.

The distinctive moth species, the six spot Burnet, *Zygaena filipendulae* (Appendix 6; Plate 8.2), was relatively common at the site, particularly in the densely vegetated floor of the quarry. This is a common and widely distributed moth that is found on the wing from June until August (Chinery, 1986). Older individuals tend to have a faded washed out appearance (Plate 8.2).

8.4.5. Habitat & Botanical Survey

The phase 1 habitat survey revealed that there was a variety of habitat types within and adjacent to the site boundary. The indicative location of each of these habitats is shown in Figure 8.1. A description of the typical composition of each of these habitats is contained in Appendix 7.

The dominant habitats within the site are Scrub (WS1), Exposed Calcareous Rock (ER2), Dry Meadows/Grassy Verges (GS1) and Treelines (WL2). Several other habitats are also represented, most notably Ornamental/Non Native Shrub (WS3) and Artificial Underground Habitats (EU2). The underground habitats are caves that have been exposed as a result of the historic mining activity. There are also a number of ornamental garden 'escapes' among the dominant flora at the site. In places invasive species such as Flowering Nutmeg, *Leycesteria formosa* predominate. Much of the woody vegetation occurs on the slopes of the old quarry with the floor dominated by scrub and areas of grass verge.

The treelines are made up of a variety of common species e.g. Sycamore, *Acer pseudoplatanus* and Ash, *Fraxinus excelsior*. Many of these trees are young to semi-mature with few older specimens. The site is fringed in places by thorn hedgerows (WL1) dominated by Hawthorn, *Crataegus monogyna* and Blackthorn, *Prunus spinosa*. Here too there are a variety of garden escapes e.g. Japanese Rose, *Rosa rugosa* and Butterfly Bush, *Buddleja davidii*.

The scrub is relatively species rich although in many places strongly dominated by Bramble, *Rubus fruticosus* agg., and Stinging Nettle, *Aglais urticae*. Species such as Hedge Bindweed, *Calystegia sepium* and Gorse, *Ulex europaeus* are patchily distributed in the scrub.

The areas of grass have a variety of species with Ribwort Plantain, *Plantago lanceolata* and Common Knapweed, *Centaurea nigra* agg. especially frequent in these areas. Common Ragwort, *Senecio jacobea*, is also widespread throughout the site.

Table 8.4 lists the dominant botanical species present at Beaumont quarry identified during the August 2006 site survey. The species represent a mix of common native species typical of the habitats present and some established garden escapes. The previous EIS (FTC, 2000) also identified several of these species.

The previous survey also recorded a small number of species not observed in the current study including Butterbur, *Petasites hybridus* and Osier, *Salix viminalis*.

It is also known that there have been a number of nationally scarce plants recorded at Beaumont Quarry and surrounding areas (O'Mahony, pers. comm.). Most notably Little Robin, *Geranium purpureum*, has been recorded at the quarry in the past. However, it was not observed during the August site visit.

8.4.6. Other species

There are no water features on site and as expected, no amphibian or aquatic species were recorded during the survey.

8.4.7. Designated Conservation Sites

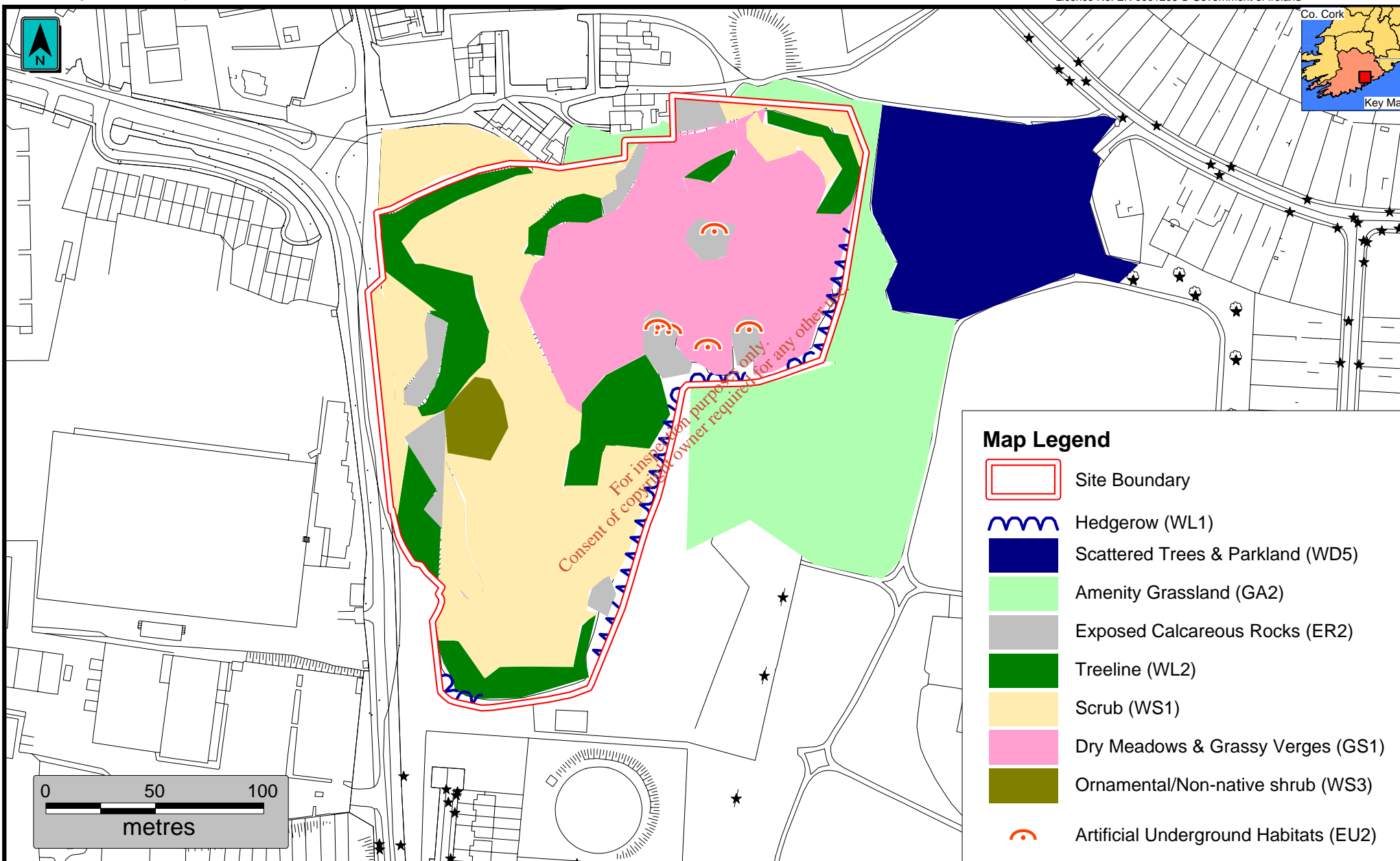
Figure 8.2 shows the designated sites of conservation importance within 10km of the site boundary. Many of the sites are associated with the River Lee and other rivers that feed into Cork Harbour. Cork Harbour is a Special Protection Area for birds, regularly holding internationally important numbers of overwintering wildfowl.

The three sites closest to the quarry are Douglas River Estuary (pNHA, approx 570 metres from the site), Cork Harbour (SPA, approx 670 metres from the site) and Dunkettle Shore (pNHA, approx. 2.62km from the site). The fact that there are no water features on site and that the habitat types present at Beaumont Quarry are unlikely to be attractive for wildfowl and waders means that the linkages between the site and these areas of conservation importance are likely to be very weak. It is highly unlikely that the proposed development will have any impact on these sites of conservation importance. Similarly, the other two sites located within 5km of the site, namely Glanmire Wood and Cork Lough will not be affected by the proposed development.

8.5. **Potential Impacts**

The proposed development will involve the development of a landfill for inert waste at the site of the disused Beaumont Quarry. It is envisaged that the site would subsequently be developed as a civic amenity, including parkland and perhaps community sports facilities. It is at present an area that sees a considerable amount of use by locals. In general it is an area favoured by walkers and as an occasional congregation spot for local youths.

The following sections assess the potential impacts of the proposed development on the existing local flora and fauna suggesting, where appropriate, suitable mitigating measures to offset potential negative impacts.



8.5.1. Impacts on Scarce or Uncommon Species

The flora and fauna at the site are by and large common locally and nationally. No avian species of high conservation concern was recorded. The importance of the site for mammal species would appear to be low. The macroinvertebrate community at the site was relatively diverse. However, the survey coincided with a time of year when most butterflies, in particular, are on the wing. The presence of important food species such as Butterfly Bush and Knapweed undoubtedly increases the local abundance of such invertebrate species. No plant species of particular scarcity or importance was recorded during the site survey.

