

ENVIRONMENTAL IMPACT STATEMENT

Volume 1

For the Proposed Construction Demolition & Excavation Waste Recovery Facility

At
Wallingstown & Inchera
Little Island
Cork



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1.0 INTRODUCTION

1.1 General

Golder Associates Ireland (Golder) has been retained by Thornbush Holdings Ltd. (Thornbush), to submit a planning application to Cork County Council (CCC) for a proposed development comprising a Construction Demolition & Excavation Waste Recovery Facility (C,D&E Facility), located in the townlands of Wallingstown and Inchera, Little Island, Co. Cork. The proposed C,D&E Facility will be designed and operated to accept, handle and process up to 300,000 tonnes of mainly clean/inert (non hazardous) construction, demolition and excavation wastes per annum (C,D&E wastes). The site location is depicted in Figure 1.1.

The proposed C,D&E Facility will be located on a ca. 2.2 ha site (the Application Site) in the north-western corner of a ca. 29 ha 'brownfield' site that includes waste lagoons, unfilled ponds and vacant lands (the Thornbush Site). Development of the Thornbush Site was undertaken by Mitsui Denman and involved the construction of large artificial lagoons to facilitate waste material from its adjacent industrial plant. The proposed C,D&E Facility, if granted planning permission, will ensure compliance with existing Planning and Licensing consents for the former Mitsui Denman electrolytic plant at Wallingstown, Little Island. The Planning Permission (PP) (Planning Ref: 1466/73) for the development by Mitsui Denman (Ireland) Limited, which was granted in 1973 set conditions for environmental control and restoration of the site. In 1999 the Environmental Protection Agency (EPA) granted an Integrated Pollution Prevention Control (IPPC) Licence (Reference No. P0389-01) to Mitsui Denman for the facility with requirements for a residuals waste management plan and restoration of the IPPC licensed site which includes the Application Site. The purpose of the proposed C,D&E Facility is to provide the necessary engineering materials to restore the existing waste lagoons and other lands lying within the current IPPC site boundary to comply with conditions in the existing planning permission and IPPC licence and in any future waste licence granted by the EPA.

1.2 Overview of the Proposed Development

The objective of the proposed C,D&E Facility is to process C,D&E wastes to produce inert engineering material for the restoration of waste lagoons that are within an IPPC licensed site (No. P0389-01) at Little Island. The Application Site for the proposed C,D&E Facility is within the IPPC licence boundary/Thornbush Site as shown on Figure 1.2. The Application Site is located mainly on part of the waste lagoons, known as Cell 8, which is being capped with processed clean imported granular (hard core) materials as agreed by the EPA in October 2007. The location of proposed development, in relation to Little Island, the N8 and the N25 is also shown on Figure 1.1.

The restoration of the circa 22.4 ha of lagoons within the Thornbush Site, which are outside the boundary of the Application Site will involve filling in lagoons / ponds and covering the waste with inert secondary fill materials 2 metres (m) thick on average. Upon completion of the restoration, of the lagoons / ponds outside the C,D&E Facility site boundary, additional inert restoration materials will be placed on the C,D&E Facility site to complete its restoration. This circa 2 m thick layer on the waste will create a firm platform where appropriate for the future beneficial redevelopment and construction of the site, as well as providing a clean barrier between the underlying waste and future uses of the Site.

The restoration of vacant brownfield industrial sites such as the Thornbush Site represents a particular challenge for national and regional policymakers. The restoration of the site will be beneficial to environmental regulators, planning authorities, local communities and the local economy at large. In this regard the restoration project supports European strategies and programs for derelict land reclamation and economic revitalization.

The materials to be processed at the proposed C,D&E Facility will be sourced from wastes generated by construction, demolition and excavation projects in the greater Cork area. All incoming material will undergo rigorous control procedures to ensure that it can produce a high quality product using simple separation and screening and crushing processes. The final product must conform with approved engineering and environmental standards in order that it is useful for restoration purposes. The intention is to accept predominantly clean inert C,D&E wastes that contain a low percentage of un-useable material in regard to the restoration of the lagoons. The small quantities of the recoverable and non recoverable non inert materials that are not required for restoration purposes on the Thornbush Site (such as spurious amounts of wood, plastics, metals etc that are not removed from the C,D& E wastes at the source) will be separated out and removed at the proposed C,D&E Facility to be recovered/recycled or disposed by authorised and approved waste management contractors at appropriately authorised waste management facilities.

It is estimated that approximately 700,000m³ of inert material will be required for the proper capping and restoration of the Thornbush Site and the lifetime and operation of the proposed C,D&E Facility will be directly related to the requirements of the restoration project. A 10-year life has been approximated to account for the potential cyclical or sporadic nature of obtaining suitable material.

It is also anticipated that the proposed Facility will contribute to the overall waste management structure of the greater Cork area by providing a suitable outlet for C,D&E wastes. The proposed development is in keeping with national and regional waste management policies and will assist in the achievement C&D waste recovery targets.

1.3 Legislative Requirement for EIS

The development is not a scheduled development requiring an Environmental Impact Statement (EIS) as per the requirements set out in Schedule 5 of the Planning and Development Regulations, 2001 and 2006).

The developer previously sought planning permission for the proposed development on adjacent lands (Planning Ref: 05/5618) and submitted as supplementary information a detailed environmental report. Subsequently the Planning Authority considered that the proposed development required an EIS under sub threshold article 103 of the 2001 Planning and Development Regulations.

It is in this context that an EIS has been prepared (i.e. this Report) by Golder on behalf of Thornbush to accompany the planning application for the C,D&E Facility.

The format and content of the EIS is in accordance with the requirements set out in accordance with the Local Government (Planning and Development) Regulations 2001 and 2006 (SI No. 600 of 2001; SI No. 685 of 2006).

This EIS provides the community, government, non-government bodies and other interested parties with information regarding the existing environment, potential impacts associated with the proposed development during the construction and operation phases and any mitigation measures required to ameliorate these impacts.

1.4 Planning Context

1.4.1 Site History

The Thornbush Site, inclusive of the Application Site, was formerly used by Mitsui Denman (Ireland) Limited, a subsidiary of the Mitsui Mining and Smelting Co. Ltd, Tokyo Japan. Mitsui Mining and Smelting Company began producing Electrolytic Manganese Dioxide (EMD), for use in the manufacture of dry cell batteries in Wallingstown, Little Island, Co. Cork in 1973 (Planning Ref: 1466/73). The production of EMD commenced in early 1976 and continued until the facility closed in 2003. The Mitsui Denman (Ireland) Limited facility previously encompassed approximately 40 ha of land of which approximately 24 ha were utilised for waste management activities, with the remaining lands utilised for manufacturing, production, office facilities, landscaping and ancillary infrastructure.

Post closure Mitsui Denman commissioned O'Callaghan Moran & Associates to undertake an exit audit of the facility. This report was submitted to the EPA in December 2003. The scope of the exit audit was to identify all environmental liabilities and remediation issues, undertake an independent exit audit identifying the decommissioning, rendering safe or removal for disposal/recovery, of any soil, subsoil's, buildings, plant or equipment, or any waste materials

or substances or any other matter contained therein or thereon, that may result in environmental pollution.

In January 2004 the EPA independently undertook an exit audit of the site excluding the waste lagoon area. In March 2004, the EPA confirmed that the Exit Audit was to their satisfaction. At this time Thornbush purchased the entire site from Mitsui Denman (Ireland) Limited. The IPPC Licence No. P0389-01 was transferred to the name of Thornbush in March 2004. Decommissioning of the manufacturing/production facility and associated lands (excluding the waste lagoons) commenced in 2004 and was completed in 2006.

In February 2007 the EPA accepted a boundary revision to exclude lands outside the waste lagoons from licensable activities. These lands were subsequently purchased by Howard Holdings PLC. The remainder of the former Mitsui Denman site, comprising mainly waste lagoons and ponds, continues to be owned and managed by Thornbush under the existing IPPC licence.

The waste lagoons remain classed as a landfill and require capping/restoration under the IPPC licence and existing planning permission (Planning Ref: 1466/73). As per accepted best practice the capping system is to provide engineering and restoration layers consistent with environmental management and the beneficial after-use of the facility.

1.4.2 Recent planning and development associated with the front part of the former Mitsui Denman Site

In 2005 Thornbush applied for planning permission to develop the former manufacturing/production facility site as an enterprise and business park (Planning Ref: 05/7800). The proposed development, which was the subject of that application was for Phase 1 of a 'Masterplan' for the entire former Mitsui Denman Site.

Thornbush was issued a notification of a decision to grant Planning Permission by Cork County Council. There was one appellant to the proposed development. On appeal the An Bord Pleanála Inspector recommended a Grant of Permission, however, the inspector's recommendation was not accepted by the Board and planning permission was refused.

In deciding not to grant permission for the development An Bord Pleanála was of the opinion that the proposed development of 11.25 ha was close to the threshold of 15 ha, as set out in Schedule 5, Part 2 - Class 10(a) of the Planning and Development Regulations, 2001 as prescribed development that is subject to environmental impact assessment and mandatory submission of an EIS with the planning application. While acknowledging that the developer did submit a detailed environmental report, An Bord Pleanála was of the opinion that the cumulative impact of the development with other proposed development in the vicinity must be considered, therefore requiring a full environmental impact assessment (and EIS) of the project.

One can conclude that An Bord Pleanála were of the opinion that the proposed development must be examined in association with further planning applications that may be made as part of the proposed site, taking into consideration the overall former conceptual master plan and previous development objectives of the site owners.

The lands associated with the previous planning application are no longer in the ownership of Thornbush and the conceptual master plan developed by Thornbush is no longer relevant or viable.

1.4.3 Planning on lands adjacent to the former Mitsui Denman site and associated with the restoration of the Mitsui Denman waste lagoons

Thornbush previously sought in 2005, through its subsidiary company Recycled Aggregates Ltd, planning permission (Planning Ref: 05/5616) to develop and operate a C,D&E waste recovery facility on lands, adjacent and to the south east of, the existing waste lagoons at Wallingstown, to provide recovered inert C,D&E materials to cap the waste lagoons. A third party lease was secured for these adjacent lands (2.59 ha) at Wallingstown, Little Island. The location of the proposed site was selected as it was considered to be the most suitable location for the proposed development at that time, taking into consideration the following:

- Development constraints associated with the un-restored former Mitsui Denman waste lagoons; and
- Legal and licensing restrictions associated with the IPPC licensed site where the principal activity had ceased.

There was one appellant to the proposed development (Planning Ref: 05/5616). The Planning Authority refused planning for the proposed development having regard to the An Bord Pleanála decision and grounds for refusal to grant planning for the proposed 'Phase 1' development on the former Mitsui Denman Site (Planning Ref: 05/7800).

In consideration of the decision of the planning authority and noting the considered opinion of the Planning Authority on the suitability of the proposed site location, Recycled Aggregates surrendered the lease for these lands in 2006 and no longer has any material or financial interests in these lands.

1.4.4 The Current Planning Application

Thornbush have sought to facilitate the concerns of the Planning Authority and revise, in agreement with the EPA, the restoration plan for the waste lagoons. A key concern of the Planning Authority was the location for the proposed C,D&E Facility. The planning authority determined that, subject to the decision of An Bord Pleanála to refuse planning permission for other developments in the northern part of the former Mitsui Denman Site (Planning Ref.

05/7800), the lands to the north could be considered further as a possible alternative site for the proposed C,D&E Facility within the context of the overall Mitsui Denman site. Furthermore the Planning Authority sought further information regarding the suitability of locating the proposed C,D&E Facility within the boundary of the remaining IPPC licensed site.

The lands associated with the previous planning applications (Planning Ref: 05/7800 and Planning Ref: 05/5616) are no longer in the ownership or control of Thornbush and are subject to separate planning applications of which Thornbush are not party to. Thornbush cannot therefore propose either site as alternative site locations for the proposed C,D&E waste recovery facility.

For the purposes of restoration, to minimise the environmental impacts of the proposed development that is the subject of this EIS, and in the interests of sustainable development it is considered essential to locate the C,D&E Facility in proximity to the waste lagoons. However, it is noted that the EPA informed the Planning Authority in previous correspondence that *"it is not possible to review the licence for a ceased activity to introduce new associated operations"*. Consequently under the terms of the existing IPPC licence the proposed C,D&E Facility could not be located within the IPPC licence boundary. This was a critical factor in the Recycled Aggregates Ltd proposed development (Planning Ref: 05/5616) not being located on the IPPC licensed site and the planning application being refused in 2006.

The principal changes to the situation since the Recycled Aggregates planning application is that Thornbush had the boundary of the IPPC licence amended to exclude the original manufacturing plant facilities area in the northern part of the site. The north part of the site has been sold and the lands to the south east are no longer under lease. As a consequence Thornbush has modified the Recycled Aggregates proposal and now seek to locate the proposed C,D&E Facility on a ca. 2.2 ha Application Site in the north west part of the IPPC licensed Thornbush Site (see Figures 1.2, and 1.3). Thornbush met with the EPA on the 9th of October 2007 to review the restoration plan for the site and to discuss the proposal of locating the proposed C,D&E Facility within the existing IPPC licence boundary. Thornbush was informed by the EPA that such a development can be facilitated within a capped/restored area of the waste lagoons subject to Thornbush surrendering its current IPPC licence while at the same time securing from the EPA a Waste Licence to (i) operate a C,D&E Facility on the existing IPPC site; and (ii) complete the required restoration of waste lagoons, as required by the current IPPC licence. It was agreed with the EPA that considering the planning history for the proposed development that this proposal was the most appropriate for the restoration of the waste lagoons/ponds.

This proposal would be subject to planning and development controls and dependent on Thornbush obtaining planning permission for access to the site from along the R623 with a

new site entrance (thereby facilitating the movement of material for restoration/capping onto the site) and for ancillary infrastructure for the C,D&E Facility.

The EPA are supportive of this proposal and have consented that Thornbush can commence restoration of the Thornbush Site to facilitate locating the proposed C,D&E Facility within the existing IPPC licensed boundary and subject to Thornbush applying for a Waste Licence to replace the existing IPPC licence for the facility. The EPA will remain the Regulatory Authority with responsibility for licensing, environmental management and site restoration activities.

1.4.5 Outline of the programme for implementation of the restoration plan

It is proposed that the most suitable location for the proposed C,D&E Facility is on Cell 8 of the waste lagoons. This area is currently being restored to the extent required to function as a facility to recover C,D&E wastes. It is noted that a Waste Licence would include, in addition to the operation, management monitoring, decommissioning and closure of the C,D&E Facility, restoration of the lagoons. Thornbush have appointed Golder Associates (UK) Ltd. to commence site restoration activities that will facilitate the restoration of an area of the site for locating the proposed C,D&E Facility within the existing IPPC boundary.

It is envisaged that the sequence of activities will be as follows:

- Complete capping/restoration of the ca. 2.2 ha Application Site, in accordance with plans prepared by Golder Associates (UK) Ltd.;
- Apply for planning permission for a new site entrance and associated development infrastructure for the proposed C,D&E Facility on the ca. 2.2ha Application Site;
- Concurrently apply for waste licence to the EPA to operate a C,D&E Facility on the restored lands; the licence will include restoration and monitoring activities for the remainder of the Thornbush Site;
- Surrender the existing IPPC licence on obtaining the new waste licence and planning permission; and
- Upon grant of planning permission and development of the C,D&E Facility commence site restoration of the IPPC Site.

Thornbush wish to emphasise that their interest and legal obligations pertaining to these lands are to ensure satisfactory capping/restoration and closure of the ca. 24 ha. waste lagoons / ponds, which includes the Application Site, and subsequent closure and surrender of licence. It is important to note that it will be necessary to restore the entire Thornbush Site

including the lagoon / pond areas to the satisfaction of the EPA before the licence can be surrendered. This process is expected to take in the region of 10 years.

1.5 Alternative Locations

Due to its excellent accessibility to the Port of Cork and to the national road and rail networks, Little Island is considered to be a strategic industrial location, which is particularly suitable for the logistics sector. These location advantages would also make the area very suitable for a C,D&E Facility. The planning authority recognises the need to develop waste management infrastructure and encourages the clustering of such activities in Ringaskiddy and Little Island where there are already a number of similar installations and existing or proposed waste processing facilities.

Principal criteria for suitable site selection for location of a C,D&E waste recovery operation include proximity to major communication corridors, transport network, availability of land, land zoning, location of site in relation to environmental sensitive areas and proximity to potential outlets for recovered/recycled products. The proposed site fulfils all such criteria:

- Proximity to National Primary and Secondary routes;
- Established industrial zoned site;
- Waste recovery requirement to cap existing lagoons;
- Proximity to the lagoons requiring restoration site;
- Proximity to sources of C,D&E waste material;
- Greater than 500m from the nearest residential receptors; and
- Suitable infrastructure near the site.

Given the planning history outlined in Section 1.4 and the taking into consideration the views of the Planning Authority, the only remaining option available to Thornbush for the location of the C,D&E Facility, which will meet the criteria listed above, is within the waste lagoon area. The north-western part of the lagoons has been selected because of its proximity to the available road and services infrastructure.

1.6 Seveso Sites

The Application Site is located in proximity to a number of Seveso Sites (Seveso II Directive 96/082/EEC). These are located in the industrial lands to the north of the Application Site and are as follows:

- Pfizer Ireland Ltd “Lower Tier” Seveso Site;
- Pfizer (Cork) formerly Pharmacia “Lower Tier” Seveso Site; and
- Cognis “Top Tier” Seveso Site.

Three Seveso Sites located to the east of the Thornbush Site, BOC Gasses, Janssen Pharmaceutical and Corden Pharmaceutical have been delisted.

In 2003 the Health and Safety Authority (HSA) provided the Planning Authority with Land Use Planning (LUP) advice for the Pfizer site (formerly the Pharmacia Ireland site). Noting that all relevant risks are largely contained within the boundary of the former Pharmacia site, with some off-site impact on lands immediately to the north of the former Pharmacia site. These contours have a maximum diameter of approximately 200m. Both the HSA and Cork County Council advise that this LUP advice is the most up to date available. While LUP information is available for the remaining two Seveso Sites, it is noted that the Application Site is approximately 300m from the closest risk contours nearest of any Seveso Site. It is considered therefore that the potential impacts from listed Seveso sites are negligible. Furthermore the operations associated with the proposed C,D&E Facility will involve a minimal number of operational personnel, while restoration activities are a permitted development and not regarded as a risk factor.

Notwithstanding this, it is noted in the Draft County Development Plan 2007 under Objective ECON 3-9 that the council will consult with the Health and Safety Authority regarding proposed developments adjacent to existing Seveso-listed establishments.

1.7 Relevant National Plans, Policies and Reports

1.7.1 National Waste Management Policy

As a Member State of the European Union (EU), Ireland’s most significant waste policies were drawn up in the 1990’s and were derived from laws, policies and strategies adopted by the EU. The foundation of EU waste management policy (Waste Framework Directive 75/442/EEC) is the Waste Management Hierarchy and states that the prevention and reduction of waste production is the most preferable option, however, if waste is produced inescapably, then re-use, recovery and recycling are necessary. Disposal is the least favoured waste management option. The Proximity Principle is one of the founding principles in this Directive and based on this waste should be handled as close to where it was generated as possible. This will aid in establishing sufficient infrastructure and disposal facilities in all areas.

The 1996 Waste Management Act, the 2001 Waste Management (Amendment) Act, and the Protection of the Environment Act, 2003 are the primary legislative instruments that govern

the recovery and disposal of waste in Ireland. The Acts and subordinate Regulations enable the transposition of existing and future European Union Policy and/or Directives on waste management into Irish law. The Acts, most recently The Protection of the Environment Act 2003, places the responsibility on each local authority to formulate a Waste Management Plan according to the Waste Management (Planning) Regulations, SI No. 137 of 1997.

Waste management policy is set by the Government and is detailed in a set of three policy documents produced since 1998:

- Changing Our Ways, 1998;
- Delivering Change – Preventing and Recycling Waste 2002; and
- Waste Management – Taking stock and moving forward 2004.

‘Changing Our Ways’ now forms the cornerstone of all waste management planning in Ireland. This document established national targets for recovery, recycling and diversion from landfill. ‘Delivering Change - Preventing and Recycling Waste: 2002-’ highlights the most important waste management practices from the Waste Management Hierarchy - prevention, re-use and recycling.

In the Policy document ‘Changing our Ways’, the Construction industry is charged with the primary responsibility of ensuring environmentally sound management of C&D wastes. The main target for C&D waste is set forth in ‘Changing our Ways’ as:

“Put in place an effective system to ensure that the recycling targets for Construction and Demolition Waste, of 50% by 2003 and 85% by 2013, are met by the construction industry”

The Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects were published by the Minister for the Environment, Heritage and Local Government in 2006 (DoEHLG, 2006). The purpose of these Guidelines is to promote an integrated approach to construction and demolition waste management throughout the duration of a project. They are designed to promote sustainable development, environmental protection and optimum use of resources. The Guidelines introduce the concept of project based waste management planning for construction and demolition waste. On foot of a recommendation made in the EPA publication, “The Nature and Extent of Unauthorised Waste Activity in Ireland (2005)”, the Guidelines were given a statutory footing by the Development Management Guidelines (Planning Guidelines 13: Development management – Guidelines for Planning Authorities) issued by the Minister for the Environment, Heritage and Local Government in 2007 under Section 28 of the Planning and Development Act 2000. Planning authorities must have regard to guidelines issued under Section 28 in performance of their functions under the Act. It is recommended that the waste management plans prepared under these guidelines be considered by the construction and demolition industry as a

potential source of data on the generation and management of construction and demolition waste.

The guidelines (DoEHLG, 2006) recommend the C&D waste management plans be prepared for projects in excess of any of the following thresholds:

- New residential development of 10 houses or more;
- New developments, other than (1) above, with an aggregate floor-area in excess of 1,250m²;
- Demolition/renovation/refurbishment projects generating in excess of 100m³ of C&D waste; and
- Civil Engineering projects producing in excess of 500m³ of waste, excluding waste materials used for development works on the site.

The challenge for the industry set forth in Changing our Ways is reiterated in the guidelines (DoEHLG, 2006) with recycling/reuse/recovery of waste identified as essential for waste management issues:

"The recycling of C&D waste is essential in order to reduce our dependency on finite natural resources such as geological and energy reserves."

1.7.2 National Waste Report 2006

The EPA National Waste Report 2006 (published January 2008) states that in terms of the National Waste Profile, the construction and demolition sector is now the predominant waste generator, with construction and demolition waste now accounting for over half of all wastes generated, up from 45% in 2004.

The total quantity of construction and demolition waste collected in 2006, based on data reported to local authorities by the waste industry, is estimated at 16,819,904 tonnes, a 13% increase since 2005. A reported 13,365,880 tonnes was recovered and 442,567 tonnes disposed at authorised waste licensed and waste permitted facilities. It is noted that the resulting discrepancy of 3,011,457 tonnes reflects a lack of attention being paid by operators in the waste industry to the importance of accurate and timely data. Data reporting is highlighted as a serious issue in this report for the construction and demolition sector.

1.7.3 Other National Strategies/Initiatives

The National Spatial Strategy (NSS) proposes a more balanced pattern of spatial development for the state as a whole, based on continued growth in Greater Dublin but with a significant

improvement in the rate of development in nine 'Gateway' cities and nine 'Hub' towns. The strategy emphasises the critical role of 'Gateways' and 'Hubs' in delivering future economic growth and designates Cork as a 'Gateway' City and Mallow as a 'Hub' town.

The Atlantic Gateways Initiative, is a Government initiative, augmenting the National Spatial Strategy, aimed to co-ordinate and focus development and infrastructure provision in a corridor linking the 'Gateway' cities of Galway, Limerick, Cork and Waterford, and, together with the 'Hub' towns, develop a critical-mass of population capable of competing with the Greater Dublin Region for future investment and delivering an appropriate balance in the delivery of jobs, services and opportunities between Dublin and the regions.

1.8 Regional Plans and Policies

1.8.1 Cork County Development Plan 2003-2009

The current Development Plan for Cork County is for the period 2003 to 2009.

The Cork County Development Plan (CCDP) 2003 main requirements incorporate:

- Proper planning and sustainable development;
- Consistent as far as possible with National Plans, Strategies and Policies which relate to proper planning and sustainable development; and
- Include objectives for the conservation and protection of the environment.

The overall strategy of the CCDP is largely determined by medium term considerations in the Cork Area Strategic Plan 2001-2020 (CASP). This is a 20 year plan for the city and its suburbs, the surrounding satellite towns, the harbour area, and rural areas outside of the city (see Section 1.8.3 and Figure 1.4)

The proposed development has been planned with due consideration to the CCDP requirements. The Application Site is located adjacent to Cork City and National Routes (N8, N25) and in a site zoned Primarily Industry/Enterprise.

Strategic Industrial Area

The CCDP classifies Little Island as Strategic Industrial Area.

The Role of the Strategic Industrial Areas are stated as being:

“(a) It is an objective to recognise, as special parts of the settlement network, those established settlements which, because of their strategic locations, have evolved as important locations for industrial development, employment and economic activity.

(b) It is an objective to safeguard these strategic industrial locations and to avoid the use of inappropriate zonings or land use policies that would undermine their suitability for important strategic industrial uses”

Strategic aims for the Little Island settlement area are:

“Re-affirmation as a strategic industrial location, promotion of its potential for strategic distribution and logistics development. Limited expansion of its residential role while improving amenities of existing residential areas.”

The proposed development is in keeping with these aims and objectives.

Industry and Enterprise Development

General objectives of the CCDP (ECO 2-1 and ECO 2-2) relating to industry and enterprise indicate the importance of zoning suitable land for large scale industrial development and for distribution industry development at Little Island. Little Island is an area identified to be the main focus for industrial and enterprise development in the Blarney Electoral Area (Blarney Electoral Area Local Plan, September 2005).

The proposed C,D&E Facility at Wallingstown seeks to provide materials for the restoration of the IPPC licensed site. This project will, in the long term, provide Little Island with further development potential through the recovery of the former lagoon areas to lands suitable for return to industrial, commercial, residential or amenity use.

Similarly, a number of objectives with regard to appropriate uses for industry and enterprise areas are set out which include the following (ZON 3-13):

“To promote the development of Industrial areas as the primary locations for uses including manufacturing, repairs, warehousing, distribution, open-storage, waste materials treatment and recovery, and transport operating centres.”

Waste Recovery

With respect to Waste Recovery and Recycling, the CCDP (INF 3-1) states that:

“It is an objective to implement the provisions of the County Council’s approved Waste Management Plan and in particular, to promote the development of facilities for the prevention, minimisation, re-use/recycling or disposal with energy recovery of waste material”

The proposed development is a C,D&E Facility which clearly meets this objective.

Brownfield Sites

The CCDP exhibits a commitment to the restoration of such 'Brownfield lands' through policy objective ZON 2-4:

"It is an objective actively to seek and promote a significant proportion of development within the lifetime of this plan to occur on Brownfield Lands"

The proposed development is in keeping with this objective by restoration of a strategically located Brownfield site.

The 'strategic development principles' for land use and zoning include:

"Encouraging development in established areas, and the re-development of land that has been previously used, will help to re-vitalise areas, will be more sustainable and will help to prevent unnecessary encroachment onto finite green field land"

Specific Little Island Zoning Objectives

The site of the proposed development is zoned Primarily Industry/Enterprise. Little Island is designated a "strategic industrial area" in the County Development Plan (Settlement 18). The economic importance of developing the areas set aside for industry whilst protecting the amenities of the local community is considered an important planning issue for Little Island.

A specific objective of note within the County Development Plan is for the provision for a public walkway along the waterfront (U-04), directly to the west of the Application Site (CCDP Zoning Map 18: Little Island):

"Provide and maintain pedestrian walkway along shoreline to connect with open space (O-02)."

The map used to draft this walkway predates the sale of lands connecting the waterfront to the former Mitsui Denman site. The lands divided by the walkway were purchased by Mitsui Denman in 2000 from the IDA and developed into additional waste cells and are therefore part of the site now governed by an IPPC licence from the EPA. An existing right of way provides access from the public road to a grotto feature within the site of the IPPC licence but outside the outer embankment and security fence surrounding the waste cells. This right of way remains unchanged. Restoration of the waste lagoons in order to comply with the existing planning permission and IPPC licence requirements does not preclude future development of a walkway at this location. In this context, the proposed C,D&E Facility represents a means by which the long-term visual and amenity value of the area can be addressed through the provision of a means to recover a degraded area.

Cork County Development Plan 2003-2009: Summary

The proposed development is in keeping with these objectives since it seeks to restore an industrial Brownfield site and provide Little Island with further development potential. In addition the proposed development will support both the Planning Authority and waste contractors in the construction industry in providing a much needed outlet for the inert waste generated by other development projects.

1.8.2 Draft Cork County Development Plan 2009-2015

A public draft of the County Development Plan for 2009-2015 (dated December 2007) has recently been made available. This plan seeks to maintain and enhance the implementation of the strategies that were developed in the County Development Plan 2003.

Some minor changes in terminology are noted, however, the objectives noted above have not changed significantly. 'Strategic Industrial Areas' are being referred to as 'Strategic Employment Areas' in the new draft plan, however it is noted that "*strategic employment centres are those that are strategic locations for large scale industry*".

SET 1-37 states that:

"It is an objective of this Plan to consolidate the development of Little Island as a strategic employment centre"

Development Plan Objectives for strategic employment centres in County Metropolitan Strategic Planning Area include ECON 2-2:

"It is an objective to promote the development of Ringaskiddy, Little Island, Carrigtwohill and Kilbarry as Strategic Employment Centres, which will be the primary locations for large scale industrial development."

Development Plan objectives with respect to locations for large-scale industrial development include ECON 3-2:

"It is an objective to ensure that sufficient and suitable land is zoned for large-scale and general industry (including development to meet the likely needs of the chemical, pharmaceutical and oil refining sectors) at the major employment centres of Ringaskiddy, Whitegate, Carrigtwohill, Kilbarry and Little Island. Such land will, normally, be protected from inappropriate development that would prejudice its long-term development for these uses."

The main issues to be addressed in the Local Area Plan for the Blarney electoral area include:

“Develop the North Environs and Little Island as a focus for employment and economic growth.”

Development Plan Objectives relating to Brownfield sites include ECO 3-10 ‘Employment Potential of Brownfield Sites’

“It is an objective to recognise the employment potential of Brownfield sites in both urban and rural areas in the County and their contribution to a more sustainable pattern of development.”

Development plan objectives for waste include INF 6-1 which relates to the waste management plan:

“It is an objective to implement and support the provisions of the County Council’s approved Waste Management Plan and in particular, to promote the development of facilities for the prevention, minimisation, re-use/ re-cycling or disposal with energy recovery of waste material.”

As noted these policies all reflect those outlined in the 2003-2009 CCDP detailed in the previous section. The proposed development therefore remains in-keeping with the policies and strategies of the Draft 2007 CCDP.

1.8.3 Cork Area Strategic Plan (CASP)

The Cork Area Strategic Plan 2001-2020 (CASP) is a 20 year plan for Cork city and its suburbs, the surrounding satellite towns, the harbour area, and rural areas outside of the city. The CASP area is made up of Metropolitan Cork, the Mallow Hub, the ring towns and their rural hinterlands (Figure 1.4). Metropolitan Cork comprises the City and the area immediately surrounding it (including towns such as Midleton, Cobh, Ballincollig, Carrigaline, etc.). In addition to Mallow, the CASP ring towns include the settlements of Bandon, Fermoy, Kinsale, Macroom, and Youghal.

The CASP Plan is currently being updated to reflect the most recent population and economic targets for the region. This will develop a spatial distribution for additional population and employment/economic categories and areas.

As noted, the CASP plan has guided the policies and objectives of the County Development Plans for Cork. It is stated in the Draft 2007 CCDP that the policy and objectives of the plan for the CASP Ring Strategic Planning Area are based on the following planning and sustainable goals:

“To recognise the importance of the role to be played by Mallow as a ‘Hub’ town in the implementation of the National Spatial Strategy and the Atlantic Gateways Initiative; to

promote its development as a major centre of employment and population where there is a high standard access to educational and cultural facilities” and

“To establish an appropriate balance in the spatial distribution of future population growth, broadly in line with the Cork Area Strategic Plan, so that Bandon, Fermoy, Macroom and Youghal can accelerate their rate of growth and achieve a critical mass of population to enable them to maximise their potential to attract new investment in employment, services and public transport”.

The Draft 2007 CDP also includes a development objective for the role of CASP Ring towns - SET 1-16:

“It is an objective of this Plan to provide a better balance of development throughout the CASP area, by giving priority to the provision of infrastructure, to accelerate the rate of population and employment growth in the CASP Ring Towns so that they can fulfil their economic and employment potential as quality urban centres providing employment, shopping, services and public transport for their rural hinterland.”

1.8.4 Waste Management Plan for County Cork and Cork City

The Waste Management Plan for Cork County 2004 reinforces Cork County Council’s commitment to a system of waste management that will see the least amount of waste going to modern engineered landfills and that this will be achieved through the use of bring sites, civic amenity sites and material recovery and treatment facilities. The proposed facility supports the principles and objectives of the Waste Management Plan for Cork County, 2004.

The Waste Management Plan for Cork County 2004 also states that the plan is governed by governmental policy that must be strictly adhered to in local government waste management planning including:

- *The dramatic reduction in reliance on landfill in favour of an integrated waste management approach, utilising a range of treatment options to deliver ambitious recycling and recovery targets,*
- *Increased participation by the private sector in the provision of waste management services.*

The proposed facility is located in close proximity to Cork City. Therefore the waste management objectives of Cork City have also been considered.

The proposed C,D&E Facility by Thornbush at Wallingstown, Little Island is in keeping with the objectives of both Cork County and Cork City Waste Management Plans. The proposed facility endeavours to assist the Construction Industry, including commercial developers,

government agencies and local authorities, in achieving C&D waste recovery targets. Overall, the proposed development has the potential to provide the Cork area with a much needed facility to accommodate the volumes of waste currently being generated and to fill a large gap in the waste infrastructure of the region.

1.9 Need for the Facility

1.9.1 Existing Acceptors of C&D Waste in the Cork Region

The progress on diversion of C&D waste from landfill in the Cork area is reported in the Cork County Waste Management Plan 2004. In 2002, 81% of C&D waste was recovered, with 12,332 tonnes of the remaining waste being landfilled at Cork County Council landfills. Timbers, where feasible were composted and metals were exported for recycling.

A number of permitted and EPA licensed facilities in the city area currently take C&D waste. The majority of these facilities only accept small quantities of C&D waste. Youghal landfill continues to accept C&D waste on an intermittent basis from permitted builders. Formerly, the Kinsale Road landfill and Rossmore landfill were also C&D waste repositories, but these have now closed.

In January 2008, An Bord Pleanála granted permission for a development to restore the disused 'Beaumont Quarry' in Ballinlough, Co. Cork with inert waste. This will be a major acceptor of C&D waste however; this facility is set to close after 2 years of operation as it is intended to recover the former quarry to a public park.

Another restoration project, Ballygarvan Quarry, is permitted to take in a total of 300,000 tonnes of inert materials over the next 3 years (Waste Permit – CK (S) 463/07).

In addition to the county council facilities, a number of privately run facilities are operating in the county under waste licence from the EPA, some of which accept small quantities of C&D waste material (Table 1.1).

Table 1.1: Waste Licence Holders in Cork accepting C&D waste (Source: EPA waste licence database 2008)

Facility	Quantity of C&D waste accepted in tonnes per annum (tpa) where specified
Waste Recovery Services (Fermoy) Ltd	1800 tpa
Greenstar Recycling (Munster) Ltd	'small quantities' - not specified
Ashgrove Plant Waste Transfer Facility	25,000tpa
Veolia, Forge Hill, Kinsale Rd – Materials	4,000 tpa

Handling and Recycling Facility	
Ted O' Donoghue & Sons Ltd	ca. 7,500tpa

1.9.2 Estimates of C&D Waste in the Cork Region

There are a number of estimates regarding available construction and demolition waste arisings in the Cork region as summarised in Table 1.2 below.

Estimates of C&D waste arisings in 2001 and 2002 were 500,000 tonnes for Cork City and County (County Waste Management Plan). The 2001 figures were based on analyses in the Bacon Report 2001.

Table 1.2: Construction and Demolition Waste in the Cork Region (Source: Cork County Waste Management Plan)

REPORT	YEAR	REGION	C&D WASTE (TONNES)
EPA/NCDWC Reports	2001	Cork & Kerry Region	256,596*
CIT Study	1996	Cork Region	300,000 (550,000 by 2001)
Bacon Report	2001	Cork Region	500,000

- This is a regional application of the EPA 2001 National Waste Database figures for C&D waste and includes new construction, repair and maintenance waste only.

The Construction and Demolition Waste Council (NCDWC) was launched in 2002. Its objective is to facilitate the construction industry in meeting the target set in *Changing our Ways* (1998) of recycling at least 50% of C&D waste by 2003 with a progressive increase to at least 85% recycling by 2013. The NCDWC (Annual Report 2002-2003) estimates the quantity of C&D waste arising in different regions of the country. It estimates the quantity of C&D waste generated in the south-west region (Cork & Kerry) to be 256,596 tonnes; this figure relates to new construction, repair and maintenance waste only. The quantity arising increases to 456,528 tonnes when the estimated quantities of excavated soil and demolition waste are added. Other studies (e.g. Bacon Report, 2001) estimate the C&D arisings for the Cork region alone to be approximately 500,000 tonnes per annum.

At the time of writing, more recent figures relating to C&D waste generation in the Cork region were not available. More recent NCDWC reports have not provided detailed figures on a regional/county basis.

The Cork City Waste Plan 2004 notes that it is difficult to estimate the quantity of C&D waste arising in Cork City as the quantity arising varies enormously from year to year according to the scale and type of development taking place in the area. Cork City Council generally requires (through the planning process) that any new developments which involve demolition

of old buildings preferably crush and reuse the demolition waste on site or alternatively dispose of it to an approved facility. For the purpose of the Cork City Plan, it is estimated that 500,000 tonnes of construction and demolition waste arise in Cork City and County each year and it is assumed that approximately 200,000 tonnes of this total arises in Cork City.

1.9.3 Requirement of Planning and IPPC

As noted previously, planning permission (1466/73) for Mitsui Denman Ireland obtained in 1973 set conditions for environmental control and restoration of the site.

In addition, deposit of waste in lagoons constituted a waste activity connected to, and associated with, an IPPC activity; as such obligations under the Waste Framework Directive are addressed within the IPPC Licence No. 389. Consequently Thornbush are required to complete closure of the waste impoundment lagoons in accordance with the IPPC Licence for the facility.

The proposed C,D&E Facility will generate over its lifetime sufficient material for the proper capping and restoration of the lagoons. During the course of its operation, the proposed development will also contribute to the provision of suitable outlets for the management of C,D&E wastes generated in the Cork area.

It is important to note that where such a dedicated facility were not to be granted Planning Permission, the operational and logistical problems in restoring the waste lagoons area would have a significant impact on the ability of the site owners to restore these environmentally sensitive lands in compliance with the original planning permission and current IPPC licence.

1.9.4 Sources of C,D&E Wastes

1.9.4.1 CASP Area

Cork is the largest County in Ireland with a total area of 7,454 km² and a coastline of over 1,100 km. The 2006 Census records that the population of the County (including Cork City) was 481,295 persons. Since the previous census in 2002 the overall population of the County had grown by 33,466 persons or 7.5%. The most recent population targets issued by the Government suggest that the County (including Cork City) should plan for continued strong levels of population growth towards a target of 608,354 persons in the year 2020, an increase of 127,059 persons, or 26.4%, in addition to the number recorded in 2006.

The Draft Cork County Development Plan 2007 notes that future planning issues for Cork are likely to include:

“Significant future pressure for new growth in the ‘Gateway’, ‘Hub’ towns and generally within the Atlantic Gateway Corridor including it’s’ villages and rural areas”

These areas have developed considerably in the last decade and under the Cork Area Strategic Plan (CASP) 2001-2020 are scheduled for further growth and expansion. Construction developments of infrastructural projects, housing developments, commercial and industrial parks, and regeneration projects all create construction, demolition waste and excavation waste.

It is the intention of Thornbush Holdings to source most of the inert materials that are required to restore the site from Cork City and Environs. In keeping with the national spatial strategy, the Atlantic gateways initiative, the Cork County Development Plans, and given the projected population increase in the Cork area, it is anticipated that there will be sufficient material generated within Cork City area and environs to ensure sufficient volumes of C,D&E wastes are available for processing and reuse in the restoration of the waste lagoons. The focus on the CASP area is also in keeping with the 'proximity principle' with waste being managed as close to where it was generated as it possible.

1.9.4.2 Current Economic Outlook

DKM Economic Consultants published a report entitled 'Review of the Construction Industry 2006 and Outlook 2007–2009' in September 2007. They note that while there is likely to be a downward adjustment to a lower housing supply level in 2008, the easing back in terms of housing supply, together with more sustainable levels of prices and lending, should give rise to a more balanced and stable market over the medium-term. The base case projection for construction output forecasts a decline (-6.2%) in 2008, due to the decline in new housing output, followed by an increase of similar proportions (+6.2%) in 2009. They consider that recovery in 2009 reflects a stabilisation in housing output and an acceleration in the volume of construction output from civil engineering projects, most notably in public transport and airports.

The latest published ESRI Quarterly Economic Report (Spring 2008) also re-iterates that it has been evident for some time that 2008 was likely to be a year of slow economic growth. The note "*The leading indicators for house building that emerged last year suggested that this sector would contract in 2008.*" For 2009 they note that "*we expect a modest recovery...Against a background of an improving international climate and with the easing in the contraction in house building*".

As indicated by figures outlined in the latest published National Waste Report for 2006, by the EPA, the total quantity of C&D waste collected in 2006 nationally, based on data reported to local authorities by the waste industry is estimated at 16,819,904 tonnes, a 13% increase since 2005. This can be attributed to the boom in the construction sector in these years, both relating to residential and infrastructure projects. While at the time of writing, a slowdown in the construction sector was in progress, the current economic outlook appears to be for a more stable sector in the coming years.

1.9.4.3 Potential Sources

Typical sources of C&D waste are described in Table 1.3 below.

Developments considered to be potential sources of C,D&E material in the Cork area have been identified and are listed in Table 1.4. These consist of some developments which are still in the planning/appeals process, and others which have permission. Only large scale developments are listed comprising significant industrial developments, and residential developments consisting of greater than 100 houses. Of particular note is the proposed docklands development in Cork City which is likely to be a major generator of C,D&E waste requiring disposal and/or recovery in the coming years.

Table 1.3: Potential Sources of Construction & Demolition Waste

Type of site	Characteristics of site
“Demolish and clear” sites	Sites with structures or infrastructure to be demolished, but on which no new construction is planned in the short term
“Demolish, clear and build” sites	Sites with structures or infrastructure to be demolished prior to the erection of new ones
“Renovation” sites	Sites where the interior fittings are to be removed and replaced
“Greenfield” building sites	Undeveloped sites on which new structures or infrastructure are to be erected
“Road build” sites	Sites where a new road is to be constructed on a green field or rubble free base
“Road refurbishment” sites	Sites where an existing road is to be resurfaced or substantially rebuilt

1.9.5 Summary – Need for the Facility

There are a limited number of major acceptors of C,D&E waste in the Cork region. While two quarry restoration projects will require C,D&E material in the short-term, it is considered that a medium-term acceptor of C,D&E waste such as the proposed Facility will enable Cork County Council to fulfil its waste recovery objectives.

It is difficult to predict the quantity of C,D&E waste that will arise in the Cork region in the coming years, as the quantity arising varies enormously from year to year according to the scale and type of development taking place in the area. While up to date figures of C,D&E waste generation specifically for the Cork area are not available, it has been estimated previously (2001-2002) that 500,000 tonnes are likely to be generated in the Cork region. Given that this estimate was made prior to the construction boom, and considering the current ‘post-boom’ climate, it is likely that such a figure could be anticipated to be generated in the coming years. This can be justified based on the projected population growth within the CASP region, objectives for development in this region set out in the County Development Plans, and government commitments to development in the region such as the National

Spatial Strategy and the Atlantic Gateways Initiative. A 10-year life has been estimated for the proposed development to account for the potential cyclical or sporadic nature of obtaining suitable material.

Finally, it is noted that restoration of the Thornbush Site is a requirement of existing planning and licensing conditions, if sufficient C&D material is not available in the Cork region Thornbush may consider accepting waste from outside the region.

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Table 1.4: Illustrative Sources of Construction Demolition and Excavation Material

PLANNING FILE NUMBER	APPLICANT	PROPOSED DEVELOPMENT	PLANNING STATUS: CORK COUNTY/CITY COUNCIL	PLANNING STATUS: AN BORD PLEANALA
08/32919	Alleyquay Investments Ltd	Mixed use development in Cork Docklands including 564 residential units, retail units, office space, hotel and events arena	Lodged March 2008	
04/52053	Cobh Marina Developments	Mixed use residential and commercial development in Cobh including 150 apartments and a 200 berth marina	Granted with conditions.	Appealed – PL53.220852
06/13225	Amgen Limited	Biotechnology manufacturing facility, Ballyadam, Carrigtwohill, Co. Cork.	Granted with conditions.	Appealed – PL04.222364
06/13071	SMCMC Property Limited	Private Hospital in Garranedarragh, Bishopstown, Co. Cork	Granted with conditions.	Appealed – PL04.225202
06/10668	R Walsh	Development including 122 houses at Clashdermot East, Killeagh, Co. Cork	Conditional	Contribution Appeal Decided - PL04.224246
06/13608	O'Mahony Developments Ltd	Development including 256 houses and community centre at Johnstown, Killahora, Glounthaune, Co. Cork	Conditional	Grant permission with revised conditions - PL04.223799
06/6741	Fenton	Development including 42 warehouse units and 11 office buildings at Killacloyne, Carrigtwohill, Co. Cork	Conditional	Grant permission with conditions - - PL04.218710
07/11699	Prime Line Developments	Wallingstown, Little Island. Development of 3 light industrial warehouse units with office units and Block B, with 8 light industrial buildings or warehouse units and office units, and block c, a single light industrial / warehouse / distribution unit with office and ancillary works.	Granted	Granted permission 27/02/08
07/13099	Fota Business Park Partnership	Construction of office complex comprising 3 to five story blocks and provision of 275 basement car parking spaces and associated site development works.		

Source: Cork County Council Planning Enquiry Service, Cork City Council Planning Enquiry Service and An Bord Pleanala (www.pleanala.ie)

1.10 Structure of the EIS

The EIS is presented in the "Grouped Format Structure" as set down in the Environmental Protection Agency (EPA) publication – Guidelines on the Information to be contained in Environmental Impact Statements, March 2002. In general, it follows the framework presented in the EPA publication - Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements), September 2003.

The information to be contained in an EIS is specified in the Sixth Schedule of S.I. No. 600 of 2001. These EIA requirements derive from European Communities Directive 85/337/EEC (as amended by Directive 97/11/EC).

The EIS is presented in two volumes. Volume 1 of the EIS is made up of 14 no. sections including this section (1.0 - Introduction), with tables within each section, and figures and appendices at the end of each section where relevant. The Non Technical Summary appears at the front of Volume I. Volume II is composed of a number of appendix reports.