The areas that will be directly impacted by the proposed development will centre largely on the floor of the old quarry. These areas are dominated by scrubby vegetation and occasional areas of open grassland. The scrub and other areas of the floor have a number of highly competitive and invasive species. The removal of these habitats will see an overall decrease in botanical diversity at the site but the floral species recorded in these areas in this study are of no particular conservation importance. Indeed, the areas of scrub and grassland appear to be of relatively low ecological value. For instance, these areas are not especially important for any species of vertebrate. Invertebrates especially butterflies were relatively frequent visitors to the vegetation on the floor of the quarry. However, they were also common on the steep slopes of the quarry e.g. on the southern faces where Butterfly Bush is common. Similarly, scarce botanical species recorded at the site in the past e.g. Little Robin, are likely to persist on the slopes of the quarry.

8.5.2. Design Features that could impact on resident fauna

Certain plant and animal species are adversely affected by floodlighting. Lighting at the site will be carefully designed to reduce potential negative impacts on the local avifauna (see Mitigating Measures). Lighting will also be designed to enhance the foraging success of certain bat species (see Enhancement Measures).

Noisy workplaces with heavy vehicular and human traffic are avoided by many animal species. However, mitigation can help reduce the footprint of impact (see 8.6).

The caves at the site have a high potential resource value for roosting and hibernating bats. Although bat activity at the site was found to be low it is possible that the site is of greater importance at other times during the year. It must be considered that any activity at the site that could directly impact on the caves and their access could have an impact on bats. Therefore access to the cave entrances during the proposed development will be restricted before a fuller assessment is made of the importance of the caves for bats.

8.5.3. Effects of Pests

Creating conditions that would allow a small number of species (and not necessarily just animals) to dominate could also disrupt the local ecosystem. For example, an increase in the number of mammalian predators, such as Rats, or feral Cats *Felis sp.*, could adversely affect the local avian community. This would be most likely to occur during the operation of the facility, if food waste was inadequately stored at the

site offices. Good house keeping practices will ensure that this is not an issue at the site.

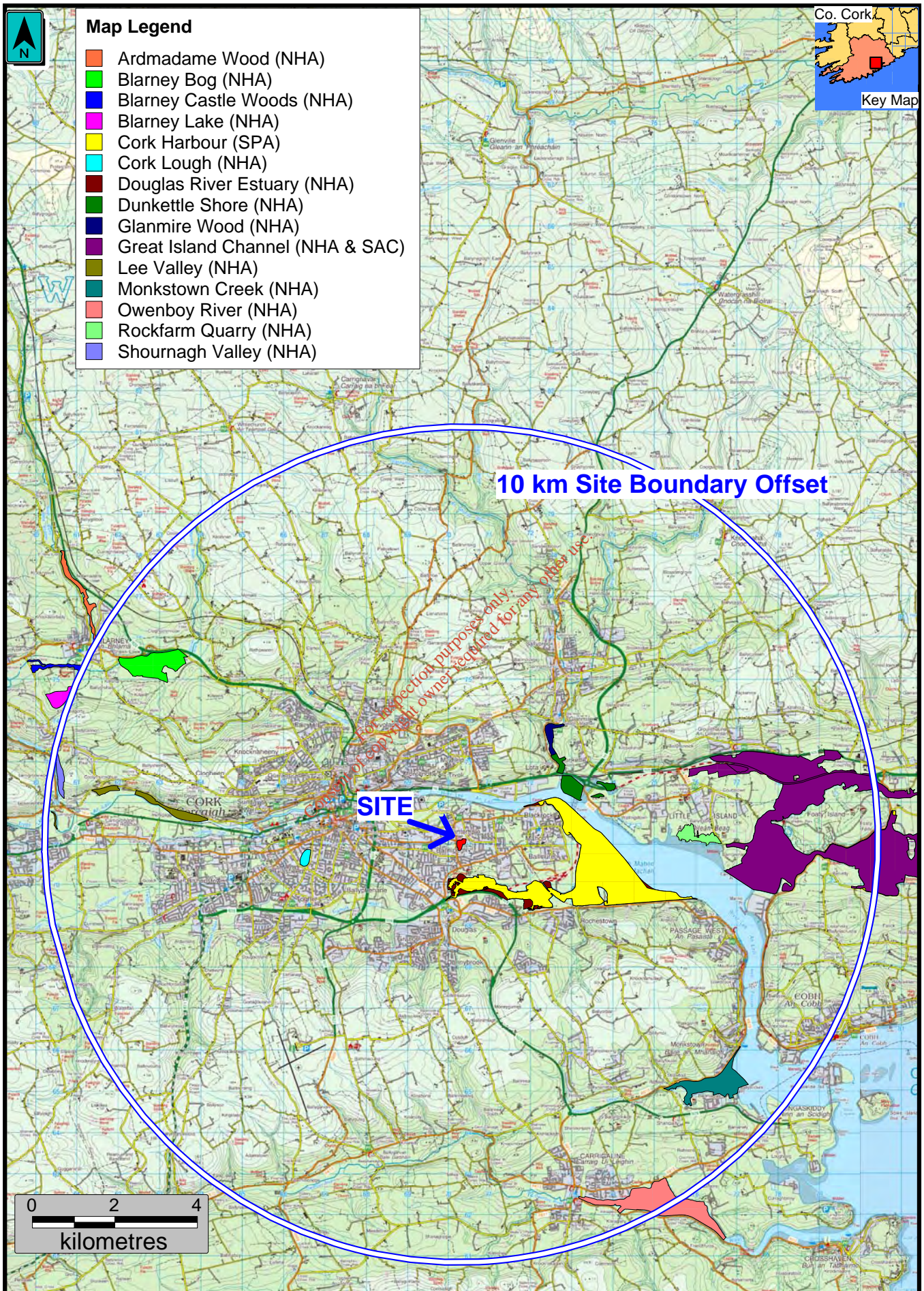
8.5.4. Disturbance

Heavier traffic levels (and noise disturbance) associated with the construction and operation, of the proposed landfill will constitute a considerable local increase in disturbance. Disturbance, particularly noise and vehicular activity associated with construction (as mentioned earlier) could pose a threat to the composition of the local fauna. Vegetation removal should be timed as to minimise the potential effects on local fauna. Some suitable measures are proposed in the mitigation section.

The well vegetated slopes of the quarry that are to be unaffected by habitat removal will be conserved where possible by creating a buffer from the siteworks.

Apart from the removal of habitats and the predictable decline in botanical diversity the increased noise and vehicular disturbance at the site during the construction and operation of the landfill would make the site less attractive as a whole for certain vertebrate species. For instance, light and noise disturbance can increase stress and restlessness affecting typical patterns of activity in birds and mammals living close to such a development. However, many of these problems will be easily mitigated with suitable lighting etc. (See Mitigation Measures). It must also be noted that the planned operational life of the facility is relatively short (2-3 years) and that the eventual site configuration is along the lines of a municipal park. This will in the longer term present landscape architects the opportunity to increase the local biodiversity by the design of ecologically attractive landscape features.

For inspection purposes only
Consent of copyright owner required for any reuse



Conservation Sites within 10km of Beaumont Quarry

8.6. Mitigation Measures

The following mitigation measures are proposed at the site:

1. Disturbance of breeding birds during construction will be avoided, where possible, by minimising habitat removal work conducted between March-August (in accordance with Wildlife Amendment Act, 2000).
2. Prior to any significant site-works a winter bat survey will be carried out to identify if the caves are used as hibernacula for bats. If bats use the caves in appreciable numbers grids will be erected on the openings to preclude human access – in consultation with a suitably qualified person and in agreement with the National Parks & Wildlife Service (NPWS).
3. Prior to habitat removal the site will be visited by a suitably trained person to conserve a seed store of any plant species of importance found e.g. Little Robin. These could be planted in areas around the margin of the site unaffected by the landfill development.
4. The vegetated slopes will be conserved, where possible, by erecting a protective fence or by establishing a suitable setback from the site works.
5. Excessive lighting at the site will be avoided. Lighting will be kept to minimum safe levels to reduce disturbance to nocturnal mammals and birds in particular.
6. During construction and operation of the facility, wastes generated within the site offices will be stored in suitable receptacles and removed off-site to an appropriate facility.
7. Future landscaping plans will be reviewed by an ecologist to maximise the potential benefits for local biodiversity. Several of the proposed landscape mitigation measures (Chapter 9) also promote the longer term increase in local biodiversity at the site.

8.7. Ecology Enhancement Measures

1. Any future landscaping will be designed to be bird & insect 'friendly' – also minimising the spread of light and noise into the wider area. Planting berry shrubs e.g. Whitethorn, would also improve the local resource value for winter bird migrants such as Redwing.
2. Future landscaping measures will be aimed at increasing overall species diversity while maintaining the landscape character of the wider area.
3. Several of the bird species recorded at the site regularly use nest-boxes. It is proposed that nest-boxes will be used to increase breeding opportunities for these resident species. Similarly, it would be a beneficial to provide a number of bat boxes to encourage these species to roost locally.
4. The planting, if deemed feasible and maintenance of a relatively unmanaged band of grasses, flowers and other seed crops – perhaps in the setback from the siteworks to the well vegetated quarry slopes – will provide a valuable food resource for several species e.g. Finches (Fringillidae). This band may be a couple of metres wide and outside existing mature vegetation. It could also increase the amount of invertebrate prey available for insectivorous species e.g. Swallow, and Hedgehog, *Erinaceus europaeus*.

8.8. Summary & Conclusion

The flora and fauna survey at the site of the proposed development provides a baseline assessment of the local ecosystem. Assessments of birds, mammals, macroinvertebrates, habitats and flora were examined within the site boundary and surrounding areas. This survey also considered data collected in a previous environmental impact assessment of the site (FTC, 2000).

The site of the proposed development is a disused quarry in a suburban area in Cork city. The area that is proposed to be infilled is dominated by scrub and grasses. These areas were not found to be of any particular ecological importance. Indeed, there are a number of invasive alien species that are beginning to flourish in these areas. The removal of these habitats will inevitably lead to a decline in botanical diversity but is unlikely to significantly impact on species of conservation concern – be they flora or fauna. The faunal community recorded at the site in this and a previous study is almost entirely comprised of common species, locally and nationally. Most of the trees, mainly Sycamore and Ash, that fringe much of the site will not be required to be felled as part of this development.

The caves at the site are potentially the most important feature for local ecology. Caves are sometimes used as roosts or hibernacula for bats. The summer bat survey conducted in this survey indicates that the caves do not hold significant numbers of bats during the summer period. It is important that the status of the caves as hibernacula also be addressed. At present there is unimpeded access to several of the caves and there has been a considerable amount of human disturbance and dumping at these sites. With increasing levels of activity at the site it will be important to restrict this access to prevent disturbance of any roosting bats. Mitigation of these impacts is straightforward and is addressed in the mitigation sections of this report (see 8.6 & 8.7).

The construction and operational phase of the proposed inert landfill would be predicted to have a low, highly localised negative impact on botanical diversity. With mitigation the impact is likely to be negligible in terms of losses of species of any elevated conservation importance. The post-landfill development of a municipal parkland amenity will include landscaping features that will benefit local biodiversity in the longer term. It is important however that the well vegetated slopes, particularly the mature trees and shrubs, are conserved during the development. With suitable mitigation it is unlikely that there will be any significant negative impacts on the local fauna. The increased disturbance may make the site less attractive for certain species of birds and mammals. However, many of these impacts are short-term and with mitigation can be effectively reduced. The residual impacts on flora and fauna at the site are predicted to be negligible and highly localised.

Table 8.1: Species Recorded during the avian survey August 2006

The level of conservation concern is indicated by the colour in which each species is highlighted – *Red** (*High*), *Amber* (*Medium*), *Green* (*No special concern*) – based on the BirdWatch Ireland and RSPB appraisal of the conservation concern of Irish bird species (Newton *et al.*, 1999).

Common Name	Scientific Name
WOODPIGEON	<i>Columba palumbus</i>
RACING PIGEON	<i>Columba livia</i>
SWALLOW	<i>Hirundo rustica</i>
HOUSE MARTIN	<i>Delichon urbica</i>
PIED WAGTAIL	<i>Motacilla (alba) yarelli</i>
WREN	<i>Troglodytes troglodytes</i>
DUNNOCK	<i>Prunella modularis</i>
ROBIN	<i>Erithacus rubecula</i>
BLACKBIRD	<i>Turdus merula</i>
WILLOW WARBLER	<i>Phylloscopus trochilus</i>
GOLDCREST	<i>Regulus regulus</i>
LONG-TAILED TIT	<i>Aegithalos caudatus</i>
COAL TIT	<i>Parus ater</i>
GREAT TIT	<i>Parus major</i>
BLUE TIT	<i>Parus caeruleus</i>
CHAFFINCH	<i>Fringilla coelebs</i>
GREENFINCH	<i>Carduelis chloris</i>
GOLDFINCH	<i>Carduelis carduelis</i>
BULLFINCH	<i>Pyrrhula pyrrhula</i>
MAGPIE	<i>Pica pica</i>
JACKDAW	<i>Corvus monedula</i>
ROOK	<i>Corvus frugilegus</i>

* No species of high conservation concern was recorded at the site

Table 8.2: The distribution of avian records, recorded during transect survey in August 2006.

Birds listed in descending order based on the number of transects on which each species was recorded. Presence on each of the survey transects (T1-T7) is indicated by an 'X'.

Species	T1	T2	T3	T4	T5	T6	T7	Number of Transects
Woodpigeon	X	X	X	X	X		X	6
Swallow	X		X	X	X	X	X	6
Wren	X	X	X		X		X	5
Rook	X	X	X	X				4
Chaffinch	X			X	X		X	4
Willow Warbler	X				X		X	3
Robin	X	X			X			3
Blackbird					X	X	X	3
Greenfinch	X					X		2
Goldcrest		X				X		2
Goldfinch			X	X				2
Dunnock			X	X				2
Bullfinch			X		X			2
Great Tit					X	X		2
Blue Tit					X	X		2
Long-tailed Tit	X							1
Jackdaw			X					1
Magpie			X					1
House Martin				X				1
Pied Wagtail						X		1
Coal Tit						X		1

Table 8.3: The Ten most Abundant Avian Species recorded, August 2006

The ten most abundant avian species as recorded on transect at the Beaumont Quarry site, August 2006. Shown for reference is the number of transects on which each of these species was encountered.

Rank	Species	Transects
1	Rook	4
2	Woodpigeon	6
3	Swallow	6
4	Wren	5
5	Chaffinch	4
6	Blackbird	3
7	Goldcrest	2
8	Willow Warbler	3
9	Robin	3
10	Goldfinch	2

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

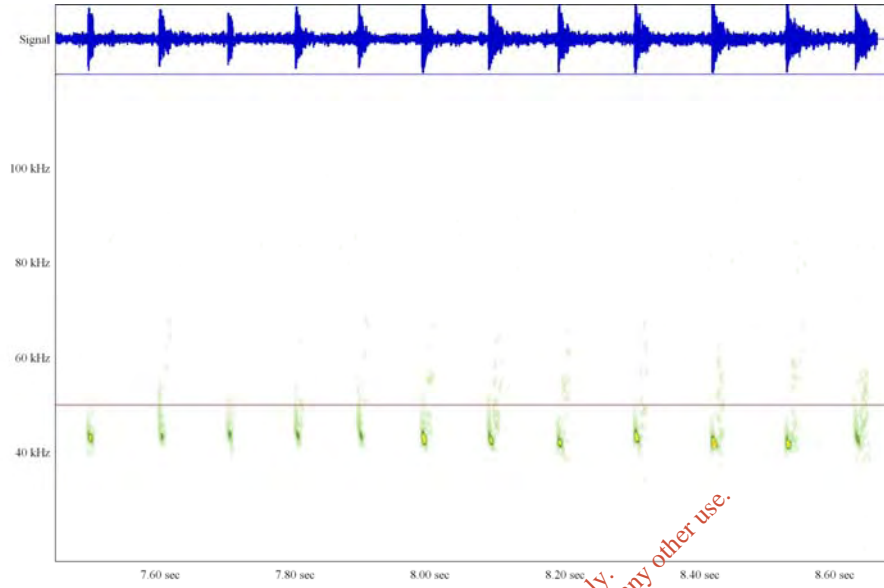
Table 8.4: A list of dominant botanical species recorded at the Beaumont Quarry site in August, 2006.

Common Name	Scientific Name
Ash	<i>Fraxinus excelsior</i>
Sycamore	<i>Acer pseudoplatanus</i>
Bramble	<i>Rubus fruticosus</i> agg.
Common Fleabane	<i>Pulicaria dysenterica</i>
Stinging Nettle	<i>Aglais urticae</i>
Rowan	<i>Sorbus aucuparia</i>
Hawthorn	<i>Crataegus monogyna</i>
Blackthorn	<i>Prunus spinosa</i>
Hedge Bindweed	<i>Calystegia sepium</i>
Japanese Rose	<i>Rosa rugosa</i>
Gorse	<i>Ulex europaeus</i>
Beech	<i>Fagus sylvatica</i>
Creeping Thistle	<i>Cirsium arvense</i>
Alder	<i>Alnus glutinosa</i>
Oak	<i>Quercus robur</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Common Ragwort	<i>Senecio jacobaea</i>
Common Knapweed	<i>Centaurea nigra</i> agg.
Wild Carrot	<i>Daucus carota</i>
Lords-and-Ladies	<i>Arum maculatum</i>
Ivy	<i>Hedera helix</i>
Coltsfoot	<i>Tussilago farfara</i>
Butterfly Bush	<i>Buddleja davidii</i>
Rosebay Willowherb	<i>Epilobium angustifolium</i>
Purple Loosetrife	<i>Lythrum salicaria</i>
Red Valerian	<i>Centranthus ruber</i>
Flowering Nutmeg	<i>Leycesteria formosa</i>
Broad-leaved Dock	<i>Rumex obtusifolius</i>
Dandelion	<i>Taraxacum officinale</i>
Creeping Buttercup	<i>Ranunculus repens</i>

Consent of copyright owner required for any other use.