Each of the 12 no. sections of the EIS follows the same general format, as follows:

- an **Introduction** describing the purpose of the section;
- a description of the **Methodology** used in the section;
- a description of the aspects of the **Existing Environment** relevant to the environmental topic under consideration;
- an assessment of the **Impact** of the proposed development on the environmental topic;
- recommendations for **Mitigation** measures to avoid reduce and where possible remedy any significant negative impacts identified;
- an assessment of the **Residual Impact** which will remain assuming that the recommended mitigation measures are fully and successfully implemented.

The EIS is structured under the following subject headings

- Section 1.0 Introduction
- Section 2.0 Project Description
- Section 3.0 Traffic
- Section 4.0 Humans
- Section 5.0 Flora and Fauna
- Section 6.0 Soils and Geology
- Section 7.0 Water (Hydrology and Hydrogeology)

- Section 8.0 Climate
- Section 9.0 Air Quality
- Section 10.0 Noise
- Section 11.0 Landscape and Visual
- Section 12.0 Material Assets
- Section 13.0 Archaeology and Cultural Heritage
- Section 14.0 Interactions/Inter-Relationships

1.11 Consultations

A scoping document was forwarded to a number of consultees, as listed in Table 1.5. below. Responses from Cork County Council representatives were received at pre-planning meetings.

Table 1.5: Consultee List

ORGANISATION	CONTACT NAME (WHERE RELEVANT)
Cork County Council Planning Dept	Pio Condon Pat Lyons
Cork County Council Environmental Dept	Jean Sayers (Waste)
Cork County Council Roads Dept	Derry Sullivan Eileen Coleman (Traffic)
Cork County Council Heritage Dept	Catherine Power (Archaeology) Sharon Casey (Heritage Officer)
Cork County Council – Glashboy Waterworks	David O’Keefe John Slattery
National Roads Authority (NRA)	
Environmental Protection Agency	Dr. Jonathan Derham Peter Cunningham
National Parks & Wildlife Service (NPWS) - Development Applications Unit	
Little Island Residents Association	

1.12 Team

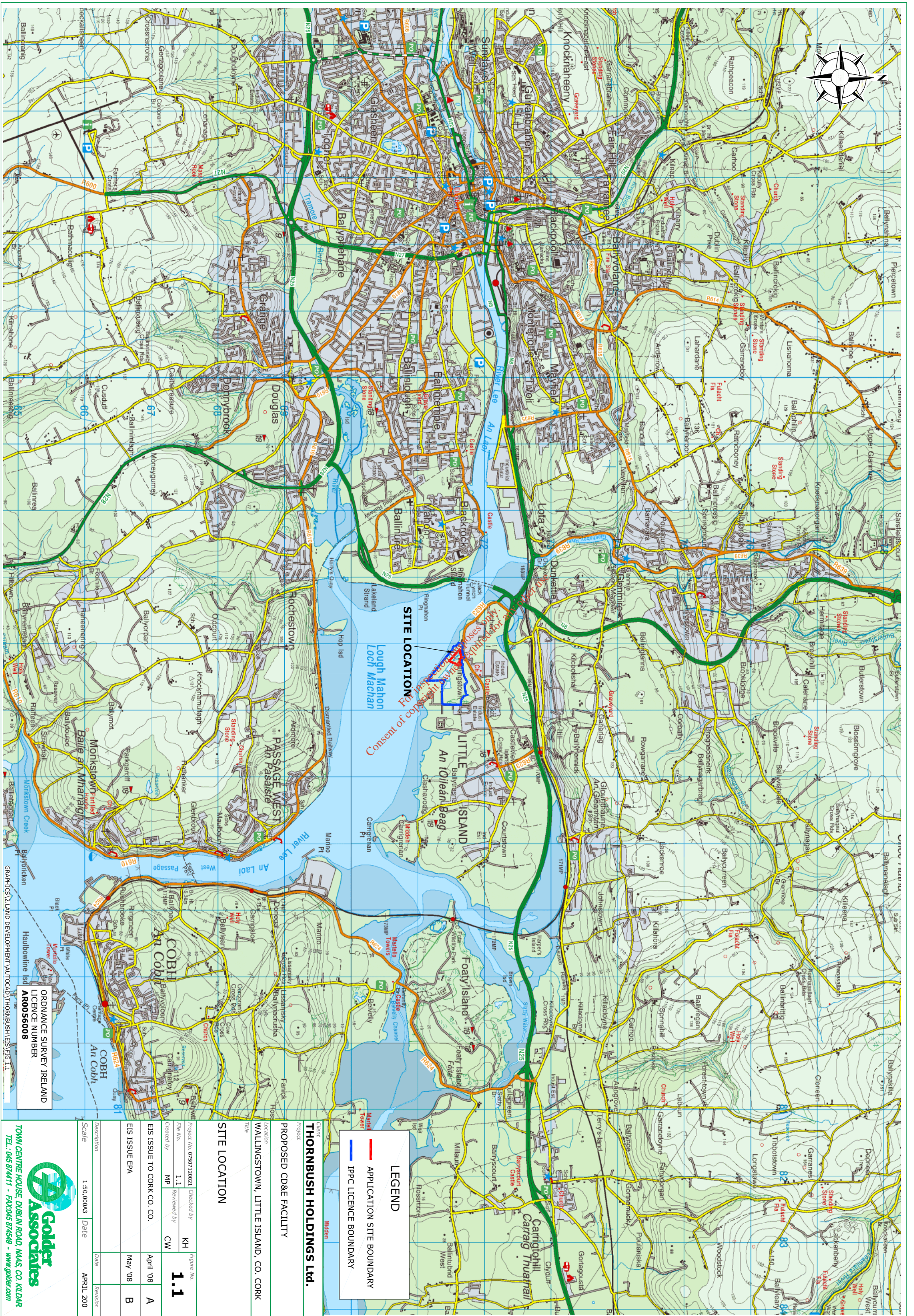
The following team members were involved in the preparation of this EIS are included in Table 1.5 below:

Table 1.6 EIS Team Members

SECTION	TEAM MEMBER
Introduction	Golder Associates Ireland Thornbush Holdings Ltd
Project Description	Golder Associates Ireland Thornbush Holdings Ltd
Human Environment	Golder Associates Ireland PMCE Ltd. (specialist Traffic Consultants)
Flora and Fauna	Golder Associates Ireland
Soils and Geology	Golder Associates Ireland
Water	Golder Associates Ireland (data provided by Thornbush Holdings Ltd.)
Climate	Golder Associates Ireland
Air Quality	Golder Associates Ireland (data provided by Thornbush Holdings Ltd.)
Noise	Golder Associates Ireland (data provided by Thornbush Holdings Ltd.)
Landscape and Visual	Cunnane Stratton Reynolds Landscape Architects
Material Assets	Golder Associates Ireland
Archaeology, Architecture and Cultural Heritage	Tobar Archaeology

FIGURES

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SITE LOCATION
 For the proposed CD&E facility
 Consent of Cork County Council

LEGEND

- APPLICATION SITE BOUNDARY
- IPPC LICENCE BOUNDARY

THORNBUSH HOLDINGS LTD.

PROPOSED CD&E FACILITY

LOCATION
 WALLINGSTOWN, LITTLE ISLAND, CO. CORK

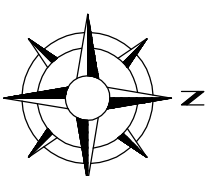
SITE LOCATION

Client	Thorntush Holdings Ltd.	Figure No.	1.1
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Proposed	PROPOSED CD&E FACILITY	Created by	MP
Location	WALLINGSTOWN, LITTLE ISLAND, CO. CORK	Reviewed by	CW
Title	SITE LOCATION	EIS ISSUE TO CORK CO. CO.	April '08
		EIS ISSUE EPA	May '08
			B
Description		Date	Revisor
Scale	1:50,000A3	Date	APRIL 200

ORDNANCE SURVEY IRELAND
 LICENCE NUMBER
 AR0056008



Golder Associates
 TOWN CENTRE HOUSE DUBLIN ROAD, W4AS CO. KILDAR
 TEL: 045 874411 - FAX:045 874549 - WWW.GOLDER.COM



LEGEND

- APPLICATION SITE BOUNDARY
- IPPC LICENCE BOUNDARY

Client
THORNBUSH HOLDINGS Ltd.

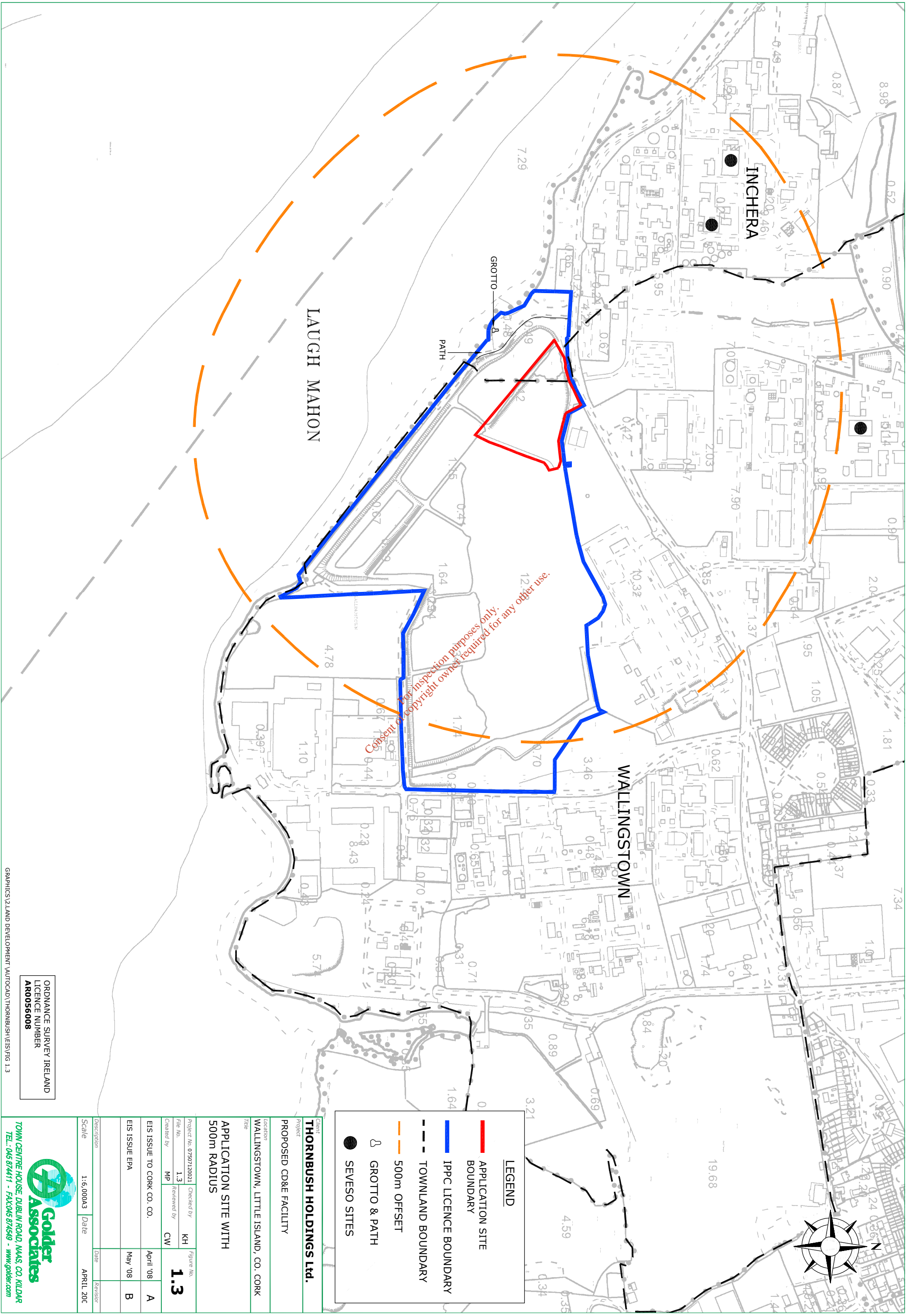
Project
PROPOSED CD&E FACILITY

Location
WALLINGSTOWN, LITTLE ISLAND, CO. CORK

Title
AERIAL PHOTOGRAPH

Project No.	07507120021	Checked by	KH	Figure No.	
File No.	1.2	Reviewed by	CW	1.2	
Created by	MP				
EIS ISSUE TO CORK CO. CO.				April '08	A
EIS ISSUE EPA				May '08	B
Description	NOT TO SCALE	Date	APRIL 2008	Revisor	

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LEGEND

- APPLICATION SITE BOUNDARY
- IPPC LICENCE BOUNDARY
- - - TOWNLAND BOUNDARY
- - - 500m OFFSET
- ⊕ GROTTO & PATH
- SEVESO SITES

Client
THORNBUSH HOLDINGS Ltd.

Project
PROPOSED CD&E FACILITY

Location
WALLINGSTOWN, LITTLE ISLAND, CO. CORK

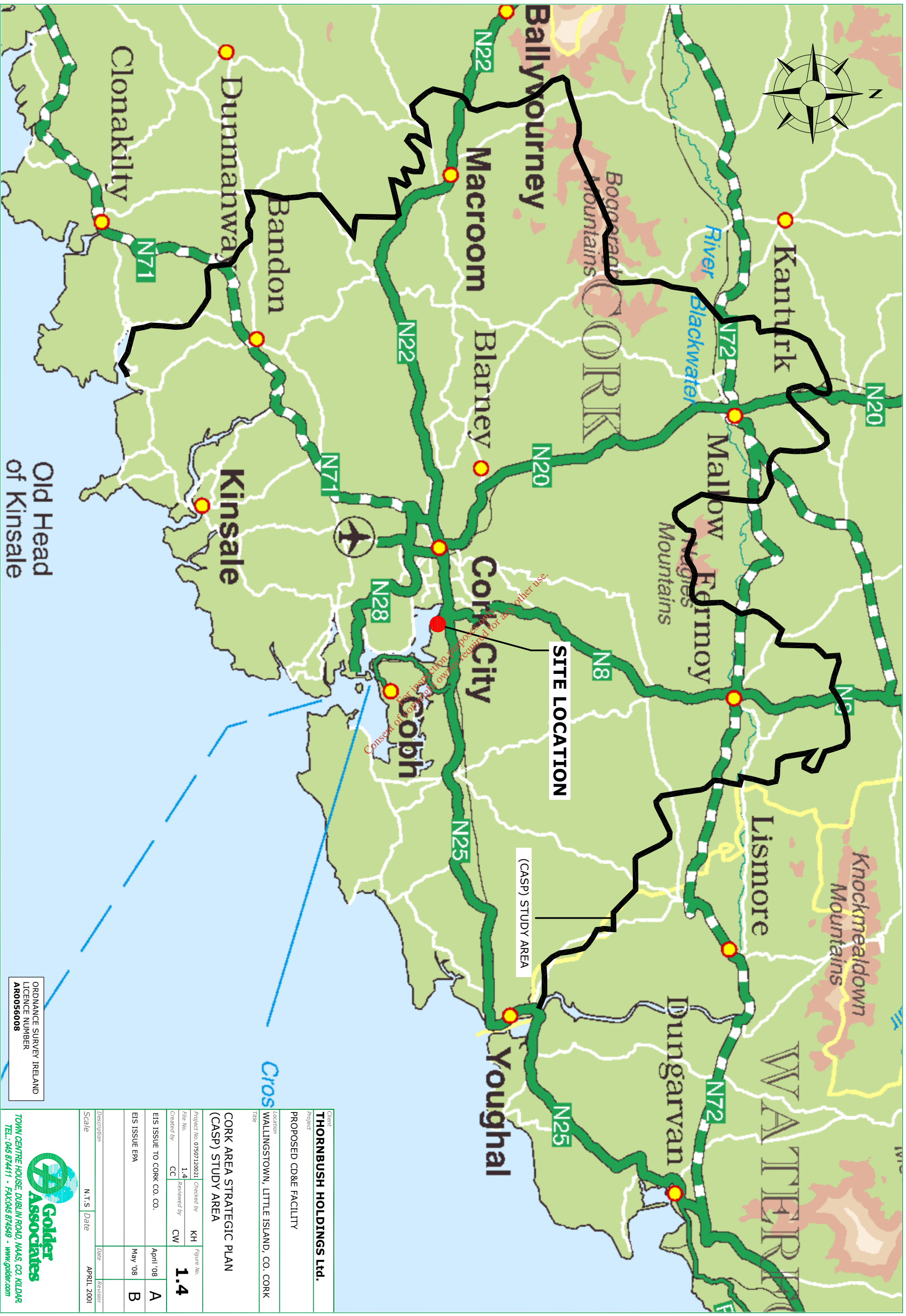
Title
APPLICATION SITE WITH 500m RADIUS

Project No. 07507120021	Checked by KH	Figure No. 1.3
File No. 1.3	Reviewed by CW	
Created by MP		
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EIS ISSUE EPA	May '08	B
Description	Date	Revisor
Scale 1:6,000A3	Date APRIL 20C	

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LICENCE NUMBER
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GRAPHICS 2/LAND DEVELOPMENT/AUTOCAD/THORNBUSH/EIS/FIG 1.3

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LICENCE NUMBER
AR0056008

Client THORNBUSH HOLDINGS Ltd.		
Project PROPOSED CD&E FACILITY		
Location WALLINGSTOWN, LITTLE ISLAND, CO. CORK		
Title CORK AREA STRATEGIC PLAN (CASP) STUDY AREA		
Project No. 07507120021	Checked by KH	Figure No.
File No. 1.4	Reviewed by CW	1.4
Created by CC		
EIS ISSUE TO CORK CO. CO.	April '08	A
EIS ISSUE EPA	May '08	B
Description	Date	Revisor
Scale	N.T.S.	APRIL 2001

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 TEL.: 045 874411 - FAX: 045 874549 - www.golder.com

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2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 General

The proposed development consists of a dedicated C,D&E Facility on a ca. 2.2 ha site at Wallingstown and Inchera, Little Island, Co Cork (the Application Site). This section of the EIS defines the particular types of materials passing through the facility, the facility design and layout, the steps involved in processing incoming waste, site management and environmental controls.

2.2 The Existing Site

The Application Site is located in the townlands of Wallingstown and Inchera, ca.1km West of Little Island. As described in detail in Section 1, the site comprises part of the former Mitsui Denman electroplating facility, which operated under IPPC licence. No. P0389-01.

The land area surrounding the Application Site is highly developed with significant anthropogenic influences on the landscape and land use including light to heavy industry, pharmaceutical manufacturing facilities, and mixed office use for professional service providers. The main residential area of Little Island is located ca.700m northeast of the Application Site. The land immediately to the east and south of the Application Site comprises the rest of the IPPC licensed waste lagoons (Figure 2.1).

2.3 Restoration of the Lagoons on the former Mitsui Denman Site

The former Mitsui Denman site, has a planning permission (Planning Ref: 73/1466 PL 4/5/24246), which allowed the manufacture of electrolytic manganese dioxide and on-site disposal of solid wastes generated by the process, including filter cake waste, dewatered sludge and crystal waste. The plant site itself has been decommissioned. The EPA accepted a boundary revision to exclude these lands from licensable activities in February 2007. They were subsequently purchased for 'brownfield' redevelopment by Howard Holdings PLC and are the subject of separate planning applications lodged on behalf of Howard Holdings Inc. The waste lagoons remain and are subject to the relevant conditions of Planning Ref: 73/1466/PL 4/5/24246 and IPPC Licence No. P0389-01. These consents require that the lagoons be restored.

As detailed in Section 1, following consultations between Thornbush and the EPA it was agreed that Thornbush would apply for a waste licence to operate a C,D&E Facility on a restored area within the existing licensed site and on obtaining a waste licence and a planning permission for the C,D&E Facility, surrender the IPPC licence. (Note - the waste licence will also include management, monitoring and restoration of the waste lagoons and any other areas, as required within the current IPPC licence boundary.).

The restoration of the ca. 22 ha of lagoons, which are outside the boundary of the Application Site will involve filling in lagoons / ponds and covering the existing waste with inert secondary fill materials 2 metres thick on average. The secondary fill materials will create an engineered capping and restoration layer for the waste lagoons and provide a suitable barrier between the underlying waste and future users of the lands. The capping and restoration layer will furthermore provide a suitable engineered platform for Brownfield redevelopment on the existing Site.

The EPA has stated that the capping material must meet the criteria of inert waste. Systems and procedures will be put in place to ensure that wastes are subject to the appropriate technical appraisal to ensure its suitability for the proposed final product. This would be monitored on an ongoing basis by Thornbush and the EPA as the product is produced prior to use as a capping material.

The C,D&E wastes will be processed to provide a material that conforms to a technical specification for General Fill which can consist of a graded coarse granular material with a maximum particle size of 500 mm and less than 15% fine material (63 micron sieve). Soil material from off-site excavations may also be used and if clayey in nature, would have a maximum particle size of 125 mm and less than 15% fine material, with a suitable moisture content to permit effective compaction of the fill material. A total of approximately 700,000 m³ of fill material is to be produced, equivalent to approximately 1,200,000 to 1,400,000 tonnes.

As detailed in Section 1.0, in agreement with the EPA, the restoration of an area in the north west of the IPPC licensed site will be undertaken ahead of the development of the C,D&E Facility to provide a platform for the development of the proposed Facility. A geotechnical report on the restoration of this area known as 'Cell 8' was produced by Golder Associates (UK) Ltd in January 2007, and is included in Appendix 1 Volume 2 for reference. This report describes the proposed capping of Cell 8: the methodology for preparing the C,D&E waste recovery facility area; and ground stability, monitoring and environmental, health and safety considerations.

2.4 Overview of the Proposed C,D&E Facility

2.4.1 General

The purpose of the proposed Facility is to accept and produce suitable materials for the restoration of the IPPC Site No. P0389-01. The material to be used in restoration of the lagoons must be inert.

Thornbush will put in place a management system and stringent operating procedures meeting current industry standards in regard to Best Available Techniques for a C,D&E waste recovery facility to ensure that material delivered to the proposed Facility, and the recovered material leaving the site for restoration purposes on the adjoining lands, are subject to the appropriate technical appraisal. A waste licence will be obtained for the Facility, as such the management system and operating procedures will be monitored by the EPA. All material utilised for restoration capping must meet the classification of inert waste, the volumes and monitoring of all material must be recorded, and information provided to the EPA.

2.4.2 Types of Materials to be Produced

The objective of the proposed Facility is to generate a high quality product which can be used for the restoration of the waste lagoons and other areas within the current IPPC site boundary. Granular capping material will be required. However, soil and growth medium (topsoil like) materials could be required in some areas. The final products must conform to approved engineering standards in order for it to be useful for restoration purposes and also it must conform to environmental legislative standards for inert waste. The relevant standards are summarised as follows:

- Fill Material Class 1C (NRA Specification for Road Works) with a particle size distribution typically in the range of 0 – 500 mm. This material must be of a particular grade size and does not allow for more than 1% of “foreign” material in the final product.
- General Soil Fill with particle sizes ranging between 0 mm and 125 mm, with no more than 15% fines.
- Recovered inert material for restoration purposes must meet criteria as set out in the definition of inert waste in Article 2(e) of the Landfill Directive and the criteria listed in section 2.1.2 of council decision 2003/33/EC. Inert waste is defined as:

“Waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes in contact in a

way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular, not endanger the quality of surface water and/or groundwater.”

2.4.3 Testing of Products

Thornbush propose that sampling of the final fill product for further analysis will be undertaken as required by the Agency prior to use as fill material on the surface of lagoons and other areas within the current IPPC licence boundary.

2.4.4 Types of Wastes to be Accepted

The materials to be processed at the proposed C,D&E Facility will be sourced from wastes generated by construction, demolition and excavation projects in the greater Cork area. All incoming material will undergo rigorous control procedures to ensure that it can produce a high quality product using simple separation and screening processes. The final product must conform to approved engineering and environmental standards as described in Section 2.4.2 in order for it to be used for restoration purposes. The intention is to accept predominantly clean inert C,D&E Wastes that contain a low percentage of un-useable material in regard to the restoration of the Thornbush Site.

The small quantities of the recoverable and non recoverable non inert materials that cannot be used for restoration purposes on the Thornbush Site (such as spurious amounts of wood, plastics, metals etc that are not removed from the C,D&E wastes at the source) will be separated out and removed at the proposed C,D&E Facility to be recovered/recycled or disposed by properly authorised and approved waste management contractors at appropriately authorised waste management facilities. The waste types which will be accepted are shown in Table 2.1.

Wastes which may be accepted as inert waste without testing according to Section 2.1.1 Council Decision 20/33/EC are indicated in Table 2.1. Materials not appearing in Section 2.1.1 of the Council Decision 20/33/EC are also indicated in Table 2.1. These will be accepted subject to approval by the EPA and to the testing procedures detailed in the same item of legislation.

The specific quantities of each waste type accepted will be dependent on the requirements of the restoration programme. Different areas within the Thornbush Site may have separate restoration requirements and also they type of material required will vary throughout the restoration programme; for example, larger more coarse material may be required initially but excavated soil and stone may be more appropriate as cover material in the final stages of restoration. Materials will need to be sourced and stored according to the recommendations of the restoration engineers throughout the project.

Table 2.1: Wastes to be Accepted at the Facility

EWC code	Description	Restrictions	Comment
04 01 08	Waste gravel and crushed rocks (uncontaminated)		Testing required
17 01 01	Concrete	Selected C & D waste only (*)	No Testing Required according to Council decision
17 01 02	Bricks	Selected C & D waste only (*)	No Testing Required according to Council decision
17 01 03	Tiles and ceramics	Selected C & D waste only (*)	No Testing Required according to Council decision
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only (*)	No Testing Required according to Council decision
17 02 02	Glass	Not applicable	No Testing Required according to Council decision
17 05 04	Soil and stones	Excluding topsoil peat excluding soil and stones from contaminated sites	No Testing Required according to Council decision
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03		Testing Required
20 02 02	Soil and stones	Only from garden and parks waste: Excluding topsoil, peat	No Testing Required according to Council decision

Notes:

(*) Selected construction and demolition waste (C & D waste): with low contents of other types of materials (like metals, plastic, soil, organics, wood, rubber, etc). The origin of the waste must be known.

— No C & D waste from constructions, polluted with inorganic or organic dangerous substances, e.g. because of production processes in the construction, soil pollution, storage and usage of pesticides or other dangerous substances, etc., unless it is made clear that the demolished construction was not significantly polluted.

— No C & D waste from constructions, treated, covered or painted with materials, containing dangerous substances in significant amounts.

2.4.5 Source of Materials

A high quality of incoming C,D&E waste will be required to meet the engineering and environmental standards required in the restoration materials. To ensure this, all incoming C,D&E waste will be subject to strict controls on site or pre-approved before arriving on site to ensure that it is of sufficient quality that it can be processed by simple crushing and screening techniques to achieve the standard required.

Thornbush intend to establish contact with major building and infrastructural developers around Cork in order to source suitable, easily processed C,D&E wastes. The facility can also

approach Cork County Council and Cork City Council in order to be listed as an approved site for the acceptance of inert materials on Cork County and City Local Authority contracts.

It is the intention that wastes from Contractors who practice the Construction Industry initiative aimed at prevention, minimisation and recycling of construction and demolition waste will only be accepted at the Facility. Contractors and waste generators who support and practice this initiative are required to have an on-site C&D waste management plan that facilitates waste segregation on the construction site. Where this initiative is correctly implemented a significant proportion of unsuitable waste will not be delivered to the proposed Thornbush Facility.. The initiative will ensure qualitative prevention (reducing the hazards posed by construction and demolition waste) generating a more homogenous mix of waste, separating at source major contaminants and facilitating higher recovery potential of inert material.

It is anticipated that C,D&E material from such sources will provide the majority of incoming waste into the facility and thus ensure that a high quality material will be accepted. Incoming material from other sources will be subject to more rigorous investigation prior to acceptance. The intention is to not accept mixed C&D waste streams having a large proportion of non-inert materials that would require intensive sorting and separating processes. Waste acceptance and approval procedures are outlined in this section and complete details will be contained in the Waste Licence Application.

2.4.6 Controls on Incoming Waste

Incoming material to the C,D&E Waste Recovery Facility will be limited to the wastes listed in Table 2.1.

Inspection, documentation and control procedures will be implemented to ensure that only high quality material will be accepted and processed. Waste shipments will arrive by truck at the Facilities Reception. Scheduled and documented shipments will be directed to the weighbridge where the load is weighed and visually checked by CCTV cameras. Thornbush will provide access on-line access to CCTV footage if required by the Regulatory Authority. Thornbush will have established procedures for verification of waste at the proposed Facility. Subject to the waste being suitable the Facility operator will sign a declaration and give a copy to the waste contractor/generator.

Any waste streams resulting from recovery or processing of material that do not meet the specification of the required restoration materials will be removed and disposed or recovered offsite. Testing will be conducted on any waste streams where there is any doubt that the waste fulfils the necessary criteria regarding the lack of contamination of the waste.

Records will be maintained on all consignments of waste, providing information on:

- The tonnage and EWC Code for the waste materials imported and/or sent off-site for disposal/recovery;
- The names of the agent and carrier of the waste, and their waste collection permit details, if required (to include issuing authority and vehicle registration number);
- Details of the ultimate disposal/recovery destination facility for the waste and its appropriateness to accept the consigned waste stream, to include its permit/licence details and issuing authority, if required;
- Details of any rejected consignments;
- Details of any approved waste mixing; and
- The tonnages and EWC Code for the waste materials recovered/disposed on-site.

2.5 C,D&E Facility Design and Layout

2.5.1 Functional Design Components

The functional design components of a typical C,D&E waste recovery/processing facility are:

- Acceptance and Receipt: selection and receipt of C,D&E materials and direction to specific stockpile areas;
- Primary Sorting: for primary sorting of incoming C,D&E materials to be processed. Bulk C,D&E waste removed from the C,D&E material stream at this stage;
- Crushing and Screening: for processing of the sorted inert C,D&E materials into final fill product(s);
- Finished Product Stockpiling: of the product of various grades; and
- Loading and Removal: to areas within the IPPC Site No. P0389-01

The proposed C,D&E Facility in Little Island will be a temporary development only and in operation for the lifetime of the restoration works (estimated to be a ten year period) on the waste lagoons created by Mitsui Denman during the operation of its facility. The design and layout of infrastructure and plant for the proposed C,D&E Facility were selected with the temporary nature and the five functional components in mind.

2.5.2 Proposed Infrastructure

The proposed infrastructure and site layout is shown in the context of the overall IPPC licence boundary in Figure 2.2, and in detail in Figure 2.3

A new entrance from the R623 Little Island Road will be used for access to the facility. Site security will be ensured by a secure access point from the public road network which will be gated and only opened during operational hours. A key to this gate will be maintained by the Facility Manager.

Existing services adjoining the application site include water mains, foul and storm water sewers, ESB power supply and Telecom. Connections to these services will be made.

An area of hardstanding will be installed in the entrance area, and around the porta-cabins which will be used for office/administration and welfare facilities (see Figure 2.4). Further hardstanding will be constructed for the waste quarantine, recyclables storage and banded fuel-storage area. These hardstandings will likely comprise macadam, concrete or similar. The remaining hardstandings on the site will comprise hardcore granular fill.

Storm water drainage from the paved yard areas will be serviced by 8 proposed trapped gullies for a total paved area of 1600 m². This equates to 1 gully per 200m². For details of proposed drainage details including oil interceptor (specified as a Bypass Separator NSBD004), gully and silt traps reference Figure 2.4.

The weighbridge will be installed adjacent to a porta-cabin in the main reception area.

A wheelwash unit will be installed on-site to clean down vehicles departing the site. The wheel wash which will be designed to re-circulate water.

A waste quarantine area will be constructed on-site. This will include bunds to ensure surface water run-off from the quarantine does not enter the site stormwater drainage system

A fuel storage area will be constructed on-site. This area will be banded to prevent potential contamination of surface and ground waters. Two (2 No.) 5,000-litre tanks will be installed. A full retention oil interceptor will be installed in conjunction with the banded fuel tanks. A double-skinned fuel bowser will be used to distribute fuel to the plant described in Section 2.5.2.

The infrastructure to be installed includes (Figure 2.3):

- new paved entrance onto the R623 and steel frame security gate;
- a porta-cabin weighbridge office;
- 1No. weighbridge;

- porta-cabin site offices, canteen and toilet facilities;
- paved reception area with car parking for 8 No. cars/vans;
- wheel wash;
- hardstand inspection, processing and stockpiling area;
- quarantine area for the storage of material unsuitable for recovery;
- an area for the storage of other recyclables (wood, plastics, metals);
- bunded fuel tank area with oil interceptor and a parking area for a double contained fuel bowser;
- all ancillary surface water drainage works including road gullies, piping systems, silt settling tanks oil interceptor,, percolation areas for some of the runoff, a connection to the public surface water drainage system for runoff from paved areas;
- ancillary foul drainage works including a holding tank and a connection to the IDA sewer for some trade effluent from waste quarantine/fuel storage areas;
- connection to the public water mains for potable water;
- connections to the ESB power supply and to the telephone/broadband system;
- landscaping berms;
- post and wire type fencing circa 1.2 m high where required on the southern boundary to cordon off the application site and provide health and safety access controls to adjoining ponds/lagoons;
- pole mounted misting system and power sprinklers dust-suppression ,as required;
- security cameras;
- internal security gate at the northeast corner of the site;
- standard pole lighting;
- tree/hedge row planting along the potentially sensitive northern boundary; and
- signage at the site entrance (ca. 1200 mm x 800 mm)to meet the requirements of a waste licence to be granted for the facility; and general signage around the site.

2.5.3 Proposed Plant and Equipment

The secondary fill engineering materials to be produced from the C,D&E wastes received at the Facility are required to meet a technical specification for General Fill which can consist of a graded coarse granular material with a maximum particle size of 500 mm and less than 15% fine material (63 micron sieve). Soil material from off-site excavations may also be used and, if clayey in nature, would have a maximum particle size of 125 mm and less than 15% fine material, with a suitable moisture content to permit effective compaction of the fill material.

The selection of plant is based on the expected nature of the incoming wastes and the specifications of the materials that will be required for the capping and restoration of the lagoons. It is intended that at full operating capacity the proposed Facility will manage up to 300,000 tonnes per annum of construction and demolition waste.

C,D&E material recovery plants are comparable to crushing and screening plants used in the gravel industry, except that a greater mobility of the plants is typically required and special

mechanical systems for the sorting of impurities and metals from the C,D&E materials is required.

Design Calculations concerning the recycling and materials handling plant and equipment were carried out based on an annual import of 300,000 tonnes of C,D&E materials per annum. The calculations are summarised below in Table 2.2.

Table 2.2: Aspects for Which Design Calculations for the facility have been prepared

<i>Aspect</i>	<i>Requirements</i>
Incoming CD&E Materials	Quantities and compositions
CD&E Materials sorting requirements	CD&E Stockpiling wheel loader CD&E Primary sorting wheeled excavator CD&E Primary Sorting Unit
Crushing capacity requirements	Crusher loading tracked excavator Primary crushing unit
Screening capacity requirements	Primary screening unit
Materials loading requirements	Recycled products wheel loader
Supplementary facilities	Dust suppression water requirements Diesel storage requirements
Site Layout Requirements	Materials storage requirements

2.5.3.1 Incoming C,D&E Material

The following total C,D&E materials expected at the site, based upon the operational parameters for the facility have been used for the design calculations:

Table 2.3: Expected Quantities and Composition of C,D&E Materials Accepted to Site for Purpose of Design Capacities

<i>Scenario</i>	<i>Total CD&E to site</i>	<i>Recyclable to Type C</i>	<i>Asphalt and tar</i>	<i>Metals</i>	<i>Waste</i>
Design Capacities	1000 t	900 t (90%)	20 t (2%)	20 t (2%)	60 t (6%)

2.5.3.2 C,D&E Materials Sorting Requirements

The C,D&E stockpiling wheel loader (see Table 2.3 for specifications) is used for the handling of the incoming C,D&E materials into respective stockpiles for either immediate crushing or sorting (if mixed C,D&E material). The loader operates by pushing the C,D&E materials in various stockpiles around the site.

For the mechanical sorting of large pieces of wood, metals and installations from mixed C,D&E materials a wheeled excavator with attached grab and hydraulic hammer are to be used.

Table 2.4: C,D&E Stockpile Loader

CD&E Stockpile Loader Type of material	Density (t/m ³)	Quantity required handled			Cycles per hour	Capacity required per cycle
		(t/day)	(t/hour)	(m ³ /hour)		
Bulky incoming CD&E material	1.8	1000	100	56	50	1.1m ³
Summary	A wheel loader with a 1.5m ³ bucket can achieve this since the CD&E material will be heaped in front of bucket as it is pushed along ground and peak times are taken into account.					
Materials sorting loader Type of material	Density (t/m ³)	Quantity required handled			Cycles per hour	Capacity required per cycle
		(t/day)	(t/hour)	(m ³ /hour)		
Bulky CD&E components	0.5	<100	<10	20	N/A	N/A
Summary	A wheeled excavator with grab and hydraulic hammer attachments can achieve this since task. Minimum size for operation of grab is 15t excavator.					

The primary sorting unit (see Table 2.4 for specifications) sorts the C,D&E material into fines and oversize. It is assumed that the primary sorting unit will remove at least 20% by mass of the C,D&E materials, and thus the capacity of the jaw crusher is set for ca. 800 tonnes / day.

Table 2.5: Primary Sorting Unit

Primary Sorting Unit Type of material	Density (t/m ³)	Quantity required handled			Cycles per hour	Capacity required
		(t/day)	(t/hour)	(m ³ /hour)		
Bulky incoming CD&E material	1.8	1000	100	56	N/A	100 tph
Summary	A typical primary sorting unit has a capacity of up to 250 tph which allows for peak periods					

2.5.3.3 Crushing Capacity Requirements

For the loading of the Jaw crusher, a tracked excavator with a bucket is required (see Table 2.5 for specifications).

Table 2.6: Crusher Loader

Crusher Loader Type of material	Density (t/m ³)	Quantity required handled			Cycles per hour	Capacity required per cycle
		(t/day)	(t/hour)	(m ³ /hour)		
Recyclable CD&E material	1.8	800	80	45	75	0.6m ³
Summary	A tracked excavator with attached bucket size of 1 m ³ is proposed to achieve this task. The excavator needs to be of at least 20t in mass to manage the bucket size and required oil pressures.					

For the crushing of the recyclable C,D&E materials, a jaw crusher is proposed (see Table 2.6 for specifications).

Table 2.7: Crushing Unit

Crushing Unit Type of material	Density (t/m ³)	Quantity required handled			Operating minutes	Capacity required
		(t/day)	(t/hour)	(m ³ /hour)		
Recyclable CD&E material	1.8	800	80	45	n/a	80 tph
Summary	A primary crusher with approximately 150 tph capacity will achieve this task, taking into account 25% possible downtime and actual reduced capacity of machinery compared to factory trials.					

2.5.3.4 Screening Capacity Requirements

The screening unit (see Table 2.7 for specifications) separates the crushed material into 2 or 3 size fractions.

Table 2.8: Screening Unit

Screening Unit Type of material	Density (t/m ³)	Quantity required handled			Operating minutes	Capacity required
		(t/day)	(t/hour)	(m ³ /hour)		
Crushed CD&E material	1.8	800	80	45	n/a	80 tph
Summary	A screening unit with approximately 150 tph capacity will achieve this task, taking into account 25% possible downtime and to fit with the crusher capacity.					

2.5.3.5 Materials Loading Requirements

For the loading of approximately 10 dumpers per hour (corresponding to production rate of 97 tph and 14 t capacity trucks) a wheel loader (see Table 2.8 for specifications) is required to load the dumpers with the recycled product.

Table 2.9: Recycled Products Loader

Recycled products loader Type of material	Density (t/m ³)	Quantity required handled			Cycles per hour	Capacity required per cycle
		(t/day)	(t/hour)	(m ³ /hour)		
Finished Product (Fill Type 1C)	1.8	900	90	50	50	1m ³
Summary	A wheel loader with a 1.5 m ³ bucket is proposed for this task in order to prevent any bottlenecks should a 2 nd dumper truck be procured.					

The plant and equipment proposed at the facility has been proven in waste management and is consistent with similar facilities throughout the country. The following plant and equipment will be used at the C,D&E material recovery facility:

Table 2.10: Design specifications for plant and equipment

Type of Plant	Function	Capacity
Primary sorting unit with vibrating twin deck grizzly	For the separation of fines/soils from the material to be crushed.	250 tph
Jaw crushing unit with single/double toggle jaw plates and magnetic separator.	For the crushing of the C,D&E material and separation of the ferrous material.	>150 tph
Screening unit for primary screening of the crushed material with vibrating twin mesh deck.	Separation of crushed materials into 2 or 3 fractions, for example to 0 – 40 mm / >40 mm.	>150 tph
Wheel Loader	Stockpiling incoming C,D&E materials	1.5 m ³
Wheeled Excavator (15t)	Sorting of mixed C,D&E materials	Attachments: Grab & Breaker
Tracked Excavator (20t)	Loading Jaw crusher	1.0 m ³
Wheel Loader	Stockpiling and loading recycled products	1.5 m ³

2.5.4 Site Services

2.5.4.1 Water Supply

There will be a number of demands for water at the Facility as follows:

1. Drinking Water and water for the canteen, toilets, etc. – circa 90l/employee per day
2. Crusher / Screener dust suppression – circa 500l/day
3. Misting Systems on the Site Perimeter for dust suppression – weather dependent
4. Wheelwash - periodic top up – weather dependent
5. Damping down roads and hardstands – weather dependent
6. Power sprinklers for dust suppression – weather dependent

Public mains water will be used for demands 1 to 2. Alternative sustainable water sources such as surface water collected on site, a groundwater well into bedrock upgradient of the waste lagoons and locally abstracted water from Lough Mahon will be considered and used as appropriate for demands 3 to 6.

2.5.4.2 Fuel Storage

The hourly rate of diesel consumption for all of the plant and equipment proposed for the C,D&E is approximately 175 litres/hour (corresponding to approximately 1,750 litres/day) With the expectation to refill every third day (twice weekly), then an onsite diesel storage requirement of at least 5,250 litres is required. Taking into account production requirements, 2 No. 5,000 litre diesel storage tanks are proposed

2.5.4.3 Trade Effluent

Run off from the hardstand areas holding quarantined wastes and the fuel bunds, will be directed to the IDA foul sewer.

2.5.4.4 Storm Water

Run off from the macadam surfaced reception area will be directed to the public storm waters sewer, located west of the Application Site, via a system comprising silt box and an oil interceptor.

2.6 Waste Acceptance and Handling Procedures

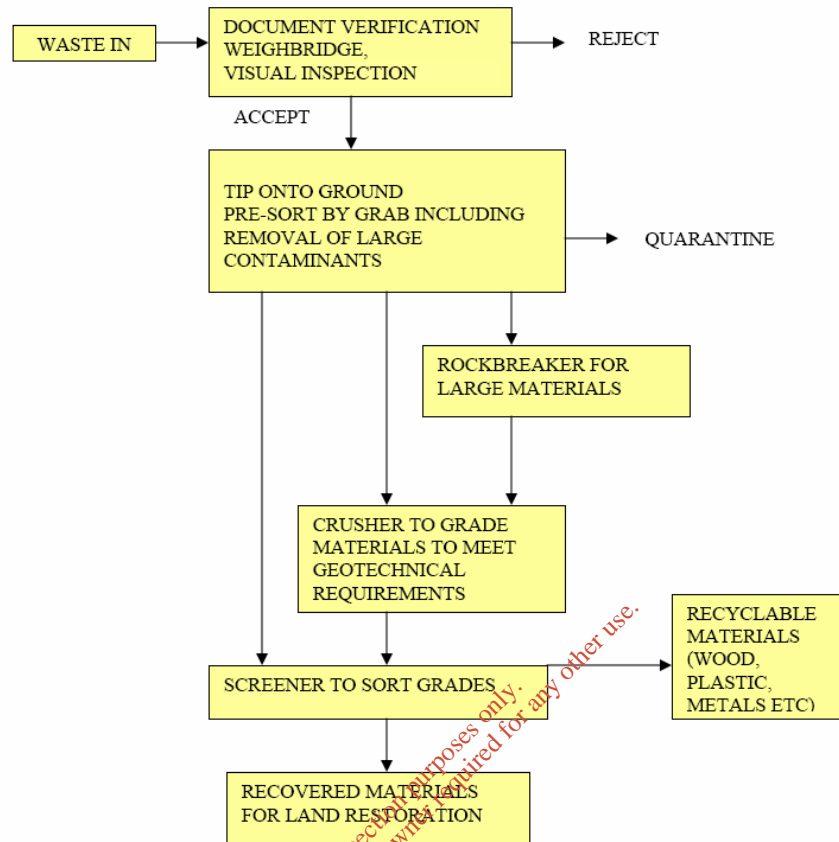
2.6.1 Overview

Waste shipments will arrive by truck at the facilities reception area. Scheduled and documented shipments will be directed to the weighbridge where the load will be weighed and visually checked by CCTV cameras.

Chart 2.1 shows the general waste acceptance and handling procedures that will be followed at the Facility:

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Chart 2.1 Waste Acceptance and Handling Procedures Flow Chart



2.6.2 Waste Reception

When wastes arrive on site they will be visually inspected and accompanying documentation will be verified. Where there is evidence from the visual inspection that there is unacceptable wastes in a truck, the load will be turned away from the site. Where the visual inspection confirms appropriate inert material, the truck would be cleared to deliver the load to the heap areas.

Should non-inert material be discovered subsequent to tipping and when processing the C,D&E waste, it would be transported to the bunded concrete quarantine area indicated on Figure 2.3. This bunded concrete quarantine area would contain a covered quarantine container and skip for materials that should be kept dry. The quarantine area will drain into the IDA sewer system rather than the storm sewer pipework. Waste in the quarantine area will be removed to an appropriately licensed facility for disposal.

Standard operating procedures for waste acceptance, rejection, quarantine, testing and removal of unsuitable material from site will be developed and agreed with the EPA. Standard environmental operating practices applied will include:

- Providing a dedicated quarantine waste storage area, so that if the inspection or analysis indicates that the wastes fail to meet the acceptance criteria then the wastes can be safely temporarily stored. Potentially hazardous material will only be stored for a maximum of 5 working days. After acceptance, the waste can be moved to another storage area. Written procedures will be in place for dealing with wastes held in quarantine;
- Defining areas for the inspection, unloading and sampling areas;
- Assessing the wastes deposited within the tipping area and immediately segregating wastes, to remove possible hazards or unsuitable materials;
- Providing quarantine area with an impervious surface and self-contained drainage, to prevent any spillage entering the storage systems or escaping off site;
- Providing absorbents/adsorbents to deal with any spills;
- Training of personnel, who are involved in the sampling, checking and analysis procedures on a regular basis;
- Weighing/quantifying all incoming loads, and not accepting any load on the site unless sufficient storage capacity exists; and
- Ensuring that all documents that are checked and approved, and that any discrepancies are resolved before the waste is accepted.

Records will be maintained on-site in order to assist tracking of material from source to final destination. Records will be kept in accordance with EPA requirements.

2.6.3 Main Feed Stockpiles

The feed stockpiles are split into the following categories:

- a) Clean soils (not requiring crushing or screening);
- b) C,D&E materials (for crushing and screening); and
- c) Mixed C,D&E materials (requiring primary sorting):
 - i. Oversize materials
 - ii. High steel and metal content
 - iii. High soils content.

Vehicles should tip as directed and leave the site once tipping has been completed. A wheel loader is required for the management of the main feed stockpiles, ensuring that these stockpiles are maintained in order to provide the excavator feeding the crusher can reach the C,D&E materials for processing. This wheel loader will be required to handle a throughput of approximately 100 - 150 tonnes/hour and thus a 1.5 m³ bucket (and teeth tips) has been specified.

2.6.4 Processing of C,D&E Material

2.6.4.1 Primary Sorting

There are three types of materials which should not be fed directly into the crusher:

- (i) C,D&E materials with a high content of soils;
- (ii) C,D&E material which contains oversize material (i.e. concrete elements which are larger than the feed capacity of the crusher or concrete with reinforcement bars protruding more than ca. 400 mm); and
- (iii) C,D&E material with a high content of steel, scrap metal and other ferrous items.

A small wheeled excavator is proposed dedicated to the primary sorting area, for example a 15 tonne excavator accompanied with attachments including:

- A bucket for handling materials;
- A grab or grapple, effectively claws which can pick out oversize items in the C,D&E materials; and
- A hydraulic hammer for the breaking of large concrete elements to size enabling feed into the crusher.

For the high soil content C,D&E materials (category i), a mechanical “grizzly” (a motored twin deck vibrating grizzly with underlying conveyor) is required, as a primary sorting unit (Plate 1). The capacity requirement for this primary sorting unit is approximately 250 tph with a requirement to sort the feed material into two fractions, fines/soils of <20 mm and oversize materials of >20 mm.

The fines/soils that are removed with the mechanised grizzly will be conveyed by the underlying conveyor to the clean soils stockpile area. The oversize material will be handled by the main feed wheel loader and fed to the main C,D&E feed stockpile for processing.

For the oversize materials (category ii.), the wheeled excavator with hydraulic hammer attached can break the larger concrete elements into sizes which fit the feed intake of the crusher.

For the high ferrous content C,D&E materials (category iii.), the wheeled excavator with grab attachment can pick out the scrap metal items and place to one side for subsequent loading to scrap metal haulage trucks.

Plate 2.1: Typical Mechanised Grizzly with Underlying Conveyors



2.6.4.2 Crushing

The downsizing (crushing) of the rubble materials is a mechanical process, typically performed by either an impact crusher or a jaw crusher. The choice of crusher depends upon the material type, content and the desired product.

A jaw crusher operates by downsizing the rubble between two large hydraulically driven jaws. This type of crusher is relatively robust when compared with other types of crushers and is normally set at 1.2 to 1.5 times the maximum size of the original aggregate. The range in terms of sizes of the crushed material that can be attained by this type of crusher is wider than that of the others. The resulting product from a jaw crusher, after screening, is typically suitable for use as road sub-base and as fill material.

An impact crusher, on the other hand, operates with rotating blades that crushes material against its impact plates in an enclosed chamber. This mechanism is capable of crushing both the cement and the aggregates, thereby allowing greater control over the sizing of the final product for producing new concrete when compared to a jaw crusher.

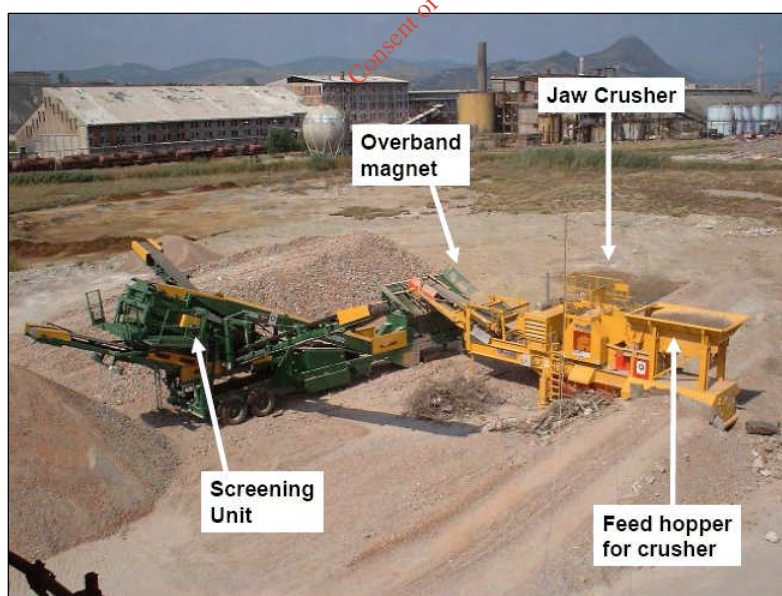
When comparing the pros and cons of the two types of crushers, larger C,D&E material can be fed into a jaw crusher. Furthermore, a jaw crusher allows reinforcement bars to pass through with minimum risk for blockage. For an impact crusher, reinforcement bars are often caught and can block the motion of the rotating drum.

Other types of crushers such as cone crushers and hammer mills are not recommended for the recycling of C,D&E material due to their susceptibility for damage from reinforcement bars, high maintenance costs and low output.

It is therefore proposed that a Jaw Crusher is utilised as opposed to an Impact Crusher since the jaw crusher will produce a product which meets the Class 1C requirements as well as being both more robust and less expensive than an impact crusher. The robustness is due to the simplicity of the operation (single moving jaw part and impact plates) as well as reduced maintenance requirements as compared to an impact crusher.

All C,D&E materials for processing are stockpiled and proposed fed with an excavator into a jaw crusher. The excavator required for this feeding operation must have a feed rate of no less than 150 tph. With the loading excavator positioned on or close to the feed stockpile, a cycle time of 30 - 40 seconds is adequate. The typical operating hour of machinery is 50 minutes per hour (due to operator's other activities), resulting in 75 - 100 loads per hour. This requires an excavator bucket size of 1m³ to be attached, hence requiring an excavator size in excess of 20 tonnes. Several manufacturers supply excavators in the 20 – 23 tonne range.

Plate 2.2: Typical Crusher and Screening Unit Setup



It is noted that for the loading of the crusher, the option of loading directly from the truck into the crusher using a truck ramp is inappropriate due to the risk of unwanted materials (plastics, timber, cardboard etc.) being possibly contained within the truck's load of C,D&E

materials. A visual inspection at the reception area may not identify these materials and once they are entered into the processing line, the ensuing products will be polluted and in turn become unwanted for future use in restoration. Loading by excavator where the trucks unload at the primary sorting facility is recommended.

Once the material has entered the processing system, there is no further requirement for handling of the crushed and screened material until it has to be moved from the product stockpiles. Odd jobs around the recycling plant do, however, require ad hoc lifting and moving work, i.e. container with ferrous metals from the magnetic separator. These jobs can be done by the on-site excavators/wheel loaders in between their main duties.

The proposed jaw crusher must have a capacity of at least 150 tph (which is considered in the medium –small scale for crushers). The feed opening of the jaw crusher should be at least 1,100 mm by 650 mm to accept concrete blocks. The feed material is placed by the excavator into the feed hopper which comprises a vibrating grizzly for separating the fines from the crusher feed, these fines being deposited adjacent to the crusher via an underlying conveyor. These fines will be regularly moved by one of the on-site wheel loaders to the final product stockpile.

2.6.4.3 Screening

The gap between the two jaws of the primary crusher can be adjusted to ensure the production of the chosen particle size. However, this gap should be set at no less than 40 mm. Further reduction will increase the wear rate on the jaw plates.

After primary crushing, the crushed material will pass under an over-band magnetic separator where majority of the ferrous materials will be removed to one side. The metals should be dropped into a specific container, which is to be emptied/replaced regularly. The magnetic separator is built onto the same structure/chassis as the primary crusher.

Once the C,D&E material has gone through the crushing process, it will need to be separated into the required product sizes. Considering the final product requirement at Little Island is a Class 1C material, a twin deck screening is proposed which will separate the crusher material into 2 or 3 fractions. These comprise:

- **Fines:** which are 0 – 10 mm and is an optional fraction since the 2nd screen deck can be removed to allow for this fraction to be included in the “product” material. Final decision on this will depend on trial crushing of the various C,D&E materials in Cork to determine whether there is the right quantity of fines already in the feed materials;
- **Product:** which is the fraction which will be used as Class 1C with a particle size distribution of 0 – 40 mm (or even 50 mm depending on type of material and effectiveness of the screening decks); and

- **Oversize:** which is that material >40 mm (or 50 mm depending on selected screen mesh), which can be fed directly back into the crusher for re-processing ensuring that all materials are eventually crushed to specification.

The real-time choice of mesh decks (those mesh screens used to separate out the material) will depend upon the desired product specifications and can be fixed after trial crushing. The final screened products are stockpiled by the screening units' own fixed conveyors and are thereafter ready to be loaded directly onto either the dumper truck or into the jaw crusher for re-processing.

The capacity of the whole set-up is to be no less than 150 tph. All of the above plants proposed are presently available on the market as standard machines.

2.6.4.4 Product Stockpiling & Inventory Management

The principle governing the management and storage of materials will be to ensure that the correct type and quantity of materials are stored according to the particular land restoration requirements. Materials of different granular size will stockpiled separately in order that the correct "blend" of inert materials is used for restoration. The entire process will be managed so that the correct type of materials will be accepted in order to maintain a consistent composition of stockpiled product.

For the loading of the final product into the site dumper truck, a wheel loader with a 1.5 m³ bucket is required. This loader will also be able to move the oversize and fines fraction to, respectively, the jaw crusher for re-feeding or the final product stockpile if required.

2.7 Management and Operation of the Facility

2.7.1 Operational Hours

The C,D&E Facility will only operate between 8:00am and 6:00pm Mondays to Fridays. On Saturdays operations will take place between 8:00am and 4:00pm. The facility will be closed on Sundays and Bank Holidays, and will be open for a maximum of 302 days per year.

2.7.2 Management Personnel

There will be between 4 and 6 staff members: 1 facility manager, 1 weighbridge operator, 2 to 4 plant operators.

2.7.3 Operating Procedures

Draft operating procedures are included in Appendix 2 Volume 2. The procedures contain all the proposed criteria and control measures to be implemented with respect to the following:

- Waste Acceptance, Handling and Processing, at the Facility;
- Criteria for the Acceptance of Material at the Facility;
- Segregation and Removal of Unsuitable Wastes Arriving at the Facility;
- Procedure for Testing and Storage of Quarantine Material; and
- Removal of Unsuitable Wastes at the Facility.

2.8 Construction Phase Site Management

The co-ordination of people and materials on site will be one of the key activities throughout the construction phase. Every practicable effort will be made to ensure that any environmental impacts will be minimised during the construction phase of this project. It is anticipated that with the proper construction management, there will be no negative residual impacts arising from the construction of this development.

2.8.1 Activities and Duration

Construction activities for the proposed project will include the following:

- Erection of site fencing where required for safety purposes;
- Site development in the form of vegetation clearing, topsoil stripping, cutting and filling including the construction of berms;
- Construction of watertight underground sumps, tanks, oil-water separators and manholes;
- Installation of drainage and underground services;
- Connections to public storm water, public water mains, IDA sewer and also ESB and telecom services;
- Road and car park works including placement of sub-base and base granular materials, kerbs, macadam surface and road markings;
- Erection of structures e.g. weighbridge, wheel wash, porta-cabin offices/canteen/amenity facility including concrete foundations;
- Fit-out of offices/canteen/amenity facility;

- Other works including electrical mechanical services, yard lighting, CCTV systems and dust suppression system, signage, security gate etc.;
- Installation of mobile plant; and
- Landscaping and other restoration works at the site entrance.

It is envisaged that the general contractor will be appointed to carry out all works immediately, if permission is granted.

It is anticipated that the construction programme will take circa 3 months.

2.8.2 Site Preparation

As noted in Section 1 completion of restoration work is required at the proposed site location in order to provide a platform for further development. This work is taking place within the terms of the existing IPPC licence, and details are provided in a technical report included in Appendix 1, Volume 2.

With the platform for development completed, it is anticipated that there will be a requirement for some imported fill material, primarily to construct the berm along the northern and eastern boundary of the Application Site.

2.8.3 Construction Methods

Standard civil and mechanical and electrical engineering construction methods will be used.

The porta-cabins will be standard prefabricated painted steel structures which will be founded on pad foundations. In-situ placed concrete will be used to form the foundations. It is likely that all in-situ concrete will be brought to site ready-mixed in trucks and be placed directly from the trucks. The off-site prefabrication of the porta cabins components will reduce significantly the amount of waste generated when compared to other forms of construction, and reduce the time needed to complete the work.

The weighbridge will be an above ground structure resting on concrete slab foundation.

The wheel wash will be a bath type wheel wash with rattle bars. The wheel wash will be designed to re-circulate water.

The site entrance area, vehicle parking and truck turning area will be surfaced in asphalt/macadam, while the storage areas for the incoming construction and demolition waste and the recovered material are surfaced in hardcore.

2.8.4 Construction Materials Sourcing and Transportation

In so far as possible, construction materials will be sourced locally.

2.8.5 Employment and Accommodation

The average construction workforce required for the project will number approximately 10 - 15.

Temporary office accommodation and other construction facilities will be installed on site for the construction phase. All temporary units will be of high standard in accordance with statutory regulations as a minimum.

Parking for construction staff will be provided on the site. Access to the site during the construction phase, will be from an entrance located on the former Mitsui Denman site.

Normal working hours during the construction phase will be as follows:

Start	Finish	
0800	1800	Monday to Friday
0800	1600	Saturday

It may occasionally be necessary to work outside of the working hours detailed above, including at night and weekends, at certain stages. Working outside normal hours may be necessitated through considerations of traffic management, safety or weather and sub-contractor availability. It is not anticipated that particularly noisy construction activities would generally take place outside normal hours.

2.8.6 Construction Waste

Material that is likely to be surplus to requirements and disposed of off-site will include general demolition debris, machinery oils and chemical cleaning solutions. Wastes arising will be disposed of or recovered in accordance with the relevant regulations. Only contractors with valid waste collection permits will be allowed to remove wastes from the Facility.

2.8.7 Other Construction Impacts

Due to the nature of construction activities, there will be diesel-powered plant and machinery operating at the site for the duration of the construction phases. The storage of all fuels and chemicals will be in bunded areas.

Other impacts arising from the construction phases of the project are dealt with in specific sections of this EIS.

2.9 Environmental Controls

2.9.1 Construction Phase

Every reasonable effort will be made to ensure that any detrimental environmental effects will be minimised during the construction phase of this project. The construction planning will be geared towards keeping disruption and nuisance to a minimum. Appropriate measures will be taken to ensure that the site and the surroundings are maintained to a high standard of cleanliness.

A dust minimisation plan will be prepared and implemented by the contractor during the construction phase of the project, as construction activities are likely to generate some dust emissions, particularly during site clearance and re-grading of the site. The likely principal elements of the dust minimisation plan are listed below:

- Limiting vehicle speeds in the construction site;
- During very dry periods, dust emissions from heavily trafficked locations will be controlled by spraying surfaces with water;
- Re-suspension of spillages of material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site and by use of a mechanical road sweeper on the public road;
- Soil and other dusty material being removed from site will be transported in covered trucks, where the likelihood of emitting dust is high, and during dry weather conditions the area of removal will be sprayed by a mobile tanker on a regular basis, to control dust emissions;
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that all equipment is well maintained and that machinery is not left idling unnecessarily; and
- Measures to control emissions will be used to prevent a nuisance within the locality where drilling or cutting, grinding or similar types of stone finishing operations are taking place, which may be a significant local source of fine particulate emissions.

Construction noise and vibration will be kept to a minimum in accordance with BS 5228 (BSI 1993, 1999). Noise sources during construction, and mitigation measures, are assessed in Section 10 of this EIS.

It is anticipated that, with proper management, the construction phase of the development will not have significant or long-term negative impacts.

2.9.2 Operational Phase

The following measures will be implemented:

- Road spraying and sweeping will be employed to control dust from the proposed facility;
- A wheel wash will be installed and all vehicle exiting the facility will be required to use it to control mud and dust;
- Visual site inspections will be implemented to ensure litter does not linger on-site;
- A waste management procedure for wastes generated on-site including canteen wastes, administration wastes, etc. will be implemented to ensure recycling and recovery of waste streams associated with the operation of the site;
- It is estimated there will be 50 incoming waste deliveries daily. It is proposed that all trucks both entering and departing the site will do so to/from the west along the R623 accessing the N8/N25 at the Dunkettle Interchange. As management of the facility will ensure that trucks utilising the site enter and exit the site via the Dunkettle roundabout, the successful implementation of this scheme will ensure that there will be no net increase in HGV's in residential area of Little Island. In addition to the truck movements there will be staff cars arriving and leaving during the peak periods. It is assumed that there will be 5 additional car movements arriving in the morning and leaving in the evening;
- Vermin control measures will not likely be required since no putrescible waste is to be stored on-site. An appropriate rodent control specialist will be contracted if required;
- Environmental monitoring programmes including noise, dust, surface water for the facility are outlined in the relevant sections of the EIS;
- A decommissioning plan is described in section 2.10 below. The plant and infrastructure to be used at the site is largely mobile and/or temporary in nature. Therefore, it is not envisaged that there will be significant issue in restoring the site;

All wastes will be removed from the site by licensed/permitted contractors on closure of the facility; and

- A landscaping plan for the facility is included in Appendix 4, Volume 2.

2.10 Decommissioning and Restoration

2.10.1 Overview

The proposed C,D&E Facility will be a temporary development in operation for the lifetime of the restoration programme (estimated to be a ten year period) and is required to adhere to the requirements of the existing IPPC licence and planning permission. The outline plan presented below sets out the actions to be taken prior to closure of the facility. Successful decommissioning will only be complete when all buildings, equipment, materials wastes or any other materials, which could result in environmental pollution, are removed from the Application Site in accordance with the conditions of the planning permission, waste licence and other pertinent regulations. The EPA will need to be satisfied that the decommissioning is complete before the waste licence is surrendered.

The Decommissioning Plan is based on the following:

- A review of the types of activities to be carried out on the Application Site, including waste handling and recovery options.
- Identification of potential hazards, including an evaluation of the waste products typically stored on-site and bund integrity.
- Identification of all items of plant and other materials, including buildings that may be decommissioned, rendered safe or removed from the Application Site for disposal or recovery in the event of closure of the facility.

The following areas will be dealt with during decommissioning.

2.10.2 Materials

All materials and wastes present at the C,D&E Facility will be returned to the supplier, or disposed/recovered by a licensed waste contractor. This would include any fuel present in the storage tanks or any other materials required for the day to day running of the equipment.

2.10.3 C,D&E Waste

All excess waste present in stockpiles will be recovered/disposed of off-site by a licenced waste contractor. Any fill material will be removed and used for the capping.

2.10.4 Equipment & Processes Materials

The main equipment used during the process would be loaders, excavators, crushers and screeners. This equipment will be either sold for operational use or as scrap at an approved waste disposal/ recovery facility. Cleaning of the majority of plant and equipment will be carried out on-site as it will not have processed hazardous material during the operation lifetime.

2.10.5 Environmental Monitoring Results & Reports

Environmental monitoring carried out under conditions of the waste licence to be granted will identify if any investigations or post closure monitoring is required to ensure that the facility poses no continuing risk to the environment. This will be reviewed based on monitoring data obtained during the operational period.

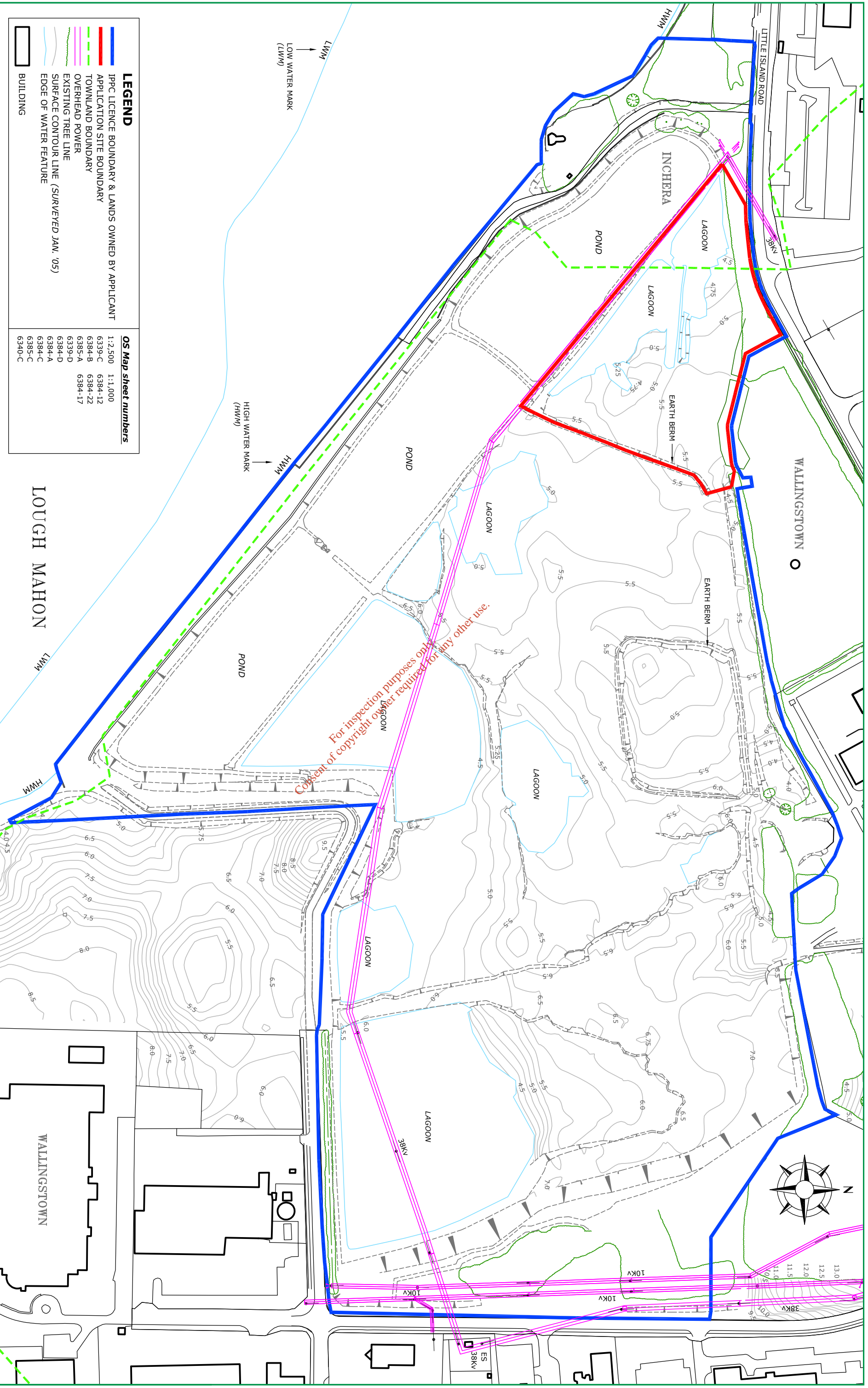
2.10.6 Restoration Grading

The Application Site will be re-graded in accordance with a closure and restoration plan that will be agreed with the EPA under a condition of the waste licence. The restoration surface on the Application Site will blend into the adjoining restored lagoon/pond areas. It is anticipated that the restoration levels on the Application Site will not be too dissimilar to the heights shown on Figure 2.3.

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FIGURES

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LEGEND

- IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
- APPLICATION SITE BOUNDARY
- TOWNLAND BOUNDARY
- OVERHEAD POWER
- EXISTING TREE LINE
- SURFACE CONTOUR LINE (SURVEYED JAN. '05)
- EDGE OF WATER FEATURE
- BUILDING

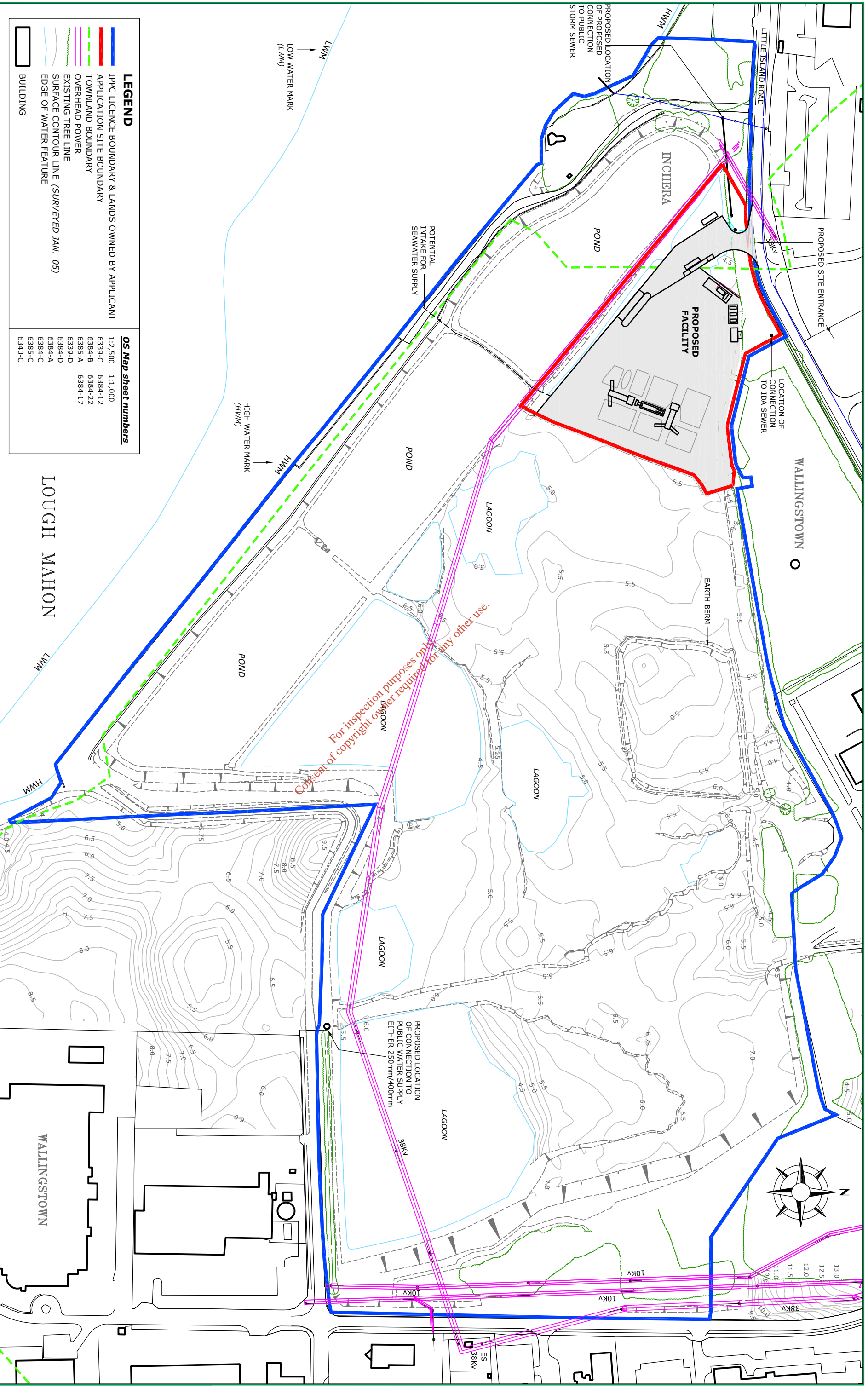
OS Map sheet numbers

1:2,500	1:1,000
6339-C	6384-12
6384-B	6384-22
6385-A	6384-17
6339-D	
6384-D	
6384-A	
6384-C	
6385-C	
6340-C	

<p>Client: THORNBUSH HOLDINGS Ltd.</p>		<p>Project number: 07507120021</p>		<p>Created by: CC</p>		<p>Issue to: EIS ISSUE TO CORK CO. CO.</p>		<p>Date: April '08</p>		<p>Revision: A</p>		<p>Title: EXISTING CONDITIONS SITE OVERVIEW</p>		<p>Figure No.: 2.1</p>	
<p>Location: WALLINGSTOWN, LITTLE ISLAND, CO. CORK</p>		<p>File Location: GRAPHICS\2 LAND DEVELOPMENT (AUTOCAD)\THORNBUSH\EIS\2.1</p>		<p>Checked by: DK</p>		<p>EIS ISSUE EPA:</p>		<p>May '08</p>		<p>B</p>		<p>Scale: 1:1,250 A1 1:2,500 A3</p>			
<p>Project: PROPOSED CD&E FACILITY</p>		<p>ORDNANCE SURVEY IRELAND LICENCE NUMBER: AR0056008</p>		<p>Reviewed by: GP</p>											

Golder Associates

TOWN CENTRE HOUSE, DUBLIN ROAD, MAAS CO. KILDARE
 TEL: 045 874411 - FAX: 045 874519 - WWW.GOLDER.COM

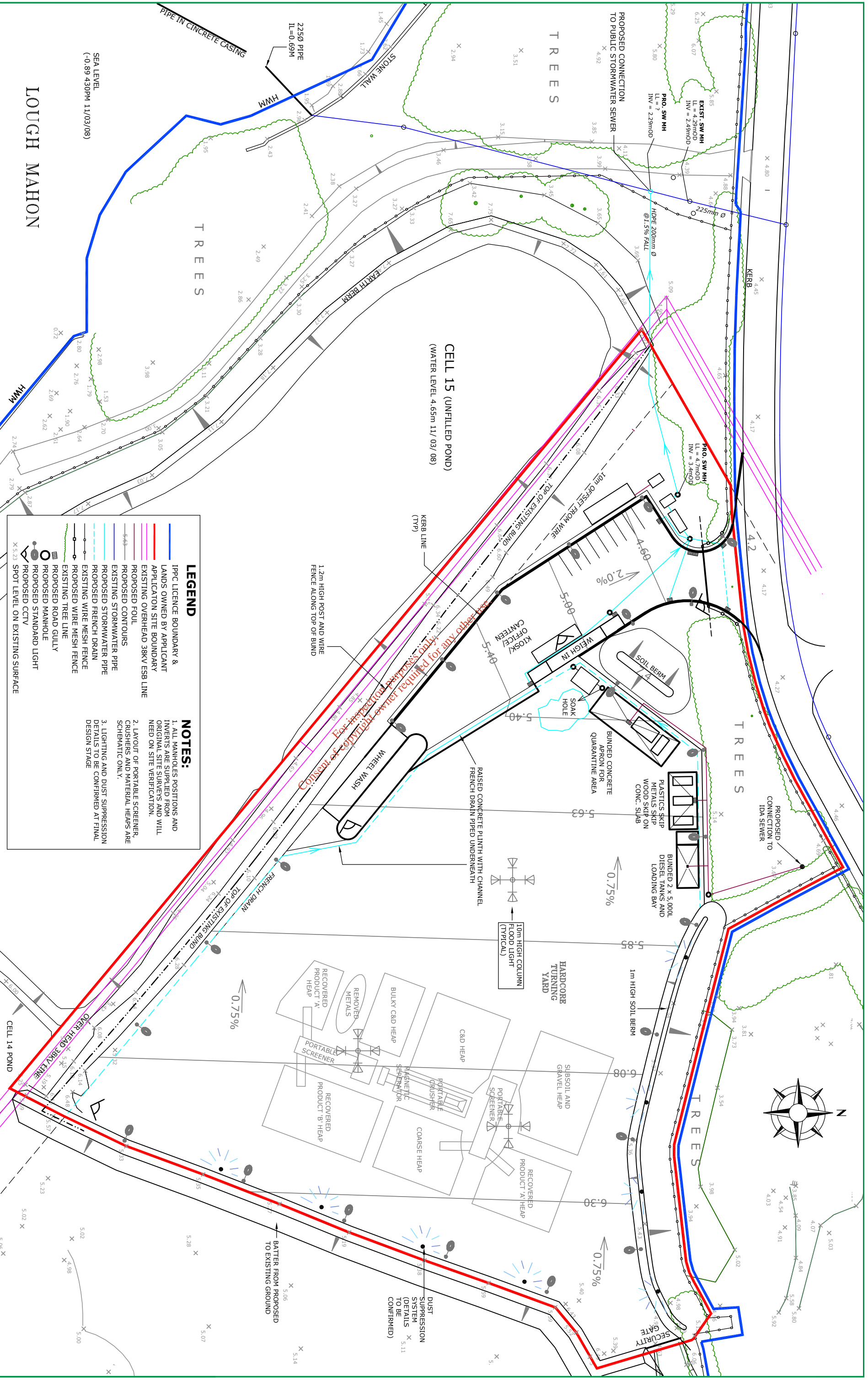


LEGEND	
	IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
	APPLICATION SITE BOUNDARY
	TOWNLAND BOUNDARY
	OVERHEAD POWER
	EXISTING TREE LINE
	SURFACE CONTOUR LINE (SURVEYED JAN. '05)
	EDGE OF WATER FEATURE
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6339-D	6384-D
6384-A	6384-A
6385-C	6384-C
6340-C	6340-C

Client:	THORNBUSH HOLDINGS Ltd.
Location:	WALLINGSTOWN, LITTLE ISLAND, CO. CORK
Project:	PROPOSED CD&E FACILITY
Project number:	07507120021
File Location:	GRAPHICS\2 LAND DEVELOPMENT (AUTOCAD)\THORNBUSH\EIS12.2
Created by:	CC
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Date:	April '08
Revision:	A
Issue to:	EIS ISSUE TO EPA
Date:	May '08
Revision:	B
Title:	EXISTING AND PROPOSED CONDITIONS SITE OVERVIEW
Figure No.:	2.2
Scale:	1:1,250 A1 1:2,500 A3

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 TEL: 045 874411 - FAX: 045 874549 - WWW.GOLDER.COM



LEGEND

- IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
- APPLICATION SITE BOUNDARY
- EXISTING OVERHEAD 38KV ESB LINE
- PROPOSED FOUL
- PROPOSED CONTOURS
- EXISTING STORMWATER PIPE
- PROPOSED STORMWATER PIPE
- EXISTING FRENCH DRAIN
- PROPOSED WIRE MESH FENCE
- EXISTING TREE LINE
- PROPOSED ROAD GULLY
- PROPOSED MANHOLE
- PROPOSED STANDARD LIGHT
- PROPOSED CCTV
- SPOT LEVEL ON EXISTING SURFACE

NOTES:

1. ALL MANHOLES POSITIONS AND INVERTS ARE SUPPLIED FROM ORIGINAL SITE SURVEYS AND WILL NEED ON SITE VERIFICATION.
2. LAYOUT OF PORTABLE SCRENER, CRUSHERS AND MATERIAL HEAPS ARE SCHEMATIC ONLY.
3. LIGHTING AND DUST SUPPRESSION DETAILS TO BE CONFIRMED AT FINAL DESIGN STAGE

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<p>Project number: 07507120021</p> <p>File Location: GRAPHICS\2 LAND DEVELOPMENT (AUTOCAD)\THORNBUSH\EIS\2.3</p> <p>ORDNANCE SURVEY IRELAND LICENCE NUMBER: AR0056008</p>	<p>Created by: CC</p> <p>Checked by: DK</p> <p>Reviewed by: GP</p>	<p>Issue to: EIS ISSUE TO CORK CO. CO.</p> <p>EIS ISSUE TO EPA</p>
<p>Date: April '08</p> <p>Revision: A</p>	<p>Date: May '08</p> <p>Revision: B</p>	<p>Title: PROPOSED SITE LAYOUT OVERVIEW</p> <p>Scale: 1:400 A1 1:800 A3</p>
<p>Figure No.: 2.3</p>		

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3.0 TRAFFIC

3.1 Introduction

PMCE Ltd was commissioned in November 2007 by Golder Associates Ireland to undertake a review of the likely traffic impacts at the location of the proposed CD&E Facility on a ca. 2.2ha. site in the townlands of Wallingstown and Inchera, Little Island in Co. Cork (the Application Site). The full report and Road Safety Audit are included in Vol 2, Appendix 3.

3.2 Methodology

In preparing the report, reference was made to various guideline documents. The methodology adopted for this appraisal and report involved, in brief:

- A site visit;
- Classified Traffic Counts undertaken on the 16th January 2008 at two locations;
- Existing Traffic Assessment – The traffic count data was used to develop a PICADY model for the proposed access; and
- Future Year Assessments – The estimated future year volumes on the study area network, as a result of the increase in background traffic and the additional development related traffic was used to assess the future operational performance of the junctions both at the year of opening of the development and at an assessment year.

3.3 Existing Environment

3.3.1 Road Network

The Application Site is bounded to the north by the R623. No access currently exists onto the R623 from the Application Site at this location. As part of the development it is proposed to construct an access from the Application Site directly onto the R623.

The N25 is the primary Cork to Rosslare route which also serves the east and south of Cork city. In the vicinity of the proposed Application Site the N25 is a dual carriageway with grade separated interchanges. Little Island can be accessed from the N25 by one of two interchanges, to the west the Dunkettle Interchange and from the east the Little Island Interchange. The National Roads Authority estimate the Annual Average Daily Traffic (AADT) for the N25 to be 51,516 with HGV's accounting for 6.5% of road traffic. These figures are derived from traffic counter data for 2007 and are based on 245 days of recorded data, as published on the NRA website for the traffic counter located at Little Island, on the western side of the Little Island Interchange.

The R623 is a single carriageway route that runs from the N25 at the Dunkettle Interchange at its western end to the N25 at the Little Island Interchange at its eastern end. It runs through Little Island village and is the primary route serving the majority of employment centres in the area. The R623 is a single carriageway road with footpaths along either one or both sides of the road. The road is busy during peak periods. It is proposed to develop an access onto the R623 from the Application Site.

3.3.2 Traffic Volumes

Two classified traffic counts were carried out on the R623 on the 16th January 2008 at the junction of the R623 and the Waterfront Business Park Road to the east of the Application Site, and on the R623 at the three arm roundabout to the north west of the Application Site. The counts were carried out between 7:00am and 7:00pm. This time period encompasses the proposed main operating hours of the construction and demolition waste facility and also includes the peak hours on the R623. Surveyed vehicles were broken down into five categories as follows:

- Cars;
- LGV's (Light Goods Vehicles);
- OGV1 (Two and three axle goods vehicles);
- OGV2 (Four and five axle goods vehicles); and
- Buses.

Results of the traffic surveys are summarised in Tables 3.1 and 3.2.

Table 3.1: Two-way Surveyed Flows and Calculated AADT for R623/Waterfront Business Park Junction

Hour Ending	R623 West	Local Road	R623 East
08:00	635	305	604
09:00	913	308	871
10:00	428	223	441
11:00	307	173	314
12:00	325	175	320
13:00	363	227	416
14:00	349	209	390
15:00	404	247	443
16:00	400	254	398
17:00	589	336	553
18:00	683	221	666
19:00	369	105	326
Period Total	5765	2783	5742
<i>Period Total HGV's</i>	<i>497</i>	<i>389</i>	<i>492</i>
<i>% HGV's</i>	<i>8.62%</i>	<i>13.98%</i>	<i>8.57%</i>
Total AADT	8283	3998	8250

Table 3.2: Two-way Surveyed Flows and Calculated AADT for R623 Roundabout at Richmond Road and Inchera Road

Hour Ending	Richmond Road	R623	Inchera Road
08:00	494	711	221
09:00	661	1012	361
10:00	291	449	164
11:00	146	298	162
12:00	143	313	174
13:00	118	351	247
14:00	153	334	183
15:00	169	379	216
16:00	136	384	254
17:00	106	633	535
18:00	57	769	714
19:00	80	379	307
Period Total	2554	6012	3532
<i>Period Total HGV's</i>	<i>198</i>	<i>483</i>	<i>299</i>
<i>% HGV's</i>	<i>7.75%</i>	<i>8.03%</i>	<i>8.47%</i>
Total AADT	3669	8638	5074

3.3.3 Site Entrance

It is proposed to provide an access from the Application Site onto the R623. The location of this entrance in relation to the proposed development at the Application Site and the R623 has been shown in Section 2, Figure 2.2. The proposed access road will be 6.0 metres in width, and the junction with the R623 will comply with the requirements of the Road Geometry Handbook (NRA). The location of the access has been chosen to maximise available sightlines for approaching and exiting vehicles, and at a location not directly below existing overhead electricity cables so as to minimise risks to operatives during construction and following opening.

3.3.4 Adjacent Proposed Development

A significant scheme which is currently at planning stage was identified as being potentially significant in relation to traffic flows in the vicinity of the proposed development and its access. This site is located directly to the northeast of the proposed development. The site in question is being developed by Howard Holdings plc and the proposed development is to consist of office and light industrial units of approximately 47,681m² Gross Floor Area. Howard Holdings plc propose to develop 42,123m² of office floor space and 5,579m² of warehouse/light industry floor space. This development has been considered in the traffic assessment below.

3.4 Assessment

3.4.1 Forecast Traffic

Based on the proposed incoming volumes of materials, and assuming a peak factor of 2 to take account of short-term peaking in incoming material, a 'worst case scenario' figure of 100 waste deliveries per day during peak times has been estimated. In addition, trips associated with exporting unsuitable material, staff trips and other miscellaneous trips have been considered.

With regards to trip assignment and in consultation with the planning Authority, two scenarios have been assessed:

- Scenario A: 100% to/from the R623 West; and
- Scenario B: 80/20 directional split West/East.

It is considered that site traffic will travel to/from the Dunkettle Interchange to avoid delays associated with travelling via the Little Island village area as it represents the shortest route to/from Cork City where a high percentage of the imported material is likely to be sourced and to avoid any potential public perceived nuisance associated with haulage traffic travelling through the village area. Nevertheless two traffic scenarios have been assessed in order to

assess the potential impacts associated with traffic generated by the proposed development under both scenarios.

3.4.2 Link Capacity

The National Roads Authority’s document “Traffic and Transport Assessment Guidelines” (September 2007) states that a full Traffic and Transport Assessment is not required if the development traffic does not exceed 5% of the two way flow on the adjoining road where congestion exists or in sensitive locations. Table 3.3 gives the development traffic as a percentage of the traffic on the R623. The level of development trips associated with the proposed scheme does not constitute a traffic impact on the basis of the National Roads Authority’s criteria.

Table 3.3: Peak Hour Link Capacity Assessment

	R623 EXISTING TRAFFIC (VEHICLES PER HOUR)			DEVELOPMENT TRAFFIC (VEHICLES PER HOUR)			DEVELOPMENT TRAFFIC AS A % OF EXISTING TRAFFIC		
	2008	2009	2018	2008	2009	2018	2008	2009	2018
Excluding Adjacent Development									
AM	1050	1069	1190	37	37	37	3.5	3.5	3.1
PM	782	785	886	37	37	37	4.7	4.7	4.2
Including Adjacent Development									
AM	1050	1232	1356	37	37	37	3.5	3.0	2.7
PM	782	944	1036	37	37	37	4.7	3.9	3.6

3.4.3 Junction Capacity Analysis

The capacity of the existing access between the R623 and the site entrance was assessed using the Transport Research Laboratory's (TRL) computer programme PICADY (Priority Intersection Capacity and DelaY). Junction performance is measured as a ratio between the flow and capacity (RFC). The capacity analysis has been carried out for both the AM and PM Peaks for each of the assessment years (2008, 2009 and 2018). An urban junction with an RFC below 0.85 is considered to be operating within capacity, with an RFC of 0.85 indicating a junction operating at capacity. For rural junctions, with 100 kph speed limits on the approaches, an RFC of 0.75 is taken to represent capacity.

The junction capacity was assessed under the two assignment scenarios:-

- Scenario A: 100% of trips to/from R623 west; and
- Scenario B: 80/20 West/East directional split.

Tables 3.4 presents a summary of the analysis for 2008. Turning movements are illustrated in the main report, Appendix B, along with analyses for 2009 and 2018.

The turning movements for both the AM and PM peaks are shown. The PICADY analysis indicates that the existing junction will continue to operate within capacity for each of the Assessment Years for all scenarios assessed.

Table 3.4: Summary of PICADY Junction Capacity Analysis for 2008

	MAXIMUM RFC	MAXIMUM QUEUE (VEHICLES)	QUEUING DELAY (MIN/VEH)
Scenario A – AM Peak			
Site Access	0.056	0.1	0.22
R623	0.068	0.1	0.22
Scenario A – PM Peak			
Site Access	0.082	0.1	0.22
R623	0.067	0.1	0.29
Scenario B – AM Peak			
Site Access	0.062	0.1	0.25
R623	0.060	0.1	0.21
Scenario B – PM Peak			
Site Access	0.105		0.25
R623	0.232	0.4	0.34

3.5 Mitigation

The assessment indicates that the development of the C,D&E Facility at the proposed location will not have a negligible impact on the existing road network due to the low volumes of the traffic to be generated by the proposed development. The PICADY analysis indicates that the existing junction will continue to operate within capacity for each of the Assessment Years for all scenarios assessed. The priority junction formed by the proposed access to the Application Site with the adjacent R623 Regional Road will be capable of accommodating the generated traffic in both the opening and assessment years. In addition, an assessment of the proposed access including traffic flows from the possible future planned adjacent development, the priority junction formed will continue to operate within capacity over the proposed lifespan of the Waste Recovery Facility.

While the assessment indicates the link capacity and the access junction capacity will operate within capacity for both Scenario A and B, Scenario A is recommended in order to avoid routing HGV's through Little Island Village. It is therefore recommended that an Operational

Traffic Management Plan be developed to encourage heavy vehicles to travel to/from the Application Site via the Dunkettle Interchange.

Mitigation measure relating to potential dust and noise impacts of traffic from the proposed development are dealt with in Sections 9 and 10 respectively.

3.6 Residual / Likely Significant Effects

Based on the analysis presented in this section it is anticipated there will be no significant residual impacts as a result of the proposed development on traffic.

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4.0 HUMAN BEINGS

4.1 Introduction

Human beings are a key element for consideration in the EIS process. Impacts on human beings, as a result of the proposed development of a CD&E Facility are assessed in the succeeding sections with appropriate mitigation measures provided.

The human beings section has been broken down into the following subsections:

- Population;
- Land-use, housing and infrastructure;
- Local Economic Activity and Employment;
- Amenities; and
- Health and Safety.

Issues relating to potential dust and noise impacts arising from development of the Application Site are dealt with in Sections 9 and 10, respectively. Traffic impacts are dealt with in Section 3, with a full traffic report included in Volume 2 Appendix 3. An environmental assessment of the impact of the development on human beings is provided below.

4.2 Methodology

Information for the assessment of the impacts on the human beings was obtained by means of a desk-based review and from the following sources:

- Census Returns (CSO 1996, 2002 and 2006);
- Cork County Development Plan (2003-2009);
- 1:50,000 Discovery Map – Sheet 87;
- Landscape Report (Section 11, Volume 2, Appendix 4);
- Field surveys of the Application Site and other local knowledge.
- Recycled Aggregates (2005) EIS – C&D Waste Recovery Facility, Little Island, Co. Cork.

The existing environment is described, the impacts from the Application Site are identified and assessed and where possible mitigation measures are proposed in the following subsections.

4.3 Existing Environment

The proposed CD&E Facility is located in the north-western corner of a Brownfield Site in the townlands of Wallingstown and Inchera, Little Island. The Application Site comprises waste lagoons formerly used by Mitsui Denman (Ireland) Limited for the disposal of waste from the production of Electrolytic Manganese Dioxide (EMD), which was used in the manufacture of dry cell batteries (Planning Ref: 1466/73). The Application Site, and the townlands of Wallingstown and Inchera, are within the Caherlag Electoral Division.