Figure 8.3: Sound analysis of Common Pipistrelle
a) Sonogram b) Power Spectrum – note peak at approx 45kHz

a)



b)

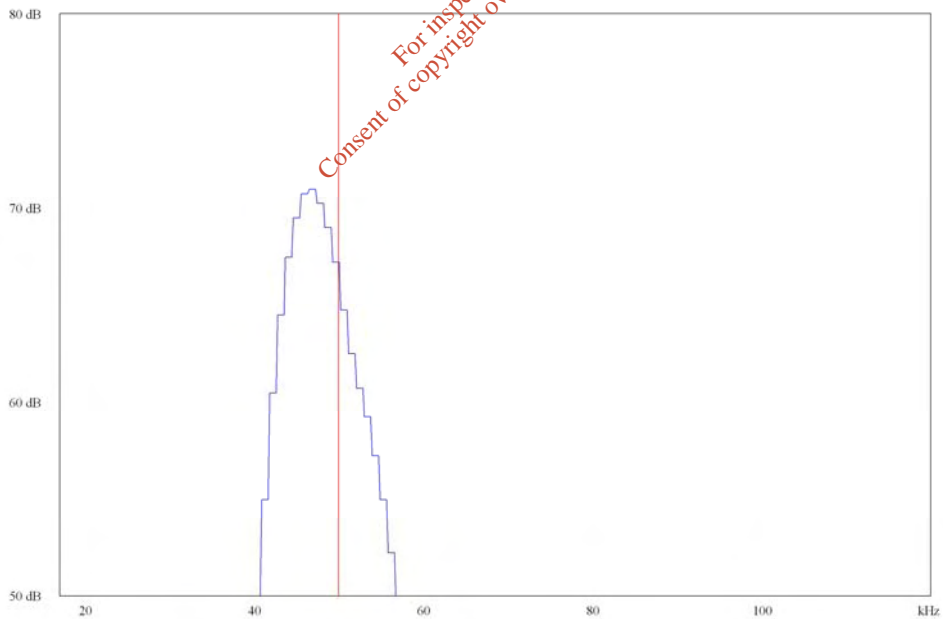
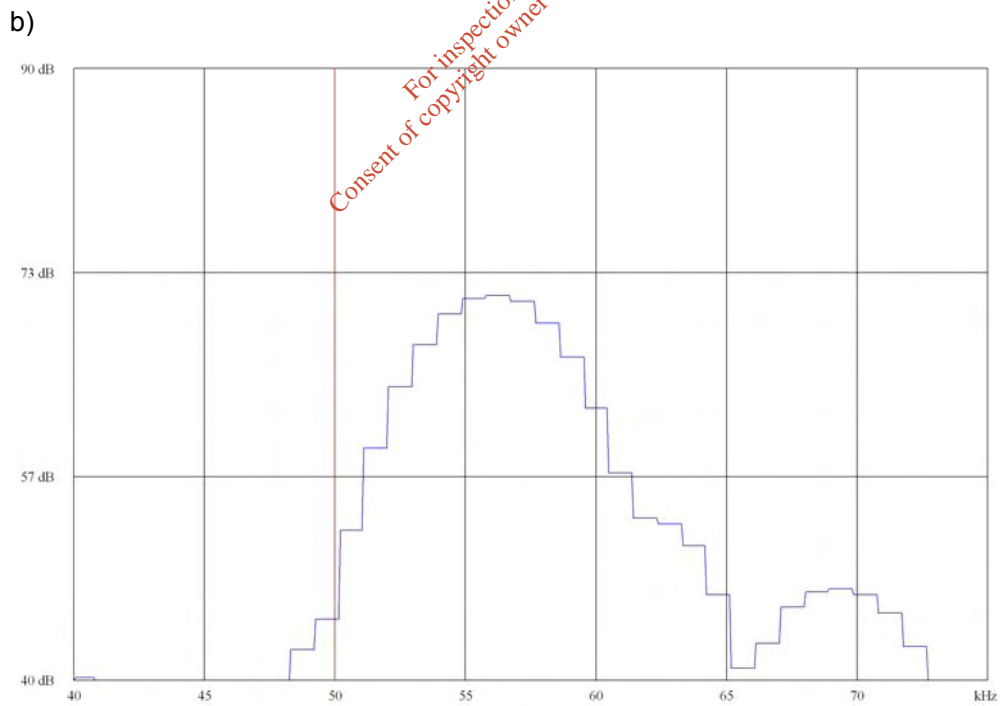
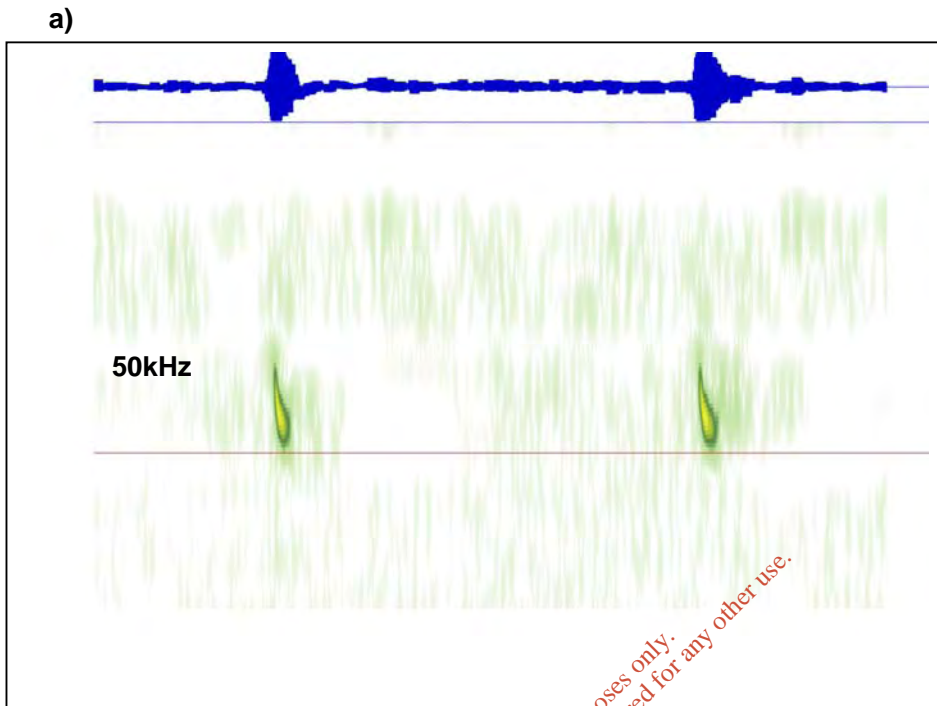


Figure 8.4: Sound analysis of Soprano Pipistrelle
a) Sonogram b) Power Spectrum – note peak at approx 55kHz



9. LANDSCAPE AND VISUAL IMPACTS

This section was prepared by the landscape architects John Ketch and Associates. It assesses the existing environment of Beaumont Quarry in terms of visual aspects and identifies potential impacts as well as proposed mitigation measures.

9.1. Existing landscape

The site is situated in Ballinlough/Ballintemple on the south side of Cork City, near the village of Ballintemple.

It is bound to the west by Churchyard Lane and Boreenmanna Rd. Churchyard Lane runs north south from the Blackrock Road at Ballintemple to the Well Road.

Private dwellings at St. Gerard Majella's Terrace and Beaumont Cottages bound the site to the north.

The ground to the east is formed by a functioning public open space which contains areas for passive and active recreation, and which is accessed primarily from Beaumont drive. The passive recreation area is composed of open lawns and a well thought out pathway network with associated plantings of deciduous trees. No ground cover and importantly no low or middle height shrub planting exist in the area. The pathway network leads to and from the active recreation areas, which consist of a football pitch. Also to the southeast is a Pitch and Putt course. Parking for this amenity is off Churchyard Lane.

Beaumont National School is situated to the southeast of the proposed site, and this component completes the overall amenity.

To the south is the residential area of Cherrington.

The site covers an area of approximately 3.5 hectares and consists of a large depression arising from a disused quarry. It is located on the crest of an east-west trending ridge, forming a local depression in that ridge. The Beaumont Quarry was worked extensively throughout the 19th and the 20th Century for limestone.