4.3.1 Population

According to the 2006 Census, the total population of Caherlag DED is 6,555 persons. This represents an increase of 1,277 persons (24%) over the 2002 census figures. Over the same period the 2006 Census results indicate that the population of Cork City is 119,418 persons. This represents a decrease of 3,644 persons (3%) over the 2002 census figure. The Cork Area Strategic Plan (CASP) predicts that the population of Cork City will grow by 12,010 to 135,820 by 2020 and the population for metropolitan Cork will grow by 53,010 to 180,710 by 2020.

Table 4.1: Population Change at State, Province, County and Local Level, 1996 to 2006

Area	1996	2002	% Change	2006	% Change
STATE	3,626,087	3,917,203	8.0%	4,239,848	8.2%
Munster	1,003,903	1,100,614	6.5%	1,173,340	6.6%
Cork County and City	420,510	447,829	6.5%	481,295	7.5%
Cork County	293,323	324,767	10.7%	361,877	11.4%
Cork City	127,187	123,062	-3.2%	119,418	-3.0%
Caherlag DED	4,157	5,278	26.97%	6,555	24.2%

Source: <http://www.cso.ie/census/>
1996 and 2002 data from Recycled Aggregates (2005)

The chart above illustrates the relative increase of Caherlag's population compared to average State, Province and County levels. It also illustrates Cork City's relative decrease in population over the same period. This could be indicative that citizens are moving towards the suburbs and away from the industrial areas.

The age distribution of Caherlag has remained fairly consistent. The primary trend differences in the 2006 census are a relative decrease in the total percentage of the 10-19 age bracket, and a relatively significant increase in the 20-39 age bracket.

Table 4.2: Age Demographic Changes in Caherlag DED

Age	1996		2002		2006	
	No.	Total %	No.	Total %	No.	Total %
0 to 9	627	15.1%	875	16.6%	1,119	17.1%
10 to 19	880	21.2%	810	15.4%	839	12.8%
20 to 39	1,143	27.5%	1,754	33.3%	2,391	36.5%
40 to 59	1,066	25.6%	1,275	24.2%	1,520	23.2%
60+	441	10.6%	556	10.6%	686	10.5%

Source: <http://www.cso.ie/census/>
1996 and 2002 data from Recycled Aggregates (2005)

4.3.2 Landuse, Housing and Infrastructure

The Cork County Development Plan 2003 classifies the area as a Strategic Industrial Area, and the Application Site is zoned as Primarily Industry/Enterprise. Further, the Draft Cork County Development Plan 2007 classifies the area as a Strategic Employment Centre. Industrial, manufacturing and pharmaceutical facilities are located near the Application Site. Much of the landscape between the Application Site and Cork City, particularly along the northern coastline of the harbour is characterised by industrial, commercial, dockland and port activity. There is, however, a small, long-established residential population in Little Island located to the west of the Application Site.

Non-industrial uses in the vicinity of the site include a sports and community facility to the north of the former Mitsui Denman site, and a housing estate of approximately 50 dwellings (St Lappin's Terrace) and a school over 700m to the north east. There is a golf course located to the east of the industrial area of Little Island.

In terms of road infrastructure, the R623 Little Island Road runs to the north of the Application Site. To the east this links to the Dunkettle Interchange allowing access to a variety of national routes to Cork City, Dublin and Waterford. To the west the R623 links to the N25 Cork-Waterford road via the Little Island Interchange.

4.3.3 Local Economic Activity and Employment

The tables below illustrate the changes in employment and workforce over the time period 1996 – 2006. Of interest are the following trends which have materialised in the Caherlag DED between 1996 and 2006:

- While the total numbers employed in the primary industry sectors have changed since the 1996 census, the percentage employed for each sector relative to the total population has remained fairly constant.
- There has been an increase in the size of the labour force, with a significant increase in numbers employed but a decrease in numbers unemployed. This is indicative of Ireland's recent economic boom.

Table 4.3: Employment Structure of Caherlag DED

PERSONS AT WORK BY INDUSTRY	1996		2002		2006	
	No.	%	No.	%	No.	%
Agriculture, forestry and fishing	61	4	43	2	39	1
Building and Construction	81	5	161	7	270	8
Manufacturing	477	30	524	22	720	22
Transport	98	6	129	6	178	6
Commerce and Trade	297	19	692	30	925	29
Public Administration	70	4	129	6	154	5
Professional Services	311	20	362	15	459	14
Other	187	12	303	13	481	15
TOTAL	1,582	-	2,343	-	3,226	-

Source: <http://www.cso.ie/census/>
1996 and 2002 data from Recycled Aggregates (2005)

Since 2002, the total number of persons employed in the primary industries (manufacturing, commerce and trade, and professional services) industries have increased, but the relative percentage of the total population employed in these industries has not changed. The population of Caherlag may be employed in other locations including Cork City, but there remains a move away from traditional industry as a source of employment.

Table 4.4: Labour Force of Caherlag DED

Persons	1996	2002	% Change	2006	% Change
Employed	1,582	2,343	48%	3,226	38%
Unemployed	174	156	-10%	130	-17%
Labour Force ^{Note1}	1,756	2,499	42%	3,356	34%
Age 15+	3,098	4,003	29%	3,607	-10%

Source: <http://www.cso.ie/census/>
1996 and 2002 data from Recycled Aggregates (2005)
Note 1: Labour Force is persons employed plus persons unemployed

4.3.4 Amenities

Tourism is an important factor in the Cork Harbour area with a well known hotel chain recently locating a hotel on Little Island approximately 1km to the east of the Application Site adjacent to the Little Island Interchange. A golf course (Cork Golf Club) is located to the east of the Application Site past the adjacent industrial facilities. A public walkway leading to the grotto feature, and beyond to the shoreline of Cork harbour, is located directly to the west of the Application Site. The Application Site itself is a Brownfield site and currently has no amenity value.

4.3.5 Health and Safety

At present the Application Site is secure, and there is low potential of causing health and safety issues for local residents and workers.

4.4 Assessment

4.4.1 Population

Due to the current industrialised nature of the area, it is considered that the proposed development of a CD&E Facility at the Application Site will not have a significant impact on the population trends of the area.

4.4.2 Landuse, Housing and Infrastructure

The proposed development will result in a shift in landuse from a derelict site to a waste recovery facility in the short and medium term. While specific longer term landuse of the site cannot be speculated on at this stage, the Application Site and surrounding waste lagoons are to be restored for beneficial use in keeping with County Development Plan objectives for the area.

The Application Site is not located in the immediate vicinity of a hospital, hotel or school. The nearest residential area and school is over 700m away. Impacts relating to traffic, air quality and noise at this location are dealt with in Sections 9 and 10 respectively.

4.4.3 Local Economic Activity and Employment

It is not predicted that the proposed development will have a negative impact on employment. Employment opportunities will be created, directly and indirectly, at the construction and operational stages of the proposed development. As the site remains in an area characterised predominately by manufacturing and pharmaceutical industries, it poses no conflict to small and medium sized enterprise uses.

The main areas of concern with respect to the potential effects of the development on the human environment are related to air quality, noise, visual impacts and traffic. Impacts relating to air quality, noise and visual impacts are dealt with in Sections 9, 10 and 11 respectively. A traffic assessment for the proposed development was undertaken and results are presented in Section 3, with a full report included in Volume 2 Appendix 3.

4.4.4 Amenities

The proposed development provides for the restoration of a Brownfield site located in a high profile position on the edge of Lough Mahon. As such, the development allows for the possible positive impact on the surrounding landscape viewed by visitors to Cork Harbour in the medium term.

The closest amenity to the Application Site is a public walkway located to the west. Negative impacts to walkers utilising this walkway are possible due to noise, dirt and dust generation, and increased traffic, as a result of the proposed development. These impacts are likely to be mostly confined to the construction phase which is short-term in nature however, they are considered to be minor given that appropriate mitigation measures will be followed (as detailed in the relevant sections of the EIS). Medium-term impacts associated with the operational phase will be intermittent, depending on the supply of CD&E waste. It is considered that these impacts will also be minor for walkers given that appropriate mitigation measures will be applied and ongoing monitoring will ensure that the facility operates within the terms of its waste licence. The restoration of the derelict waste lagoons is a requirement of current planning permission and IPPC licensing for the Site and will ultimately provide a positive environmental impact both for the wider environment and for recreational users of the adjacent shoreline walkway.

The Application Site is not within a designated scenic landscape (Cork County Development Plan, 2003-2009). Therefore the Application Site will have a neutral impact on scenic landscapes and routes in the area as identified in the Cork County Development Plan. (Further dealt with in Section 11 with a full report in Appendix 4 Volume 2).

4.4.5 Health and Safety

Any development may give rise to both occupational and public accidents and waste management schemes are no exception. However, accidents to the public are extremely unlikely as the site is not a municipal facility. Potential health and safety impacts during the construction and operational phases of the proposed development may include:

- Risk associated with the erection of buildings and equipment;
- Risks associated with traffic movement;
- Exposure to dust and noise; and
- Working with heavy duty equipment.

In order to reduce the risk of health and safety impacts, the site will have an appointed Health and Safety Manager who will be responsible for implementing the on-site Health and Safety Plan. Required Health and Safety standards will be maintained by training and sign posting

of safety information on site. Hazardous materials will not be stored on-site. Only diesel oil and waste will be stored on site, both of which will be stored securely. The site does not fall under the SEVESO Directives (96/82/EC; 2003/105/EC).

4.5 Mitigation

Mitigation measures relating to traffic, dust, noise and visual impacts are dealt with in Sections 3, 9, 10 and 11 respectively. Proper management and maintenance procedures will be followed on site to ensure that there is no impact of the proposed development in terms of litter, dirt, dust and noise.

No additional remedial or reductive measures are proposed with respect to the population of the area, as the development will have no perceivable negative impact on the population of structure or demography of residents in the area. The development will be entirely beneficial in employment terms.

Having regard to the potential Health and Safety impacts, safety signs will be erected at the site and all construction work will take place with regard to relevant legislation.

Operations during the lifespan of the facility will be conducted inline with the relevant legislation and implementation of the site Health and Safety Plan and will be overseen by the Health and Safety Manager.

4.6 Residual / Likely Significant Effects

If the appropriate measures are implemented there will be no significant effects of the development on the socio-economic situation and the population in the area. Potential impacts felt by recreational users of the public walkway will be minimal once proper management systems on-site are fully implemented.

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5.0 FLORA AND FAUNA

5.1 Introduction

This section presents the results of an ecological impact assessment for a proposed CD&E Facility at a ca. 2.2 ha site in Wallingstown and Inchera, Little Island, Co. Cork ('the Application Site'). The Application Site is located in the north-western corner of a ca. 29.1 ha Brownfield site comprising waste lagoons ('the Thornbush Site'). Its development in the 1970s was undertaken by Mitsui Denman (Ireland) Limited and involved the excavation of large artificial lagoons to facilitate waste material from an adjacent industrial plant. It was subsequently bought by Thornbush Holdings, who are obliged to restore the site under the existing planning permission (Planning Ref: 1466/73) and the IPPC licence (No. P0389.01). The proposed CD&E waste recovery facility will facilitate the restoration of the Thornbush Site.

A detailed baseline ecological survey of the Thornbush Site, inclusive of the Application Site, was undertaken on 7th, 8th and 9th of February 2008. Following on from this an impact assessment was carried out on the impact of the proposed development on flora and fauna. This assessment was conducted in accordance with 'EPA Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002), 'EPA Advice Notes on Current Practice' (EPA, 2003), and with reference to the 'Guidelines for Ecological Impact Assessment in the United Kingdom' (JNCC, 2006).

5.2 Methodology

A desktop review was conducted of all available published information and unpublished information together with consultation with National Parks and Wildlife Services (NPWS) to identify key habitats and species that may be present, particularly those protected by legislation. The main source of historical information was the comprehensive set of ecological surveys carried out for the entire former Mitsui Denman site and the immediate surrounding environs undertaken for Thornbush Holdings in regard to a number of previous planning applications including the Recycled Aggregates EIS in 2005 (Planning Ref: 05/5616), and referenced herein as Lewis (2005).

A walkover survey of Thornbush Site was conducted during February 2008 to record the habitats and flora of the area. Habitat Assessment follows Joint Nature Conservation Committee (JNCC) Phase One Habitat Survey methodology (JNCC, 1990, revised 2003) and the 'Habitat Survey Guidelines' (Draft 2, Heritage Council, 2005). Aerial photographs and site maps assisted the habitat survey. Fauna were recorded by sightings, signs of activities or dens/roosts.

Habitats are named and described following Fossitt (2000). Nomenclature for higher plants principally follows that given in Webb *et al.* (1996). Habitats are assessed according to the site evaluation scheme contained in the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2006), these are given in Appendix 5.1.

The survey was carried out in February and it is therefore likely that some species may have been under-recorded. In relation to mammals, the survey was based upon sightings and signs of mammal activity during the habitat survey and also the identification of possible suitable habitats. The survey was carried out before the main bird breeding season (typically March to July) and during the latter part of the wintering bird period. Photographs mentioned throughout the report are shown in Appendix 5.2 of this section. Notwithstanding the above the Lewis surveys and original ecological assessments were undertaken between Jan and Jun 2005 and provide for representative data.

5.3 Existing Environment

5.3.1 Ecological landscape of the Thornbush Site

The Thornbush Site is located at Wallingstown in the southwest of Little Island, County Cork. It lies adjacent to Lough Mahon in the upper reaches of Cork Harbour. The Application Site is located in the north-western corner of the Thornbush Site and has been partially colonised by mosses and other vegetation (Photo 5.1). A small area of open water occurs in the far western corner edged by rushes and scrub. At the time of survey, the Site was not in use, it is grazed by rabbits and this has kept grasses and scrub in check in the revegetating areas.

The Thornbush Site comprises grassland verges, scrub, treelines, waste impoundment lagoons, recolonising and bare ground (Photos 5.2-5.4). Some of the lagoons are drained exposing silt/mud covered in mosses and recolonising vegetation, other lagoons contain water with edge vegetation. An area of woodland and a small stream occur in the east of the Thornbush Site.

Beyond the Thornbush Site the surrounding land is dominated by industrial activity with some residential development. Lough Mahon (Cork Harbour) occurs on the south and west of the Thornbush Site.

5.3.2 Areas of nature conservation

The Application Site and the wider Thornbush Site are not designated for conservation purposes. Nature conservation designations and their locations with respect to the proposed

development are summarised in Table 5.1 below. These designated areas occur within the vicinity of the Application Site.

Cork Harbour SPA occurs in close proximity (approximately 100m) to the Application Site. The boundary has been reviewed recently by NPWS to include the intertidal area up to high tide mark along the shoreline of Wallingstown. This SPA qualifies under 4.1 of the Birds Directive (79/409/EEC) as it supports populations of European importance of a number of

Table 5.1: Designated conservation areas within the vicinity of the Application Site

Site	Site Code	Status	Approx. Distance from Application Site
Cork Harbour	4030	SPA	100m S
Douglas River Estuary	1046	NHA	500m SW
Great Island Channel	1058	SAC/NHA	3km E
Rock Farm Quarry	1074	NHA	1km SE
Dunkettle Shore	1082	NHA	600m NW

Annex I species of the Directive including Golden Plover (*Pluvialis apricaria*), Little Egret (*Egretta garzetta*) and (during the breeding season) Common Tern (*Sterna hirundo*). The SPA also supports populations of European importance of migratory species – Black-tailed Godwit (*Limosa limosa*) and Redshank (*Tringa totanus*).

Cork Harbour also contains a Ramsar site. According to internationally agreed criteria, Cork Harbour is a wetland of 'International Importance' for wetland birds. These criteria are reviewed and updated at a meeting of the Ramsar Convention held every three years, at which the contracting parties attend. Ireland is one of these parties. Although there are (currently) eleven criteria by which a wetland may be identified as being of 'International Importance', two important ones relate to numbers of wetland birds. These state that a wetland must (1) regularly support 20,000 wetland birds, or (2) regularly support 1% of the individuals in a population of one species of wetland bird. Cork Harbour qualifies by regularly supporting in excess of 20,000 wintering waterfowl. Also, seven species occurred in numbers of 'International Importance' in the period before 1995, although only two did so regularly (Black-tailed Godwit and Redshank), while 23 species occurred in numbers of 'National Importance'. Since 1995, the Black-tailed Godwit and Redshank have held their 'International Importance' status, and 19 species have occurred in numbers of 'National Importance'¹.

¹ <http://www.corkharbour.ie/birds.htm>

The Cork Harbour complex encompasses the designated sites of Dunkettle Shore pNHA, Douglas River Estuary pNHA and Great Island Channel SAC/pNHA. These designated areas form wetland and mudflat areas important for many bird species. The site synopsis for each of the designations listed in Table 5.1 are given in Appendix 5.3.

5.3.3 Description of Habitats within the Application Site

The Application Site is dominated by 'spoil and bare ground' habitat with some 'recolonising ground' in the east, and a partially inundated waste lagoon edged by rushes and scrub in the west. The northern boundary is edged by a fence and treeline. The habitats recorded at the Application Site are given in Table 5.2.

Table 5.2 Habitats of proposed development at Wallingstown, Little Island

Habitat	Habitat code
Scrub	WS1
Treeline	WL2
Other artificial lakes and ponds	FL8
Recolonising bare ground	ED3
Spoil and bare ground	ED2

Scrub WS1

Scrub occurs in association with the treeline on the northwest corner of the Application Site. It is dominated by Gorse (*Vlex europaeas*) with Buddleja (*Buddleja davidii*), Hawthorn (*Crataegus monogyna*), Escallonia (*Escallonia macrantha*), Dog-rose sp. (*Rosa* sp.), Bramble (*Rubus fruticosus* agg.) and Willow sp. (*Salix* sp.). The canopy is generally dense and ground flora sparse, where the scrub opens the ground flora reflects the adjacent grassy embankment.

Treeline WL2

The treeline edges the roadside boundary of the Application Site and is part of the original planted boundary of the former Mitsui Denman plant. The tree component is poor with very few species including Buddleja (*Buddleja davidii*), Cherry laurel (*Prunus laurocerasus*), Hawthorn (*Crataegus monogyna*) and Sycamore (*Acer pseudoplatanus*).

Other artificial lakes and ponds FL8

Water fills part of the lagoon area in the western edge of the Application Site and appears shallow, with some emergent vegetation comprising mainly Sea-club rush (*Bolboschoenus*

maritimus) on the north western edge, beyond which are scrub and trees on a high embankment. No floating vegetation was visible on the day of survey. The presence of Seaclub rush would indicate that the water is brackish. The saline influence is probably from sea spray.

Spoil and bare ground ED2

Areas of bare ground composed of the exposed waste material dominates the proposed development area. The ground is colonised mainly by mosses and is largely devoid of vegetation apart from some pioneer species including Creeping bent (*Agrostis stolonifera*), Creeping thistle (*Cirsium arvense*), Common ragwort (*Senecio jacobaea*), Greater willowherb (*Epilobium hirsutum*) and Yorkshire fog (*Holcus lanatus*) occurring in gaps and cracks in the surface. Sea milkwort (*Glaux maritima*) and Lesser Sea-spurrey (*Spergularia marina*) amongst other species have been noted in the general habitat in previous studies and these salt loving species indicate high saline content of the sediments (Lewis, 2005). The spoil and bare ground gradually grade eastward into recolonising bare ground where vegetation becomes more established and covers approximately 70% of the surface.

Re-colonising bare ground ED3

Re-colonising bare ground comprises the plant species; Bramble (*Rubus fruticosus*), Broad-leaved dock (*Rumex obtusifolium*), Buddleja (*Buddleja davidii*), Creeping bent (*Agrostis stolonifera*), Creeping buttercup (*Ranunculus repens*), Creeping thistle (*Cirsium arvense*), Common ragwort (*Senecio jacobaea*), Dandelion (*Taraxacum* agg.), Daisy (*Bellis perennis*), False oat-grass (*Arrhenatherum elatius*), Greater willowherb (*Epilobium hirsutum*), Glaucous sedge (*Carex flacca*), Hawkbit spp. (*Leontodon* spp.), Lesser celandine (*Ranunculus ficaria*), Meadow-grass spp. (*Poa* spp.), Red fescue (*Festuca rubra*), Teasel (*Dipsacus fullonum*), White clover (*Trifolium repens*) and Yorkshire fog (*Holcus lanatus*). Pampas grass (*Cortaderia selloana*), a robust exotic grass which has probably come from adjacent ornamental planted beds has taken hold next to the treeline that borders the north of the Application Site.

5.3.4 Habitats in the adjacent Thornbush Site

The surrounding area within the Thornbush Site largely comprises the remaining waste impoundment lagoons which edge three sides of the Application Site to the east, west and south. These are within the IPPC-licensed boundary as indicated on Figure 5.1. Habitats within this boundary are described below.

Scrub WS1

Scrub occurs along embankments edging the lagoons, in the central revegetating area, and in the stream valley in the east of the Thornbush Site. Scrub in the stream valley is dominated by Willow sp. (*Salix* sp.) and Bramble (*Rubus fruticosus* agg.) along with some individual specimens of Sycamore (*Acer pseudoplatanus*), Common Ash (*Fraxinus excelsior*), Holly (*Ilex aquifolium*) and Oak (*Quercus* sp.) extending from the nearby woodland. Part of this scrub area has been cleared to erect fencing and this has given rise to patches of open areas of recolonising bare ground within the scrub with pioneer species such as Cleavers (*Galium aparine*), Crucifer sp. (*Brassica* spp.), Common ragwort (*Senecio jacobaea*), Dandelion (*Taraxacum* agg.), Dead nettle sp. (*Lamium* sp.) and Thistle sp. (*Cirsium* sp.).

Treelines WL2

There are a number of treelines both edging and within the waste lagoons. The treeline along the northern boundary is dominated by Norway Maple (*Acer platanoides*) with Poplar (*Populus* sp.) towards the eastern edge. This treeline runs behind a hedgerow of New Zealand Broadleaf (*Grisilinea littoralis*). The eastern treeline contains Poplar (*Populus* sp.), Cypress (*Cupressus leylandii*) and Ash (*Fraxinus excelsior*) and grades into the small area of woodland (WD1) described below. Another treeline dominated by Poplar (*Populus* sp.) and Cypress (*Cupressus leylandii*) edges the southern and western part of the hardstanding area.

Mixed Broadleaved Woodland WD1

The description and species list of woodland that follows has been compiled based on species recorded during the current survey, in addition to species recorded by Lewis (2005) during the flowering season.

In the area of woodland to the west of the Application Site (Figure 5.1), Sycamore (*Acer pseudoplatanus*) and other non-native species, including Cherry Laurel (*Prunus laurocerasus*), dominate the canopy, with Holly (*Ilex aquifolium*), Ash (*Fraxinus excelsior*) and Oak (*Quercus* sp) occasional. Elder provides an understorey with Holly, and suggests that the area is nutrient enriched. Ivy (*Hedera helix*) dominates the ground flora. Further woodland, grading into scrub habitat (described above) occurs to the east of the Thornbush Site. Ash and Sycamore dominate, with Oak, Holly, Hawthorn and Elder also present, and vigorous growth of Clematis is smothering some trees. Lying and standing dead wood is present. The ground flora is sparse, with Ivy, ferns and Arum Lily frequent and Ground Ivy occasional. The canopy is open in places; Bramble and Bracken are dominant where trees have been removed to provide space for electricity lines.

Other artificial lakes and ponds FL8

While some of the waste impoundment lagoons within this area are filled with water, others have been completely infilled with waste with the substrate at various stages of recolonisation by mosses and vascular plants. The three water-filled lagoons located along the seaward edge of the Thornbush Site are entirely flooded and all three are linked by openings in the dividing embankments. These lagoons dry out at times as indicated by the presence of submerged scrub.

Depositing/lowland rivers (and streams) FW2

In the east of the Thornbush Site beyond the waste lagoons and embankment, a stream of unknown source emerges from below ground through an area of mixed woodland and scrub for a short distance south where it disappears again at the adjacent road, known as 'Middle Road'. The stream appears to have very little flow and the water is tinged green. The edges of the stream are overgrown on the west side while the eastern edge has been cleared to allow for the erection of fencing, a number of the removed trees, branches and debris lie in the stream. There is no instream vegetation apparent and very little emergent vegetation.

Dry meadows and grassy verges GS2

This habitat occurs on the embankments edging the lagoons and along the edge of the stream. These are generally rank areas dominated by tall grass tussocks with occasional rabbit grazed patches giving rise to somewhat diverse and herb rich grassland species mainly to the east of the Thornbush Site. The lagoon embankments have been planted with a variety of trees and shrubs. Scrub species, mainly Buddleja (*Buddleja davidii*), Bramble (*Rubus fruticosus* agg.) and Gorse (*Ulex europeas*), are invading some areas of grassland. The species list of this habitat that follows has been compiled based on species recorded during the current survey, in addition to species recorded by Lewis (2005) during the flowering season. Species within the grassland include: Velvet Bent (*Agrostis capillaris*), False Oat-grass (*Arrhenatherum elatius*), Daisy (*Bellis perennis*), Knapweed (*Centaurea nigra*), Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Cocksfoot (*Dactylis glomerata*), Tufted Hair-grass (*Deschampsia caepitosa*), Teasel (*Dipsacus fullonum*), Willowherb (*Epilobium* sp.), Red Fescue (*Festuca rubra*), Shining Crane's-bill (*Geranium lucidum*), Yorkshire Fog (*Holcus lanatus*), Hard Rush (*Juncus inflexus*), Winter Heliotrope (*Petasites fragrans*), Ribwort Plantain (*Plantago lanceolata*), Rough Meadow-grass (*Poa trivialis*), Self-heal (*Prunella vulgaris*), Creeping Buttercup (*Ranunculus repens*), Broad-leaved Dock (*Rumex obtusifolius*), Ragwort (*Senecio jacobaea*), Hedge Mustard (*Sisymbrium officinale*), Dandelion (*Taraxacum officinale*), clover (*Trifolium* sp.), Germander Speedwell (*Veronica chamaedrys*), Bush Vetch (*Vicia sepium*), Marsh foxtail (*Alopecurus geniculatus*), Sea beet (*Beta vulgaris* ssp. *maritima*), Sea clubrush

(*Bolboschoenus maritimus*), Soft-brome (*Bromus hordaceus*), Grey sedge (*Carex divulsa* ssp. *divulsa*), False fox sedge (*Carex otrubae*), Saltmarsh rush (*Juncus gerardii*), Alexanders (*Smyrniium olusatrum*), Perennial sowthistle (*Sonchus arvensis*), Sea mayweed (*Tripleurospermum maritimum*).

Stone walls and other stonework BL1

Seaward of the Thornbush Site there is a seawall which has been breached in places by storms and high tides. This wall is largely unvegetated and is fronted by rocks covered in seaweeds dominated by *Fucus* spp. A proposed protected structure, 'the grotto', edged by scrub and woodland is located in the west of the Thornbush Site.

Spoil and bare ground ED2 and Re-colonising bare ground ED3

These habitats dominate the waste lagoons in this area, the colonisation vegetation is as for the description of these habitats within the Application Site (Section 5.3.3).

Buildings and artificial surfaces BL3

The access roads and paths are categorised as 'BL3' habitat under Fossitt (2000).

5.3.5 Flora

NPWS records² indicate that the Thornbush Site is located within the 10km grid square W77. The rare plant species within W77 are given in Appendix 1. One rare Red Data Book plant species - Round-leaved crane's-bill (*Geranium rotundifolium*) was recorded from the dry grassland/stone wall habitat west of the Thornbush Site during a previous study (Lewis, 2005). It is noted in that study that this species is common on limestone on Little Island and surrounds and is well-monitored by the BSBI Recorder for Cork.

No legally protected plant species (as listed under the Flora Protection Order 1999 or Annex II of the EU Habitats Directive) were recorded from the Application Site or the wider Thornbush Site during the current survey. However, three locally scarce species Yellow bartsia (*Parentucellia viscosa*), Square-stemmed willowherb (*Epilobium tetragonum*) and Bristly ox-tongue (*Picris echioides*) have been noted in open and disturbed areas within the Thornbush Site and may occur within the Application Site. The area was searched for these species during the current survey but they were not located. While they may now be absent from the area, it is also possible that they were not recorded as the current survey took place outside of the main flowering season.

² www.npws.ie (mapviewer)

5.3.6 Fauna – Mammals

No legally protected mammal species (as listed under Annex II of the EU Habitats Directive) were recorded from the Application Site during the current survey. NPWS records indicate that they hold records of Otter (*Lutra lutra*), Red squirrel (*Sciurus vulgaris*), Hedgehog (*Erinus europaeus*), Pygmy shrew (*Sorex minutus*) and Stoat (*Mustela erminea*) at Mahon which is located on the opposite shore of Lough Mahon (Appendix 4.4).

Although there were no sightings of any mammals during the site visit, there were signs of Fox (*Vulpes vulpes*), Rabbit (*Oryctolagus cuniculus*) and Brown rat (*Rattus norvegicus*) within the Application Site and in the surrounding area.

Rabbit burrows are present in the waste lagoons adjacent to the Application Site, mainly on embankments, and rabbit grazing is apparent in the grassy areas to the east of the Application Site. Rabbit droppings were abundant within and around the Application Site. Fox tracks were noted across the Application Site and the surrounding waste lagoons, with a fox hole in the embankment to the south of the Application Site. Rat holes were common on old spoil heaps.

Hedgehog (*Erinus europaeus*) droppings were noted to the east of the Application Site and they may forage along the treeline and scrub edging the Application Site. This species is protected under the Irish Wildlife Act 1976 (Amended 2000). All of these species were previously recorded by Lewis (2005).

It is possible that other mammal species may use the Application Site and surrounding waste lagoons, including species that favour hedgerows/scrub such as Wood mouse (*Apodemus sylvaticus*), Bank vole (*Clethrionomys galarolus*), Stoat (*Mustela erminea*) and Pygmy shrew (*Sorex minutus*). The latter two are protected under the Irish Wildlife Act 1976 (Amended 2000).

Otter (*Lutra lutra*), an Annex II species of the EU Habitats Directive has been previously noted along the coastal edge beyond the Application Site. During this survey otter spraints were recorded along the stream east of the Application Site and the adjacent waste lagoons, however there is no suitable water body within the Application Site or its environs for this species and it is likely that they do not use the Application Site.

No Badger signs (*Meles meles*) were found during the survey as this species is extinct on Little Island since the mid 1990s.

Lewis (2005) recorded three species of bat foraging in the scrub and trees in the surrounding areas of the Application Site, however there was no sign of any bats within the wider Thornbush Site, including the Application Site, during the study.

5.3.7 Fauna - Birds

5.3.7.1 Terrestrial bird survey

Within the Application Site bird species are few, as a result of the limited habitat area available. The species observed in the treeline and scrub of the Application Site include the following; Chaffinch (*Fringilla coelebs*), Goldfinch (*Carduelis carduelis*), Greenfinch (*Carduelis chloris*), Great tit (*Parus major*), Robin (*Erithacus rubecula*) and Blackbird (*Turdus merula*). Pied wagtail (*Motacilla alba*) are also present on the Application Site and are attracted to the disturbed and bare areas of the waste impoundment lagoons where they can see and catch insects especially around the areas of standing water. Moorhen *Gallinula chloropus* and Snipe *Gallinago gallinago* were flushed from the rushes edging the lagoon in the northwestern part of the Application Site. Overall the species recorded in this survey are similar to those recorded by Lewis (2005). The terrestrial bird species within the Application Site and the wider Thornbush Site are given in Table 5.3.

Within the Thornbush Site habitats of particular importance to terrestrial birds include woodland and associated scrub areas. The dry grassland and gorse scrub habitat beyond the Thornbush Site to the south-east has been cleared for development recently, however the remaining rough grassland component still supports high numbers of Meadow Pipit (*Anthus pratensis*) and Linnet (*Carduelis cannabina*).

Table 5.3: Bird species observed during the winter terrestrial bird survey. Latin names and conservation status of the bird species are given in Appendix 5.5

Bird Species	Application Site	Thornbush Site Waste Lagoons	Thornbush Site Woodland	Thornbush Site Recolonising vegetation, grassland and scrub
Grey Heron		*		
Shelduck		*		
Mallard		*		
Teal				
Little Grebe		*		
Tufted duck		*		
Merlin				
Pheasant				
Moorhen	*	*		
Lapwing				
Woodcock				
Snipe	*	*		*
Wood			*	*
Meadow				*
Grey Wagtail				
Pied Wagtail	*			
Wren			*	*
Duncock			*	*
Robin	*		*	*
Stonechat				*
Song Thrush			*	
Blackbird	*		*	*
Goldcrest			*	
Great Tit	*			
Coal Tit				
Blue Tit	*		*	*
Long-tailed			*	
Magpie			*	*
Jackdaw				*
Rook			*	*
Starling				*
Chaffinch	*		*	*
Linnet				*
Goldfinch	*		*	*
Greenfinch			*	*
Bullfinch			*	
Total species	9	7	15	17

5.3.7.2 Estuarine bird surveys

As the Application Site lies close to Cork Harbour SPA, an estuarine bird survey was carried out. The four study sections used by Lewis (2005) were also used in the current survey to establish consistency in reporting. The following section details the findings of both the current survey and that carried out by Lewis (2005). The four sections comprise the intertidal and subtidal channel area of Lough Mahon to the west and south of the Thornbush Site (Appendix 5.6). Section 1 to the west of the Thornbush Site, comprises a muddy intertidal area with gravel and the uppershore dominated by rocks covered with seaweed (*Fucus* sp.) (Photo 5.5). Section 2, to the southwest of the Thornbush Site, had a very narrow intertidal area, only exposed at extreme low water. Section 3, to the south of the Thornbush Site had a wider rocky furoid intertidal zone. Section 4, to the far south east of the Thornbush Site comprises a wider mudflat intertidal area that continues along the southern shore of Little Island.

Low-tide survey

The number of bird species in the four sections ranged from 9-11 species in the current study and 7-13 in Lewis (2005) as shown in Tables 5.4 and 5.5. Of the four study sections, Section 4 recorded the greatest diversity of bird species and a greater number of total birds in both studies and this can be attributed to the wider mudflat area providing foraging areas for birds. Section 1 and 2 are immediately adjacent to the Thornbush Site and the narrow band of exposed mudflat is used mainly by Curlew (*Numenius arquata*), Redshank (*Tringa totanus*) and Oystercatcher (*Haematopus ostralegus*). Dabbling ducks including Wigeon (*Anas Penelope*) and Mallard (*Anas platyrhynchos*) were present further out in the channel. Great-Crested Grebe (*Podiceps cristatus*) and Red-Breasted Merganser (*Mergus serrator*) were observed further from shore in the deeper channel area. All other birds within these sections were observed further from shore in the deeper channel. A factor that will influence bird usage of Section 2 is human disturbance caused by frequent walkers and dogs on the path running adjacent to the seawall. Section 3, with a wider furoid zone, attracted numerous Turnstone (*Arenaria interpres*) that forage by turning the algae over to find invertebrate prey beneath. The lands adjacent to Section 3 have been recently given planning permission for the development of industrial units.

Table 5.4: Peak numbers of estuarine birds observed within study sections during low-tide survey (6th January 2008)

Species	Section 1	Section 2	Section 3	Section 4
Great-Crested Grebe	0	0	2	3
Cormorant	1	0	2	1
Grey Heron	0	1	0	0
Mallard	4	4	2	2
Wigeon	8	2	6	4
Red-Breasted Merganser	0	2	4	0
Oystercatcher	2	6	0	8
Turnstone	0	0	16	28
Dunlin	3	1	7	88
Redshank	6	6	3	1
Black-tailed Godwit	0	7	4	12
Curlew	1	4	0	7
Black headed gull	22	5	4	2
Lesser Black-backed gull	2	0	0	0
Total Number of Species	9	10	10	11

Table 5.5: Peak numbers of estuarine birds observed within study sections during low-tide survey (23rd January 2005). Source Lewis (2005).

SPECIES	Section 1	Section 2	Section 3	Section 4
Mallard	4	6	0	1
Wigeon	5	6	15	3
Red-Breasted Merganser	0	4	3	0
Oystercatcher	2	1	0	11
Turnstone	1	0	29	22
Dunlin	1	0	0	150
Redshank	8	2	1	2
Greenshank	0	0	0	2
Black-tailed Godwit	0	0	0	3
Curlew	2	5	0	5
Black-headed gull	16	2	2	1
Total Number of Species	12	8	7	13

High-tide survey

The high-tide estuarine bird survey aimed to assess whether estuarine birds use any of the shoreline areas adjacent to the Thornbush Site as high-tide roost sites. Bird species recorded within the study sections 1-3 (Appendix 5.6) are shown in Tables 5.6 and 5.7.

Birds were not abundant within shoreline stretches adjacent (Sections 1 and 2) suggesting that these sections are not major roost areas for estuarine birds. The physical characteristics of these shorelines and potential disturbance caused by human activity (e.g. walkers and dogs) also supports this conclusion. Section 3 which is to the far south-east of the Thornbush Site and directly south of the rough grassland area appears to support good numbers of roosting and foraging Turnstone during the high-tide period. This shoreline section provides a wider shore area covered with fucoid algae (as described above). With no easily accessible pedestrian access, this section also offers a more sheltered and disturbance-free roost area.

Table 5.6: Peak numbers of estuarine birds observed within study sections during the high water survey (8th February 2008)

SPECIES	Section 1	Section 2	Section 3
Wigeon	4	0	6
Oystercatcher	2	0	0
Turnstone	0	0	18
Redshank	3	2	5
Black-tailed Godwit	1	0	0
Curlew	0	0	1
Black-headed gull	5	2	0
Total number of species	5	2	4

Table 5.7: Peak numbers of estuarine birds observed within study sections during the high water survey (18th February 2005). Source Lewis (2005)

SPECIES	Section 1	Section 2	Section 3
Mallard	2	2	1
Wigeon	4	0	6
Oystercatcher	0	0	5
Turnstone	0	0	44
Redshank	5	0	4
Black-Tailed Godwit	1	0	0
Curlew	1	0	1
Total number of species	5	1	6

Lagoon surveys

A survey of the lagoon area within the Application Site indicates that it is of very limited value to birdlife due to the small area of open water available. Only two species, Moorhen and Snipe, were observed using the Application Site during the current survey. Ringed Plover were observed foraging and roosting on the bare and exposed ground of the lagoons by Lewis (2005).

A few bird species are attracted to the lagoons within the Thornbush Site along the seaward edge. These lagoons are used by Shelduck, Tufted duck, Mallard, Little grebe, Grey Heron, Moorhen and Snipe (Table 5.3). It should be noted that the lagoons contain a combination of process water and site drainage water (storm waters/rainwater) on top in some instances of Mitsui Denman waste material which was deposited in the lagoons as a slurry/paste. The presence of standing water on the lagoons may therefore represent a potential pollutant pathway for the bioaccumulation of potential contaminants in the waste to wider ecological systems. The restoration and capping of the lagoons provides for the environmental remediation of the Site.

5.3.7.3 Breeding bird survey

As the current survey was carried out before the breeding bird season, the breeding bird survey data is taken from Lewis (2005). Of the species recorded, the ones that may use the tree and scrub part of the Application Site include Dunnock, Robin, Blackbird, Great tit, Blue tit, Chaffinch and Greenfinch. Mallard, Shelduck and Moorhen may use the rushes and treeline/scrub edge. Ringed Plover were observed within the flat, bare areas of the waste impoundment lagoons.

Appendix 5.7 presents a list of all bird species recorded within or adjacent to the Application Site during the breeding bird surveys of 2005. Birds were assumed to be breeding if males were holding territories (territorial song) or if direct observations of e.g. adults carrying food (indicative of provisioning of young) or observations of juveniles themselves, were made. Given the small size of the Application Site, it is unlikely all these species would be breeding on-site.

5.3.8 Fauna - Reptiles and amphibians

The time of survey was not suitable for recording amphibians or reptiles. The previous survey of the Thornbush Site by Lewis (2005) did not record amphibians or reptiles. The influence of adjacent saline waters and the presence of predators, such as Brown rat, on the Thornbush Site may have deterred the use of the site by the Common frog (*Rana temporaria*). Although this species is widely distributed throughout Ireland, it was not

recorded on Little Island in a previous survey (Lewis, 2005). The Common lizard (*Lacerta vivipara*) is recorded from County Cork but not from Little Island (Marnell, 2002).

5.3.9 Fauna - Invertebrates

A detailed study of invertebrates is presented Lewis (2005), although it is noted that the surveys were seasonally and meteorologically restricted. The restriction of the current survey to Spring along, with the unfavourable weather on the days of survey meant that an invertebrate survey was not feasible. Given the limited area/habitat that the Application Site covers it is likely that some species may utilise the Site. These may include moths, dragonflies, damselflies and butterflies such as the Speckled wood, Common white and Orange-tip. The most favourable habitats noted by Lewis (2005) for terrestrial invertebrates include the dry grassland habitats, south-facing margins of scrub and woodland habitat. These habitats are absent or poorly represented within the Application Site. The waste impoundment lagoon (partially drained) which dominates the Application Site is considered of little value to terrestrial invertebrates.

5.3.10 Species of Conservation Importance

Although the Application Site was not specifically indicated, the presence of the uncommon species Yellow bartsia (*Parentucellia viscosa*), Square-stemmed willowherb (*Epilobium tetragonum*) and Bristly ox-tongue (*Pteris echioides*) have been noted on disturbed and recolonising ground with the waste lagoon areas of the Thornbush Site. As noted, the possibility that these species exist within the Application Site cannot be ruled out despite not having recorded them in the current survey, which may have been due to seasonal factors.

5.3.11 Adjacent Site of conservation importance – Cork Harbour SPA

Cork Harbour is the closest designated site to the proposed CD&E Facility, lying approximately 100m from the Application Site, and is therefore it is evaluated below. Five separate areas within Cork Harbour, all on estuarine mudflat and amounting to approximately 1,420ha have been designated as an SPA and part of this area is also designated as a Ramsar site.

The most recent I-WeBS data calculated as a five-year average for the winters 1998/99 – 2002/03 (shown in Appendix 5.8) shows that Cork Harbour supports internationally important numbers of Redshank, Black-Tailed Godwit and Bar-Tailed Godwit and nationally important numbers of a further 19 bird species: Little Grebe, Great-Crested Grebe, Shelduck, Wigeon, Gadwall, Teal, Red-Breasted Merganser, Moorhen, Ringed Plover, Golden Plover, Lapwing, Dunlin, Black-Tailed Godwit, Bar-Tailed Godwit, Curlew, Redshank, Greenshank

Black-Headed Gull and Common Gull. Of the regularly occurring bird species, Golden Plover and Little Egret are also listed as Annex I species under the EU Birds Directive.

Areas in closest proximity to the Application Site at Little Island that are counted as part of the I-WeBS scheme are Douglas Estuary to the south-west, Dunkettle Estuary to north-west and the Belvelly Marino Point area to the south-east (Table 5.8). Douglas Estuary sub-site supports nationally important numbers of Shelduck, Dunlin and Black-Tailed Godwit with numbers close to the national threshold for Redshank. Douglas Estuary also supports nationally important numbers of the Annex I species Golden Plover. Likewise, Dunkettle Estuary, a relatively small Cork Harbour sub-site, supports nationally important numbers of Golden Plover and Dunlin, together with a further 13 other regularly occurring waterbird species. The Belvelly-Marino Point sub-site supports nationally important numbers of Golden Plover, Shelduck, Dunlin and Redshank with numbers of Black-Tailed Godwit close to the national threshold. This sub-site supports 21 regularly occurring waterbird species.

I-WeBS data therefore shows that the areas of Cork Harbour surrounding the proposed development site on Little Island support a diversity and abundance of wading birds and waterfowl during winter. These areas support significant proportions of bird species, whose abundances over Cork Harbour as a whole, qualify as nationally or internationally important and as such are one of the qualifying interests of the site as a SPA. The SPA area nearest to the Application Site is an integral part of the overall SPA and provides intertidal foraging grounds during the low-tide periods when the birds are distributed over available exposed areas of mud to probe for their invertebrate prey.

Table 5.8: I-WeBS data for Cork Harbour showing average peak counts of selected bird species within three sub-sites (Dunkettle, Belvelly-Marino & Douglas Estuary) and the average peak counts for Cork Harbour as a whole. (Based on a five-year averages for the winters 1998/99 – 2002/03). * National Importance; ** International Importance. Source Lewis (2005).

Species	Dunkettle Estuary sub-site	Belvelly Marino Point sub-site	Douglas Estuary sub-site	Whole Harbour
Dunlin	1432*	2181*	1717*	6413*
Black-Tailed Godwit	125	163	488*	2373**
Redshank	62	575*	321	1955**
Golden Plover	1804*	103	3733*	4396*

5.4 Assessment

5.4.1 Evaluation

5.4.1.1 Habitats

The assessment of the impact of the proposed development on each habitat at the Application Site is given in Table 5.9 and is based on the NRA Site Evaluation Scheme, included in Appendix 5.1. The proposed development will involve the loss of bare and recolonising ground along with some loss of scrub and trees. Most of the treeline will be retained for screening purposes, except where it will be necessary to remove vegetation for the construction of the site entrance, and will be enhanced where gaps occur.

Table 5.9: Site/Habitat Evaluation using NRA Scheme

Habitat name	Habitat Code	Rating
Scrub	WS1	E - Low Local Value
Treeline	WL2	E - Low Local Value
Other artificial lakes and ponds	FL8	E - Low Local Value
Recolonising bare ground	ED3	C – High Local Value
Spoil and bare ground	ED2	E - Low Local Value

The Application Site is dominated by waste impoundment lagoons some of which have begun to recolonise. A small patch of scrub and treeline edges the northern boundary of the site. The value of these habitats is poor. The scrub and trees edging the northern boundary of the Application Site were planted for screening and contain exotic species with some Gorse naturally colonising in places. These habitats no doubt provide some refuge, feeding area, corridors for the movement of animals and birds as well as the dispersal of plant species, however, for the most part are not considered significant or valuable habitats for wildlife.

5.4.1.2 Flora

Cork is the national stronghold for Square-stemmed willowherb (*Epilobium tetragonum*) which is considered an alien species in Ireland (Preston *et al.*, 2002). It appears to be common in the Cork Harbour area, and is spreading into semi-natural vegetation. Loss of this site will not threaten the survival of the local population (Lewis, 2005). Bristly ox-tongue (*Picris echioides*) is known to be an alien casual and will be difficult to retain, unless disturbance is on-going. It is becoming widespread in the Cork area and is likely to spread nationally, therefore it is not considered a species of conservation concern (Lewis, 2005).

Yellow bartsia (*Parentucellia viscosa*) is a native hemi-parasitic annual of damp, open grassy places on sandy soils, normally occurring on drier duneslacks, but is increasingly found in rough, scrubby grassland and waste places (Preston *et al.*, 2002). It thrives on disturbance. It is known from the surrounding areas of Little Island but has not been recorded there since the 1980s. There is a decline of this species in the south-west of Ireland (Lewis, 2005).