"The limestone quarries of Ballintemple were also known as the Carrigmore Quarries. A light grey closed grained and compact stone was produced from this quarry. It was stone which could be worked well." (Portrait of Cork by TF McNamara Page 201 Cork Limestone.)

According to local knowledge, the quarry has been in disuse since the 1960's. The 1840 ordinance survey shows Beaumont House on the site, which was occupied by the Beamish Family. Associated with this house at the time is an apparently complex garden with open spaces, pathways and intricate planting schemes. An Ice House is shown in the gardens and no quarrying appears to have taken place at that time. This feature was destroyed during quarrying activities.

Currently the quarry is used by people as part of the public amenity, for walking and exercising their pets and a certain amount of behaviour that is sometimes perceived as anti-social takes place.

Aesthetically, the rock outcrops remaining from the working of the quarry form a strong and high quality visual amenity. The existing self seeded plants, being mainly grasses, Ash, Sycamore, Ivy's and other groundcovers on the sides of the space combine with the rock and shapes of the remaining landform to further strengthen its visual appeal.

The quarry floor varies in height over the extent of the space. This variation in level works to particularly good visual effect, in particular along the northern end of the space where the level reduces to 19 m below the surrounding landscape and the pedestrian circulation passes between a rock outcrop and earthen mound.

The quarry floor is currently overgrown with scrubby vegetation, brambles and occasional areas of open grassland. The scrub and other areas of the floor have a number of highly competitive and invasive species. The upper and well-vegetated slopes of the quarry, particularly along the south-eastern boundary are to be retained as part of the proposed development.

No enclosure exists and the space is currently open to anybody who wants to use it.

9.1.1. Landscape Character

The site currently consists of a disused quarry set in a residential urban fabric. The quarry has become an urban waste ground defined by the under-utilised open space and some perceived anti-social behaviour. The steep gradients and sunken nature is cutting this amenity off from the outside world resulting in one access point.

9.1.2. Designated Heritage Landscape

The site is zoned as public open space. According to the Archaeological Survey of Ireland's Sites and Monuments Record Database there are 6 National Monuments and Places within 1 km of Beaumont Quarry (Refer to Section 6 of the EIS report). The quarry itself has an important historical value in terms of its historic use as well as it being the location of the town-land boundary between Ballintemple and Ballinlough.

9.1.3. Cave Network

There are a number of caves on-site and while the access to them is not restricted there has been a considerable amount of human disturbance and dumping at these sites in the past.

9.1.4. Visual Envelope

The visual envelope is the extent of potential visibility of the site to or from a specific area or feature. The visual envelope of the site is defined by the ridgeline on the East and the excavated ridgeline on the South, West and North of the site. The visual envelope of Beaumont Quarry is limited due to the sunken nature of the site. There are a few external views into the site which include:

- Views from St. Gerard Majella's Terrace and the newly constructed houses at Beaumont Cottages
- Views from the pedestrian pathway connecting Churchyard Lane and Beaumont Drive
- Limited views towards the excavated ridges from Boreenmanna Rd.

An outward view from the ridge on the eastern boundary of the site has spectacular views towards the north. From this point you can see the residential area of Montenotte.

9.2. **Potential Visual and Landscape Impacts**

9.2.1. Proposed Development

The proposed scheme includes the infill of 2.5 ha of the area. The landfill will be filled in three different phases. The filling process will bring the final levels up by 10 metres at the highest point and approximately 7 metres at its lowest point following the natural profile of the area. When all three phases are filled the area will be landscaped and developed into a public amenity park. The proposal will have a number of associated features, which will give rise to landscape and visual impact, namely:

- Construction of site infrastructure
- Earthmoving/Infilling operations
- Development of public park amenity

The objective of the rehabilitation programme is to develop the quarry site into a safe and secure public amenity park, which the general public will be able to enter and enjoy.

The public park will have walkways and associated passive and active recreational areas. The quarry will ultimately provide passive recreational opportunities for the public and will serve a strong educational function with interpretative labelling of native planting and geological and historical features.

The natural depression in the northern corner of the site is ideal for the development of a wetland area that can further add to the biodiversity of the site and accommodate site

9.2.2. Visual Impact Assessment

Visual impact may occur by means of intrusion and/or obstruction where these terms are defined as follows:

Visual Intrusion: Impact on view without blocking

Visual Obstruction: Impact on view involving blocking thereof

Visual impacts by means of intrusion or obstruction on a particular view may be viewed as positive, neutral or negative and can be rated as follows:

- Imperceptible or no impact arises where the proposal is adequately screened by existing landform, vegetation or built environment.
- Low/slight impact arises where views affected by the proposal for only a small element in the overall panorama.
- Moderate impacts arise where an appreciable segment of the panorama is affected or where there is an intrusion into the foreground. Generally, there will be open views into a site located in the mid-ground, with the site representing a significant proportion of the overall views. The development may interrupt the skyline. Existing vegetation/townscape provides partial screening except where existing views are elevated.
- High/significant impact arises where the view is significantly affected, obstructed or so dominated by the proposal as to form the focus of attention. Generally there will be open views of the development located in the foreground. The development will give rise to both visual intrusion and visual obstruction and may obstruct the skyline.
- Severe/profound impact arises where a view of significance is completely obscured or altered.

9.2.3. Impact on Visual Character

The development will give rise to a temporary intrusion during the period of construction, causing a temporary negative impact upon the existing character of the site. This impact will be significant in the immediate vicinity, from adjacent houses and pedestrians along the boundary of the site.

The long-term impact on views from these above mentioned parties will be positive. The development of the amenity park will enhance the character of the quarry.

9.2.4. Impact on Views

Three inbound views and two outbound view were identified from where the visual impact, during and after construction, could be assessed.

Figure 9.2 shows the locations from where the photographs were taken. Four viewpoints were examined:

View 1: *Outbound* from the rocky outcrop, looking north towards the Northern Ridgeline and Montenotte (Figure 9.2 and 9.3).

- View 2: *Inbound* from the pedestrian footpath, looking southeast towards the rocky outcrops (Figure 9.4 and 9.5).
- View 3: *Inbound* from St. Gerald Majella's Terrace, looking south (Figure 9.6 and 9.7).
- View 4: *Inbound* from the Southern boundary, looking northwest (Figure 9.8 and 9.9).
- View 5: *Outbound* from the North-eastern boundary, looking West (Figure 9.10 and 9.11).

All impacts after construction (long-term) will be considered as positive and only the impacts during construction (short term) will be considered negative. For the purposes of this report only the negative short term impacts on the individual views will be assessed.

Potential short term negative impacts during the course of construction are described below:

- **The Site Development Plan** (as part of Phase 1) to facilitate the importation of waste and provide site security will include:
 - Construction of a hard standing area
 - Temporary site offices, weighbridge and wheel wash facilities
 - Ramp down to the quarry floor
 - Staff car parking
 - Alterations to ground levels
 - Removal of some existing vegetation on quarry floor area
 - Lighting
 - Noise created by construction traffic.

- **Operation of the Landfill (Phases 1 to 3)**

Earthmoving and infilling operations will take place over a 2 - 3 year period. The operations will take place in three phases. The first area to be filled is the north-eastern corner area of the quarry, followed by the southern area and finally the central area. As the filling progresses and the floor of the quarry are raised, the earthmoving operations will become increasingly more visible.

- **Development of Public Park Amenity/Final Restoration of the Site**

Potential impacts associated with the development of the site into a public amenity including a change in character due to the restoration of the site, the natural habitats and views in and out of the quarry.

It is envisaged that the creation of a public amenity will greatly enhance the visual quality of the amenity for both users of the site and nearby residents. See illustrations, Figures 9.2 – 9.11.

View 1: Outbound view from the rocky outcrop, looking north towards the Northern Ridgeline and Montenotte

This view indicates the existing and future views respectively from the rocky outcrop, looking north towards the Northern Ridgeline and Montenotte, overlooking the Ecological Zone (Zone 1 in Figure 9.1) with the proposed footpath, seating areas and the proposed stone circle.

The negative visual impact at this location which will occur during the earthmoving operations will be moderate. Moderate because the visual intrusion is in the foreground.

The development of a park will have a positive impact on this viewpoint in the long-term. The temporary loss of vegetation and character of the area will be restored by the development of the park amenity. The positive impact will be significant.

View 2: Inbound view from the pedestrian footpath, looking South-East towards the rocky outcrops.

This view indicates the existing and future views from the pedestrian footpath, looking southeast towards the rocky outcrops, into the Ecological Zone (Zone 1 in Figure 9.1) with the stone circle visible at the far right side.