5.4.1.3 Fauna

Terrestrial Birds

None of the bird species observed during the terrestrial bird surveys (2005 and 2008) are listed on Annex I of the Bird's Directive. One species (Lapwing) observed by Lewis (2005) are Red Listed (high conservation concern) within Birds of Conservation Concern in Ireland (Newton *et al.*, 1999) but as described above, would be regarded as a temporary visitor to the site. A further 6 species (Shelduck, Teal, Merlin, Snipe, Woodcock and Stonechat are Amber Listed Species, defined as having medium conservation concern. Of these, only one would be regarded as a regularly occurring species within the area (Stonechat) as opposed to the other five species that are considered temporary/occasional winter visitors.

Breeding Birds

The breeding bird survey described by Lewis (2005) encompasses the entire Thornbush Site. None of the species observed during the breeding survey are listed on Annex I of the Bird's Directive. Similarly, none are Red listed under Birds of Conservation Concern in Ireland (Newton *et al.*, 1999). Seven species are Amber listed and a few may occur within the Application Site boundary including Snipe, Stonechat and Lesser Whitethroat.

Estuarine Birds

During the low-tide survey no Annex I species were observed in those sections close to the Application Site (Section 1 and 2). The Red listed species – Curlew and Amber listed species – Great-crested grebe, Cormorant, Dunlin, Redshank, Black-headed gull and Black-tailed godwit were all observed close to the Application Site.

The high-tide survey indicates that the shoreline edging the wider Thornbush Site is not an important roosting area for birds however it does form an integral part of Cork Harbour SPA.

Mammals

The three mammal species that occur on Application Site are Fox, Rabbit and Rat. None of these species are considered of conservation value and will readily inhabit adjacent habitats. The impact of the proposed development is considered neutral with respect to these species.

Bats and Otters are known to occur beyond the Application Site boundary. These are both Annex II species under the EU Habitats Directive (92/43/EEC), listed in the Berne Convention and protected under the Wildlife Act 1976 (Amended 2000).

Terrestrial Invertebrates

The diversity of invertebrates within the wider Thornbush Site was considered moderately good by Lewis (2005), the habitats noted as most favourable for invertebrates occur outside of the Application Site and include the dry grassland habitats, south-facing margins of scrub and woodland habitat. Given the limited area of suitable habitat available within the Application Site, it is classified as E (Low value, locally important) for invertebrates.

5.4.2 Impact Assessment

5.4.2.1 Habitats

Table 5.10: Site/Habitat Impact Assessment using NRA Scheme

Habitat name	Habitat Code	Rating	Impact
Scrub	WS1	E - Low Local Value	Neutral
Treeline	WL2	E - Low Local Value	Neutral
Other artificial lakes and ponds	FL8	E - Low Local Value	Neutral
Recolonising bare ground	ED3	C – High Local Value	Moderate Negative
Spoil and bare ground	ED2	E - Low Local Value	Neutral

The habitats are assessed as follows:

Scrub WS1

This habitat is rated as E (Low value, locally important). The value of scrub is limited due to the poor value of species present. There will be a permanent impact on a very small part of the Application Site as the removal of the scrub will result in the loss of potential nesting and foraging sites for a number of taxa, including birds, mammals and invertebrates. However, it is likely that the mammals, birds and insects displaced from the area of scrub will readily inhabit linked treeline and woodland/scrub directly west of the Application Site. The impact is considered neutral under the NRA scheme.

Treeline WL2

This habitat is rated as E (Low value, locally important). The treeline that borders the northern edge of the Application Site forms part of the planted screening of the former Mitsui Denman factory. There will be a permanent impact on a very small part of the Application Site as the removal of some trees will be necessary to provide site access and safe views to the road. The impact is considered neutral under the NRA scheme, reflecting the poor quality of the treeline comprising mainly non-native species.

Other artificial lakes and ponds FL8

A very small area standing water occurs in the western corner of the Application Site. The water level fluctuates and is brackish in nature. The lagoons are not connected directly to the adjacent harbour area and are likely to be of little value for aquatic fauna. The impact of the loss of this habitat is therefore considered neutral.

Spoil and bare ground

The surface of the waste lagoon within the Application Site has been partially colonised by moss other common pioneer vegetation, however the habitat is considered to be of low ecological value. The impact of the proposed development on this habitat is therefore considered to be neutral.

Recolonising bare ground

Disturbance of re-colonising ground, will involve loss of a small area of annual vegetation and re-establishing grassland, that is composed largely of common grasses and weedy species that are widespread in the local area. However, the presence of the three locally uncommon species - Yellow bartsia (*Parentucellia viscosa*), Square-stemmed willowherb (*Epilobium tetragonum*) and Bristly ox-tongue (*Picris echioides*) noted by Lewis (2005) cannot be ruled out.

However, only one of these - Yellow bartsia (*Parentucellia viscosa*) is identified as having conservation interest, although it has no legal protection. Following the precautionary principle therefore this habitat is therefore rated as 'C' as it is possibly of high local value if Yellow Bartsia in particular is found to be present on-site. The impact of the loss of this habitat is therefore considered of potential moderate negative significance.

5.4.2.2 Flora

As noted above, the potential loss of Yellow barstia from the Application Site is potentially of moderate negative significance.

5.4.2.3 Fauna

Habitat Loss

Habitat loss will be the main impact to the fauna of the Application Site. The removal of a small area of scrub, trees and recolonising bare ground is likely to impact a small number of breeding and foraging bird species using the Application Site. However, it is likely that any birds, mammals and invertebrates that are displaced from the small area will readily inhabit the better quality scrub, woodland and associated grassland areas within the adjacent Thornbush Site.

The main impact of the loss these habitats to bird, mammals and invertebrate species is therefore considered of neutral significance.

Snipe and Moorhen currently use the water-water edge within the waste impoundment lagoons of the Application Site, a few waterfowl species were observed in the adjacent lagoons during high tide. The waters contained within the lagoons are of poor quality and may pose a risk to any existing aquatic fauna and foraging birds.

Spoil and bare ground provide a poor environment for foraging by birds and mammals, but pose some risk to any fauna that probe the surface of the waste material in search of prey items.

The impact of the loss of the lagoon waters and bare ground areas is considered neutral.

Noise

Sensitivity to noise disturbance varies amongst bird species. The main noise associated with the proposed development will be from the movement of trucks and humans. The common species currently nesting and feeding in the vicinity of the Application Site are likely to be accustomed to disturbance by humans and traffic, as the trees and scrub are located in an industrial area next to a main R623 road and footpath. It is likely that any birds that are more sensitive to noise will move to adjacent habitats, especially the woodland and scrub to the west of the Application Site.

The significance of the negative impact is considered slight for the duration of the construction and operation stage as there is alternative habitat for the bird species in the wider area.

The study of mammal response to noise is a function of many variables including characteristics of the noise and duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex and age, previous exposure and whether other physical stressors (e.g. hunger) are present. However, the impact of noise decreases with distance and there are areas of additional habitat available for mammals, at a greater distance from the Application Site.

Therefore, the significance of impact is considered slight during construction and operational stage of the proposed development.

Dust

Smothering by dust can interfere with photosynthesis and transpiration of plants and thus growth rates and seed rates etc. Dust can harm invertebrates indirectly by eliminating their habitat or food plants or by making them unavailable, and directly by being toxic or by causing mechanical damage. The effect of dust depends on the prevailing winds and the transport distance is related to particle size. The impact of dust is on flora and fauna is considered minor negative assuming mitigation measures outlined in Section 9 relating to dust suppression are implemented.

5.4.3 Surrounding Habitats – the adjacent waste lagoons

The proposed development will facilitate the planned restoration of the surrounding waste impoundment lagoons. As for the habitats within the Application Site, those within the adjacent lagoon areas are largely of low local value, with the possible exception of the wooded/scrub areas which would be of moderate local value, and any areas where Yellow bartsia is growing which could be considered to be of high local value. The impact of regarding the waste material in places, and capping of the lagoons is considered to be generally neutral in terms of flora and fauna. There may be minor negative impacts associated with noise and dust generation, though the capping activities will be phased and will be subject to limits and on-going monitoring under the waste licence application. Where Yellow is located, appropriate mitigation measures will need to be implemented in consultation with NPWS, to ensure that this species is not removed in its entirety. The restoration of the waste lagoons is expected to be positive in the medium-term with regard to the adjacent SPA as it will involve capping of the exposed waste material and regulation of the site drainage, and will therefore minimise environmental pathways for potential

bioaccumulation of substances. Any future development at this location will be subject to planning and EIS and will need to consider impacts on the adjacent SPA.

5.4.4 Adjacent Site of conservation importance – Cork Harbour SPA

The SPA adjacent to the Thornbush Site is ranked as A (Internationally important) under the NRA scheme.

The main noise associated with the proposed development will be from the movement of trucks and humans. Wading birds and waterfowl using areas of the SPA adjacent to the Thornbush Site may be disturbed during the construction and operation phases of the proposed CD&E Facility. However, the embankments and screening located along the western (seaward) edge of the Thornbush Site provide a buffer to activities within the site. Also, it is noted that the intertidal area directly adjacent to the Site is not a major roosting or feeding area for waders. Once the embankment and screening is retained the impact of Site activities is considered minor and temporary for the duration of the proposed development.

The release of sediment into the adjacent SPA has the potential to interfere with the foraging ability of birds, aquatic and benthic fauna. Sediments have the potential to smother and reduce the availability of habitats for aquatic organisms, to clog fish gills reducing resistance to disease, to lower growth rates and to affect fish egg and larvae development. Nutrients transported by sediments and may also increase algae production, and reducing water quality. The potential negative impact of sediment release associated with the CD&E facility is considered negligible based on the implementation of mitigation measures aimed at preventing sediment release which are outlined in Section 6 of this EIS.

Heavy metals in waste derived sediments have the potential to lead to bioaccumulation of toxic substances in benthic organisms which may be consumed by foraging birds. The proposed development will have a positive impact with regard to such sediments as exposed wastes that may contain heavy metals will be capped, and site drainage will be regulated.

Chemicals that may be toxic to birds and aquatic organisms, such as plant and machinery oils etc, can be released into water if appropriate mitigation measures are not undertaken. The impact of these substances is considered negligible once the mitigation measures given in Section 7 of the EIS are carried out.

5.4.5 Cumulative Impacts

Cumulative Impacts of the proposed development are considered with the proposed adjacent Howard Holdings Ltd development on the former Mitsui Denman manufacturing facility site (Planning Ref: 07/12475).

The Howard Holdings Site is largely comprised of highly modified habitats, which are all anthropogenically influenced and are mostly of extremely low ecological value. Based on the ecological assessment undertaken for this development it appears, assuming mitigation measures are implemented, that the only negative impacts to flora and fauna will result from the removal of an area of woodland habitat. As the habitats described within the proposed CD&E waste recovery facility are generally of low ecological value, and the fact that the proposed development will not result in any additional loss of significant blocks of woodland, the cumulative impacts of the developments on the local flora and fauna will be minor. Given mitigation measures outlined with respect to water, dust and noise for both developments, there does not appear to be any potential to impact either alone or in combination on the nearby SPA.

5.5 Mitigation

Consideration is given to the close proximity of the Application Site to the SPA of Cork Harbour in the mitigation measures below.

5.5.1 Surface water/Runoff

All surface water run-off will be collected and discharge appropriately to minimise the impact on water quality and prevent habitat degradation of the adjacent SPA. Mitigation measures relating to surface water are detailed in Section 7 of this EIS and should be fully implemented.

5.5.2 Dust & Noise

As this is a coastal area it is likely that there will be high winds and an increased chance of dust creation compared with more sheltered terrestrial sites. Mitigation measures relating to dust minimisation during the construction and operational phases of the proposed development are detailed in Section 9 of this EIS and should be fully implemented.

Mitigation measures relating to Noise are detailed in Section 10 of this EIS, and should be fully implemented to prevent excessive disturbance to fauna adjacent to the Application Site.

5.5.3 Birds

Vegetation removal will be restricted to September 1st – March 1st outside of the bird breeding season. Draining of the remaining water lagoon and any associated vegetation should also be undertaken outside of the bird breeding season.

The embankment and screening located along the seaward edge of the Thornbush Site should be retained to act as a buffer zone between the SPA and the proposed development.

5.5.4 Flora

The local ranger (NPWS) should be consulted regarding further action or mitigation to be taken with respect to the potential presence of Yellow bartsia in the area.

5.5.5 Trees & Landscaping

Landscaping/planting for screening will be undertaken along the northern site boundary where existing vegetation is required to be removed during the construction phase, and where enhancements in the vegetation screen are needed. This planting will consist of native species only. In keeping with the adjacent woodland and scrub areas, species recommended for use are Ash, Oak, Holly, Hawthorn and Elder. The planted areas will be linked to existing areas of vegetation to enhance habitat linkages and wildlife corridors.

Trees which are to be retained will be protected from site works and machinery by a 5m buffer zone to prevent damage to the crowns and root systems.

5.6 Residual / Likely Significant Effects

Given the small area being developed and once the recommended mitigation measures are put in place it is probable that there will be little if any, residual effect, if the recommended mitigation.

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APPENDIX 5.1
NRA SITE EVALUATION SCHEME

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Site evaluation scheme (NRA, 2006)

RATING	QUALIFYING CRITERIA
A	<p>Internationally Important Sites designated (or qualifying for designation) as SAC or SPA under the EU Habitats or Birds Directives Undesignated sites containing good examples of Annex I priority habitats under the EU Habitats Directive Major salmon river fisheries Major salmonid (salmon, trout or char) lake fisheries</p>
B	<p>Nationally Important Sites or waters designated or proposed as an NHA or statutory Nature Reserve, Undesignated sites containing significant numbers of resident or regularly occurring populations of Annex II species under the EU Habitat Directive or Annex I species under the EU Birds Directive or species protected under the Wildlife (Amendment) Act 2000. Major trout river fisheries Water bodies with major amenity fishery value Commercially important coarse fisheries</p>
C	<p>High value, locally important Sites containing semi-natural habitat types with high diversity in a local context and a high degree of naturalness, or significant populations of locally rare species Small water bodies with known salmonid populations or with good potential salmonid habitat Sites containing any resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive Large water bodies with some coarse fisheries</p>
D	<p>Moderate value, locally important Sites containing some semi-natural habitat or locally important for wildlife Small water bodies with some coarse fisheries value or some potential salmonid habitat Any water body with unpolluted water (Q-value rating 4-5)</p>
E	<p>Low value, locally important Artificial or highly modified habitats with low species diversity and low wildlife value Water bodies with no current fisheries value and no significant potential fisheries value</p>

Criteria for assessing the impact significance (NRA, 2006)

SITE CATEGORY*					
IMPACT LEVEL	A INTERNATIONALLY IMPORTANT	B NATIONALLY IMPORTANT	C HIGH VALUE, LOCALLY IMPORTANT	D MODERATE VALUE, LOCALLY IMPORTANT	E LOW VALUE, LOCALLY IMPORTANT
Severe negative	Any permanent impact	Permanent impacts on a large site			
Major negative	Temporary impacts on a large part of a site	Permanent impacts on a small site	Permanent impacts on a large part of a site		
Moderate negative	Temporary impact on a small part of the site	Temporary impact on a large part of the site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site	
Minor negative		Temporary impact on a small part of the site	Temporary impact on a large part of the site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site
Neutral	No impacts	No impacts	No impacts	No impacts	Permanent impacts on a small part of a site
Minor positive				Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site
Moderate positive			Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site	
Major positive		Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site		

APPENDIX 5.2
PHOTOGRAPHS

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Photo 5.1: Waste impoundment lagoons within the Application Site (Aspect S)



Photo 5.2: View of Thornbush Site Waste Lagoons to the southeast of Application Site (Aspect S)



Photo 5.3: View of Thornbush Site ponds to northwest of Application Site (Aspect N)



Photo 5.4: Long view northwards towards Application Site from the southeast boundary of the Thornbush Site



Photo 5.5: Intertidal area of nearby Cork Harbour SPA at low water (Aspect S)

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APPENDIX 5.3 NPWS SITE SYNOPSES OF NATURE CONSERVATION SITES

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SITE NAME: CORK HARBOUR SPA

SITE CODE: 004030

Cork Harbour is a large, sheltered bay system, with several river estuaries – principally those of the Rivers Lee, Douglas, Owenboy and Owenacurra. The SPA site comprises the main intertidal areas of Cork Harbour, including all of the North Channel, the Douglas Estuary, inner Lough Mahon, Monkstown Creek, Lough Beg, the Owenboy Estuary, Whitegate Bay and the Rostellan inlet.

Owing to the sheltered conditions, the intertidal flats are often muddy in character. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algae species occur on the flats, especially *Ulva lactuca* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially where good shelter exists, such as at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for the birds. Salt marsh species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Sea Arrowgrass (*Triglochin maritima*). Some shallow bay water is included in the site. Cork Harbour is adjacent to a major urban centre and a major industrial centre. Rostellan Lake is a small brackish lake that is used by swans throughout the winter. The site also includes some marginal wet grassland areas used by feeding and roosting birds.

Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country. The five-year average annual core count for the entire harbour complex was 34,661 for the period 1996/97-2000/01. Of particular note is that the site supports an internationally important population of Redshank (1,614) – all figures given are average winter means for the 5 winters 1995/96-1999/00. A further 15 species have populations of national importance, as follows: Great Crested Grebe (218), Cormorant (620), Shelduck (1,426), Wigeon (1,750), Gadwall (15), Teal (807), Pintail (84), Shoveler (135), Red-Breasted Merganser (90), Oystercatcher (791), Lapwing (3,614), Dunlin (4,936), Black-Tailed Godwit (412), Curlew (1,345) and Greenshank (36). The Shelduck population is the largest in the country (9.6% of national total), while those of Shoveler (4.5% of total) and Pintail (4.2% of total) are also very substantial. The site has regionally or locally important populations of a range of other species, including Whooper Swan (10), Pochard (145), Golden Plover (805), Grey Plover (66) and Turnstone (99). Other species using the site include Bat-tailed Godwit (45), Mallard (456), Tufted Duck (97), Goldeneye (15), Coot (77), Mute Swan (39), Ringed Plover (51), Knot (31), Little Grebe (68) and Grey Heron (47). Cork Harbour is an important site for gulls in winter and autumn, especially Common Gull (2,630) and Lesser Black-Backed Gull (261); Black-Headed Gull (948) also occurs.

A range of passage waders occur regularly in autumn, including Ruff (5-10), Spotted Redshank (1-5) and Green Sandpiper (1-5). Numbers vary between years and usually a few of each of these species over-winter.

The wintering birds in Cork Harbour have been monitored since the 1970s and are counted annually as part of the I-WeBS scheme.

Cork Harbour has a nationally important breeding colony of Common Tern (3-year mean of 69 pairs for the period 1998-2000, with a maximum of 102 pairs in 1995). The birds have nested in Cork Harbour since about 1970, and since 1983 on various artificial structures, notably derelict steel barges and the roof of a Martello Tower. The birds are monitored annually and the chicks are ringed.

Extensive areas of estuarine habitat have been reclaimed since about the 1950s for industrial, port-related and road projects, and further reclamation remains a threat. As Cork Harbour is adjacent to a major urban centre and a major industrial centre, water quality is variable, with the estuary of the River Lee and parts of the Inner Harbour being somewhat eutrophic. However, the polluted conditions may not be having significant impacts on the bird populations. Oil pollution from shipping in Cork Harbour is a general threat. Recreational activities are high in some areas of the harbour, including jet skiing which causes disturbance to roosting birds.

Cork Harbour has is of major ornithological significance, being of international importance both for the total numbers of wintering birds (i.e. > 20,000) and also for its population of Redshank. In addition, there are at least 15 wintering species that have populations of national importance, as well as a nationally important breeding colony of Common Tern. Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover, Bar-Tailed Godwit, Ruff and Common Tern. The site provides both feeding and roosting sites for the various bird species that use it.

SITE NAME: GREAT ISLAND CHANNEL SITE CODE: SAC & NHA 001058

The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the open sea by ridges of Old Red Sandstone. Within this system, Great Island Channel forms the eastern stretch of the river basin and, compared to the rest of Cork Harbour, is relatively undisturbed. Within the site is the estuary of the Owennacurra and Dungourney Rivers. These rivers, which flow through Midleton, provide the main source of freshwater to the North Channel.

The main habitats of conservation interest are the sheltered tidal sand and mudflats and Atlantic salt meadows, both habitats listed on Annex I of the EU Habitats Directive. Owing to the sheltered conditions, the intertidal flats are composed mainly of soft muds. These muds support a range of macro-invertebrates, notably *Macoma balthica*, *Scrobicularia plana*, *Hydrobia ulvae*, *Nephtys hombergi*, *Nereis diversicolor* and *Corophium volutator*. Green algal species occur on the flats, especially *Ulva lactuca* and *Enteromorpha* spp. Cordgrass (*Spartina* spp.) has colonised the intertidal flats in places, especially at Rossleague and Belvelly. The salt marshes are scattered through the site and are all of the estuarine type on mud substrate. Species present include Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Common Saltmarshgrass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurry (*Spergularia media*), Sea Lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Mayweed (*Matricaria maritima*) and Red Fescue (*Festuca rubra*).

The site is extremely important for wintering waterfowl and is considered to contain three of the top five areas within Cork Harbour, namely North Channel, Harper's Island and Belvelly-Marino Point. Shelduck are the most frequent duck species with 800-1000 birds centred on the Fota/Marino Point area. There are also large flocks of Teal and Wigeon, especially at the eastern end. Waders occur in the greatest density north of Rosslare, with Dunlin, Godwit, Curlew and Golden Plover the commonest species. A population of about 80 Grey Plover is a notable feature of the area. All the mudflats support feeding birds; the main roost sites are at Weir Island and Brown Island and to the north of Fota at Killacloyne and Harper's Island. Ahanesk supports a roost also but is subject to disturbance. The numbers of Grey Plover and Shelduck, as given above, are of national importance.

The site is an integral part of Cork Harbour which is a wetland of international importance for the birds it supports. Overall, Cork Harbour regularly holds over 20,000 waterfowl and contains Internationally important numbers of Black-Tailed Godwit (1,181) and Redshank (1,896) along with Nationally important numbers of nineteen other species. Furthermore, it contains the large Dunlin (12,019) and Lapwing (12,528) flocks. All counts are average peaks, 1994/95 – 1996/97. Much of the site forms part of Cork Harbour Special Protection Area, an important bird area designated under the EU Birds Directive.

While the main land use within the site is aquaculture (Oyster farming), the greatest threats to its conservation significance come from road works, infilling, sewage outflows and possible marina developments.

The site is of major importance for the two habitats listed on the EU Habitats Directive that it contains, as well as for its important numbers of wintering waders and wildfowl. It also supports a good invertebrate fauna.

2.10.2001

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SITE NAME: DOUGLAS RIVER ESTUARY SITE CODE: NHA 001046

This is a large site situated in the north-west corner of Cork Harbour, stretching from Blackrock to Passage West. It is an integral part of Cork Harbour, which contains several other N.H.A.'s. Geologically, Cork Harbour consists of two large areas of water in a limestone basin, separated from each and the sea by ridges of Old Red Sandstone. This site occurs within the upper harbour and consists of extensive mudflats, formed from fine silts, bisected by the Douglas River. Damp grassland occurs on part of the southern side, extending to some low islands that are inundated in extreme tides.

Generally, mudflats within Cork Harbour are covered in algal mats (*Enteromorpha* spp.) with some growth of cord-grass (*Spartina* spp.). Here the spread of spartina is quite advanced and considered a threat to the site. Some saltmarsh occurs, with characteristic species including Arrowgrass (*Triglochin* spp.), Sea Aster (*Aster tripolium*) and sedges (*Carex* spp.). There is a narrow fringe of common reeds (*Phragmites australis*) along parts of the shore.

An area of pasture adds to the value of the site since it provides an important roost for many wading birds, including Black-Tailed Godwit, and a feeding area for around 400 Wigeon.

The prime importance of this site is its birdlife and it ranks as the second most important area in Cork Harbour (1991-92). It is a valuable area and high tide roost for waterfowl; a typical count, provided by the 1986 An Foras Forbartha County Report, is as follows (average and peak winter counts given):- Teal (48; 181), Wigeon (161; 550), Shelduck (168; 577), Red-Breasted Merganser (80; 120), Oystercatcher (314; 1,100), Lapwing (948; 5,485), Golden Plover (1,148; 3,400), Curlew (236; 675), Black-Tailed Godwit (220;481), Bar-Tailed Godwit (220; 474), Redshank (197; 400) and Dunlin (684; 2,543). This gives totals of 412 (1, 074) wildfowl and 3,563 (37,355) waders.

Based on the above figures, four species occur in nationally important numbers, namely: Shelduck, Red-Breasted Merganser, Golden Plover and Black-tailed Godwit. However, the bird populations tend to be mobile and this site must be considered an essential part of Cork Harbour which is of international importance for waterfowl.

The main land use within the site is conservation, with the Douglas Estuary designated a wildfowl sanctuary. Some damage has occurred to the site through water pollution, including sewage, tidal littering and the spread of *Spartina*. However, perhaps the greatest threats come from current road developments and a proposed marina, both of which could lead to serious loss of mudflat areas.

This site is of interest because it is an essential part of the Cork Harbour complex and contains much higher densities of waders than would be expected from its relative size. It is ranked as the second most important area within the harbour.

The Irish Biogeographical Society (Newsletter, March 1990) reports that the saltmarsh supports an unusual assemblage of moths.

Additional Information from Ken Bond:

It is true that there was a diverse and distinctive Lepidopterous fauna in this area of damp grassland and saltmarsh up to about 1991, but much of this was lost during the construction of the South Ring Road, slip roads and flyovers (Ken Bond, pers. obs).

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SITE NAME: LOUGH BEG (CORK) SITE CODE: NHA 001066

Lough Beg is a constituent part of Cork Harbour, occurring south of Ringaskiddy in the lower harbour. It occupies low ground between two small ridges, one behind Ringaskiddy and the other running through Coolmore and Currabinny. Limestone outcrops on part of the shore show that it is in the syncline or valley between the two main sandstone ridges on which Cork Airport and Ballymartle are sited.

In the outer parts of Lough Beg the shoreline is generally rocky with bedrock or boulder beaches. Around Lough More however a more sandy beach full of shells occurs where Sea Sandwort (*Honkenya peploides*), Orach (*Atriplex hastata*) and Wild Carrot (*Daucus carota*) are common above the tideline along with Mugwort (*Artemisia vulgaris*) and the introduced Hoary Cress (*Cardaria draba*). The Yellow Horned Poppy (*Glaucium flavum*) is close by. Patches of saltmarsh are also found in which Red Fescue (*Festuca rubra*) is dominant with Sea Blite (*Suaeda maritima*) and Perennial Sow Thistle (*Sonchus arvensis*).

The inner section of the bay consists of mudflats which are partly colonised by *Spartina* grass. The corners have been reclaimed behind embankments but much of this ground remains brackish and ill-drained with marsh and wet grassland vegetation. Rush species (*Juncus acutiflorus*, *J. effusus* and locally *J. gerardii*) are frequent here with Creeping Bent (*Agrostis stolonifera*), Glaucous (*Carex flacca*) and Fox Sedges (*C. otrubae*), Fleabane (*Pulicaria dysenterica*), Greater Birdsfoot Trefoil (*Lotus uliginosus*) and willowherbs (*Epilobium parviflorum*, *E. palustre* and *E. hirsutum*). Clubrushes (*Bolboschoenus maritimus* & *Schoenoplectus tabernaemontani*) grow in many of the drains and there are small areas of Reed (*Phragmites australis*) also.

As part of the Harbour complex, Lough Beg plays a part in supporting internationally important numbers of waders (over 20,000) and of two particular species, the Black-Tailed Godwit (peak in 1991/92: 2,077) and Redshank (1,859). There are also nationally important flocks of nineteen others. Wildfowl are relatively numerous as compared to other parts of the Harbour and Wigeon, Teal and Shelduck each occur in numbers up to 350 (counts pre-1979). There are also up to 3,000 waders present, mostly Golden Plover, Lapwing and Dunlin. But the area is perhaps more valuable as a secure roosting site for flocks of all shorebirds when their feeding areas on the mudflats are covered by the tide.

Current developments around Lough Beg seem not to have had a major impact on the bird numbers using the site and while the mudflats and open fields remain, this should continue to be the case. It is a significant area for wintering shorebirds and an attractive local amenity for this part of Cork. Some of the land near the Smith Kline Beecham plant is an Irish Wildbird Conservancy reserve.

**SITE NAME: ROCK FARM QUARRY, LITTLE ISLAND, COUNTY CORK SITE CODE: NHA
001074**

Rock Farm Quarry is located c. 9km west of Cork City on Little Island in the River Lee estuary. It is situated on the southern shore of Little Island, the limestone is of Carboniferous age and was formed of a shell reef. There are a range of rock types in the area including fine-grained crinoidal limestone, pseudobreccia, reef limestone and a conglomerate - the Cork marble. Formerly, the area was quarried for its limestone, but it is now no longer actively quarried and a golf course occupies much of the site. This site's southern boundary is a long the top edge of the quarries' rock cliffs.

The following site description is proposed with reference to the An Foras Forbartha report of 1986 and a BSBI record of 1993. The habitats within the site include unimproved lowland dry grassland, amenity grassland (the improved tees and greens of the golf course), scrub woodland and the exposed rock and spoil of the quarries.

On the floor of the quarries and around their edges, a rich calcareous flora has developed and within this small area (30 ha) there is a considerable diversity of species. The calcareous grassland species include Gramineae such as Red fescue (*Festuca rubra*), Quaking-grass (*Briza media*), Downy oak-grass (*Avenula pubescens*) and a small annual species - Fern grass (*Desmazeria rigida*). Crested Dog's tail (*Cynosurus cristatus*) is also frequently encountered. Some of the forbs present include: Kidney Vetch (*Anthyllus vulneraria*), Common Knapweed (*Centaurea nigra*) Field scabious (*Knautia arvensis*), Ox-eye daisy (*Leucanthemum vulgare*), Fairy Glax (*Linum catharticum*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and Bulbous buttercups (*Ranunculus bulbosus*). The rock from the quarries also supports the growth of a distinct flora including species such as Round-leaved Cranesbill (*Geranium rotundifolium*), Weld (*Reseda luteola*), Dwarf Spurge (*Euphorbia exigua*) and Great Mullein (*Verbascum thapsus*). Ferns noted in the area are Maidenhair Spleenwort (*Asplenium trichomanes*) and the Rusty-back (*Ceterach officinarum*).

These are small areas of scrub woodland, mainly of Ash (*Fraxinus excelsior*) with Travellers-joy (*Clematis vitalba*) and the exotic species - Japanese Knotweed (*Fallopia japonica*). The proximity of the site to the sea also gives a maritime influence to the site and the presence of White Campion (*Silene alba*), Wild Madder (*Rubia peregrina*) and the Portland Spurge (*Euphorbia portlandica*) are noted. Many Orchids are found in the site including the Early-purple orchid (*Orchis mascula*), Bee orchid (*Ophrys apifera*) and Dense-flowered orchid (*Neotinea maculata*), a species usually only found occasionally in the west and centre of Ireland (Webb, 1977). Also of note is a parasitic plant, the Ivy Broomrape (*Orobancha hederæ*). Although the present landuse within the site would appear to maintain the sites interest, alteration or extension of the golfing activities may be potentially damaging to the site. It is suggested that no new areas of 'rough' should be taken into the golf course, heavy fertilizer application should be

avoided, as should the dumping of mown grass on the dry calcareous grassland areas; extensive reseeding or top seeding of greens and trees with rye-grass mixtures would also be detrimental to the areas species composition and diversity.

The area is of considerable interest botanically because of its species diversity and the presence of 'varieties' for the region, such as the dense-flowered orchid and the Portland Spurge. Geologically the area is unique, being the only exposed reef of limestone in Cork it is also different from the reef limestone facies that are more typical of the north midlands scenery. The area could also be used as an educational resource for local schools - for example, projects such as comparing the species composition and phenology of the cut and uncut areas of the golf course, species composition changes with scrub invasion, invertebrate sampling and fossil identification. The area is easily and safely accessible too. With sympathetic management of the golf course, the area should hopefully continue to support the diverse flora present in the 1993 survey and so the area is recommended for conservation and inclusion as an NHA.

Sources :

1. BSBI Ireland Survey, June 1993, F. Fitzgerald & P. Smiddy.
2. An Irish Flora. Sixth edition 1977, D.A. Webb.

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SITE NAME: ROSTELLAN LOUGH, AGHADA SHORE AND POULNABIBE INLET SITE

CODE: 001076

This site occupies the north-east corner of Cork Harbour, west of Saleen and Rostellan. Geologically, Cork Harbour consists of several limestone basins reported from the sea and from each other by ridges of Old Red Sandstone.

According to a description provided for this site in the 1986 County Report, Rostellan Lough differs from the rest of Cork Harbour in that it is impounded and so is no longer tidal. As a result its bird community is distinct, with diving ducks and grebes most noticeable, Little Grebe (50), Pochard (100), and Tufted Duck (60) are frequent species, some of which breed here along with Mallard. Snipe are the most obvious waders present.

Vegetation on the lake margins is mostly Club-rushes (*Scirpus lacustris* and *S. maritimus* especially), with a little Bulrush (*Typha latifolia*). A little wet woodland of Alder (*Alnus glutinosa*) occurs on some of the shore and wet grassland is frequent, with plants such as Bearded Couch (*Elymus caninus*), Creeping Bent (*Agrostis stolonifera*) and Water Mint (*Mentha aquatica*). Algae are very common in the lough itself, but the brackish nature of the water apparently inhibits the growth of many higher plants.

Mudflats occur westwards to Aghada and these were utilised by many feeding waders, while the sea offshore is used by species such as Scaup, Goldeneye and Great Crested Grebe.

Although the site itself is seen to support only moderate numbers of waterfowl, the area forms an integral part of Cork Harbour, which is a wetland of international importance for its wintering populations of Black-Tailed Godwit, Curlew and Redshank and its spring migration numbers of Whimbrel. Twelve species occur at nationally important levels and Cork Harbour is one of only a few Irish wetlands to regularly hold over 20,000 waterfowl. The birdlife in this part of the Harbour offers an interacting contrast with the rest of the area and this feature could be used for educational purposes.

The whole Cork Harbour area is under pressure from industrial and urban development, pollution and from recreational usage. Drainage or reclamation would be particular threats to this sector of the Harbour, and the level of shooting could usefully be controlled to protect bird populations. Cord-grass (*Spartina* spp.) occurs at Poul nabibe, possibly posing a threat to the quality of the mudflats there for feeding birds.

The Rostellan Lough, Aghada Shore and Poul nabibe Inlet NHA is of local significance for its waterfowl. This status is enhanced, though, as the whole of Cork Harbour is of international importance and as such is a proposed Special Protection Area. Sections such as this NH should not be considered in isolation as the bird populations are very mobile throughout the area.

SITE NAME: DUNKETTLE SHORE SITE CODE: NHA 001082

This site is located at the mouth of Glashaboy River, where it meets the Lee estuary, on the eastern edge of Cork city. It is adjacent to Glanmire Wood, N.H.A., and is an integral part of Cork harbour, which contains several other N.H.A.'s.

The main habitat is mudflats which, within the Cork harbour area, are often covered in algal mats (*Enteromorpha* spp.) with some growth of cord-grass (*Spartina* spp.). Generally, they are rich in invertebrates which attract large numbers of wintering waders. Weedy wasteground as a result of land reclamation, is a feature of this site and has some importance as a high tide roost.

The prime importance of this site is its bird life and it ranks as one of the top ten areas within Cork harbour (1991-92). A typical count, provided by the 1986 An Foras Forbartha County Report, is as follows:- Teal (50), Oystercatcher (700), Ringed Plover (15), Curlew (40), Black-tailed Godwit (220), Bar-tailed Godwit (200), Redshank (60), Knot (1,270), Dunlin (2,000) and Lapwing (50). Based on these figures, four species occur in Nationally Important numbers, namely: Black-tailed Godwit, Oystercatcher, Knot and Dunlin. However, the bird populations tend to be mobile and this site must be considered as an integral part of Cork harbour which is of international importance for Black-Tailed Godwit, Curlew and Redshank and its spring migration of Whimbrel.

The site is of value because its mudflats provide an important feeding ground for waterfowl and it acts as a significant roost for birds in the upper harbour. Furthermore, it is an integral part of Cork Harbour which is an internationally important wetland, regularly holding flocks of over 20,000 waterfowl.

A Heronry occurs to the east of the site. This part of Cork harbour is heavily industrialised and been substantially modified by infilling and reclamation for industry and road developments. Further, such activities, including the building of the Lee tunnel pose a serious threat to the area.

SITE NAME: WHITEGATE BAY SITE CODE: NHA 001084

This site is situated in the south-east corner of Cork Harbour, immediately to the west of Whitegate in County Cork. Geologically, Cork Harbour consists of several limestone basins separated from each other and from the sea by ridges of Old Red Sandstone. Recent muddy and silty deposits obscure much of the solid geology, however.

Most of the Whitegate Bay NHA comprises open marine water, with extensive mudflats exposed at low tide and is a haunt of a wide range of waterfowl, in particular Grebes, Diving Ducks and Waders. Many of these used to roost on Long Point, but this area is now occupied by the Aghada Power Station and so many of the birds spend the night in the vicinity of Corkbeg Island.

In the 1986 Report on the important conservation areas of County Cork, a number of figures were given as 'typical' for some bird species on a daily basis. They are as follows: Shelduck (15), Wigeon (220), Dunlin (500), Knob (200), Curlew (80), Redshank (30), Bar-Tailed Godwit (75), Turnstone (25), Oystercatcher (120) and Ringed Plover (50).

The figures quoted above give the site a status of local conservation importance. However, Whitegate Bay is an integral part of Cork Harbour which is a wetland of international importance for its wintering populations of Black-Tailed Godwit, Curlew and Redshank and its spring migration numbers of Whimbrel. Twelve species occur at nationally important levels, and Cork Harbour is one of only a few Irish wetlands to regularly hold over 20,000 waterfowl. Whitegate Bay usually holds about 10% of the winter waterfowl community of Cork Harbour.

The whole Harbour area is under pressure from industrial and urban development, pollution and from recreational usage. Run-off from the surrounding rich agricultural land poses a further pollution threat. Sewage is discharged directly into Whitegate Bay from the town of Whitegate. Excessive growth of Cord-grass (*Spartina* spp.) threatens to obscure parts of the mudflats.

Whitegate Bay is an NHA of local significance for its waterfowl. This status is enhanced, though, as the whole of Cork Harbour is of international importance and as such is a proposed Special Protection Area. Sections of the Harbour, such as Whitegate Bay, should not be considered in isolation as the bird populations are very mobile throughout the area.

SITE NAME: MONKSTOWN CREEK SITE CODE: 001979

Monkstown Creek is situated between Monkstown and the major seaport of Ringaskiddy on the western shores of Cork Harbour. Geologically, Cork Harbour consists of two large areas of open water in a limestone basin, separated from each other and the sea by ridges of old red sandstone. Within this system, Monkstown Creek is a tidal inlet composed of mudflats, with limestone along the southern shore. A brackish lake also occurs, separated from the sea by a sluice gate.

The mudflats and tidal creeks are fringed by a small amount of saltmarsh vegetation while, above the limestone on the southern shore, two areas of semi-natural woodland occur. The latter contain Spindle (*Euonymus europaeus*) and a thick carpet of Bluebell (*Hyacinthoides non-scripta*) and Ramsons (*Allium ursinum*).

The marsh interest of the site is ornithological, with the mudflats acting as winter refuge to at least locally important numbers of waterfowl, including Shelduck, Teal, Redshank and Dunlin. However, Cormorant may reach nationally important numbers with the jetty supporting a Cormorant roost of over 100 birds, in addition to a second roost in the woods (NHA survey, 1994).

The predominant land use is as a safe mooring for small craft; however major industry and a golf course adjoin the site. The main potential threat is water pollution.

The area is of value because its mudflats provide an important feeding area for waterfowl and it is a natural part of Cork Harbour which, as a complete unit, is of international importance for waterfowl.

SITE NAME: CUSKINNY MARSH

SITE CODE: NHA 001987

This site is located 2.5km east of the centre of Cobh on the shores of Cork Harbour.

It is a small site with the dominant habitat being a brackish lake, joined to the sea through a sluice gate, and fed by streams flowing from the west and north. The lake is fringed with Common Reed (*Phragmites australis*) with wet deciduous woodland, composed of Alder (*Alnus glutinosa*) and Willow (*Salix* sp), occurring to the north and west. A small area has been planted with Sitka Spruce (*Picea sitchensis*).

The main interest of the site is ornithological, with the lake supporting locally important numbers of dabbling ducks and mute swans.

The main land use is management for conservation purposes, with the site being an Irish Wildbird Conservancy reserve. No obvious damaging operations occur within the site.

Cuskinny Marsh is of interest because it contains a nice mix of habitats, within a small area, and supports locally important numbers of wildfowl.

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Cork Harbour: Ramsar Site 7IE029

Ireland	7IE029
Site: Cork Harbour	Designation date: 11/06/1 996
Coordinates: 51°50'N 008°15'W	Elevation: 0 m
	Area: 1,436 ha
Location: The Ramsar site Cork Harbour is located in the northeast corner of the bay Cork Harbour, west of the towns Saleen and Rostellan on the south coast of Ireland.	
Criteria: (3a),3b The site is a wetland of international importance for its wintering populations of waterbirds. Although the site itself supports only moderate numbers of waterfowl, the area forms an integral part of greater Cork Harbour, which regularly hold over 20,000 waterfowl. The site is important to wintering populations of <i>Limosa limosa</i> , <i>Numenius arquata</i> and <i>Tringa totanus</i> and in spring for the migrating <i>Numenius phaeopus</i> .	
Wetland Types: F,G,Q,(Xf) Cork Harbour consists of a sheltered bay with river estuaries, wet woodland, intertidal mudflats and a brackish lake	
Biological/Ecological notes: Vegetation on the lake margins is mostly <i>Scirpus lacustris</i> and <i>S. maritimus</i> , with a little <i>Typha latifolia</i> . Some wet alder <i>Alnus glutinosa</i> woodland occurs on some of the shore. Wet grassland is frequent, with plants such as <i>Elymus caninus</i> , <i>Agrostis stolonifera</i> and <i>Mentha aquatica</i> . Algae are very common in the lough itself, but the brackish nature of the water apparently inhibits the growth of many higher plants. Many feeding waders utilise the mudflats that occur westwards to Aghada, while species such as <i>Aythya marila</i> , <i>Bucephala clangula</i> and <i>Podiceps cristatus</i> use the sea offshore. Because Rostellan Lough is impounded, its bird community is distinct, with diving ducks and grebes most conspicuous. Frequent visiting species are <i>Gallinago gallinago</i> , <i>Tachybaftus ruficollis</i> , <i>Aythya ferina</i> , and <i>A. fuligula</i> , some of which breed at the site as does <i>Anas platyrhynchos</i> .	
Hydrological/Physical notes: The site is divided into three areas, Rostellan Lough, Aghada Shore and Poul nabibe Inlet. Geologically, Cork Harbour consists of several limestone basins separated, from the sea and from each other, by ridges of old red sandstone. Rostellan Lough differs from the rest of Cork Harbour because it is impounded and is no longer tidal.	
Human Uses: The bird life in the site offers an interacting contrast with the rest of the area and this feature could be used for educational purposes.	

Conservation Measures: The Rostellan Lough, Aghada Shore and Poul nabibe Inlet are designated as a Natural Heritage Area (NHA) and it is of local significance for its waterfowl. This status is enhanced, though, as the whole of Cork Harbour is an EU Special Protection Area for wild birds. Sections of the harbour such as the NHA should not be considered in isolation, as bird populations are very mobile throughout the area.

Adverse Factors: The whole Cork Harbour area is under pressure from industrial and urban development, pollution and from recreational usage. Drainage or reclamation would be particular threats to this sector of the Harbour. A decrease in the level of shooting further protects bird populations. Cordgrass *Spartina* spp. Occurs at Poul nabibe, possibly posing a threat to the quality of the mudflats for feeding birds.

Most recent Ramsar Information Sheet/datasheet: 1995; Please see Introduction for more details.

Ramsar Convention Bureau (1984)

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**APPENDIX 5.4
RARE SPECIES DATA NPWS**

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NPWS information for 10km grid square

SPECIES	COMMON NAME	LOCATION	RECORDED DATE	HD II	HD IV	HD V	RED
Erinaceus europaeus	Hedgehog	Mahon	04/24/90				II
Galeopsis angustifolia	Red Hemp Nettle	Little Island	1856				V
Hordeum secalinum	Meadow Barley	Brickfields	1845				V
Hordeum secalinum	Meadow Barley	Cork harbour	1894				V
Hordeum secalinum	Meadow Barley	Little Island marsh	1894				V
Lutra lutra	Otter	Mahon	04/24/90	II	IV		II
Mustela erminea	Stoat	Mahon	04/24/90				
Papaver hybridum	Round Prickly-headed Poppy	Blackrock	1841				E
Papaver hybridum	Round Prickly-headed Poppy	Little Island	1900				E
Sciurus vulgaris	Red Squirrel	Mahon	04/24/90				
Sorex minutus	Pygmy Shrew	Mahon	04/24/90				

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APPENDIX 5.5
BIRD SPECIES AND THEIR CONSERVATION STATUS

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Bird species mentioned in the main text, Latin names and their conservation status.

SPECIES	Listed on BoCCI¹	Annex I Species²
Great-Crested Grebe <i>Podiceps cristatus</i>	Amber List	
Little Grebe <i>Tachybaptus ruficollis</i>		
Cormorant <i>Phalacrocorax carbo</i>	Amber List	
Little Egret <i>Egretta garzetta</i>	Amber List	
Grey Heron <i>Ardea cinerea</i>		
Shelduck <i>Tadorna tadorna</i>	Amber List	
Mallard <i>Anas platyrhynchos</i>		
Gadwall <i>Anas strepera</i>	Amber List	
Wigeon <i>Anas Penelope</i>	Amber List	
Teal <i>Anas crecca</i>	Amber List	
Tufted Duck <i>Aythya fuligula</i>	Amber List	
Red-Breasted Merganser <i>Mergus serrator</i>	Amber List	
Pheasant <i>Phasianus colchicus</i>		
Moorhen <i>Gallinula chloropus</i>		
Oystercatcher <i>Haematopus ostralegus</i>		
Ringed Plover <i>Charadrius hiaticula</i>		
Golden Plover <i>Pluvialis apricaria</i>	Amber List	
Lapwing <i>Vanellus vanellus</i>	Red List	
Turnstone <i>Arenaria interpres</i>		
Dunlin <i>Calidris alpina</i>	Amber List	
Redshank <i>Tringa totanus</i>	Amber List	
Greenshank <i>Tringa nebularia</i>		
Black-Tailed Godwit <i>Limosa limosa</i>	Amber List	
Curlew <i>Numenius arquata</i>	Red List	
Whimbrel <i>Numenius phaeopus</i>		
Woodcock <i>Scolopax rusticola</i>	Amber List	
SPECIES	Listed on BoCCI¹	Annex I Species²

Snipe <i>Gallinago gallinago</i>	Amber List	
Black-Headed Gull <i>Larus ridibundus</i>	Amber List	
Common Gull <i>Larus canus</i>		
Common Tern <i>Sterna hirundo</i>	Amber List	
Wood Pigeon <i>Columba palumbus</i>		
Skylark <i>Alauda arvensis</i>	Amber List	
Meadow Pipit <i>Anthus pratensis</i>		
Swallow <i>Hirundo rustica</i>	Amber List	
Pied Wagtail <i>Motacilla alba</i>		
Grey Wagtail <i>Motacilla cinerea</i>		
Wren <i>Troglodytes troglodytes</i>		
Duncock <i>Prunella modularis</i>		
Robin <i>Erithacus rubecula</i>		
Stonechat <i>Saxicola torquata</i>	Amber List	
Song Thrush <i>Turdus philomelos</i>		
Blackbird <i>Turdus merula</i>		
Common Whitethroat <i>Sylvia communis</i>		
Chiffchaff <i>Phylloscopus collybita</i>		
Goldcrest <i>Regulus regulus</i>		
Great Tit <i>Parus major</i>		
Blue Tit <i>Parus caeruleus</i>		
Long-tailed Tit <i>Aegithalos caudatus</i>		
Magpie <i>Pica pica</i>		
Rook <i>Corvus frugilegus</i>		
Hooded Crow <i>Corvus corone cornix</i>		
Starling <i>Sturnus vulgaris</i>		
Chaffinch <i>Fringilla coelebs</i>		
Goldfinch <i>Carduelis carduelis</i>		
Greenfinch <i>Carduelis chloris</i>		

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APPENDIX 5.6
ESTUARINE SURVEY SECTIONS (LEWIS, 2005)

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APPENDIX 5.7
BREEDING BIRD SURVEY RESULTS (LEWIS, 2005)

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Bird species recorded during the terrestrial breeding bird surveys. Latin names and conservation status of the bird species are given in Appendix 3. ¥ presumed breeding; * observed but no obvious signs of breeding.