This negative impact on this view will be low. Only a small portion of the site will be visible from this viewpoint due to the existing rocky outcrop and earth mound on the Northern border of the site which will screen the earthmoving operations from this viewpoint.

During the development of the park, a more profound positive impact will be experienced from this viewpoint. This positive impact will be high arising from the flattening of the earth mound and the proposed indigenous landscaping.

View 3: Inbound view from St. Gerald Majella's Terrace, looking South.

This view indicates the existing and future views respectively from St. Gerald Majella's Terrace, looking south into the Cultural Heritage Zone (Zone 2 in Figure 9.1).

Due to its' elevated position, overlooking the site and the associated activities during the construction phase, the negative visual impact experienced from this viewpoint will be moderate.

An appreciable segment of this view will be affected by these activities. These however will be short term as mentioned before.

Mitigating measures such as placing an acoustic fencing on top of a screening berm may be required to lessen the potential noise and negative visual impacts and also maintain privacy for the residents during the earth moving operations. This will cause visual obstruction from views into the quarry from ground floor level from this terrace block.

The development of an amenity park will have a significant positive impact on this view. The temporary loss in vegetation on the floor of the quarry will be short term and will be restored as a mitigating measure.

View 4: Inbound view from the Southern boundary, looking North-West.

This view indicates the existing and future views from Southern boundary, looking northwest into the Active Recreation Zone (Zone 3 in Figure 9.1), with the proposed seating and spacious grass area.

From this viewpoint, there will be a slight negative visual impact during the construction phase. This impact will be slight for the reason that it is short term and also because the site infrastructure is located some distance from this viewpoint.

The loss of vegetation due to the earthmoving operations will be short-term and see the removal of mostly scrub planting and other invasive plant species of little ecological value. The impact would therefore be considered slight.

The development of the park will have a positive impact on this viewpoint, affecting a significant part of the foreground.

View 5 Outbound from the North-eastern boundary, looking West

This view indicates the existing and future view from the Eastern boundary, looking west towards the residential houses in St. Majella's Terrace and Beaumont Cottages (Zone 1 in Figure 9.1).

From this viewpoint, there will be a negative impact during the construction and operation of the proposed facility.

The development of the park will result in significant changes in views from this point. When mature vegetation has established, the views of the houses St. Majella's Terrace and Beaumont Cottages will be restricted.

Conclusion on Visual Assessment

The visual intrusion that the site infrastructure and earthmoving operations will have on the viewpoints will be moderate in the short-term and slight in the long term. The impact in the short term will be highly-localised. The construction activities will be mitigated by appropriate screening measures to limit the visual impact it might have on sensitive views.

Restoration of the original habitat will begin immediately after the deposition of waste has been completed. Restoration will be on-going to ensure the establishment of plants. The development of the park will have a significant positive impact on these viewpoints. The main objective is to create a public park for local use and to restore the local biodiversity.



VIEWPOINT LOCATION MAP

FIGURE 9.1



VIEWPOINT 1-FROM THE ROCKY OUTCROP, LOOKING NORTH
TOWARDS THE NORTHERN RIDGELINE AND MONTENOTTE

FIGURE 9.2



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

PROPOSED



VIEWPOINT 1-FROM THE ROCKY OUTCROP, LOOKING NORTH
TOWARDS THE NORTHERN RIDGELINE AND MONTENOTTE

FIGURE 9.3





VIEWPOINT 2-FROM THE PEDESTRIAN FOOTPATH LOOKING SOUTH-EAST

FIGURE 9.5



VIEWPOINT 3-FROM ST. GERALD MAJELLA'S TERRACE LOOKING SOUTH

FIGURE 9.6



VIEWPOINT 3-FROM ST. GERALD MAJELLA'S TERRACE LOOKING SOUTH

FIGURE 9.7



VIEWPOINT 4-FROM THE SOUTHERN BOUNDARY, LOOKING NORTH

FIGURE 9.8



VIEWPOINT 4-FROM THE SOUTHERN BOUNDARY, LOOKING NORTH

FIGURE 9.9



VIEWPOINT 5-FROM EASTERN BOUNDARY LOOKING TOWARDS ST. MAJELLAS TERRACE FIGURE 9.10



VIEWPOINT 5-FROM EASTERN BOUNDARY LOOKING TOWARDS ST. MAJELLAS TERRACE FIGURE 9.11

9.3. Mitigation Measures

9.3.1. Proposed Landscape

The following are the objectives of the proposed landscape plan:

- Create a unique public park amenity by retaining its current character
- To restore and improve overall species diversity.
- To develop a low maintenance public park amenity with significant areas of native trees and shrubs and areas of longer grass and meadow mix flowers in appropriate areas
- Provide a safe and pleasant environment for visitors to view the unique geology of the quarry, e.g. caves.
- Create practical uses for the park, creating a strong linkage with the already existing park to the East
- Utilise high points within the quarry as viewing point of the surrounding landscape
- Create a passive recreation facility that will have no negative visual impact on the residential component of St Gerald Majella's Terrace
- Retain and protect trees on the upper quarry slopes
- Reveal and complement the historic value of the quarry
- Make use of the lowest contours on the site, for the creation of wetland for example
- Reflect the historic boundary line where it crosses the site within the landscape design
- Encourage use of pedestrian circulation paths within public open areas

9.3.2. Proposed Landscaping Strategy

The following elements have been incorporated in the landscape plan to maximise the potential for the greatest diversity of use:

- The local limestone will be incorporated into the park furnishings wherever this is appropriate. (e. g. focal points, paved footpaths, signage and seating)
- Organisations and leisure groups e.g. orienteering clubs shall be actively encouraged to make use of the parks facilities for their sport or activity.
- Artificial lighting will not be implemented in the establishment of the amenity park. This will have a negative impact on bat activity and attract anti-social behaviour at night.
- Methods that include elements aimed at increasing public use of the space will be given priority in the final design in order to reduce the future potential for anti-social behaviour.
- The unique character of the upper quarry walls shall be retained, subject to the requirement for public safety.

General Landscape Strategies

It is proposed to have four access points that will be clearly defined in terms of plant use and use of materials. They will be signposted with a clear map of the Park Amenity, indicating the pathways, viewpoints and recreational facilities.

The two entrances in the northern sector of the site will create a physical and visual linkage with the existing park along the north-eastern boundary of the quarry. It will not be possible to retain the visual interest at the pinch point to the north of the site in its present form. It is proposed to alter the form of the existing earth mound along the north-eastern boundary of the quarry with the existing park outside the boundary. A band of trees will be planted along the reduced mound. This acts as a feature that will attract the attention of passing pedestrians. This band of trees with wildflower planting is set back from the pathway to create a defined entrance. This will visually draw people into the park. Strategically placed information boards will inform people of the extent of the amenity.

The pedestrian pathway will be widened at this point to further draw attention to the amenity park.

A comprehensive system of walkways will be an important element of the park amenity. It is important to note that there will be no cul-de-sacs. All paths will be circular to avoid any dead ends. The landscape master plan proposes a number of walkways that will be a level, circular track around the floor of the site. At present there is no park furniture in the amenity, however with increased numbers of visitors, adequate facilities must be provided. This will be particularly important along all walking paths and viewpoints. Specifically designed seating, signs and rubbish containers etc, will be required for the park. These elements present opportunities to make a final use of the limestone in the quarry, providing elements for daily use that celebrate the past use of the space. Paths and tracks shall provide access to view points and to focal points identified in the landscape master plan and shall provide a range of opportunities for all age groups, both abled and disabled persons.

Paths and tracks shall be located and screened where appropriate to minimise any potential loss of privacy to neighbouring properties.

Signage & Displays

The provision of appropriate information signs and interpretation displays will extend and enrich the visitor's enjoyment and perception of the park.

Interpretive displays shall be located at appropriate locations such as at the lookouts located along the rocky outcrops, walkways, and entrances and parking facilities.

Areas have been identified as centres in the park where people will be encouraged to gather, using such techniques as the placing of seats and other items, which will attract peoples' attention. This, also, is designed to focus positive attention on these areas and create a safer environment for users.

The public shall have free access to all parts of the site, except where:

- Restrictions are necessary for public safety i.e. the caves
- The flora and fauna requires conservation

The provision of figurative sculpture through a self-financing scheme shall be examined with a view to celebrating the contribution of the people who worked in the quarry.

Planting

Vegetation on the upper slopes of the quarry will be retained where possible.

New planting, particularly on the valley sides and throughout the wetlands areas shall emphasise the use of native species planted in associations that reflect patterns that would have occurred prior to human modification.

The aim of the scheme shall be to retain and enhance the existing visual appeal of the area and the use of species to be used shall be drawn from the following; Horse Chestnut, *Aesculus Hippocastanum*, Silver Lime, *Tilia tomentosa 'Brabrant*, Beech, *Fagus sylvatica*, Birch, *Betula sp.*, *Corylus avellana*, Oaks, *Quercus robur* and other oaks, *Larix deciduas*, *Crataegus sp.* *Ilex aquafolium*, *Pennisetum alopecuroides 'Hamelin'*, Meadow mix etc

Planting will consist of large trees. No mid storey of shrubs shall be utilised in order to preserve maximum visibility at ground level.