Species	Bird species recorded from within the site itself including woodland and treelines in the north	Bird species recorded in woodland/stream area, eastern site boundary.	Bird species recorded in association with unused lagoons within site	Bird species recorded in wooded area just beyond western tip of site	Bird species recorded within site boundaries and immediately adjacent to site, incl. shoreline & dry grassland to south-east
Domestic Goose			*		
Shelduck			*		*
Mallard		*			
Tufted Duck			¥		
Moorhen			¥		
Sparrowhawk	*				
Ringed Plover			¥		
Whimbrel			*		
Snipe					*
Wood Pigeon	*	*		*	*
Skylark					¥
Swallow	*		*		*
Meadow Pipit	¥				¥
Pied Wagtail			*		
Grey Wagtail			*		
Wren	¥	¥		¥	¥
Duncock	¥	¥			¥
Robin		¥		¥	¥
Stonechat	¥				
Song Thrush		¥			¥
Mistlethrush		¥			
Blackbird	¥	¥		¥	¥

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Whitethroat					☞
Lesser Whitethroat					*
Chiffchaff	☞	☞			
Goldcrest	*	☞			☞
Great Tit	☞	☞		☞	☞
Coal Tit		☞		☞	☞
Blue Tit	☞	☞		☞	☞
Long-tailed Tit		*			
Magpie	*	*			
Jackdaw	*				*
Rook	*	*			
Hooded Crow	*				*
Starling	*				*
Chaffinch	☞	☞		☞	☞
Linnet					☞
Goldfinch	*	*			*
Greenfinch	☞	☞		☞	☞
Bullfinch	*				*
Reed Bunting			☞		☞
TOTAL	21	20	11	9	26
TOTAL CONFIRMED	10	13	5	8	16

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**APPENDIX 5.8
I-WeBS DATA**

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Species name	1% national	1% international	1998/99	1999/00	2000/01	2001/02	2002/03	Mean	Peak
Great Northern Diver	20	50	1	8	3	1	1	3	8
Pied-billed Grebe			1					0	1
Little Grebe	40	3,400	56	50	58	59	60	56	60
Great Crested Grebe	70	4,800	166	218	171	287	240	228	287
Slavonian Grebe		35	4		1			1	4
Black-necked Grebe		1,000	3	3	2	2		2	3
Cormorant	150	1,200	283	556	244	392	326	389	556
Grey Heron	105	2,700	54	61	114	57	97	67	114
Little Egret		1,300	20	18	27	39	61	35	61
Mute Swan	210	210	46	42	25	15	42	38	46
Black Swan			3					1	3
Bewick's Swan	20	290	6					2	6
Whooper Swan	130	210			12	14	12	7	14
Pink-footed Goose		2,400			1			0	1
Greenland White-fronted Goose	140	300			1			0	1
Greylag Goose	40	1,000			3	4	4	2	4
Canada Goose			10	6	13	8	2	7	13
Light-bellied Brent Goose	200	200			4		6	2	6
Shelduck	150	3,000	1,875	1,870	722	1,108	1,903	1,689	1,903
Wigeon	900	15,000	1,683	1,402	1,272	1,519	1,931	1,634	1,931
American Wigeon								0	0
Gadwall	20	600	4		6	8	67	20	67
Teal	570	4,000	778	1,214	1,139	1,079	1,492	1,141	1,492
Green-winged Teal					1	1	1	1	1
Mallard	840	20,000	671	572	431	362	489	524	671
Pintail		600	52	41	2	74	73	60	74
Shoveler	40	400	103	148	74	48	103	101	148
Red Crested Pochard		200	1					0	1
Pochard	580	3,500	38	11	19	21	27	24	38
Ring-necked Duck							1	0	1
Tufted Duck	550	12,000	34	20	46	36	29	30	46
Scaup	70	3,100	2					1	2
Long-tailed Duck	20	20,000					2	1	2
Common Scoter	120	16,000		2			1	1	2
Surf Scoter								1	2
Goldeneye	140	4,000	15	14	18	28	11	18	28
Red-breasted Merganser	40	1,700	170	128	64	77	95	103	128
Coot	410	17,500	34	96	24	13	26	42	96
Moorhen	20	20,000	28	21	21	19	24	23	28
Water Rail			3	3		1	1	2	3
Oystercatcher	700	16,200	1,584	1,421	1,698	1,061	1,570	1,409	1,698
Ringed Plover	150	730	59	52	78	66	28	51	78
Golden Plover	1,500	9,300	3,000	3,432	4,009	6,888	4,262	4,396	6,888
Grey Plover	75	2,500	72	44	5	6	108	58	108
Lapwing	2,000	20,000	4,386	4,116	7,267	2,816	4,176	3,874	7,267
Knot	140	4,500	16	17	80	79	306	105	306
Sanderling	70	1,200					135	34	135
Curlew Sandpiper		4,500		15		2	1	5	15
Dunlin	1,400	13,300	8,277	8,240	6,632	5,155	3,979	6,413	8,277
Ruff				1			1	1	1
Snipe		20,000	43	47	5	20	20	33	47
Long-billed Dowitcher						1	1	1	1
Black-tailed Godwit	180	350	2,508	1,692	1,615	2,128	3,162	2,373	3,162
Bar-tailed Godwit	180	1,200	16	52	351	419	477	241	477

The counts presented in the table refer to the peak counts of species in each I-WeBS season. Figures in italics represent incomplete counts. Site peak and mean are calculated as the peak and mean of peak counts respectively over the five seasons specified. Blank columns indicate seasons for which no data are available, while blank cells within columns which contain positive values for one or more species constitute zero for those species.

The counts presented in the table refer to the peak counts of species in each I-WeBS season. Figures in italics represent incomplete counts. Site peak and mean are calculated as the peak and mean of peak counts respectively over the five seasons specified. Blank columns indicate seasons for which no data are available, while blank cells within columns which contain positive values for one or more species constitute zero for those species.



Belvelly - Marino Point

Species name	1% national	1% international	1998/ 99	1999/ 00	2000/ 01	2001/ 02	2002/ 03	Mean	Peak
Great Northern Diver	20	50	1					0	1
Little Grebe	40	3,400	2	3				1	3
Great Crested Grebe	70	4,800	10	9		9	21	12	21
Cormorant	150	1,200	91	38		235	114	120	235
Grey Heron	105	2,700	7	6		8	7	7	8
Little Egret		1,300	9	10		5	10	9	10
Mute Swan	210	210	4	3				2	4
Shelduck	150	3,000	293	382		253	336	316	382
Wigeon	900	15,000	128	111		79	108	107	128
Gadwall	20	600					65	16	65
Teal	570	4,000	192	214		130	150	172	214
Mallard	840	20,000	63	25			9	24	63
Pintail		600				5		1	5
Shoveler	40	400						0	0
Tufted Duck	550	12,000		3				1	3
Goldeneye	140	4,000	3	3		2		2	3
Red-breasted Merganser	40	1,700	23	16		16	31	22	31
Moorhen	20	20,000	3					1	3
Oystercatcher	700	10,200	330	319		70	96	204	330
Ringed Plover	150	730	22	16		30	1	17	30
Golden Plover	1,500	9,300	400			10		103	400
Grey Plover	75	2,500	14	26			65	26	65
Lapwing	2,000	20,000	570				164	184	570
Knot	340	4,500	16					4	16
Curlew Sandpiper		4,500						0	0
Dunlin	1,400	13,300	2,017	3,100		3,500	105	2,181	3,500
Snipe		20,000	26	31			5	16	31
Black-tailed Godwit	180	350	241	241			121	163	241
Bar-tailed Godwit	180	1,200	4	17			5	7	17
Whimbrel		8,400	1	1				1	1
Curlew	660	4,200	483	316		56	70	231	483
Redshank	330	1,900	703	755		285	557	575	755
Greenshank	20	3,100	19	35		3	8	11	19
Turnstone	140	1,000		17			24	10	24
Black-headed Gull	1,000	20,000					369	92	369
Common Gull	500	17,000					6	2	6
Kingfisher				1				0	1

The counts presented in the table refer to the peak counts of species in each I-WeBS season. Subsite peak is calculated as the peak count over the seasons specified, while the subsite mean is calculated as the average of the season peaks. Blank columns indicate seasons for which no data are available, while blank cells within columns which contain positive values for one or more species constitute Zero for those species.

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Douglas Estuary

Species name	1% national	1% international	1998/ 99	1999/ 00	2000/ 01	2001/ 02	2002/ 03	Mean	Peak
Little Grebe	40	3,400			8	4	9	7	9
Great Crested Grebe	70	4,800			4	100	16	40	100
Cormorant	150	1,200			14	15	6	12	15
Grey Heron	105	2,700			10	8	12	10	12
Little Egret		1,300			2	7	3	4	7
Mute Swan	210	210			0	3	2	2	3
Canada Goose							1	0	1
Shelduck	150	3,000			192	200	370	254	370
Wigeon	900	15,000			280	388	380	349	388
Teal	570	4,000			400	182	282	288	400
Green-winged Teal					1	1		1	1
Mallard	840	20,000			83	55	30	56	83
Shoveler	40	400			9	14	8	10	14
Tufted Duck	550	12,000			31	23	25	26	31
Scaup	70	3,100						0	0
Goldeneye	140	4,000			17	28	5	17	28
Red-breasted Merganser	40	1,700			4	8	13	8	13
Coot	410	17,500						0	0
Moorhen	20	20,000			5	2	3	3	5
Oystercatcher	700	10,200			100	136	560	265	560
Golden Plover	1,500	9,300			4,000	3,700	3,500	3,733	4,000
Grey Plover	75	2,500			1	1	17	6	17
Lapwing	2,000	20,000			1,200	360	1,210	923	1,210
Knot	340	4,500			80	70	116	89	116
Curlew Sandpiper		4,500				1		0	1
Dunlin	1,400	13,300			1,500	2,000	1,650	1,717	2,000
Snipe		20,000			1	2	1	1	2
Black-tailed Godwit	180	350			200	250	1,006	488	1,006
Bar-tailed Godwit	180	1,200			350	270	460	360	460
Curlew	660	4,200			271	278	460	336	460
Spotted Redshank		1,000				1	1	1	1
Redshank	330	1,900			24	120	610	321	610
Greenshank	20	3,100			6	7	7	7	7
Turnstone	140	1,000						0	0
Laughing Gull								0	0
Black-headed Gull	1,000	20,000			0		400	133	400
Ring-billed Gull						1		0	1
Common Gull	500	17,000			0		12	4	12
Lesser Black-backed Gull	500	5,300			0		4	1	4
Herring Gull	500	13,000			0	1		0	1
Island Gull								0	0
Great Black-backed Gull	500	4,000			0	2		1	2
Common Tern		6,000					1	0	1
Kingfisher						1		0	1

The counts presented in the table refer to the peak counts of species in each I-WeBS season. Subsite peak is calculated as the peak count over the seasons specified, while the subsite mean is calculated as the average of the season peaks. Blank columns indicate seasons for which no data are available, while blank cells within columns which contain positive values for one or more species constitute Zero for those species.



Dunkettle

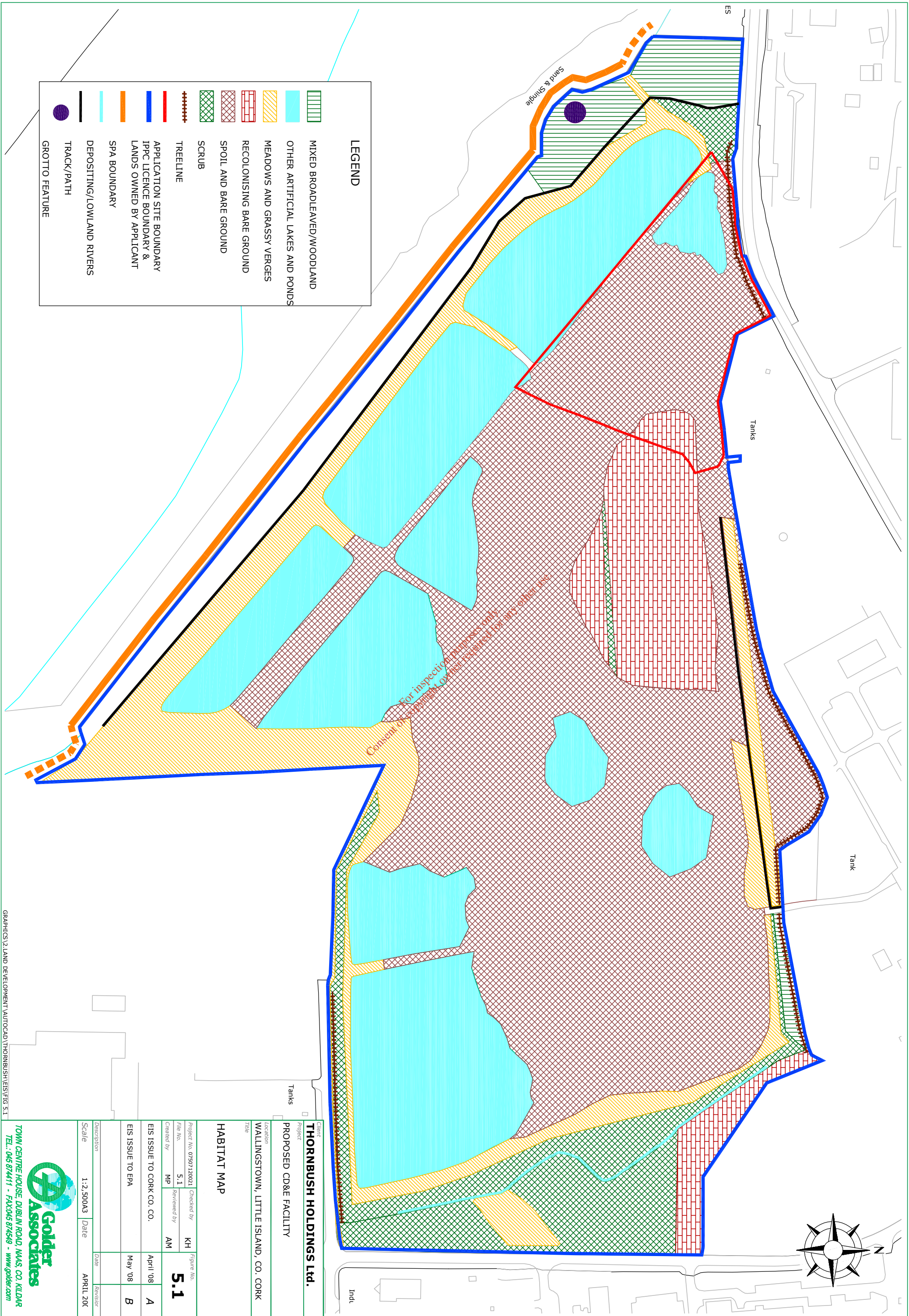
Species name	1% national	1% international	1998/99	1999/00	2000/01	2001/02	2002/03	Mean	Peak
Great Crested Grebe	70	4,800						0	0
Cormorant	150	1,200	17	55	30	30	35	33	55
Grey Heron	105	2,700	5	32	20	15	43	23	43
Little Egret		1,300					4	1	4
Mute Swan	210	210						0	0
Shelduck	150	3,000	2	2				1	2
Wigeon	900	15,000	2	20	5	4	1	6	20
Teal	570	4,000		7				1	7
Mallard	840	20,000	3	10	4	5	3	5	10
Goldeneye	140	4,000					1	0	1
Oystercatcher	700	10,200	98	100	30	117	50	79	117
Ringed Plover	150	730	50	10				12	50
Golden Plover	1,500	9,300	3,000	3,000	20	3,000		1,804	3,000
Lapwing	2,000	20,000	400	1,000	1,010	500	400	662	1,010
Knot	340	4,500						0	0
Little Stint		2,100						0	0
Curlew Sandpiper		4,500						0	0
Dunlin	1,400	13,300	550	3,000	2,200	800	610	1,432	3,000
Snipe		20,000	7					1	7
Black-tailed Godwit	180	350	85	60	20	248	210	125	248
Bar-tailed Godwit	180	1,200	5	30	72	201	30	68	201
Curlew	660	4,200	130	100	200	300	60	158	300
Redshank	330	1,900	20	40	100	50	100	62	100
Greenshank	20	3,100	5	5	3	3	5	4	5
Turnstone	140	1,000		20			10	6	20
Lesser Black-backed Gull	500	5,300						0	0

The counts presented in the table refer to the peak counts of species in each I-WeBS season. Subsite peak is calculated as the peak count over the seasons specified, while the subsite mean is calculated as the average of the season peaks. Blank columns indicate seasons for which no data are available, while blank cells within columns which contain positive values for one or more species constitute Zero for those species.

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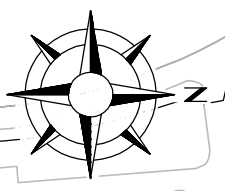
FIGURES

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LEGEND

	MIXED BROADLEAVED/WOODLAND
	OTHER ARTIFICIAL LAKES AND PONDS
	MEADOWS AND GRASSY VERGES
	RECOLONISING BARE GROUND
	SPOIL AND BARE GROUND
	SCRUB
	TREELINE
	APPLICATION SITE BOUNDARY
	IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
	SPA BOUNDARY
	DEPOSITING/LOWLAND RIVERS
	TRACK/PATH
	GROTTO FEATURE



Client		THORNBUSH HOLDINGS Ltd.	
Project		PROPOSED CD&E FACILITY	
Location		WALLINGSTOWN, LITTLE ISLAND, CO. CORK	
Title		HABITAT MAP	
Project No. 07507120021	Checked by KH	Figure No.	5.1
File No. 5.1	Reviewed by AM		
Created by MP			
EIS ISSUE TO CORK CO. CO.		April '08	A
EIS ISSUE TO EPA		May '08	B
Description	Date	Revisor	
Scale 1:2,500A3	Date APRIL 2008		

GRAPHICS 12 LAND DEVELOPMENT \AUTOCAD\THORNBUSH\EIS\FIG 5.1

Golder Associates
 TOWN CENTRE HOUSE DUBLIN ROAD, M4AS, CO. KILDAR
 TEL.: 045 8741411 - FAX:045 874549 - WWW.GOLDER.COM

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6.0 SOILS AND GEOLOGY

6.1 Introduction

This section of the EIS assesses the impact of activities to be carried out at the Application Site on the underlying soil and geology.

The Application Site is ca. 2.2 ha and comprises natural ground, reclaimed land and waste lagoons. The proposed development consists of a dedicated Construction, Demolition and Excavation Waste Recovery Facility (CD&E Facility). Light infrastructure to be installed includes a porta-cabin office, weighbridge, inspection area, processing and stock piling area, wheelwash, quarantine area, new entrance, access road to adjacent site and 8 no. car parking spaces. Mobile plant will be utilised for periodic crushing, screening, and magnetic separation, site levelling and landscaping works. Fencing and screening berms will be installed at sensitive boundaries to minimise any potential impacts on neighbouring premises.

The Application Site is located in the north-western corner of a ca. 29 ha Brownfield site comprising waste lagoons (the Thornbush Site). Its development in the 1970s was undertaken by Mitsui Denman and involved the excavation and construction over a twenty year period of a series of large artificial lagoons to facilitate waste material from an adjacent industrial plant. It was subsequently bought by Thornbush Holdings, who are obliged to restore the site under the existing planning permission (Planning Ref: 1466/73) and the IPPC Licence (No. P0389-01). The proposed CD&E waste recovery facility will facilitate the restoration of the Thornbush Site.

The impacts on waters are considered in Section 7.0. Following restoration of the Thornbush Site through processing of inert wastes at the Application Site, it is proposed that the land will be available for future development subject to planning and EIS.

6.2 Methodology

The geological information described in this section is based primarily on data taken from the Geological Survey of Ireland publication, Geology of South Cork and its accompanying geological map, Sheet 25. Additional data has been taken from Environmental Impact Surveys previously undertaken at adjacent sites. A number of site walkovers and detailed investigations have also been carried out by Golder staff.

6.3 Existing Environment

6.3.1 Topography

The topography of Little Island, which includes the Application Site is relatively level, has shorelines to the west, south and east, and is overlooked by higher ground to the north. The

topography of the Thornbush Site is mainly flat but dips slightly to the south. The elevation of the Application site rises to approximately 10 metres above Ordnance Datum.

6.3.2 Underlying Geology

The Quaternary period is the final or upper period of the Cenozoic and marks the period of the Ice Age which began about 1.6 million years ago, and the postglacial period which extends to the present day. The majority of the drift material in Ireland was laid down directly from the margin of the ice sheets as they moved across the land or by glacial melt waters from retreating ice sheets.

Most of the surface deposits in the South Cork area were deposited during the Quaternary Period, largely during the ice age itself. The overburden varies in composition and permeability in the area. Within the Thornbush Site to the south of the Application Site, soils are dominated by estuarine silts and clays with interbedded gravels representing former shingle beach levels. Within the Application Site the overburden is this and where present consists primarily of sands and gravels.

Owing to the historical activities on-site the overburden has been disturbed and supplemented with waste ground (NB: Teagasc Soil Classification, 2001 classifies soils on the Application Site as being made ground). Borehole records indicate that in the Application Site and within the adjacent Thornbush Site made ground averaging 5m thickness overlies silty gravel and gravelly clay to a depth of ca. 17.50m. The ground conditions in this northern area of the Thornbush Site have been described as comprising a crust of drier soft to firm made ground ca. 1-2m deep followed by 3-7m of soft made ground and reclamation fill, underlain by 3-5m of natural sand and gravel, followed by rock. The groundwater level was previously recorded as being between 1m and 2.3m above Ordnance Datum (See Figure 6.1).

6.3.3 Bedrock Geology

The Little Island Area falls within the Cork Syncline. The Bedrock Geology Sheet 25 prepared by the Geological Survey of Ireland was consulted in conjunction with the accompanying document "Geology of South Cork" which indicates that the bedrock underlying the Application Site is Carboniferous in age (290-350 million years old). Three formations; the Waulsortian Limestones, Cork Red Marble and Little Island have been identified in Little Island and it is likely that at least two of these formations (Waulsortian Limestones and Cork Red Marble) directly underlie the Application Site. It is noted that limestones in this area tend to be subject to karstification owing to the chemical composition of the underlying rocks and the intensive level of fracturing and fissuring present (See Figure 6.2).

The Waulsortian limestones are largely calcareous mudstones, wackestones and packstones. In the South Cork area the regional cleavage has affected the limestones so that in some

places there are zones of intense fracture cleavage a pervasive recrystallisation throughout making internal characteristic identification difficult.

The Cork Red Marble formation is only found in the Cork Syncline. It comprises a sequence of grey cherty calcisiltites, red crinoidal breccias and cherts, red pseudo-conglomeratic calcilutites, mottled grey calcilutites and pale grey or pink interbedded massive crinoidal calcilutites. Both the top and the bottom of the formation are characterised by thin bedded pale grey crinoidal and cherty calcilutites.

Borehole logs from the Application Site tend to agree with the regional mapping, indicating that the north-western portion of the site is underlain by the Cork Red marble formation and the south and east portions of the site are underlain by the Waulsortian Limestones.

6.4 Assessment

As indicated above, the Application Site shall be used for a waste recovery facility for inert wastes to produce a secondary engineered restoration and capping material for the remediation of the former waste lagoons. The potential impacts posed to the natural geological environment at the Site include the following:

- The removal of surplus overburden materials;
- Oil and fuel spills during refuelling and maintenance of site vehicles;
- Maintenance of mobile units; and
- Releases from four sewer and toilet facilities.

6.5 Mitigation

Any impact to the soils during the construction, filling and operational phases would be minimal as all the material to be excavated at the Application Site would be reused to land raise in other zones of the site. Therefore the impact to the natural ground underneath will be minimal. The final rehabilitation of the site and importation of inert fill material to create a landscaped finish on the cap, are expected to have a positive impact on the Application Site.

Regarding the operational activities at the Application Site, the following mitigation measures will be employed:

- All refuelling of the mobile plant(s) will be undertaken with care in hardstanding areas connected to an interceptor located under the concrete slab. Spill kits will also be provided at the Site in case of any accidental spillages. These practices will have

little or no effect on any drift or bedrock material remaining on the Application Site once carried out in a careful manner;

- Fuel and lubricant storage for site vehicles and machinery will be stored in appropriate double lined mobile fuel bowsers will be used; and
- A groundwater monitoring programme will monitor any changes in static water levels and water chemistry potentially associated with the Applicant Site.

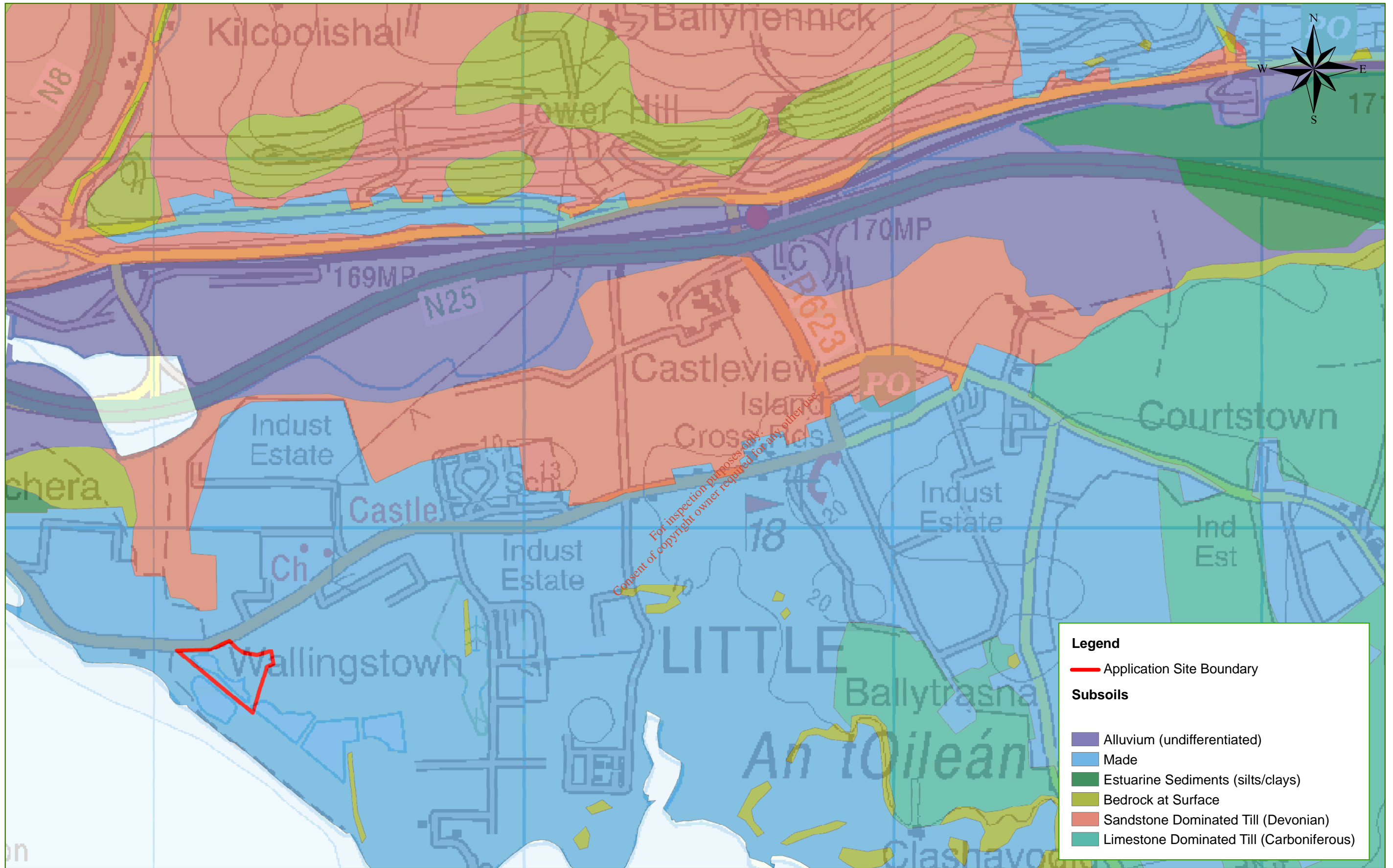
6.6 Residual / Likely Significant Effects

In the event that the mitigation measures identified in Section 6.5 are implemented, there will be no deleterious effects on the soils, overburden or bedrock caused by the activities on-site.

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FIGURES

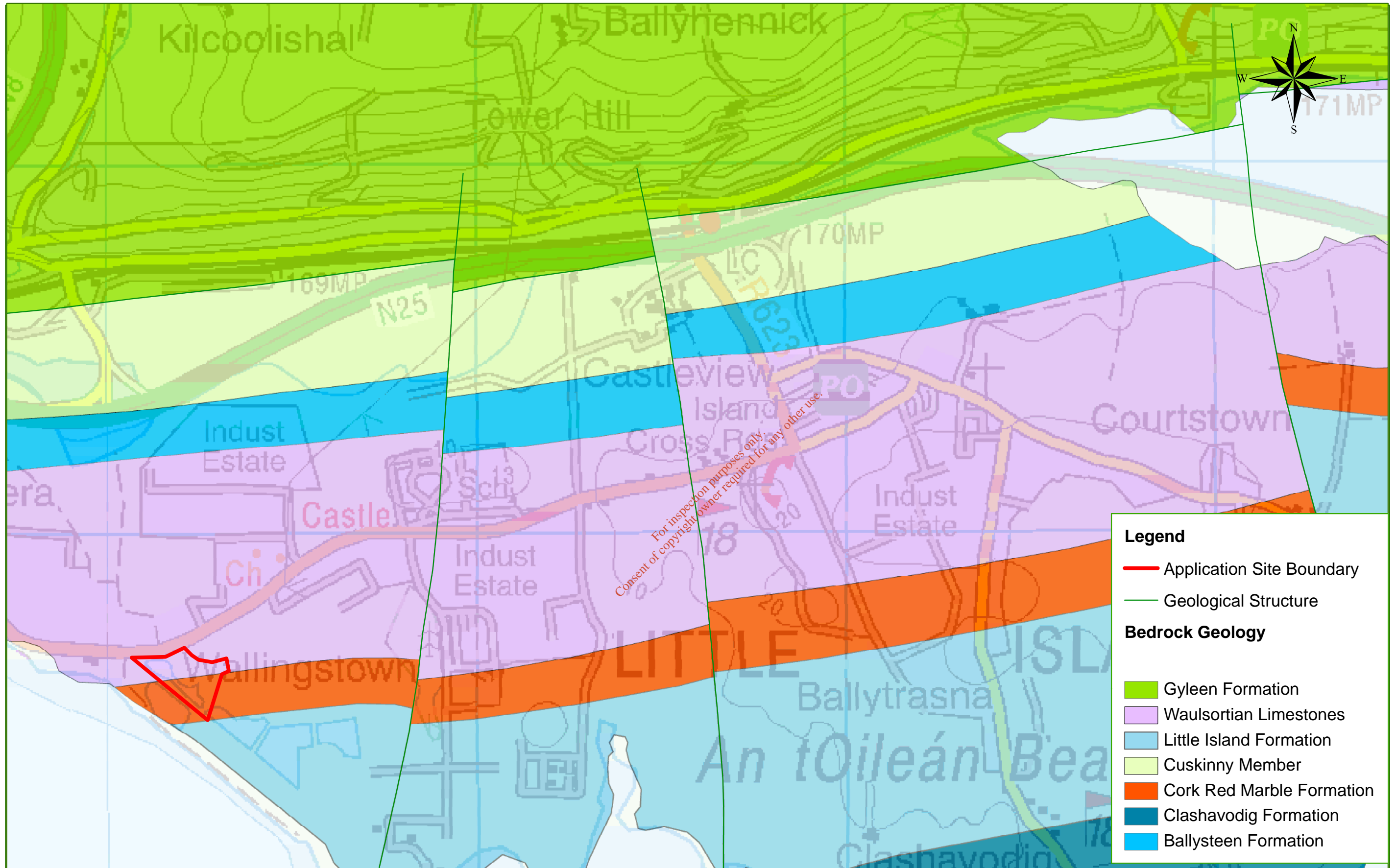
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Client THORNBUSH HOLDINGS LTD.	Project number: 07507120021
Location: WALLINGSTOWN, LITTLE ISLAND, CO. CORK	File Location: GIS\THORNBUSH\EIS\FIG 6.1
Project: WASTE LICENCE APPLICATION	ORDNANCE SURVEY OF IRELAND LICENCE NUMBER AR0056008

Created by: JH	Issue to: Cork County Council	Date: April 2008	Revision: A	Title: Subsoils Geology
Checked by: CC	Environmental Protection Agency	May 2008	B	
Approved by: CW	Source: Teagasc/ Environmental Protection Agency			Scale: 1:10,000

Figure No. 6.1



Legend

- Application Site Boundary
- Geological Structure

Bedrock Geology

- Gyleen Formation
- Waulsortian Limestones
- Little Island Formation
- Cuskinny Member
- Cork Red Marble Formation
- Clashavodig Formation
- Ballysteen Formation


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	Location: WALLINGSTOWN, LITTLE ISLAND, CO. CORK	File Location: GIS\THORNBUSH\EIS\FIG 6.2	Checked by: CC	Environmental Protection Agency	MAY. '08	B	
	Project: WASTE LICENCE APPLICATION	ORDNANCE SURVEY OF IRELAND LICENCE NUMBER AR0056008	Approved by: CW	Source: Geological Survey of Ireland			
						Scale: 1:10,000	

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7.0 WATER

7.1 INTRODUCTION

This section of the report describes the baseline and impact to the surface water (hydrology) and groundwater (hydrogeological) environments. The proposed excavation of fill material and introduction of engineering grade material is examined in terms of potential surface water and groundwater emissions. This section will deal with the baseline conditions of the surface water/groundwater quality at the site and the potential impact from the proposed development.

In assessing the issues, this report describes and considers:

- The current hydrogeological and hydrological setting of the Application Site, its surrounding area and reviews; and
- The impact of the current and proposed development on the natural groundwater and surface water regime in the area.

7.2 METHOD

7.2.1 Scope of Assessment Undertaken

The scope of the works outlined in this report includes:

- Desk study of the hydrogeological and hydrological setting of the Site;
- Report of relevant data regarding the Site development to date;
- Desk study review outlining the hydrogeological and hydrological implications of the Site development; and
- The Geological Survey of Ireland (GSI) for aquifer classification and vulnerability.

7.3 EXISTING CONDITIONS

7.3.1 Location and Surrounding Activities

The Application Site is situated at Wallingstown and Inchera, Little Island, Co. Cork, and is centred approximately at National Grid Reference 174201E 71606N, ca. 1km west of Little Island village. Lough Mahon, which forms part of upper Cork Harbour is located ca. 100m from the southern boundary of the Application Site. The predominant land use in the area is industrial with active manufacturing and pharmaceutical facilities operating in adjacent sites. The Site is located in a lowland area at an elevation of approximately 10m Above Ordnance Datum (AOD). The land surrounding and including the Application Site are predominantly flat with a slight dip southwards towards the estuary.

The water in Lough Mahon is estuarine and numerous studies on water quality indicate that water quality has been historically quite poor. Until 2003, when the Cork Main Drainage wastewater treatment plant was commissioned at Carrigrennan, Little Island, 13 million gallons of raw sewage and untreated wastewater had been flowing into the River Lee and Lough Mahon each day. Since the commissioning of the wastewater treatment plant the EPA has reported that the quality of the Lough Mahon Estuary has improved since 1999 and the classification has ameliorated from 'eutrophic' to 'potentially eutrophic'.

7.3.2 Current and Proposed Operation

The Application Site is ca. 2.2 ha and comprises natural ground, reclaimed land and waste lagoons. The proposed development consists of a dedicated CD&E Facility. Light infrastructure shall be installed on hardstanding and includes a porta-cabin office, weighbridge, inspection area, processing and stock piling area, wheelwash, quarantine area, new entrance, access road to adjacent site and 8 no. car parking spaces. Mobile plant will be utilised for periodic crushing, screening, and magnetic separation, site levelling and landscaping works. Fencing and screening berms will be installed at sensitive boundaries to minimise any potential impacts on neighbouring premises.

The Application Site is located in the north-western corner of a ca. 29 ha Brownfield site comprising waste lagoons (the Thornbush Site). Its development in the 1970s was undertaken by Mitsui Denman and involved the excavation and construction over a period of twenty years of a series of large artificial lagoons to facilitate waste material from an adjacent industrial plant. It was subsequently bought by Thornbush Holdings, who are obliged to restore the site under the existing planning permission (Planning Ref: 1466/73) and the IPPC licence (No. P0389-01). The proposed CD&E facility will facilitate the restoration of the Thornbush Site.

The only water required shall be for potable water, canteen, toilets, wheelwash, and dust suppression systems if required, during drier periods. The wastewater arising from the wheelwash shall be recycled.

7.4 ASSESSMENT - HYDROGEOLOGY

7.4.1 Aquifer Classification – Gravel Aquifer

The natural ground (gravel deposits) underlying the waste ground on the Application Site, confirmed by borehole logs (Geotech 2006, GAUK 2005, OCM 2001) (Appendix 7.1) is not considered by the Geological Survey of Ireland to be an important aquifer. Because of the proximity of the Site to the Estuary, the shallow depth to bedrock and the known karst nature of the bedrock in Little Island groundwater monitoring in the sea (Mitsui Denman Groundwater monitoring reports) has suggested saline intrusion of groundwater systems. The

nearest gravel aquifer in the area surrounding the Application Site lies approximately 5.3km to the northeast and is classified by the GSI as being a locally important sand/gravel aquifer.

7.4.2 Bedrock Aquifer

The bedrock formations at Little Island (Carboniferous Limestones) are considered by the Geological Survey of Ireland (GSI) to be part of a regionally important karstified bedrock aquifer. However, given the location of the Application Site and its proximity to the Lough Mahon Estuary and the potential for saline intrusion, abstraction of groundwater for potable water use would not be acceptable. This aquifer is considered to be dominated by fissure (cracks, joints, faults and caves) permeability (Figure 7.1).

7.4.3 Aquifer Vulnerability

The vulnerability of groundwater to contamination is determined by the thickness and type of unsaturated soils that overly the aquifer. The thicker the unsaturated zone, the greater the amount of filtration which recharging water is subject to, and so the lower the vulnerability rating that is applied to the groundwater resource. The GSI works on this premise to categorise groundwater vulnerability into four groups: Extreme, High, Moderate and Low.

The quaternary deposits tend to play an important role in the groundwater flow regime in the region. The groundwater vulnerability at the Application Site is considered by the GSI to be **Extreme (E) rock near surface or karst** to **Extreme (E)** and **High (H)** (Figure 7.2). Previous reports and the GSI designations have indicated that bedrock outcrops/shallow bedrock are common in the vicinity of the Application Site. Removal of significant depths of overburden will decrease the unsaturated thickness above the water table and therefore, in theory, locally increase the vulnerability potential of the groundwater to pollution. This shall be further discussed in Section 7.5.

The GSI reports that the water table in this area of Cork is generally found within 10m of the surface and the annual fluctuation is less than 6m. Well yields in the Carboniferous limestones of Cork have been measured at 200-1500 m³/day, although as mentioned previously it is unlikely that water abstraction would occur so close to coastal areas without the risk of saline water ingress (GSI, 1994).

According to the GSI's delineation of groundwater protection zones for Cork, the Application Site is not located within or near to a source protection area.

7.4.1 Well Search

Details of wells in the area were obtained from the GSI well database, with records for five wells within 1km of the Application Site being recorded. Out of five boreholes recorded

within the Little Island area, bedrock was encountered at 5.8m->7.5m. No information was provided on the depth to water or yield for these boreholes.

7.4.1 Groundwater flow

Groundwater at the Application Site will reportedly naturally tend to flow, under a hydraulic head, to discharge into Lough Mahon, to the south of the Application Site. Water levels taken during monitoring events at boreholes on and in the vicinity of the Application Site in 2004 and 2005 (carried out by SWS Environmental Services) were reported to confirm this. Well dips carried out on 7th of April 2008 at the Application Site appear to concur that groundwater flow direction was towards the southern portion of the Site. (See Table 7.1)

Table 7.1: Details on water levels from boreholes on and in the vicinity of the Application Site

Borehole Number	Eastings	Northings	Height Top of Casing (TOC) (mAOD)	Groundwater Level (Average) (mAOD)	No. of observations
BHA2	174182	71665	5.37	2.35	1
BHA3	174251	71524	6.57	2.9	1
MD6B	174312	71673	5.57	2.49	3
MD5	174050	71672	5.41	3.73	7
MD9A	174341	71329	3.45	1.59	5

* No information available

7.4.1 Groundwater Quality

The groundwater quality in the vicinity of the Application Site is classified as being possibly at risk of not achieving good status for the Water Framework Directive by the Environmental Protection Agency. Groundwater quality in and around the Application Site has been compromised from the historical land uses in the area.

Regular groundwater monitoring has been carried out at the Application Site and in the wider Thornbush Site as part of the Annual Environmental Reporting (AER) procedures for the IPPC licence. Groundwater reports note in particular elevated groundwater values for conductivity, manganese and sulphate that are likely to be associated with on-site activities. Groundwater monitoring data also identifies that groundwater may be affected by saline intrusion with elevated levels for chloride, sodium, magnesium, sulphate and conductivity noted in observation wells near the shoreline (Mitsui Denman 2002, 2003, SWS 2004, 2005).

Groundwater monitoring reports have noted that since the cessation of production activities at the Application Site in late 2003 there has been a general improvement in groundwater quality.

7.5 MITIGATION MEASURES - HYDROGEOLOGY

The Application Site will be noted on land registry maps as containing waste material. Groundwater quality beneath the Application Site has been impacted as a consequence of historical site activities and saline intrusion. The capping of the waste lagoons is essential to the restoration of the Thornbush Site, to provide environmental protection and restore the landfill site to beneficial afteruse.

To prevent any contamination of groundwater from accidental fuel spills, refuelling will be carried out on a covered concrete pad with any run-off being collected by an interceptor system. Vehicles will also be properly maintained to reduce the likelihood of fuel leakages. The existing monitoring programme will be continued to ensure that there is no deterioration of groundwater quality.

Groundwater abstraction will be considered, along with an abstraction from the estuary, to supply some low water supply demands such as the wheelwash and damping down roads and stockpiles. The abstraction point would be located within the bedrock and beyond the limits of in-situ waste. As the abstraction volume will be low no further mitigation measures are considered necessary.

7.6 EXISTING CONDITIONS: HYDROLOGY

7.6.1 Current Conditions and Impacts

The main potential sources of contamination to surface water shall be accidental spillage or leakage of fuels/suspended solids. There are no surface water features flowing onto or from the Application Site. A small water course is located approximately 300m north of the Application Site. Aside from this, the most notable surface water features in Little Island are the water-filled waste lagoons located within the Thornbush Site. The lack of surface water features outside of the waste lagoons is indicative of a karst environment. Cork Harbour Special Protection Area (wetlands comprising intertidal flats and saltmarshes) is located along the coastline approximately 50m from the Application Site.

Anecdotal evidence suggests that the lagoons are not hydraulically influenced by underlying groundwater. The water levels in the lagoons (which are lined with a fine layer of sediment) are above sea level and so it is unlikely that there is a tidal influence as the lagoons would drain periodically down to sea level.

7.7 MITIGATION MEASURES - HYDROLOGY

Whilst there shall be a wheelwash constructed at the facility, there will be no wastewater discharge. The water from the wheelwash shall have an integrated silt box and all water will be recycled. The solids from the wheel wash shall then be disposed of on the adjoining lands in an appropriate manner. Foul water shall be directed towards a holding tank which will be pumped regularly.

The main processing area shall be surfaced with hardcore and water shall be managed via a ring French drain which shall discharge to a soak hole in the western corner of the processing area. The parking area and weighbridge shall be surfaced with tarmac which shall drain to a silt box and oil interceptor. It is proposed to construct an enclosed drainage conduit that will discharge into the municipal stormwater management system. The stormwater shall discharge via an outfall to Lough Mahon. The discharge from the Application Site shall be monitored on a regular basis to ensure compliance with surface water discharge limit values.

7.8 CUMULATIVE IMPACTS

Cumulative impacts of the proposed development are considered with the proposed adjacent Howard Holdings Ltd. development on the former Mitsui Denman manufacturing facility site.

The main emissions to the water environment shall be via rainfall as surface water run-off and infiltration from the Application Site. As it is expected that nearly all of the wastes handled and processed at the Site will be inert, the impact on groundwater/surface water quality as a result of the proposed development shall be imperceptible and the cumulative impacts with the Howard Holdings development are expected to be insignificant. While there may be risks during the construction phase of the Howard Holdings development with respect to surface water/ groundwater pollution the impacts should be negligible provided mitigation measures are fully implemented.

As the entire Application Site shall be ultimately capped with either hardstanding/macadam and interconnected to an underlying drainage/interceptor network, it is considered that cumulative impacts to surface water/ groundwater over the lifetime of the development shall be minimal.

7.9 RESIDUAL / LIKELY SIGNIFICANT EFFECTS

The development of the Application Site is an important impact which cannot be mitigated against; however the proposed use of the site as a means to restoring the Thornbush Site in its entirety is considered to be an acceptable use of the resource.

In the long term, there will be no deleterious effects caused by the activities on-site to the surface water or groundwater provided all of the mitigation measures are followed.