Berming shall be carried out as part of the work to the finished level of the park, and this shall be used in conjunction with tree and grass planting as detailed above in order to provide intricate aesthetic interest. These berms will not be higher than 1.5 m, again to preserve maximum visibility.

9.3.3. Zoning

Figure 9.1 illustrates the conceptual layout. The concept indicates three distinctive zones that are derived from a physical and visual assessment of the site. Each Zone has a different function which is described below. Figure 9.12 illustrates an aerial view of the restored quarry.

ZONE 1 – Ecological Zone (refer to Figure 9.1)

It is proposed that the area within the amenity with the most visible mining scars be treated with the most care in determining its use. This will increase the contrast between the subtleness of nature and the harshness of mans' intervention.

This zone will have a high visual impact on St. Gerald Majella's Terrace and can therefore be zoned as visually sensitive. The activities located in this zone will therefore be restricted to passive recreational activities associated with nature appreciation and meditation.



AERIAL VIEW OF THE RESTORED QUARRY

FIGURE 9.12

The inclusion of a marsh area (wetland) will have a functional purpose and will form a landscape feature and attract birdlife. It will be visible from a large portion of the park and will help in increasing the visual intricacy of the overall amenity. It may be necessary to fence this area off from public access in order to preserve it as a wildlife area and keep it safe for visitors. This shall be done in a way which is visually appealing and which retains maximum visibility using material such as split chestnut fencing.

Earthen banks can be used as screening and also provide a potential resource for burrowing mammals and invertebrates.

A **standing stone** with small grass mounds will be placed close to the entrance point. This will stem the atmosphere of the functional zone.

A constructed **stone circle** to nestle at the base of the exposed cliff face is an appropriate element for the *genius loci* of the area. The natural amphitheatre creates a naturally defined area ideal for this use. It utilises the space efficiently and answers to the sense of place.

A path leading to the '**viewing platform**' for the use of rock climbers and cavers will be clearly defined and signage put there to indicate the importance for staying on the path and not deterring from it. Access to the viewing platform will encourage the enjoyment of the site, the distant views and local rock climbing activities in a relaxed and informal way.

ZONE 2 – Cultural Heritage Zone (refer to Figure 9.1)

This zone lies central to the site. It will accommodate an **entrance point** from Churchyard Lane, with associated car parking (5 - 7 cars). This car park will be used during the landfill activities as an entrance and the location of the temporary site office. This area is least visible from St. Gerard Majella's Terrace and parts of Beaumont Cottages.

Views from St. Gerald Majella's Terrace across the site towards this zone will be less sensitive but because of its relative closeness this zone will be earmarked for passive recreation and will focus on the relaying of historical information to the users.

Education about the formation of the Quarry, the early history of Ballinlough and Ballintemple, the flora and fauna of the region and the interpretation of their value will be important functions of the park. This will be achieved through signage and interpretative displays.

It is intended to commemorate the people that worked in the quarry and to give a historical illustration of the quarry as a heritage site. The focal point could be in the shape of a memorial that illustrates the activities and processes involved within a quarry.

The town land boundary line between Ballinlough and Ballintemple transects the quarry. The approximate locality of this is indicated on the Landscaping Plan (Refer to Figure 9.1) and will be incorporated within the focal point (Source: 1st Ordnance Survey Map (1850S)).

It could be illustrated as a pathway leading up to the focal point, paved with the local stone. The difference in material use will elevate the pathway and give importance to it.

Zones 1 and 2 both have a distinctive character. In creating a visual barrier between these two zones adds to the sense of discovery. It can best be defined by a thicket of trees that from an ecological point of view, brings diversity to the current habitat layout where the woodland areas are located mainly on the steep slopes to the sides of the site.

Within this band of trees, outdoor field/adventure activities such as cross-country running, scout group activities and outdoor education activities, this is an ideal area to facilitate a less formal **adventure playground**.

ZONE 3 – Active recreational Zone (Refer to Figure 9.1)

This zone is located some distance from St. Gerald Majella's Terrace, has the least visual impact and can therefore be developed as an area for active recreation. This Zone accommodates a pedestrian **entrance point** from Boreenmanna Road.

Steps will be constructed following the natural contours of the slope. The stepped pathway will descend into the quarry basin. This will give a clear indication of the natural history of the quarry and will add to the diversity of user experience. This entrance point will not be suitable for the disabled. Alternative entrance points are provided within Zone 2 and Zone 1.

An open grassed area will be used for **informal active recreation**. The grass will be kept short and kept free of weeds.

The staircase that accommodates the level change between this Zone 3 and Zone 2 can be used as an amphitheatre for informal gathering. A retaining wall no higher than 1m can be used for horizontal **rock climbing** and can be incorporated within the level changes between terraces. Horizontal climbing creates a safe recreational activity where the climber is never higher than 1m, within easy reach of any adult person.

The limited views towards the excavated ridges from Boreenmanna Road need to be addressed. A strong linear fence (boundary line of pitch and putt) runs along the top of the ridge and is clearly visible and visually unattractive. It therefore needs to be screened by dense tree and hedgerow planting to break the linear pattern. This design concept is so that the person travelling along Boreenmanna Road will notice the Amenity Park rather than the pitch and putt fence line.

9.4. Conclusion

The restoration of the Beaumont Quarry will have a moderate negative impact on the natural environment and local residents of St. Gerald Majella's Terrace. These impacts are however short-term and highly localised.

There will be long lasting positive impacts on the local environment and on the more regional cultural environment. The eradication of invasive and highly competitive species can be seen as highly beneficial to the overall ecological quality of the site.

The scrub and other grass species with low ecological value will be replaced by a semi-structured landscaped area, planted with indigenous grasses and trees that will increase the diversity of the current habitat.

Currently the quarry is not being used to its full potential in terms of both social and recreational use. Comment and opinion from the local public in relation to the proposed park is being addressed by introducing a variety of opportunities for active and passive recreation as part of the park development and landscaping plan.

The proposed landscape plan endeavours to answer the need to respect the park as a cultural heritage site and to provide an aesthetically pleasing environment for the local public and wider users.

The proposed infilling of Beaumont Quarry and its development as a public amenity park will be a positive impact in the long-term.

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

10. LAND USE

This section examines land use within the surrounding area of the development in terms of:

- Existing environment
- Potential impacts from the proposed development
- Proposed mitigation measures

10.1. Land Use in the Existing Environment

The land use in the immediate vicinity is dominated by residential estates, sports facilities, and industrial units.

The proposed development is located within a densely populated area. Figure 3.1 shows the land use within 500 m of the site boundary.

Housing estates are located to the north and south of the site. There are various sporting facilities around the site including, the Ballinlough pitch and putt course on the south-eastern boundary, the Cork Constitution Rugby Football Club to the west across Churchyard Lane and Pairc Criostoir Uí Rinn G.A.A. sports ground, located approximately 175 m to the west.

To the east lie a large open green public amenity and two national schools. Further to the east is the busy road of Beaumont Drive.

The remainder of the areas within the vicinity of the site is made up of open green areas and industries such as the Eircom Area Engineering Headquarters office.

Churchyard Lane, a busy public road, runs parallel to the western boundary of the site. A path cuts through the northern site boundary which is used as a pedestrian walk way between Churchyard Lane and Beaumont Drive.

The site itself covers an area of approximately 3.5 ha and is under dense bramble scrub. In recent years the site has been associated with some anti-social behaviour.

The cliffs within the north eastern part of the site are used occasionally by mountain climbing clubs to practice their absailing skills. Beaumont caves are located within the site. Access to the main caves is restricted at present.

The proposed site is not contained within any of the following designations:

- National Heritage Areas (NHA)
- Special Areas of Conservation (SAC)
- Special Protection Area (SPA)

10.2. Characteristics of the Project which may impact upon Land Use

The impact of the proposed development on land use is considered in the context of the existing land use.

The proposed development covers a total area of approximately 3.5 ha of land, which is currently scrub land and is been used for anti-social activities. As such the site offers a limited public amenity in its current state. The proposed project will have a short-term (2 – 3 years) impact on the surrounding land use, during the filling of the quarry, when access to the site will be restricted to workers and authorised visitors.

A flora and fauna survey conducted on the site as part of this proposal, concluded that it would be unlikely that there would be significant impacts on species of elevated conservation importance.

The greatest short-term potential impacts of the proposed extension will be on the amenity of local residences. This impact could occur due to increases in traffic, noise etc. The visual amenity could also be impacted due to the change in land use from a disused quarry to a landfill site. However, these impacts will be short-term i.e. less than 2 - 3 years and implementation of mitigation measures in relation to traffic, noise, air as proposed in the relevant sections of the EIS will ensure that there are no significant adverse impacts on residential amenity.

10.3. Mitigation Measures

Good-house keeping practices and environmental management will ensure that potential impacts for traffic, noise and air etc. will not be significant.

Following completion of earthworks and landscaping activities, the site will be returned to public amenity use. The restoration of the quarry is seen as a positive impact which will realise the potential of the site.

11. MATERIAL ASSETS

This chapter describes the material assets both within the site and in the area around the proposed development. It also examines the associated impacts and where applicable, proposes mitigation measures to minimise these impact.

11.1. Material Assets in the Existing Environment

The principal material assets that have been identified within or adjacent to the proposed site are:

- Land resource – loss of current land use
- Road infrastructure – short-term, increase in traffic volumes

While it is recognised that in the short term, there will be disruption to the residents in the immediate vicinity of the site in terms of increased traffic volumes, noise, dust etc, the long term, benefits of the project will far outweigh any short-term impacts.

11.2. Potential Impacts on Material Assets

Land Resource – loss of current land use

As previously described, the site in its current state, offers limited amenity. The proposed development, once restored will create a usable open public space with varying uses such as walkways, open amenity area etc. The landscape architect has designed the final layout of the site to discourage anti social behaviour by the elimination of cul-de-sacs within the park.

Road Infrastructure – increased traffic volumes

There will be an increase in local traffic both during the construction phase and operational (landfilling) phase of the development. This impact will however, be short-term. The likely increase in traffic and the likely impact of such traffic on the capacity and operation of the receiving roads network will not be significant.

The traffic assessment (Section 3) proposes a number of remedial measures that will benefit not only the proposed development but all local road users. Proposed remedial measures include the establishment of a right-hand turning lane and on the Boreenmanna road.

11.3. Material Assets Mitigation Measures

Having regard to the potential impacts outlined above, no further mitigation measures are required for the site, over and above those presented within applicable sections of this EIS.

11.4. Conclusions – Material Assets

The loss of scrubland will be inevitable given the nature of the proposed development. The significance of this loss is not significant given the current land use.

The proposed development will result in the restoration of the quarry to a public amenity which will have a positive impact for the surrounding residential estates.

Although this development is classified as a landfill in accordance with the relevant waste management legislation, this development is seen as a restoration project. The site will be infilled over a 2-3 year period with inert waste which will result in the creation of a landscaped public amenity which will add value, both from an economic and recreational point of view.

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

12. CUMULATIVE IMPACTS - INTERACTION OF THE FOREGOING

12.1. Cumulative Impacts

The use of Beaumont Quarry for the short-term landfilling of inert waste and its final restoration and development as a public amenity will have both negative and positive impacts on the receiving environment.

Potential Negative Impacts

- Potential for a reduction in air quality, due to dust, etc, if the facility is not operated in accordance with best practice
- Increase in traffic levels in the surrounding area until the site is developed as a park
- Visual impact of traffic movements and some on-site operations
- Increase in background noise levels during construction and operational phases.

Potential Positive Impacts

- The restoration of the landscape in keeping with the surrounding topography
- The creation of a valuable public amenity
- The provision of short-term employment
- The beneficial re-use of inert waste excavated from developments within Cork.

12.2. Interaction of Impacts

There is potential for interactions between one aspect of the environment and another which can result in an impact being positive, negative or neutral. Table 12.1 outlines the interaction between the various positive and negative effects listed in Section 12.1 and what their impact will be following the implementation of the various mitigation measures outlined in the previous sections of the EIS.

Table 12.1: Summary of Interaction of Environmental Effects

Cause	Impact (following mitigation)								
	Socio-economic	Cultural Heritage	Air Quality	Climate	Landscape	Ecology	Water Quality	Roads	Amenity
Development of facility	P	N	N	N	P	N	N	N	P
Noise	N	-	-		-	N	-	-	-
Dust	N	-	N	N	-	N	-		-
Traffic	N	-	-	N	-	-	-	-	-
Water quality	N	-	-	-	-	N	-	-	-
Soil	P	-	-	-	-	-	-	-	-

N = Neutral
P = Positive
Neg = Negative

12.3. Conclusions on the Interaction of the Foregoing

Beaumont Quarry is owned by Cork City Council. The site is currently overgrown and has limited use as a public amenity.

The proposed project is to infill the quarry over a 2-3 year period through the importation of 250,000 tonnes of inert waste. Once filled, the site will be landscaped and developed to create a valuable public amenity park for both the local residents and the wider area.

The previous sections of the EIS deal with any potential impacts that may occur as a result of the continued operation of the landfill. Where these impacts could be negative, specific mitigation measures as well as good housekeeping practices will be implemented at the site to minimise or neutralise these impacts on the receiving environment. There will be no significant long-term negative impacts from the interactions as a result of the development of Beaumont Quarry.

REFERENCES

Bang, P. & Dahlstrom, P. (2004). *Animal Tracks and Signs*. Oxford University Press, Oxford.

Blake, D., Hutson, AM, Racey, PA, Rydell, J. and Speakman, JR. (1994). Use of lamplit roads by foraging bats in southern England. *J. Zool.* **234**(3): 453-462.

Briggs, B. & King, D. (1998). *The Bat Detective*. Batbox, Steyning, West Sussex.

Cork City Council (2004) - The Cork City Waste Management Plan 2004 - 2009

Cork City Council (2004) – Cork City Development Plan 2004

Council of the European Union (1999), Directive on Landfilling of Waste, 199/31/EC

Clark, M. (1990). *Badgers*. Whittet Books, London.

D’Arcy, G. (1988). *The Animals of Ireland: Pocket Guide*. Appletree Press, Belfast.

Department of the Environment and Local Government (1998), Waste Management – Changing Our Ways

EPA (2001), Landfill Manual; Landfill Site Design

EPA (2004), Landfill Manual; Landfill Monitoring 2nd Edition

EPA (1999) Landfill Manual; Landfill Restoration and Aftercare

EPA (2001) Landfill Manual; Landfill Operational Practices

EPA (2002) Guidelines on the Information to be Contained in Environmental Impact Statement

EPA (2003) Advice notes on Current Practice (in the preparation of Environmental Impact Statements)

FTC (2000). *EIA for Beaumont Quarry Restoration*. Prepared for Cork City Council.

Hayden, T. and Harrington, R. (2000). *Exploring Irish Mammals*. NPWS, Dublin.

JNCC (2004). *Common Standards Monitoring Guidance for Mammals*. JNCC, ISSN 1743-8160 (online).

Lawrence, M.J. & Brown, R.W. (1973). *Mammals of Britain: Their tracks, trails and signs*. Blandford Press, Dorset.

NRA (2004). Guidelines for the treatment of badgers prior to the construction of national road schemes.
www.nra.ie/publicationsresources/downloadabledocumentation/environment/file.1489.en.pdf

O'Teangana, D., Reilly, S., Montgomery, W.I. & Rochford, J. (2000). Distribution and status of the red squirrel (*Sciurus vulgaris*) and grey squirrel (*Sciurus carolinensis*) in Ireland. *Mammal Review*, **30** (1), 45-55.

Sargent, G. & Morris, P. (2003). *How to find and identify mammals*. The Mammal Society, London.

Smal, C. (1995). *The Badger and Habitat Survey of Ireland*. Government Publications Office, Dublin.

Tupinier, Y. (1997). *European Bats: their world of sound*. Soc. Linnéenne de Lyon, Lyon.

Whilde, A. (1993). *Threatened mammals, birds, amphibians and fish in Ireland*. *Irish Red Data Book 2: Vertebrates*. HMSO, Belfast.

Bibby, C.J., Burgess, N.D. & Hill, D.A. (1992). *Bird census techniques*. Academic Press Ltd., London.

California Energy Commission. (1995). Avian collision and electrocution: an annotated bibliography. Internet edition. California Energy Commission, Sacramento.

Gibbons, D.W., Reid, J.B., & Chapman, R.A. (1993). *The new atlas of breeding birds in Britain and Ireland: 1988-1991*. T. & A.D. Poyser, London.

Jonsson, L. (1996). *Birds of Europe*. A&C Black, London.

Lack, P. (1986). *The atlas of wintering birds in Britain and Ireland*. Calton, London.

Negro, J.J. & Ferrer, M. (1995). Mitigating measures to reduce electrocution of birds on power lines: a comment on Bevanger's review. *Ibis* 137: 423-424.

Newton, S., Donaghy A., Allen, D. & Gibbons, D. (1999). Birds of Conservation Concern in Ireland. *Irish Birds*, 6: 333-342.

S.I. No. 600 of 2001 - Planning and Development Regulations, 2001