7.10 REFERENCES

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Geotech Specialists Ltd. “Clearwater, Little Island – Factual Report on Site Investigation”, 2006

Golder Associates UK Ltd. “Factual Report on Geotechnical Investigation, Mitsui Denman Ireland Site, Little Island, Co. Cork (Appendices A & D)”, 2005

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O’Callaghan Moran & Associates – “Hydrogeological Investigation, Mitsui Denman Ireland Ltd., Little Island, Co. Cork”, 2001

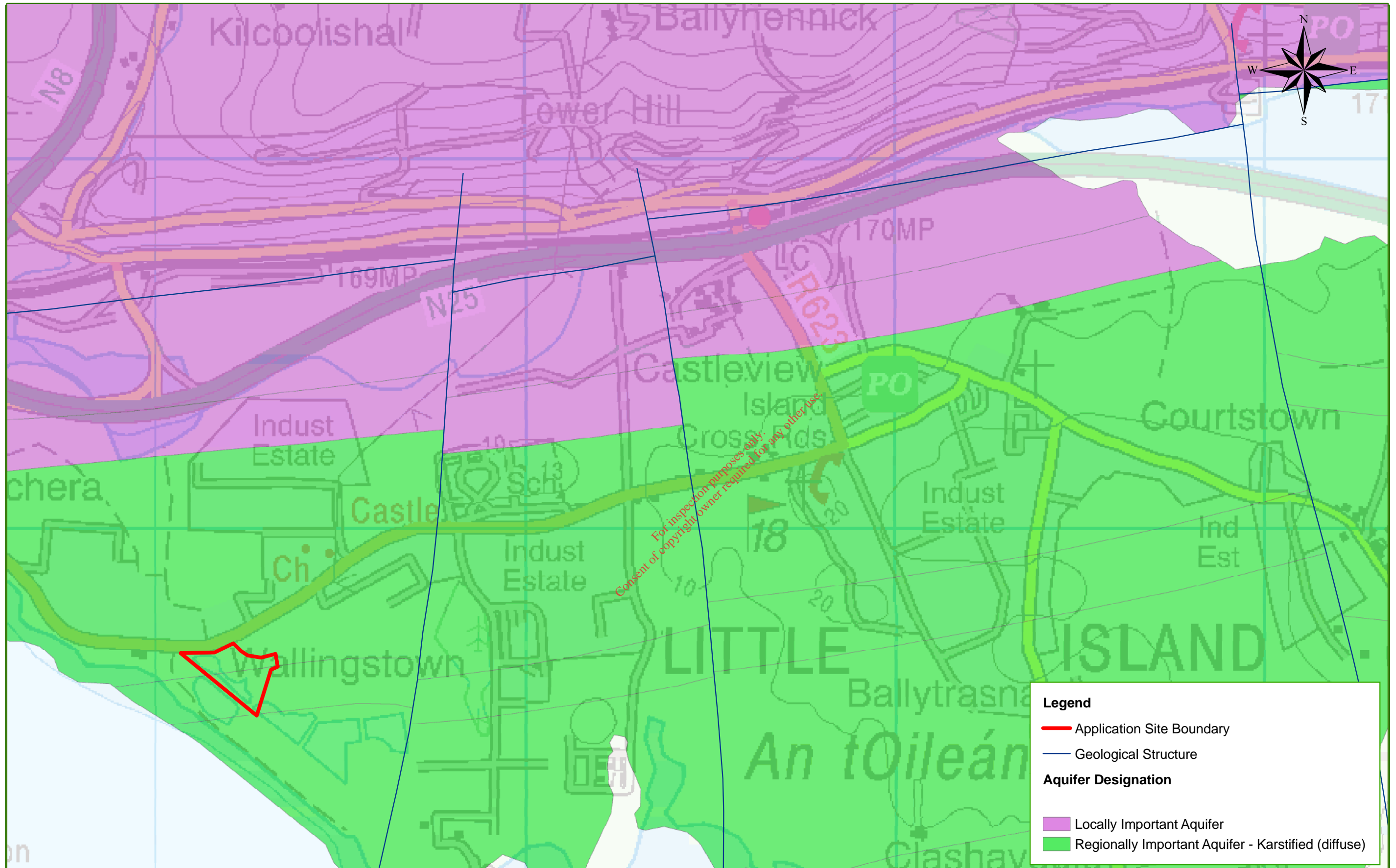
SWS Environmental Services “Groundwater Monitoring 2004 – at the Former Mitsui Denman (Ireland) Ltd. Site, Wallingstown, Little Island, Co. Cork”, 2004

SWS Environmental Services “Groundwater Monitoring 2005 – at the Former Mitsui Denman Ireland Site, Wallingstown, Little Island, Co. Cork”, 2005

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FIGURES

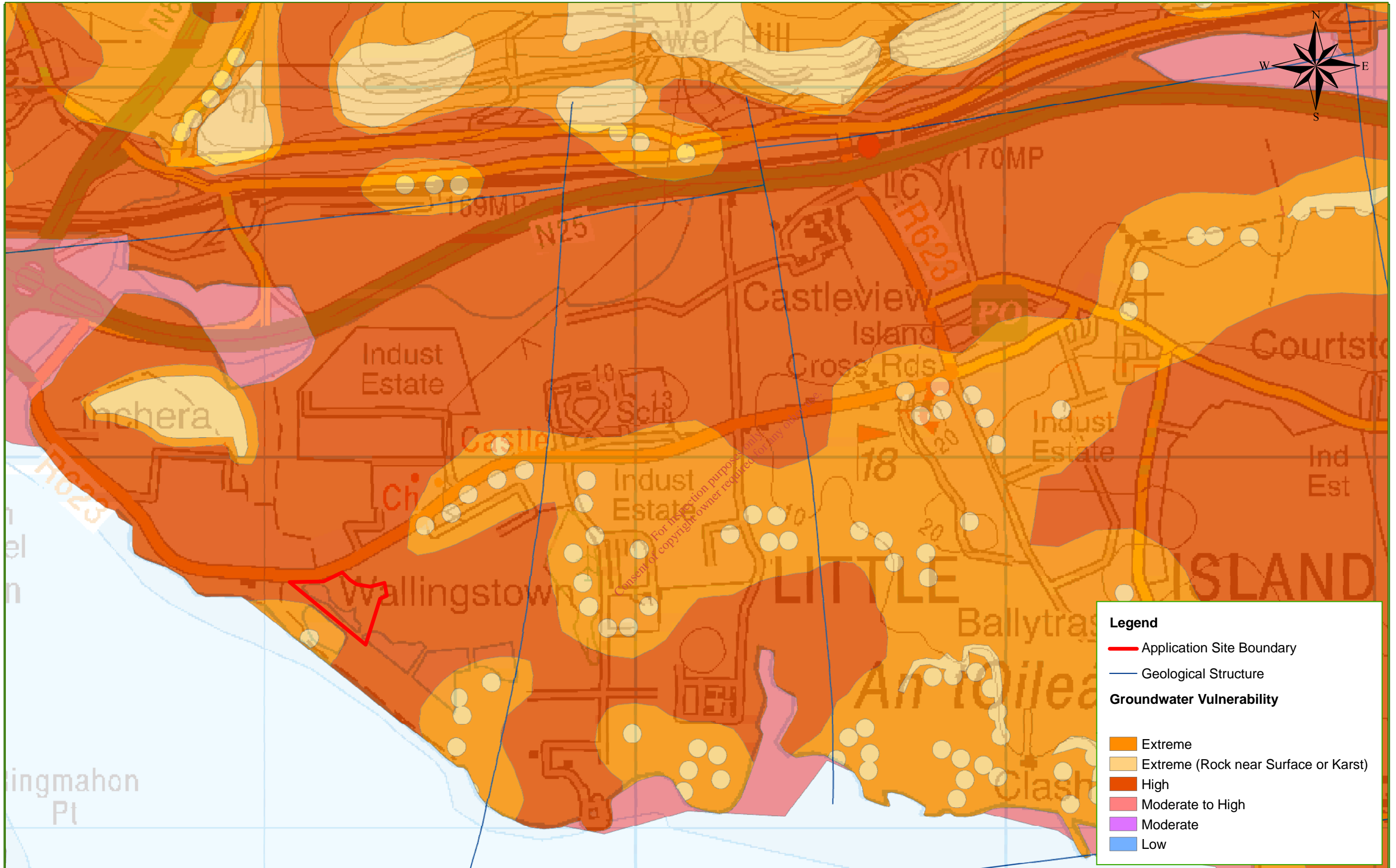
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Legend	
—	Application Site Boundary
—	Geological Structure
Aquifer Designation	
	Locally Important Aquifer
	Regionally Important Aquifer - Karstified (diffuse)

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	Location:	WALLINGSTOWN, LITTLE ISLAND, CO. CORK	File Location:	GIS\THORNBUSH\EIS\7.1	Checked by:	CC	Environmental Protection Agency	Date:	MAY '08	Revision:	B			
	Project:	WASTE LICENCE APPLICATION	ORDNANCE SURVEY OF IRELAND LICENCE NUMBER	AR0056008	Approved by:	CW	Source: Geological Survey of Ireland							



Legend

- Application Site Boundary
- Geological Structure

Groundwater Vulnerability

- Extreme
- Extreme (Rock near Surface or Karst)
- High
- Moderate to High
- Moderate
- Low


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	Location:	WALLINGSTOWN, LITTLE ISLAND, CO. CORK	File Location:	GIS\THORNBUSH\EIS\FIG 7.2	Checked by:	CC	Environmental Protection Agency	Date:	MAY '08	Revision:	B	<p>Title:</p> <h2 style="margin: 0;">Groundwater Vulnerability</h2>	
	Project:	WASTE LICENCE APPLICATION	ORDNANCE SURVEY OF IRELAND LICENCE NUMBER	AR0056008	Approved by:	CW	Source:	Geological Survey of Ireland			Scale:		

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9.0 AIR

9.1 Introduction

This section of the Environmental Impact Statement considers and assesses the impacts/effects on air quality and odour from the proposed development. A baseline air quality assessment has been carried out in the area around the site of the proposed CD&E Waste Recovery Facility (CD&E Facility) 'the Application Site'. This assessment was prepared having regard to the Guidelines on the information to be contained in Environmental Impact Statements (Environmental Protection Agency, 2002).

9.2 Methodology

9.2.1 Ambient Air Quality Monitoring Standards

Air quality control and assessment in Ireland is provided for under the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002). These transpose Council Directive 96/62/EC and the first two daughter directives (Council Directives 1999/30/EC and 2000/69/EC) into Irish Law. The Air Quality Standards Regulations, 2002 established new air quality standards for SO₂, NO₂ and NO_x, lead, PM₁₀, CO and benzene coincident with those in the daughter directives. The new legislation encompasses limits provided for under Council Directive 96/62/EC relating to sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and those specified under Council Directive 2000/69/EC relating to benzene and carbon monoxide. The Environmental Protection Agency (EPA) has been designated as the authority responsible for the assessment and implementation of air quality legislation in the State.

Other commonly referenced ambient air quality standards include the World Health Organisation Guidelines. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards are set by governments, for which additional factors, such as socio-economic factors are considered. German TA Luft guidelines also provide technical guidance which include emission values for a range of parameters for the protection of human health.

9.2.2 Ambient Air Survey

Baseline air quality monitoring was undertaken by SWS Environmental on behalf of Thornbush Holdings during the months of January and February 2005. Dust deposition monitoring was also conducted at six locations around the boundary of the site between November 2004 and March 2005. As the site has remained derelict since this time, and surrounding landuse has not altered, air quality parameters measured during this monitoring period are still considered to reflect a representative baseline of local air quality.

9.2.3 Sampling Locations

Air quality monitoring was conducted at three locations (A1 to A3). See Figure 9.1.

A1: Situated to the North-East of the site, within the former Mitsui Denman manufacturing facility, towards the administration buildings.

A2: Located immediately to the north of the site, adjacent to the old waste-water treatment tanks. The primary influences on air quality at this point are from the main road R623 which is at a distance of approximately 20 metres to the North.

A3: This point is located towards to the southeast of the site in the lagoon area. This location is quite remote with no activities in the immediate environment and at a distance of approximately 230m South of the R623 road and approximately 245 West of another minor road which serves a number industrial facilities in the area.

Dust Monitoring was conducted at six locations (D1 to D6) around the boundary of the wider Thornbush Site. All monitoring locations are shown on Figure 9.1

9.2.4 Ambient Air Quality Parameters Monitored

Table 9.1 below describes the range of parameters monitored, how they were sampled, duration of sampling, analytical technique and any referenced standards. Ambient Air Quality Standards and Emission Values are listed in tables in Appendix 9.1.

Table 9.1 Air Quality Parameters

PARAMETER	SAMPLING METHODOLOGY	SAMPLING DURATION	METHOD OF ANALYSIS	STANDARD REFERENCED
NO ₂	Passive tube diffusion	3 weeks	UV Spectrophotometry	Analysis done by UKAS accredited laboratory
SO ₂	Passive tube diffusion	3 weeks	Ion Chromatography	Analysis done by UKAS accredited laboratory
PM ₁₀ , PM _{2.5}	Filtration	24 hours	Gravimetric determination	CEN 12341
PM ₁₀ , PM _{2.5}	Air sampling continuous real - time	24 hours	Nephelometry (light scattering)	-
Metals	Filtration	24 hours	ICP-AES	Analysis done by UKAS accredited laboratory
Benzene	Passive tube diffusion	3 weeks	Gas Chromatography -FID	Analysis done by UKAS accredited laboratory
Dust and metal Deposition	Bergerhoff Gauges	1 Month	Gravimetric, Metals analysed using AA	Standard Method VDI 2119

9.2.5 Instrumentation and Sampling Equipment Used

- Osiris 2181 Real Time Atmospheric Monitoring Unit;
- TCR Tecora Bravo H2 High Volume Air sampling Pump with LVS PM10 head; and
- NO_x, SO₂ and Benzene Passive Diffusion Tubes.

9.2.6 Meteorological Data

Weather observations were made during each site visit. Wind speed and direction were recorded throughout the monitoring interval between the 17th and 31st January 2005. Further meteorological data was referenced from records from nearby meteorological stations.

9.2.7 Quality Control

All air sampling carried out by SWS personnel was done in accordance with in-house sampling procedures based on relevant standards and guidelines. All the test equipment to be utilised was of inherent high accuracy, and was calibrated before monitoring. A log of all monitoring was maintained and samples returned to the laboratory using chain of control procedures. SWS Environmental Services operate a strict quality control system and only employ the use of accredited laboratories.

9.3 Existing Environment

9.3.1 Receptors

Receptors within the vicinity of the development considered in this report are as follows:

- The nearest residential area is St Lappins Terrance located over 700m to the northeast of the Application Site (Figure 9.1);
- The nearest existing industrial property boundaries are directly to the north of the Application Site across the R623 Little Island Road;
- A proposed development (Howard Holdings) is located directly to the northeast of the Application Site;
- The nearest designated conservation site, Cork Harbour SPA, is located approximately 100m to the south of the Application Site; and
- A public walkway is located immediately to the west of the Application Site along the edge of the harbour.

9.3.2 EPA Monitoring Data for the Cork Area

The EPA designates four air quality zones for Ireland, which are as follows:

- Zone A (Greater Dublin);
- Zone B (Cork and its environs);
- Zone C (16 urban areas with population greater than 15,000); and
- Zone D (Areas in Zones A, B and C).

The location being assessed is within Zone B. Concentrations of pollutants recorded in Zone B as outlined in the EPA document “Air Quality in Ireland 2006, Key Indicators of Ambient Air Quality” were used to represent typical background levels. Average concentrations of SO₂, NO₂, PM₁₀, PM_{2.5}, and Benzene recorded in Zone B are outlined in Table 9.2 below.

Table 9.2: Air Quality Results Zone B - Old Station Rd, Cork

PARAMETER	ANNUAL MEAN
SO ₂	4 µg/m ³
NO ₂	26 µg/m ³
PM ₁₀	16 µg/m ³
PM _{2.5}	9 µg/m ³
Benzene	0.5 µg/m ³

The number of PM₁₀ exceedences for this station for 2007 and up to 31/02/2008 are recorded on the EPA website. PM₁₀ exceeded the limit of 50 µg/m³ on only one occasion in 2007, and there have been no exceedences up until the end of January in 2008. Cork City Council have also published a report on monitoring data for 2006 entitled ‘Air Pollution in Cork City – 2007 Report’.

9.3.3 Results of Ambient Air Monitoring

For examination of the results, comparison is made with limits specified in the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002) for SO₂, NO₂, PM₁₀ and Benzene. Other parameters, which do not have limits specified under these regulations, are assessed with reference to WHO (World Health Organisation) guidelines (heavy metals) and TA Luft guidelines (dust). Comparisons are also made with typical ambient concentrations measured by the EPA as part of their air quality monitoring network throughout Ireland.

9.3.3.1 NO_x, SO₂ and Benzene

Combustion processes are the principal sources of NO_x, SO₂, and Benzene. Emissions from road traffic tend to be the major influence for these parameters in Ireland. Concentrations for NO_x, SO₂ and Benzene were monitored at locations A2 and A3 illustrated on Figure 9.1. Monitoring results from the EPA network in 2006 reported NO₂ levels in Cork city averaged 26 µg/m³. The primary source of NO₂ is from traffic emissions and also contributed to by combustion emissions in the industrial zone. Typical SO₂ levels for Cork city were on average less than 4 µg/ m³ in 2006. SO₂ emissions are also from combustion operations but levels have decreased dramatically in recent years with due to controls on the sulphur content of fuels. As a result of such measures SO₂ concentrations are typically low and not a matter of concern. Road traffic is again largely the main source of Benzene emissions. EPA monitoring for benzene indicate annual mean concentrations of 0.5 µg/ m³ in 2006. Site – specific measurement results for NO_x, SO₂ and Benzene are presented in Tables 9.3 to 9.5. Concentrations are within anticipated ranges for an industrial area and are all well within limits as specified under the Air Quality Standards Regulations 2002.

Table 9.3: Average NO₂ concentrations as measured by passive diffusion tubes

LOCATION	SAMPLING PERIOD	AVERAGE NO ₂ (µg/ m ³)
A2	19/01/05 – 07/02/05	20.0
A3	19/01/05 – 07/02/05	19.0
Limit Value		50(a), 30(b)

- (a) SI 271, 2002 as an annual average for protection of human health, a target limit value of 40µg/m³ is to be achieved by 1 January 2010
(b) For the protection of vegetation a limit of 30µg/m³ exists or total oxides of nitrogen (NO_x).

Table 9.4: Average SO₂ concentrations as measured by passive diffusion tubes

LOCATION	SAMPLING PERIOD	AVERAGE SO ₂ (µg/ m ³)
A2	19/01/05 – 07/02/05	2.41
A3	19/01/05 – 07/02/05	1.88
Limit Value	-	20 (a)

- (a) SI 271, 2002 as an annual average

Table 9.5: Average Benzene concentrations as measured by passive diffusion tubes

LOCATION	SAMPLING PERIOD	AVERAGE BENZENE (µg/ m ³)
A2	19/01/05 – 07/02/05	1.06
A3	19/01/05 – 07/02/05	1.14
Limit Value	-	10.0 (a)

- (a) SI 271, 2002 as an annual average, reducing to 5 µg/m³ by 1 January 2010.

9.3.3.1.1 Particulate Matter/PM10

Particulate matter to include Total Suspended Particulate (TSP), PM₁₀ and PM_{2.5} were monitored at three locations A1, A2 and A3 as illustrated on Figure 9.1. Total suspended particulates (TSP) range in size from 0.001 to 500 µm in diameter and thus include both inhalable and non-inhalable dusts. Former standards in Europe related to total suspended particulate or smoke levels but standards nowadays relate to PM₁₀ (particulate matter in which 50% of the particles have an aerodynamic diameter of less than 10 µm), the particular fraction identified as posing health risks from inhalation. PM_{2.5} (the fraction of particulate matter with an aerodynamic diameter of 2.5 µm) was also monitored at three locations. No standard limits have yet been specified for this particular fraction.

The Air Quality Standards Regulations 2002 specifies a 24-hour PM₁₀ limit of 50µg/m³ for 2005. Monitoring results reported by the EPA (2006) from their monitoring station network throughout Ireland indicates that elevated PM₁₀ concentrations are common throughout Ireland, even in suburban and rural locations. Cork City Councils report on data generated in 2006 notes that PM concentrations have reduced over the last three years, with the average level at the 'Old Station Road' monitoring location having fallen from 26 µg/m³ to 16 µg/m³ and the number of samples exceeding 50 having fallen from 28 to 4. The report notes that suspended particulates reached about 90% of the EU limits in the past and have now reduced to about 10% of the limit due to the ban on the sale of coal.

On-site monitoring for particulates was conducted using two methods; a gravimetric and a nephelometry (light scattering) technique for location A1 (Table 9.6), for locations A2 (Table 9.7) and A3 (Table 9.8) only the nephelometry technique was possible. Apart from a slightly elevated result of 50.9 µg/m³ measured at location A2 on one occasion on the 15th February 2005, results indicate that PM₁₀ levels are well within limit values.

Table 9.6: Particulate concentrations as measured at Location A1

GRAVIMETRIC METHOD			
Parameter	Sampling Interval	Conc. (µg/m ³) ^(a)	Limit Value
TSP	21/01/05 - 22/01/05	73.2	NS
PM ₁₀	19/01/05 - 21/01/05	20.3	50 ^(b)
PM _{2.5}	28/01/05 - 29/01/05	7.52	NS

NEPHELOMETRIC METHOD ^(c)			
Sampling Interval (24hr)	TSP (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
19/02/05	18.6	15.8	9.0
20/02/05	18.2	13.6	6.5
21/02/05	40.1	29.3	10.9
22/02/05	14.4	10.7	4.0
23/02/05	15.9	13.0	7.8
Limit Value	NS	50 ^(b)	NS

Notes:

NS = None Specified

(a) Gravimetric determination of sampling that conforms with the European Standard EN 12341

(b) SI 271, 2002 as an 24 hour average for 2005 not to be exceeded more than 35 times/year.

(c) Monitored by an Osiris Real Time monitor using nephelometry (light scattering technique)

Table 9.7: Particulate concentrations as measured at Location A2

SAMPLING INTERVAL (24HR)	TSP ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)
09/02/05	26.1	24.4	16.6
10/02/05	24.7	21.2	7.4
15/02/05	79.2	50.9	17.3
21/02/05	10.7	8.0	3.3
Limit Value	NS	50 ^(b)	NS

Notes:

NS = None Specified

(a) Monitored by an Osiris Real Time monitor using nephelometry (light scattering technique)

(b) SI 271, 2002 as an 24 hour average for 2005 not to be exceeded more than 35 times/year.

Table 9.8: Particulate concentrations as measured at Location A3

SAMPLING INTERVAL (24HR)	TSP ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$) ^(A)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)
27/02/05	6.86	4.90	2.38
28/02/05	33.4	27.7	7.51
Limit Value	NS	50 ^(b)	NS

Notes:

NS = None Specified

(a) Monitored by an Osiris Real Time monitor using nephelometry (light scattering technique)

(b) SI 271, 2002 as an 24 hour average for 2005 not to be exceeded more than 35 times/year.

9.3.3.2 Heavy Metals

Heavy metals were monitored by high volume filtration at one location, A1 (Table 9.9). In the absence of legislative limits for metals, comparison of results were made with guideline limits specified in WHO guidelines (World Health Organisation, Air Quality Guidelines for Europe, 2nd Ed. 2000). Measured manganese concentrations are on the limit of acceptable annual average concentrations specified in the guidelines. Arsenic and nickel are classed as carcinogenic and thus safe concentration levels in air are not specified. Instead, carcinogenic risk estimates are given for $1\mu\text{g}/\text{m}^3$; this gives an estimated lifetime risk of 1.5×10^{-3} for arsenic and a risk of 3.8×10^{-4} for nickel. For concentrations measured, this equates to a low risk estimate of $< 7.51 \times 10^{-5}$ (for an arsenic concentration of $< 0.05\mu\text{g}/\text{m}^3$) and 1.9×10^{-5} for nickel (for a measured concentration of $0.05\mu\text{g}/\text{m}^3$).

Deposition of metals was examined around the boundary locations, D1 to D6. Only deposition rates for manganese and iron were measured as the low concentration and quantity

of sample did not allow reliable detection levels of other parameters (Table 9.10). No adverse effects are anticipated due to the low concentrations measured.

Table 9.9: Metal concentrations at A1 between 21/01/05 – 22/01/05

PARAMETER	METHODOLOGY	CONCENTRATION ($\mu\text{g}/\text{m}^3$)	GUIDE LIMIT ($\mu\text{g}/\text{m}^3$) ^(a)
Arsenic	Filtration, 24hr	< 0.05	1.0 ^(b)
Cobalt	Filtration, 24hr	< 0.02	None Specified
Manganese	Filtration, 24hr	0.15	0.15
Nickel	Filtration, 24hr	0.05	1.0 ^(b)
Zinc	Filtration, 24hr	3.40	None Specified

Notes:

(a) WHO Guideline Limits, 2000

(b) For arsenic and nickel, carcinogenic risk estimates are given for $1\mu\text{g}/\text{m}^3$, this gives an estimated lifetime risk of 1.5×10^{-3} for arsenic and a risk of 3.8×10^{-4} for manganese

Table 9.10: Metal Deposition Rates at locations D1 to D6 between 18/11/04 to 16/12/04

LOCATION	PARAMETER	DEPOSITION RATE, $\mu\text{g}/\text{m}^3/\text{DAY}$
D1	Iron	1.68
	Manganese	0.42
D2	Iron	0.20
	Manganese	0.27
D3	Iron	0.49
	Manganese	1.38
D4	Iron	0.51
	Manganese	0.77
D5	Iron	0.26
	Manganese	0.09
D6	Iron	0.08
	Manganese	0.04

Note: Deposition rates were determined using dust deposition methodology over a four-week monitoring interval. Only concentrations of Iron and Manganese were available; the low concentration and quantity of sample did not allow reliable detection levels of other parameters.

9.3.4 Dust Deposition

Dust Deposition was monitored at locations D1 to D6 at three intervals (each of approximately 1 month) between November 2004 and March 2005. Dust deposition rates are low, ranging between 30 and 193mg/m²/day (Table 9.11). TA Luft guidelines specify a dust deposition rate of 350mg/m²/day (averaged over 1 year) to protect against significant nuisances or significant disadvantages due to dust fall. Measured results at all locations indicate that dust deposition is well within acceptable levels.

Table 9.11: Dust Deposition Rates November 2004 to March 2005

LOCATION	DUST DEPOSITION RATE $\mu\text{g}/\text{m}^3/\text{DAY}$ ^(a)		
	18/11/04 to 16/12/04	19/01/05 to 23/02/05	23/02/05 to 29/03/05
D1	44	100	— ^(b)
D2	33	30	193 ^(b)
D3	50	70	73
D4	44	60	121
D5	45	20	107
D6	37	30	58

Notes:

(a) Dust Deposition Rates determined using German Standard VDI 2119

(b) Installation of borehole sampling wells adjacent to D1 and D2 during March 2005 caused direct localised contamination of samples.

9.3.5 Meteorological Data

Prevailing weather conditions (i.e. precipitation, wind speed and direction) will influence the potential for fugitive emissions to firstly become airborne and secondly remain in the air and be transported off-site prior to being deposited to ground. Areas that are most consistently affected by dust, due to the influence of prevailing winds, are located downwind of emission sources. An assessment of each of these factors in relation to the Site is therefore presented below.

Rainfall Patterns (Deposition of dusts)

In relation to dust, precipitation will suppress dust and prevent it from becoming airborne as well as increasing the rate at which dust is deposited onto ground surfaces (i.e. no longer airborne) due to surface wetting. Precipitation levels of >0.2 mm/day are considered sufficient to effectively suppress wind-blown dust emissions, whilst levels of <0.2 mm/day will still have a limited positive impact.

A review of rainfall data (Table 9.12) confirms that the relatively high local rainfall characteristics of the local area would be expected to naturally suppress dust emissions arising from the Site for considerable periods of the year.

Prevailing Wind (Dispersion of Airborne Substances)

During particularly dry or windy conditions, the potential for dust emissions to be generated and remain airborne cannot be discounted. Past studies have found that dust particles with a diameter $>30\mu\text{m}$, which make up the greatest proportion of dust emitted from demolition and construction sites, will largely deposit within 100 m of their source¹ as they are heavier than

¹ The Environmental Effects of Dust from Surface Mineral Workings, Volume 1, DETR, HMSO, 1995;

fine particulates (i.e. PM₁₀). Particles less than or equal to 10µm may remain airborne for distances up to 1 km from source². Windspeed data taken during on-site monitoring is presented in Figure 9.2. The wind rose (Figure 9.3) indicates that prevailing winds are southwesterly in direction.

Table 9.12: Rainfall Data (mm) Jan 2007 - Present (Source: Met Éireann)

YEAR	2008	2007	MEAN
Jan	193.1	89.4	148.3
Feb	51.8	141.9	115.9
Mar	3.6	89.3	97.1
Apr		27	70.2
May		64.6	84.1
Jun		155.7	67.7
Jul		117.5	65.4
Aug		80.2	89.9
Sep		36.3	97.4
Oct		64	125.8
Nov		56.8	108.7
Dec		134.7	136.5
Annual		1057.4	1206.9

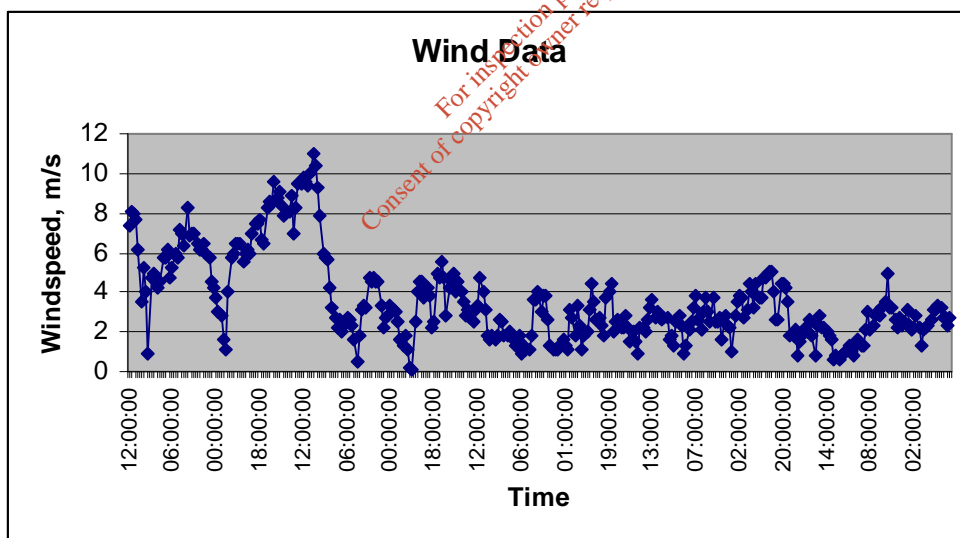


Figure 9.2: On- site wind monitoring 17/01/05 to 31/01/05

² Control of Coal Dust in Transit and in Stock Piles, IEA Coal Research, London, 1994

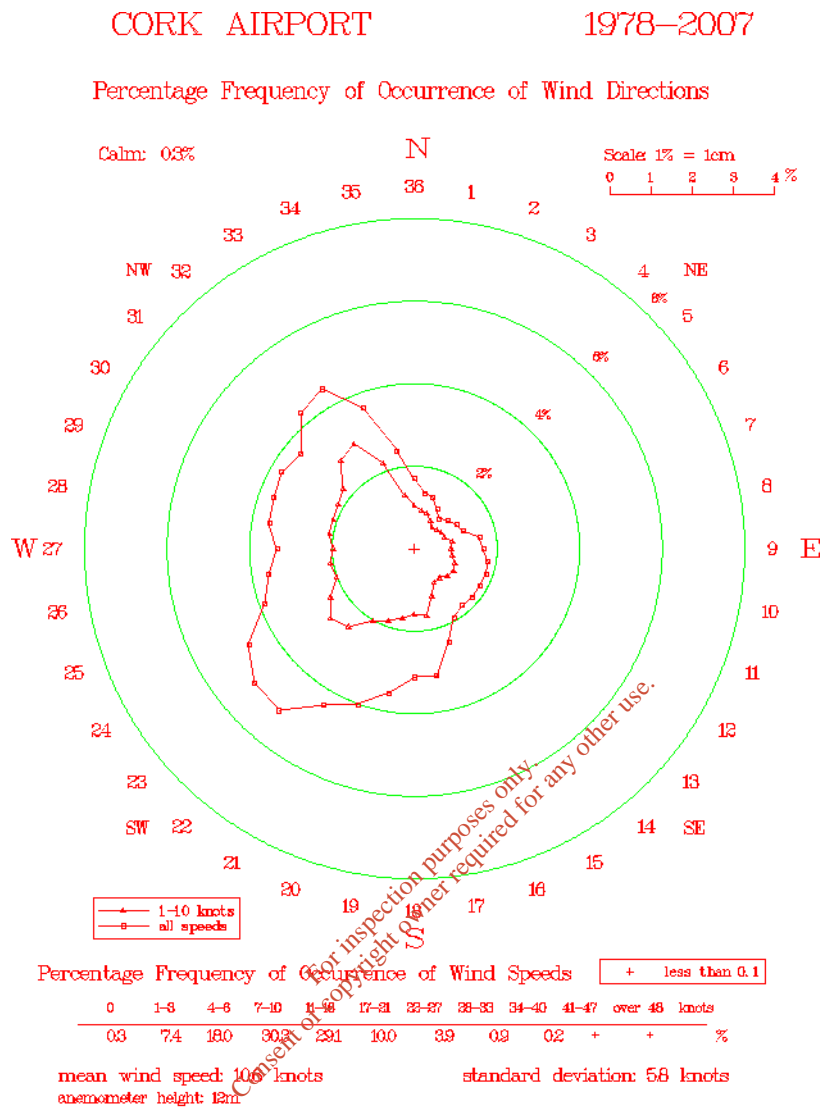


Figure 9.3: Long-term wind rose Cork Airport

9.4 Assessment

The impacts of the proposed CD&E Facility on local air quality during the construction and operational phases of the proposed development are discussed below. The focus of the assessment is on dust and gaseous emissions. No significant adverse odour impacts are anticipated during the construction phase as there are no odour generating activities. The facility will treat waste from construction and demolition activities. The absence of any significant quantities of putrescible organic waste due to segregation by the producer will ensure that any odour impacts are minimal. Potential impacts relating to climate change are dealt with in Section 8 Climate.

9.4.1 Construction Phase - Predicted impacts

It is expected that the construction phase will last approximately 2-3 months and due to the scale of the development and controlled earth moving activities, any impact on air quality will be minor and short-lived. The nearest residential area is St. Lappin's Terrace located approximately over 700m northeast of the proposed facility. The nearest existing and proposed industrial properties are located to the north and northeast of the site respectively. The impact of the operation of the proposed development on residential air quality will be negligible. Potential impacts in terms of dust, odour and gaseous impacts are addressed with respect to neighbouring properties in this section and mitigation measures are proposed in section 8.5.

9.4.1.1 Dust

The major potential impact on air quality during the construction of the development will be dust, particularly in drier weather conditions. The extent of any dust generation will depend on the nature of the dust (i.e. soils, sands, gravels, silts) and the extent of construction activity. The potential for dust dispersion depends on the local meteorological factors such as rainfall, wind speed and wind direction. Only minor site leveling works will be required as the Application Site is 2.2 ha in area. The facility will be temporary in nature with mobile plant being utilized for processing operations thus no major site excavation or preparation will be required. Initially, the building of screening berms along the northern site boundaries may have the potential to generate dust. Adverse impacts will be minimised by the proposed mitigation measures and the berms themselves will serve to shield nearby industrial receptors from windblow. Construction vehicles and plant have the potential to release particulate matter by generating windborne dust and from exhaust fumes. Impacts due to dust will be minimal if plant and equipment is kept in good working order and a dust minimization plan is implemented.

9.4.1.2 Gaseous Emissions

During the construction phase the major gaseous emissions will be exhaust fumes from construction vehicles and plant (including generators, compressors etc.). Due to the size of the Application Site, the short-term construction phase, and the distance to the nearest receptors, the impacts are deemed negligible.

9.4.2 Operations Phase – Predicted Impacts

There will be no fixed emission points on site so the only emissions of concern are fugitive emissions generated by site activities, storage and traffic. The nearest residences are located over 700m from the facility thus direct impacts will be minimal at this distance. The impact of operations on flora and fauna are examined in Section 4 of this EIS.

Air quality parameters are evaluated and assigned a rating in terms of impact potential based on the design, waste to be managed and the proposed operational procedures. This evaluation is presented in matrix form in Table 9.13.

Table 9.13: Identification of Potential Emission Sources

TYPE AND SOURCE OF EMISSION	CONSTRUCTION AND DEMOLITION WASTE PROCESSING FACILITY					ANCILLARY FACILITIES				
	L	M	M	M-H	H	L	L-M	M	M-H	H
Rating										
Odours from Waste	X					X				
Odours from Activities	X					X				
Dust from Waste	X					X				
Dust from Activities		X					X			
Vehicle Emissions	X					X				
Gaseous Emissions from machinery operating on site	X					X				

Notes: Rating: L = Low, M = Medium, H = High

9.4.2.1 Dust

Dust arises when small particles, typically less than 75 µm in diameter, are raised into the air and dispersed by the wind. The extent of wind blow across the site will be primarily dependent upon the wind speed, surface conditions and size range of particles present. Adverse affects will vary according to the distance from the source to the sensitive location as airborne dust concentrations fall off rapidly on moving away from the source. This is primarily due to its dispersion and dilution, but is also enhanced by the rapid deposition of the larger particles. The very largest particles usually only travel 10-20 m before being deposited;

PM₁₀ particles (particles averaging 10 microns in diameter), are less readily deposited and can travel for longer distances, although the vast majority is deposited within 100 m of the source, and hence it is in this zone that the risk of problems from dust is greatest.

The main source of dust will be fugitive dust from crushed concrete and soils from operations including:

- Operation and internal movement of crushing and processing plant;
- Loading and unloading of transport vehicles;
- Windblow from storage mounds; and
- Off-site transfer of dust from vehicles traveling onto site.

The dust generated will be inert and thus assessed according to nuisance potential rather than adverse health effects. The design of the proposed facility identifies appropriate storage areas to accommodate the various incoming and outgoing waste streams. Waste will be delivered on site, inspected and tipped into incoming storage waste areas. In dry weather the tipping area will be sprayed with water to minimize dust blow. A tracked excavator with hydraulic rock breaker and crusher and sorting grabs will break, crush and screen CD&E waste. The excavator will subsequently feed material into a screener. The screener pre-screens CD&E waste prior to material being fed into a crusher. The screener separates aggregate on size. Screened aggregate will be stored in separate storage bays according to quality and aggregate size.

The prevailing wind direction is south-westerly, therefore the industrial facilities to the north of the site, the walkway to the west of the site, and Cork Harbour SPA to the south of the site are not directly downwind of the proposed development. It is further noted that rainfall is likely to have a 'dampening' effect on dust generated. Mitigation measures proposed will ensure that dust is not an issue at these sensitive locations.

While the nearest residences and the proposed Howard Holdings development are located downwind of the proposed development, dust deposition is greatest within 100m of its source, therefore given the implementation of proposed mitigation measures and ongoing monitoring, the proposed development will not impact at this location.

The impacts of dust will generally be within the confines of the site but a number of measures will be implemented for the transfer of material off site (See Mitigation).

9.4.2.2 Gaseous Emissions

There will be no fixed emission points on site so the only emissions of concern are fugitive emissions generated by site activities, storage and traffic. The nearest residences are located over 700m from the facility thus direct impacts will be minimal at this distance. Vehicles and plant associated with materials handling and the incoming waste material provide the only source of gaseous emissions. The projected increases in traffic are low relative to the existing traffic environment, thus associated gaseous emissions levels are considered negligible.

9.4.3 Cumulative Impacts

Cumulative Impacts of the proposed development are considered with the proposed adjacent Howard Holdings Ltd development on the former Mitsui Denman manufacturing facility Site (Planning Ref: 07/12475). In addition the development is also considered with regard to the proposed restoration works on the rest of the IPPC-licenced site.

Howard Holdings (2007) note that road traffic would be expected to be the dominant source of emissions in the region of their proposed development, and is the focus of their atmospheric assessment. The results of the air dispersion modelling study carried out as part of their assessment, which incorporates mitigation measures on vehicles emissions at a national level, indicate that the impact on air quality as a result of the proposed development will be imperceptible. Given the small volumes of traffic associated with the proposed CD&E Facility, the cumulative impacts with the Howard Holdings Development are expected to be insignificant. While it is possible there will be some construction phase impacts from the Howard Holdings Development with respect to dust generation, the additional impact of dust generated from the CD&E facility is expected to be negligible at the nearest sensitive residences, given the distance of the facility from this receptor, the short-term nature of the construction phase activities, and assuming mitigation measures are to be fully implemented. Dust is not expected to be an issue during the 'operational phase' of the Howard Holdings development, and mitigation measures with respect to the operation phase of the Thornbush Holdings development have been outlined above.

With respect to restoration of the adjacent waste lagoons/ponds, waste materials will be largely left in-situ with some re-grading activities in parts of the site. Cap construction will be phased over a ten year period and activities are likely to be limited to small parts of the site at a time. Dust abatement measures such as water spraying and dampening-down will take place if dust is generated by cap construction. Requirements of the waste licence for ongoing monitoring, reporting, and implementation of mitigation measures, will prevent dust from becoming a nuisance issue.

9.5 Mitigation

9.5.1 Proposed Mitigation Measures - construction

Dust is not considered a significant impact during the construction phase. However, site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Exposed surfaces will be wetted using bowsers or hoses as required to prevent airborne dusts. Berms will be constructed in the north of the Application Site acting as a screen and forming a partial wind barrier for receptors 'downwind' of the proposed development. The berms will additionally act as visual and acoustic screens to the proposed Facility. The materials will be reused in the restoration of the site upon closure of the facility. Proper maintenance of vehicles and machinery will ensure that gaseous emissions are negligible.

A dust minimisation plan will be prepared and implemented by the contractor during the construction phase of the project, as construction activities are likely to generate some dust emissions, particularly during site clearance and re-grading of the site. The likely principal elements of the dust minimisation plan are listed below:

- Limiting vehicle speeds in the construction site;
- Provision of wheelwash facilities;
- During very dry periods, dust emissions from heavily trafficked locations will be controlled by spraying surfaces with water;
- Re-suspension of spillages of material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site and by use of a mechanical road sweeper;
- Soil and other dusty material being removed from site will be transported in covered trucks, where the likelihood of emitting dust is high, and during dry weather conditions the area of removal will be sprayed by a mobile tanker on a regular basis, to control dust emissions;
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that all equipment is well maintained and that machinery is not left idling unnecessarily; and
- Measures to control emissions will be used to prevent a nuisance within the locality where drilling or cutting, grinding or similar types of stone finishing operations are taking place, which may be a significant local source of fine particulate emissions.

9.5.2 Proposed Mitigation Measures - operation

Proposed mitigation measures are addressed separately for dust and gaseous emissions. Detailed dust mitigation measures in particular are proposed to prevent any negative impacts on nearby receptors. The non-acceptance of putrescible organic waste will ensure that there will be practically no odour potential from wastes. Any arriving material deemed unsuitable will be stored in a quarantine area and removed by an approved contractor.

9.5.2.1 Dust

Storage areas will be appropriately designed to accommodate the various incoming and outgoing waste streams. The implementation of good housekeeping, maintenance and training programmes on site will ensure that dust generation is kept to a minimum. Spraying of stockpiles and associated crushing activities during dry weather will be undertaken to prevent dust blow. The crushing and screening activity is to be located in an area surrounded by stockpiled material thereby providing shelter from prevailing winds and further minimising fugitive emissions. Dust suppression sprinklers may also be installed on the crusher and screening unit if required. A wheelwash unit will be available on-site to clean down vehicles departing the site. This will prevent the transfer of material off site onto neighbouring roads.

The operation of the site will require the implementation of an environmental management system. Waste management practices at the facility will require procedures and controls to minimise fugitive dust on site. Where procedures are correctly implemented the impact of the proposed development on air quality is regarded as minor. The nearest residential area is St. Lappin's Terrace located approximately over 700m from the site. The impact of the operation of the proposed development on residential air quality will be negligible.

Thornbush Holdings is proposing to install a dust suppression system designed to prevent wind blow across the site. Thornbush Holdings have consulted with suppliers of industry dust suppression management systems, including high pressure fogging systems (or similar). Fogging systems have shown to be an effective method for dust suppression, dust abatement, and air filtration. The principle of these systems is that it produces a high concentration of 10 micron fog droplets providing optimum performance for attraction and suppression of PM 10 and smaller dust particles. The systems can effectively remove breathable and fugitive dust suppression from 0.1 to 1000 micron. Particulates in contact with fog has little chance to escape into the environment. In addition a rotating sprinkler system will be installed at each end of the site close to product storage stockpiles and also near the major crushing area. Ring headers, hooplike pipes spray water around the site and the system can be automatically adjusted for wind and weather conditions, ensuring that efficient spraying of the site is achieved without using more water than necessary.

The facility design layout includes the construction of berms in the north of the Application Site, which together with the dust suppression system, should minimize the dust impact on downwind receptors lying in the path of the prevailing wind that may be associated with the proposed development.

9.5.2.2 Gaseous Emissions

Good house keeping practices will include regular cleaning and maintenance of the site, proper maintenance of vehicles, plant and machinery to ensure that gaseous emissions are kept to a minimum.

9.6 Residual / Likely Significant Effects

Baseline studies carried out indicate that air quality in the immediate environs of the proposed development is good with concentrations of parameters monitored being typical of zones of relatively light industrial activity. No negative impacts on dwellings are anticipated due to their significant distance (over 700m) from the proposed facility together with the control measures that will be implemented on site. Extreme care and use of best available technology has been taken to ensure that neighbouring industrial operations are not impacted by any potential nuisance, in particular dust. Proven dust prevention methods will be installed and monitored to ensure that all systems are operating efficiently. The proposed development is not predicted to have a major impact on air quality in the area. The mitigation measures outlined for both the construction and operation phases of the development will ensure that impacts are kept to a minimum.

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APPENDIX 9.1
Ambient Air Quality Standards and Limit Values

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Limit Values from Air Quality Standards Regulations, 2002

Pollutant	Limit Value Objective	Averaging Period	Limit Value $\mu\text{g}/\text{m}^3$	Basis of Application of the limit Value	Limit Value Attainment Date
SO ₂	Protection of human health	1 hour	350	Not to be exceeded more than 24 times in a calendar year.	1/1/2005
SO ₂	Protection of human health	24 hours	125	Not to be exceeded more than 3 times in a calendar year.	1/1 /2005
SO ₂	Protection of ecosystems	Calendar year	20	Annual mean.	19/7/2001
SO ₂	Protection of ecosystems	1 Oct to 31 Mar	20	Winter mean.	19/7/2001
NO ₂	Protection of human health	1 hour	200	Not to be exceeded more than 18 times in a calendar year.	1/1/2010
NO ₂	Protection of human health	Calendar year	40	Annual mean.	1/1/2010
NO + NO ₂	Protection of vegetation	Calendar year	30	Annual mean.	19/7/2001
PM ₁₀ stage 1	Protection of human health	24 hours	50	Not to be exceeded more than 35 times in a calendar year.	1/1/2005 ,
PM ₁₀ stage 1	Protection of human health	Calendar year	40	Annual mean.	1/1/2005
PM ₁₀ stage 2	Protection of human health	24 hours	50	Not to be exceeded more than 7 times in a calendar year.	1/1/2010
PM ₁₀ stage 2	Protection of human health	Calendar year	20	Annual mean.	1/1/2010
Lead	Protection of human health	Calendar year	0.5	Annual mean.	1/1/2005
CO	Protection of human health	8 hours	10,000	8-hourly mean	1/1/2005
Benzene	Protection of human health	Calendar year	5	Annual mean.	1/1/2010

WHO Air Quality Guidelines

Substances	Time-weighted Average	Averaging Time	Major Sources
Nitrogen dioxide	200 µg/m ³ 40 µg/m ³	1 hour Annual	Motor vehicles
Carbon monoxide	100 mg/m ³ 60 mg/m ³ 30 mg/m ³ 10 mg/m ³	15 minutes 30 minutes 1 hour 8 hour	Motor vehicles
Lead	0.5 µg/m ³	Annual	Motor vehicles
Benzene	(a)		Motor vehicles
Particulate matter (PM ₁₀)	(b)		Power stations, diesel motor vehicles

- (a) No safe level recommended owing to carcinogenicity.
- (b) No specific guideline recommended because no obvious exposure concentration and duration that could be judged a threshold and decreased by uncertainty factors to avoid risk.

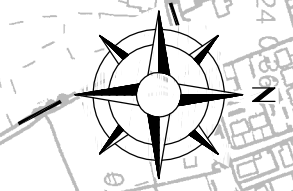
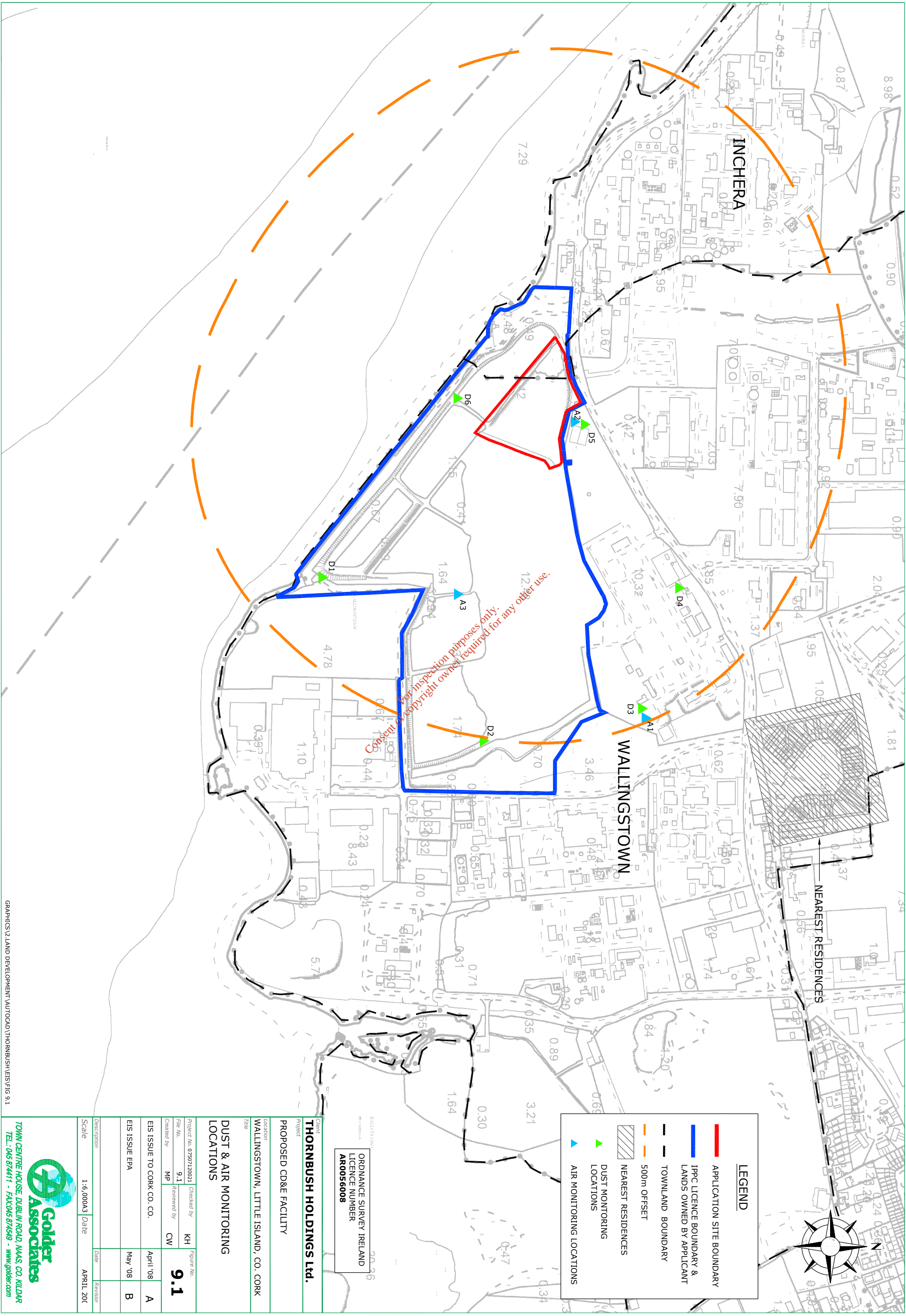
WHO Air Quality Guidelines - Carcinogenic Risk Estimates

Substance	Unit Risk ^(a)	Site of Tumour
Arsenic	1.5 x 10 ⁻⁶	Lung
Benzene	6 x 10 ⁻⁶	Blood (leukemia)
Nickel	3.8 x 10 ⁻⁴	Lung

- (a) Cancer risk estimates for lifetime exposure to a concentration of 1µg/m³.

Figures

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LEGEND	
—	APPLICATION SITE BOUNDARY
—	IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
- - -	TOWNLAND BOUNDARY
—	500m OFFSET
	NEAREST RESIDENCES
▲	DUST MONITORING LOCATIONS
▲	AIR MONITORING LOCATIONS

ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056008

Client
THORNBUSH HOLDINGS Ltd.

Project
PROPOSED CD&E FACILITY

Location
WALLINGSTOWN, LITTLE ISLAND, CO. CORK

Title
DUST & AIR MONITORING LOCATIONS

Project No. 07507120021	Checked by KH	Figure No.
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Golder Associates
TOWN CENTRE HOUSE DUBLIN ROAD, M4AS, CO. KILDAR
TEL: 045 874411 - FAX: 045 874549 - www.golder.com

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10.0 NOISE

10.1 Introduction

A baseline/existing environment noise survey was conducted in the vicinity of the site of the proposed CD&E waste recovery facility ('the Application Site') in order to assess the existing noise environment of the area. The Application Site is located in the north-western corner of the IPPC licensed former Mitsui Denman Waste Lagoons 'the Thornbush Site' (Figure 10.1). The noise implications of construction and operation of the site facilities are considered in the context of appropriate standards and guidelines. The potential impacts of the development are examined and mitigation measures are proposed to ensure that adverse impacts are minimised.

10.2 Methodology

In order to make an assessment of the current/baseline noise conditions at and around the site boundary and to assess the potential noise emissions from the proposed works, the following relevant guidance and legislation were consulted:

- BS5228, 1997 Noise Control on Construction and Open Sites;
- ISO 1996: Acoustics "*Description and measurement of environmental noise*".
- Environmental Noise Survey Guidance Document. EPA 2006, 2nd Edition;
- Integrated Pollution Control Licensing – Guidance Note for Noise in Relation to Scheduled Activities, EPA 1995;
- S.I. 320/1988 Permissible Noise Levels Regulations;
- European Directive 2002/49/EC relating to the assessment and management of environmental noise ;
- A Good Practice Guide on the Sources and Magnitude of Uncertainty Arising in the Practical Measurement of Environmental Noise (N J Craven, G Kerry, October 2001); and
- Safety Health and Welfare at Work (Control of Noise at Work) Regulations 2006 (S.I. No. 371 of 2006).

A baseline/existing environment noise survey was conducted at the site of the proposed development between the dates of the 17th of January and the 1st of February 2005 and the 24th to the 29th of March 2005 inclusive by SWS Environmental Services. As the site has remained unaltered since this time, and surrounding landuse has not altered, noise levels measured during this monitoring period are still considered to reflect a representative baseline of current noise conditions.

Monitoring was carried out at five locations as illustrated in Figure 10.1 at the end of this Section and described below in Table 10.1. These locations were chosen to reflect baseline noise conditions around the Application Site and the wider Thornbush Site.

Table 10.1: Noise Monitoring Locations

LOCATION	DESCRIPTION
N1	This point is located to the south of the Application Site in an open area located within the Thornbush Site.
N2	N2 is located at the eastern boundary of the Thornbush Site approximately 45m from the minor road that is used to access a number of industrial facilities from the main roadway.
N3	N3 is located on the southern boundary of the Thornbush Site approximately 10m from the seawall along Cork Harbour.
N4	N4 is located to the north of the Application Site.
N5	This monitoring point is located near the western end of the nearest residential area, St. Lappin's Terrace

Day, Evening and Night time environmental noise measurements were carried out at all of the noise monitoring locations. Day, Evening and Night are as per the default times defined in Directive 2002/49/EC where daytime is 07:00 to 19:00, evening is 19:00 – 23:00 and night time is 23:00 – 07:00.

Parameters recorded during the noise survey were the equivalent continuous sound level (L_{eq}), the 10% (L_{10}), and 90% (L_{90}) percentile levels. These values represent the extremes of the range recorded for, over the recording time period.

Noise parameter definitions:

- L_{Aeq} is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value;
- L_{Amax} is the maximum A-weighted sound level measured during the sample period;
- L_{Amin} is the minimum A-weighted sound level measured during the sample period;
- L_{A10} is the A-weighted sound level that is exceeded for 10% of the sample period and is used to quantify traffic noise; and
- L_{A90} is the A-weighted sound level that is exceeded for 90% of the sample period and is used to quantify background noise.

'A-weighting' is the process by which noise levels are corrected to account for the non-linearity of human hearing. All noise levels quoted are expressed in terms of decibels (dB) relative to a sound pressure of 2×10^{-5} Pa.

10.2.1 Instrumentation

Instrumentation used was as follows:

- Larson Davis 870 precision sound level meter with integrated wind speed monitor and direction sensor, used at the control site over the entire monitoring period;
- Larson Davis 812 Precision Integrating Sound Level meter;
- One Larson Davis 824 Precision Integrating Sound Level meter and Frequency Analyser/Data logger with 828 Pre-amplifier and 1/2" GRAS Microphone Model 40AE;
- Wind Shields Type: Larson Davis 2120 Windscreen; and
- Calibration Type: Larson Davis Precision Acoustic Calibrator Model CA250.

The measurement time interval was hourly, the history period was one minute and history period units was one second for all monitoring locations. The sound level meter set to frequency weighting "A" and detector response to "Fast".

All instruments were calibrated before, during and after monitoring and calibrated within specification.

10.2.2 Meteorological Conditions

Wind speed and direction measurements were carried out throughout the monitoring period in an open area, in the waste lagoon region. Weather conditions throughout the first monitoring period varied. Gusty windy conditions prevailed predominantly from the west for the first days of monitoring and then changed northerly for the remainder of the monitoring period. Wind speeds were higher also during the first few days and varied from 0.9 to 11 m/s with an average of 6m/s. During the rest of the monitoring period, wind speed was lower and varied between 0.1 - 5 m/s and averaged at 2.6 m/s.

Some cold, frost conditions were experienced as well as cloudy misty conditions. The average temperature was 5°C.

Average windspeeds during the second monitoring period was 2m/s predominantly from the southwest for the first days of monitoring and then from an easterly direction for the remainder of the monitoring period. The sky was predominantly overcast with some showers experienced.

10.3 Existing Environment

In this section the background noise levels recorded at each noise monitoring location will be analysed and discussed. Analysis is based on data provided by Thornbush Holdings/SWS Environmental Services.

10.3.1 Location N1

N1 was located in an open area within the Thornbush Site waste lagoons and was utilised as a control site for integrated sound level and wind speed and direction measurements throughout the monitoring period. Monitoring levels for this location are presented in Table 10.2 & 10.3 and Figure 10.2 below.

Table 10.2: Summary of Noise Levels at Location N1 over different time periods

N1		17TH - 20TH JANUARY 2005				21ST JANUARY - 1ST FEBRUARY 2005			
		L _{Aeq}	L _{A10}	L _{A90}	Wind Speed	L _{Aeq}	L _{A10}	L _{A90}	Wind Speed
		dB	dB	dB	m/s	dB	dB	dB	m/s
Day	Ave	65	68	56	4.4	53	55	49	2.9
	Max	72	76	63	11	68	72	57	9.3
	Min	53	55	50	3.5	46	48	45	0.1
Evening	Ave	59	63	50	5.8	51	53	48	2.6
	Max	66	70	55	8.6	60	63	51	5.5
	Min	49	50	46	0.9	46	47	44	0.6
Night	Ave	62	66	51	5.6	48	50	46	2.3
	Max	69	73	59	9.6	54	57	49	4.9
	Min	44	46	41	1.1	45	46	43	0.8

Background Noise Levels Verses Average Wind Speed

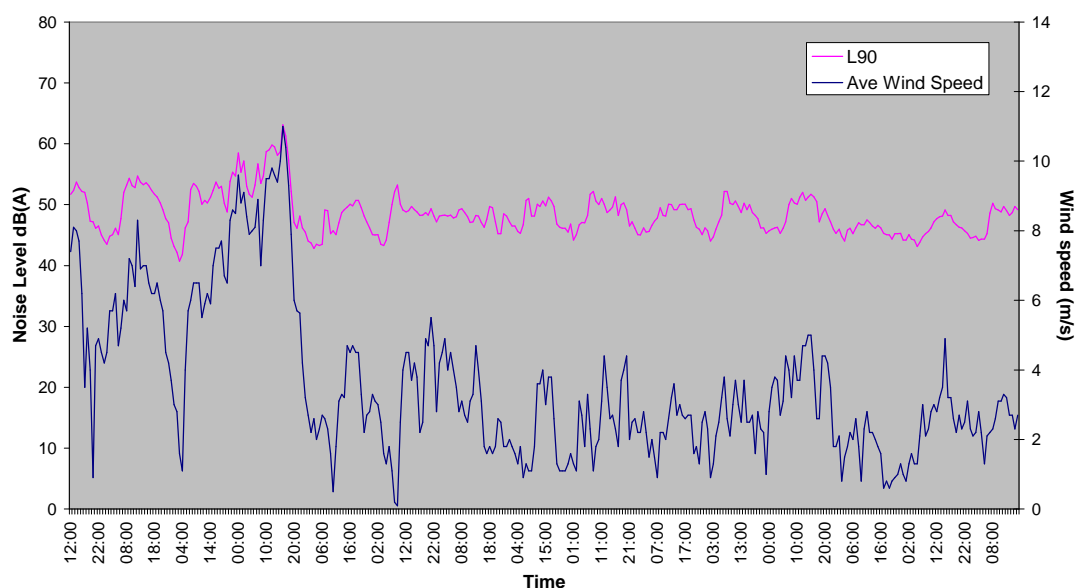


Figure 10.2: Background Noise Levels compared with Recorded Windspeed at location N1

Figure 10.2 illustrates that wind speeds were higher during the first four days of the monitoring period (until the 21st of January). Wind noise and particularly wind induced noise can have a marked affect on environmental sound levels. In the observed L_{A90} noise levels in Table 10.2, noise levels vary by approximately 5 dB over the two different time periods. This variation is a result of the increased windspeed during the first monitoring period (Figure 10.2).

Table 10.3: Summary of the Overall Noise Levels in Location N1 over the entire monitoring period

17TH JANUARY - 1ST FEBRUARY 2005						
N1		L_{Aeq}	L_{A10}	L_{A90}	Wind Speed	Comments
		dB	dB	dB	m/s	
Day	Average	59	63	52	4.0	Audible: Wind noise, distant traffic noise from the South Link & N25, surrounding industrial noise.
	Max	72	76	63	11	
	Min	46	48	45	0.1	
Evening	Average	55	59	48	3.5	
	Max	66	70	55	8.6	
	Min	46	47	44	0.6	
Night	Average	56	59	48	3.0	
	Max	69	73	59	9.6	
	Min	44	46	41	0.8	

Overall, the average daytime noise measurement L_{Aeq} at N1 is 59 dB at an average wind speed of 4m/s (Table 10.3). The corresponding L_{A90} is 52 dB. Evening and night time noise levels are similar at this location with an average of 56 dB L_{Aeq} and 48 dB L_{A90} .

At this location during day time hours, distant traffic noise is audible from both the South Link road leading to the Jack Lynch Tunnel situated to the West of the site and the main N25 Cork-Waterford road to the north of the site. Other industrial facilities surrounding the proposed site are also audible at this location.

During evening and night time, the background noise levels vary by approximately 4 dB in comparison to daytime hours. This variation is attributed to a reduction in traffic noise at these times however noise levels are still elevated due to neighbouring industrial activities.

10.3.2 Location N2

Table 10.4: Noise Levels at Location N2 (27th January – 1st February)

N2		L_{Aeq}	L_{A10}	L_{A90}	Comments
		dB	dB	dB	
Day	Average	53	55	51	Audible: Traffic noise from minor road, surrounding industrial noise sources, wind and wind induced noise.
	Max	56	59	54	
	Min	50	50	49	
Evening	Average	52	53	50	
	Max	54	57	51	
	Min	50	50	48	
Night	Average	51	53	50	
	Max	59	63	52	
	Min	49	50	48	

N2 is located at the eastern boundary of the Thornbush Site waste lagoons approximately 45m from a minor road that is used to access a number of industrial facilities from the main roadway. Several industrial facilities are located east of this monitoring location. A stream and a woodland region are located in a more sheltered area, between this monitoring location and the main road. Noise levels at this location are representative of those experienced in this woodland region. The average figures presented in Table 10.4 for day, evening and night-time noise levels, are similar, reflecting the fact that traffic noise is not as significant a factor at this location. Noise levels remain elevated however due the surrounding industrial activity.

10.3.3 Location N3

Table 10.5: Noise Levels at Location N3 (24th January – 1st February)

N3		L _{Aeq}	L _{A10}	L _{A90}	Comments
		dB	dB	dB	
Day	Average	51	53	49	Audible: Wind noise, surrounding industrial noise sources and distant traffic noise.
	Max	57	61	52	
	Min	46	47	44	
Evening	Average	49	51	47	
	Max	56	60	50	
	Min	45	46	44	
Night	Average	47	48	44	
	Max	54	57	49	
	Min	42	44	41	

N3 is located on the southern boundary of the Thornbush Site waste lagoons approximately 4m from the seawall along Cork Harbour. Noise from distant traffic and surrounding industries is audible at this location. The reduction of approximately 4 dB between day and night-time figures is attributable to a reduction in traffic noise (Table 10.5).

10.3.4 Locations N1, N2 and N3 - Comparison

A direct comparison can be made between these three sites as monitoring periods overlapped (Table 10.6).

Table 10.6: Comparison of Noise Levels at Locations N1, N2 & N3 over the 27th of January- 1st of February

MONITORING OVER 27 JAN-1 FEB		L _{Aeq}	L _{A10}	L _{A90}	COMMENTS
		dB	dB	dB	
N1	Day	51	52	49	Audible: Wind noise, distant traffic noise from the South Link & N25, surrounding industrial noise.
	Evening	49	50	47	
	Night	47	48	45	
N2	Day	53	55	51	Audible: Traffic noise from minor road, surrounding industrial noise sources, wind and wind induced noise.
	Evening	52	53	50	
	Night	51	53	50	
N3	Day	51	53	49	Audible: Wind noise, surrounding industrial noise sources and distant traffic noise.
	Evening	49	51	47	
	Night	47	48	44	

N1 and N3 monitoring points are situated in very similar locations as both are in open locations, exposed to wind noise, other surrounding industrial noise sources and distant traffic noise. Thus, noise levels are very similar as illustrated in Table 10.6.

N2 is also located in an open area and experienced similar windspeeds recorded at N1 and N3. However, L_{Aeq} and L_{A90} noise levels are greater at location N2 when compared to N1 and N3. This increase in noise level by approximately 2 dB and a background L_{A90} night time noise level of 50 dB can be attributed to the cumulative noise impact of the industrial facilities located east of this monitoring location.

10.3.5 Location N4

Table 10.7: Noise Levels at Location N4 (17th - 24th January)

N4		L_{Aeq}	L_{A10}	L_{A90}	Comments
		dB	dB	dB	
Day	Average	57	59	52	Audible: Traffic from R623. Distant traffic from the N25. PA system from industry north of monitoring point (intermittent). General industrial noise from north of the monitoring point.
	Max	61	64	56	
	Min	50	52	45	
Evening	Average	52	55	49	
	Max	55	58	52	
	Min	48	50	46	
Night	Average	50	51	47	
	Max	54	56	51	
	Min	46	47	42	

N4 is located to the north of the Application Site. This monitoring point is located 10m from the R623 road to Little Island and industrial facilities are sited immediately adjacent the road, to the north of this location. Both traffic and other industrial activities are audible at this location. As N4 is positioned in a sheltered area wind noise did not significantly affect the measured noise levels.

As is evident from Table 10.7, the L_{Aeq} and the L_{A90} noise levels vary by approximately 2 dB during the evening and night time periods. This reduction in noise levels can be attributed to a reduction in traffic volumes during these time periods. Noise levels experienced at this location, particularly at night time when traffic volumes are low, are typical of industrial areas.

10.3.6 Location N5

Table 10.8: Noise Levels at Location N5 (24th - 29th March)

N5		L _{AEQ}	L _{A10}	L _{A90}	WIND SPEED	Comments
		dB	dB	dB	m/s	
Day	Average	90	95	77	2.2	Audible: Traffic on the minor access road, on the R623 and distant traffic on the N25. Industrial noise from the east of the monitoring point.
	Max	107	113	93	5.0	
	Min	48	48	42	0.6	
Evening	Average	73	75	72	1.3	
	Max	84	85	84	3.1	
	Min	46	46	43	0.0	
Night	Average	58	61	54	1.3	
	Max	74	76	72	3.2	
	Min	43	43	42	0.0	

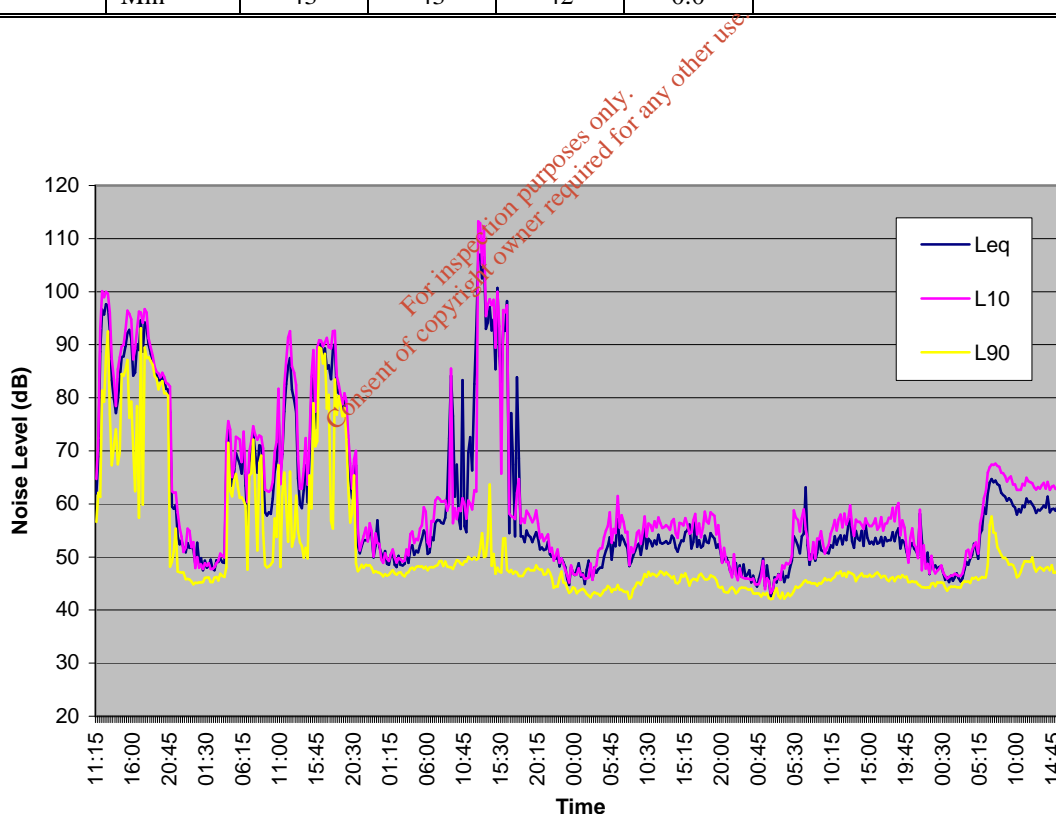


Figure 10.3: Recorded Noise Levels at Location N5

N5 is located to the north-east of the Thornbush Site bordering the R623 road to Little Island. This monitoring point is nearest the western end of the nearest residential area, St. Lappin's Terrace.

Daytime noise levels at this nearest residential receptor are greatly influenced by road traffic noise. Peaks in noise levels are evident in the 8.00-9.00am, 12.00-1.00pm and 5.00-6.00pm day time periods which represent the greatest movement of employee vehicles to and from their place of work (Figure 10.3). As for location N4, it is noted that the traffic density on the adjacent R623 is significant and highlights the degree of influence that road traffic has on the overall noise climate in the vicinity.

Monitoring was carried out over a six day period which included a bank holiday weekend to provide a background noise level of both normal work days and weekend periods. As is evident from Figure 10.3, noise levels are significantly higher for the first three and last days of the monitoring period (Thursday, Friday, Saturday, Tuesday).

A comparison of the average day and night time noise levels grouped by 'working day' and 'bank holiday weekend' highlighted the decrease in traffic volumes during weekend periods. Monitoring during the first three working days recorded an average L_{Aeq} and L_{A90} noise levels of 93 dB and 80 dB respectively. While during weekend monitoring, day time noise levels were significantly reduced to 53 dB L_{Aeq} and 46 dB L_{A90} . Night time monitoring during the working days recorded noise level averages of 60 dB L_{Aeq} and 55 dB L_{A90} respectively. Night time noise levels during the weekend monitoring period was reduced to 52 dB L_{Aeq} and 46 dB L_{A90} . The lowest noise levels are achieved between 00.00 – 04.00am when traffic volumes are at a minimum. During these periods, the surrounding industries are the major contributors to the background noise levels.

10.3.7 Influence of Surrounding Industrial Noise Sources

The proposed site and the surrounding area is zoned for enterprise/industrial use. Background noise levels in the greater area are therefore, influenced by existing industries located at Little Island. As noted in the above sections, during night time noise level monitoring periods when traffic volumes are significantly reduced, the surrounding industries are the major contributors to the background noise levels onsite.

Some of the industrial sites surrounding the Application Site are EPA licensed and are required to comply with specific noise limits as stipulated by their IPC Licence. Some of these surrounding industrial sites have day and night-time noise limits on their site boundaries which range from 49-68 dB $L_{eq,T}$. Other industries have also recorded similar noise levels on their site boundaries during night-time noise monitoring periods. The site boundary noise levels and limit values are more lenient in this area, due to the fact that it is zoned industrial/enterprise.

Nevertheless, it is necessary for most EPA licensed facilities in the area of the Application Site, to comply with noise limit values of 55 dB L_{Aeq} during daytime hours and 45 dB L_{Aeq}

during night-time hours at noise sensitive locations. Even though, all Annual Environmental Reports submitted by licensed companies state compliance with the above limit values, cumulative noise levels from all the EPA licensed and the non-EPA licensed industrial companies is not considered at nearby residential receptors.

As noted earlier, monitoring carried out in close proximity to the nearest residential receptor (N5) revealed that an average noise level of 46 dB L_{A90} at a minimum (night time weekend level), at this location, is a result of the cumulative industrial noise levels associated with industry in Wallingstown, Little Island.

10.4 Assessment

When considering the potential noise impact of the proposed development, the impact of the construction phase and the operational phase must be examined.

10.4.1 Construction Phase

As the majority of the plant and equipment for this proposed development will be mobile, this phase will only involve the construction of a hardstanding area and bunded, covered areas.

This will involve general construction equipment and tools such as lifting equipment, compressors, generators etc. as well as trucks and other associated equipment. Noise levels will also be temporarily increased due to construction traffic with deliveries of construction materials and machinery to and from the development site.

Therefore, due to the nature of activities undertaken on a construction site, there will be an increase in noise levels during the construction phase. However, given the distance from the proposed development to residential areas, and the short-term nature of the construction phase (2-3months), the impact will be negligible.

10.4.2 Operational Phase

The main sources of noise during the operational phase will be:

- Noise from plant/equipment units;
- Additional traffic noise on the public roads; and
- Deliveries to the proposed development.

The design of the proposed facility identifies appropriate storage areas to accommodate the various incoming and outgoing waste streams. Waste will be delivered on site, inspected and tipped into incoming storage waste areas. A tracked excavator with hydraulic rock breaker

and crusher and sorting grabs will break, crush and screen C&D material. The excavator will subsequently feed material into a screener. The screener pre-screens C&D material prior to material being fed into a crusher.

The impacts of noise emissions from the above activities will generally be within the confines of the site with aggregate stockpiles providing significant acoustic screening from operating machinery. The crushing and screening activity is to be located in an enclosed area surrounded by stockpiled material thereby providing shelter from prevailing winds and further minimising noise emissions.

During daytime hours all three operational noise sources will contribute to the total noise emissions from the development. The noise impacts of the proposed operation are not considered to be significant, and with residential areas at a distance of >700m from the Application Site the impact on residential areas is considered negligible.

The proposed development will not operate during night-time hours therefore there will be no potential noise emission sources at these times.

10.4.2.1 Noise from Plant/Equipment Units

The following plant and equipment will be used at the Waste Recovery Facility:

- 1 no. loader;
- 2 no. JCB-type excavators with multi grab features including bucket, grab, pincers, pneumatic head;
- Screener to grade materials with Magnet to remove ferrous materials; and
- Crusher to grade coarse materials (on-site periodically).

From British Standard BS 5228: Part 1-Noise Control on Construction and Open sites and from typical measured noise levels, the noise levels for each plant/equipment activity were estimated. These noise levels were then adjusted for attenuation over distances of 150m and 730m, to the nearest existing industrial properties north of the Application Site (Table 10.9), and to the nearest dwellings at St Lappins Terrance (Table 10.10) respectively. Distances are calculated from the centre of the Application Site.

Table 10.9: Calculation of Noise levels at the nearest industrial property boundary

Plant/Equipment	Source L_{Aeq} @ 10m dB(A)	Predicted Noise Reduction		Predicted L_{Aeq} at NSL dB(A)
		due to distance (150m) dB(A)	due to screening and ground absorption dB(A)	
1 loader	82	-23.5	-10	48
JCB	80	23.5	-10	46
JCB	80	23.5	-10	46
Grader/Screenner	86	23.5	-10	52
Compactor/Crusher	90*	-29.5	-10	50
Cumulative Noise Level				50

*Noise Level measured at 5m from the noise source

Table 10.10: Calculation of Noise levels at the nearest dwellings

Plant/Equipment	Source L_{Aeq} @ 10m dB(A)	Predicted Noise Reduction		Predicted L_{Aeq} at NSL dB(A)
		due to distance (730m) dB(A)	due to screening and ground absorption dB(A)	
1 loader	82	-37.3	-10	35
JCB	80	-37.3	-10	33
JCB	80	-37.3	-10	33
Grader/Screenner	86	-37.3	-10	39
Compactor/Crusher	90*	-43.3	-10	37
Cumulative Noise Level				36

*Noise Level measured at 5m from the noise source

All calculations are based on International Standard ISO 9613-2:1996: Acoustics – Attenuation of sound during propagation outdoors.

A combined attenuation value of 10dB has been attributed to screening and ground absorption. This will be due to stockpiles surrounding the equipment, screening berms, fencing, treelines, ground absorption and a closed line of sight between the source and receiver.

These noise calculations are indicative and will vary to a large degree depending on the activity of the facility. Note the predicted noise level for each item of plant assumes that they will be operating for 100% of the time and this will not be the case on a continuous basis. It is also proposed to hire the compactor/crusher on the ‘need to’ basis therefore this will only operate intermittently.

Calculations are based upon distance from a central location on site but in the case of the JCB or loader in particular this may not be likely. Screening berms and existing vegetation and fencing at the boundary will however be effective at reducing noise levels when machinery is in close proximity.

It is proposed that the noisier equipment (screener and crusher) will be located in a sheltered location surrounded by stockpiled material as it is generated. This will have the effect of lowering noise levels considerably below those calculated in Tables 10.9 and 10.10.

In practice noise levels due to the facility are anticipated to be much lower than those listed in Tables 10.9 and 10.10. Noise monitoring at the boundary will ensure that noise-control measures are effective.

10.4.2.2 Additional traffic noise on the public road

The potential impact of additional traffic associated with the proposed development at the location of the nearest residences is discussed below.

Existing peak traffic flows and predicted peak traffic flows into and out of the proposed site taken from the Traffic Assessment Report (Appendix 3 Volume 2) are shown in Table 10.11. These figures are AM and PM peak traffic figures taken from a location on the R623 east of the proposed entrance. The ‘worst case scenario’ for traffic along the route passing by the residential area is considered. This represents ‘Scenario B’ as outlined in the Traffic Report, with 20% of Heavy Goods Vehicles (HGV’s) from the proposed facility being routed eastwards from the proposed entrance and passing the residential area. The Traffic Assessment Report recommends that all HGV’s are routed in towards the west to avoid impacting on these residences, in which case it is not anticipated there would be any impact from traffic associated with the proposed development at this location.

Table 10.11: Summary of Existing and Proposed Traffic Flows

VEHICLE TYPE	EXISTING TRAFFIC FLOWS		PROPOSED ADDITIONAL TRAFFIC	
	Vph (AM Peak)	Vph (PM Peak)	Vph (AM Peak)	Vph (PM Peak)
Units				
HGV’s	38	14	5	5
Other Vehicles	338	686	3	3

The noise from road traffic can be calculated for most situations by using the procedure described in BS 5228: Part 1:1984 Section A.3.4.2. Noise levels can be calculated from a receptor to a haul route by the equation:

$$L_{Aeq} = LWA - 33 + 10 \log_{10} Q - 10 \log_{10} V - 10 \log_{10} d.$$

Where L_{Aeq} is the sound pressure level from a haul road used by mobile plant

LWA = sound pressure level of the plant in dB.

The sound power level for a modern truck is 102 dB(A).

The sound power for a light vehicle is worse case scenario 95 dB(A).

Q = is the number of vehicles passing per hour

V = is the average speed (km/hr). Equals 60km/hr

d = is the distance of the receiving position from the centre of the haul road. (20m)

Table 10.12: Calculation of Noise Levels from Existing Traffic Volumes – AM Peak

EXISTING TRAFFIC ENVIRONMENT					
Vehicle Type	L_{wa}	Q	V	d	L_{Aeq}
Units	dB	Vph	km/hr	m	dB(A)
Heavy Goods Vehicles	102	38	60	20	80.0
Other Vehicles	95	338	60	20	82.5
Noise Level per peak hour					81.4

Table 10.13: Calculation of Noise Levels with additional Traffic from the Proposed Development – AM Peak

PROPOSED TRAFFIC FROM C & D FACILITY					
Vehicle Type	L_{wa}	Q	V	d	L_{Aeq}
Units	dB	Vph	km/hr	m	dB(A)
Heavy Goods Vehicles	102	43	60	20	80.6
Light Vehicles	95	341	60	20	82.6
Cumulative Noise Level per peak hour					81.7

Table 10.14: Calculation of Noise Levels from Existing Traffic Volumes – PM Peak

EXISTING TRAFFIC ENVIRONMENT					
Vehicle Type	L _{wa}	Q	V	d	L _{Aeq}
Units	dB	Vph	km/hr	m	dB(A)
Heavy Goods Vehicles	102	14	60	20	75.7
Light Vehicles	95	686	60	20	85.6
Noise Level per peak hour					83.0

Table 10.15: Calculation of Noise Levels with additional Traffic from the Proposed Development – PM Peak

PROPOSED TRAFFIC FROM C & D FACILITY					
Vehicle Type	L _{wa}	Q	V	d	L _{Aeq}
Units	dB	Vph	km/hr	m	dB(A)
Heavy Goods Vehicles	102	19	60	20	77.0
Light Vehicles	95	689	60	20	85.6
Cumulative Noise Level per peak hour					83.2

As can be seen from Tables 10.12 and 10.14, traffic flows in the existing environment are already elevated, with traffic during the AM and PM peaks passing the nearest residences contributing to noise levels of 81.4 dB and 83.0 dB at this location.

The overall increase in noise level associated with the proposed development is just 0.3 dB during the AM peak period (Table 10.13), and 0.2 dB during the PM peak period (Table 10.15), therefore there is no significant increase in noise levels from the proposed development due to traffic.

10.4.2.3 Deliveries to the Proposed Development

Deliveries to the development will consist of HGV's unloading onsite. Typical noise levels at 10m from unloading lorries are 84 dB L_{Aeq}. The nearest residential receptor is St. Lappins Terrace is ca. 700m north-east of the proposed processing area therefore, taking into account noise attenuation due to distance and no other attenuation factors, the noise level contribution associated with onsite deliveries at the residences will be below 47 dB.

Overall the noise levels from deliveries on-site will be within the maximum allowable noise level contribution of 50 dB in order to achieve a total noise emission not exceeding L_{Aeq} T of 55dB at the residences.

10.4.3 Impacts of the proposed development on surrounding habitats and wildlife

Operational noise from industry can negatively impact the habitat quality and cause disturbance to wildlife. No guidance values are available in Ireland for noise and its impact on habitat or wildlife disturbance.

A European Directive on Noise (2002/49/EC) applies to environmental noise to which humans are exposed in particular in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. While the directive does not apply to wildlife it aims at providing a basis for developing Community measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery. Guidelines for community or nuisance noise for humans provide the basis for developing general guidelines for assessing impacts of noise on wildlife.

Permitting and licensing of the facility should designate appropriate noise levels within which the facility will operate. The facility by operating within the standard noise limits should have a negligible effect on wildlife. Where noise levels from the development may exceed permitted levels then mitigation measures such as noise reduction fencing should be considered.

10.4.4 Cumulative Impacts

Cumulative Impacts of the proposed development are considered with the proposed adjacent Howard Holdings Ltd development on the former Mitsui Denman manufacturing facility Site (Planning Ref: 07/12475). In addition the development is also considered with regard to the proposed restoration works on the rest of the IPPC-licensed site.

Howard Holdings (2007) note that there may be a small impact during the construction phase on nearby residential properties due to noise emissions from site traffic and other activities associated with their proposed development. The traffic noise impact will be greatest on the road to the east of the site, and imperceptible on other roads. They further note that given the development site is in a semi-urban area next to a regional route, it is considered that the various noise sources will not be excessively intrusive. Given the small volumes of traffic associated with the proposed Thornbush Holdings CD&E facility, the cumulative impacts with the Howard Holdings Development are expected to be insignificant. While it is possible there will be some construction phase impacts from the Howard Holdings Development with respect to non-traffic noise generation, the additional impact of noise generated from the Application Site is expected to be negligible at the nearest residences given the distance of the facility from this receptor, the short-term nature of the construction phase activities, and assuming mitigation measures are to be fully implemented.

With respect to restoration of the adjacent waste lagoons, waste materials will be largely left in-situ with some re-grading activities in parts of the site. Cap construction will be phased over a ten year period and activities are likely to be limited to small parts of the site at a time. Requirements of the waste licence for ongoing monitoring, reporting, and implementation of mitigation measures will prevent noise from becoming a nuisance issue.

10.5 Mitigation

10.5.1 Construction Phase

The “best practical means” to minimise noise on site during the construction phase should be used and contractors should adopt the recommendations of BS 5228 Noise Control on Construction and Open Sites, where practicable. In particular it is recommended that the following mitigation measures be implemented:

- Limiting and scheduling the hours of construction activity to avoid unsociable hours - the majority of construction work will take place during the period of 08:00 to 18:00 hours Monday to Friday and 08:00 to 16:00 Saturday, work will not normally occur on Sundays or Bank Holidays;
- Establishing communication links between the developer, contractor, Local Authority and local residents,
- Selecting plant and equipment with low inherent potential for generation of noise,
- Proper use and maintenance of plant and equipment, and
- Locating pumps and generators in positions that cause the least noise disturbance. Acoustic barriers will be erected as necessary around items such as compressors and generators and such equipment will be sited where possible away from noise sensitive areas. Such barriers may be proprietary types, or may consist of site materials such as earth mounds, timber or even straw bales.

10.5.2 Operation Phase

The Waste Recovery Facility will only operate between 08:00 and 19:00 Mondays to Fridays. On Saturdays operations will take place between 08:00 and 16:00. The facility will therefore will not be operational in unsociable hours. The mitigation measures noted above relating to the selection, siting and erection of barriers around plant and equipment will also apply during the operational phase. Soil berms are to be created along the northern boundary of the Application Site which will act as an acoustic and visual barrier for industrial and residential receptors to the north and east of the proposed development.

10.5.2.1 Noise from the Mobile Plant/Equipment Units

Overall the noise levels from the mobile plant and equipment onsite is within the maximum allowable noise level contribution therefore no mitigation measures are required.

10.5.2.2 Additional traffic noise on the public road

There is minimal noise impact from the additional traffic due to the proposed development over the existing traffic flows therefore, no specific mitigation measures are required other than those outlined above.

10.5.2.3 Deliveries to the Proposed Development

Overall the noise levels from deliveries onsite will be within the maximum allowable noise level contribution therefore no mitigation measures are required.

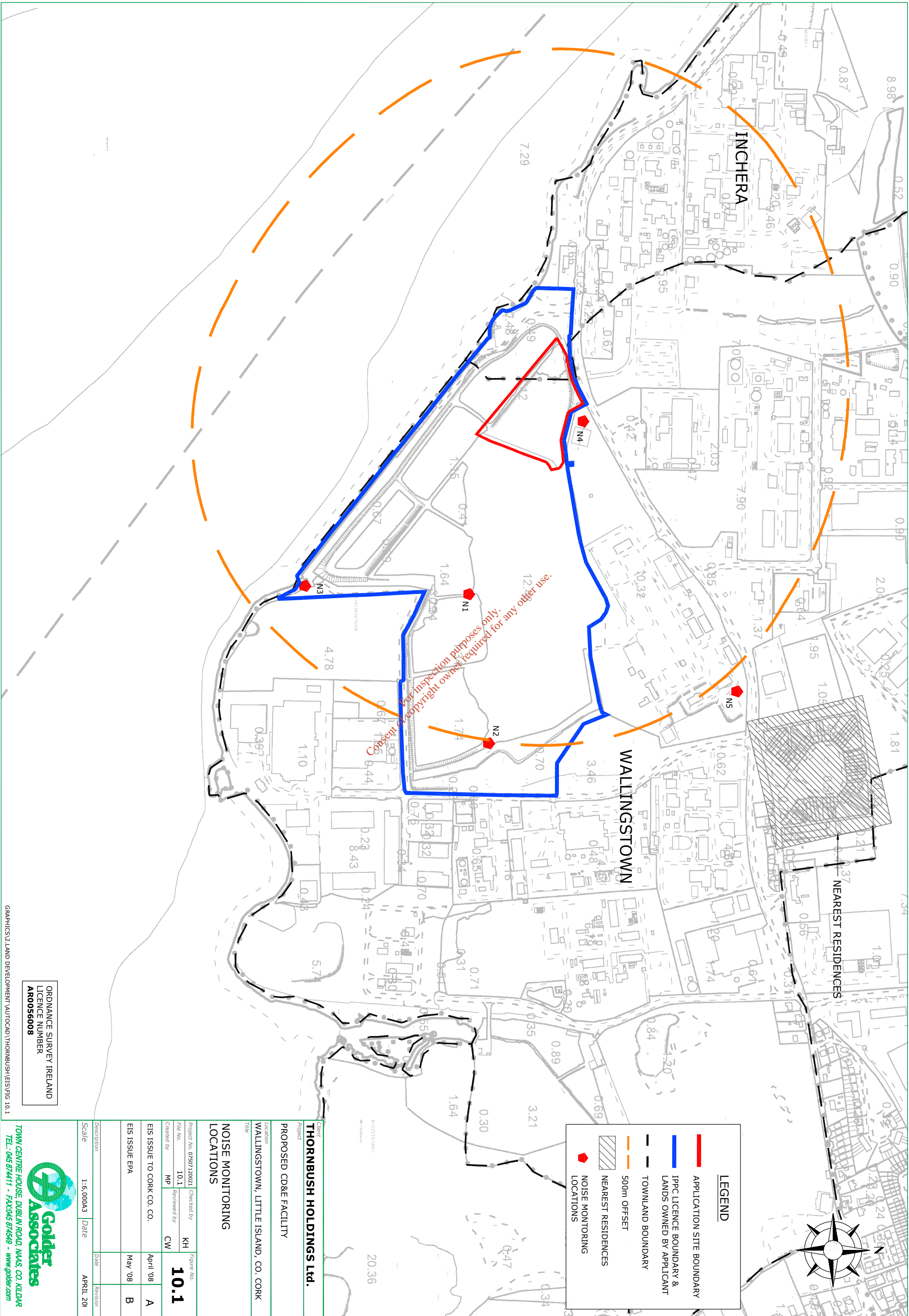
10.6 Likely Significant Effects

Ongoing noise impacts are only likely to be experienced in the immediate vicinity of the site during construction and operational phases of the restoration works. Predicted noise levels from the plant at the site have been considered and assessed. Mitigation measures have been proposed to minimise any potential noise impact and since the lifespan of the proposed facility is only anticipated to be 10 years at a maximum, no residual effects are anticipated.

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FIGURES

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LEGEND

- APPLICATION SITE BOUNDARY
- IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
- TOWNLAND BOUNDARY
- 500m OFFSET
- NEAREST RESIDENCES
- ◆ NOISE MONITORING LOCATIONS

Client THORNBUSH HOLDINGS Ltd.		
Project PROPOSED CD&E FACILITY		
Location WALLINGSTOWN, LITTLE ISLAND, CO. CORK		
Title		
NOISE MONITORING LOCATIONS		
Project No. 07507120021	Checked by KH	Figure No.
File No. 10.1	Reviewed by CW	10.1
Created by MP		
EIS ISSUE TO CORK CO. CO.	April '08	A
EIS ISSUE EPA	May '08	B
Description		Date
Scale 1:6,000A3	Date	Revisor
	APRIL 201	

ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056008

GRAPHICS: 2.LAND DEVELOPMENT\AUTOCAD\THORNBUSH\EIS\FIG 10.1

Golder Associates
TOWN CENTRE HOUSE DUBLIN ROAD, M4AS, CO. KILDAR
TEL: 045 874411 - FAX: 045 874549 - www.golder.com

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11.0 LANDSCAPE AND VISUAL

11.1 Introduction

The following section presents the major findings of the Landscape and Visual Impact Assessment (LVIA) for the proposed development of a CD&E Facility at a site in Wallingstown and Inchera, Little Island, Cork. The LVIA has been prepared by Cunnane Stratton Reynolds Ltd (CSR) and the full report is included in Volume 2 Appendix 4.

This assessment is in accordance with the EPA's Guidelines on the Information to be contained in an Environmental Impact Statement, 2002, and the Landscape Institute (UK) Guidelines for Visual Impact Assessment, 2002.

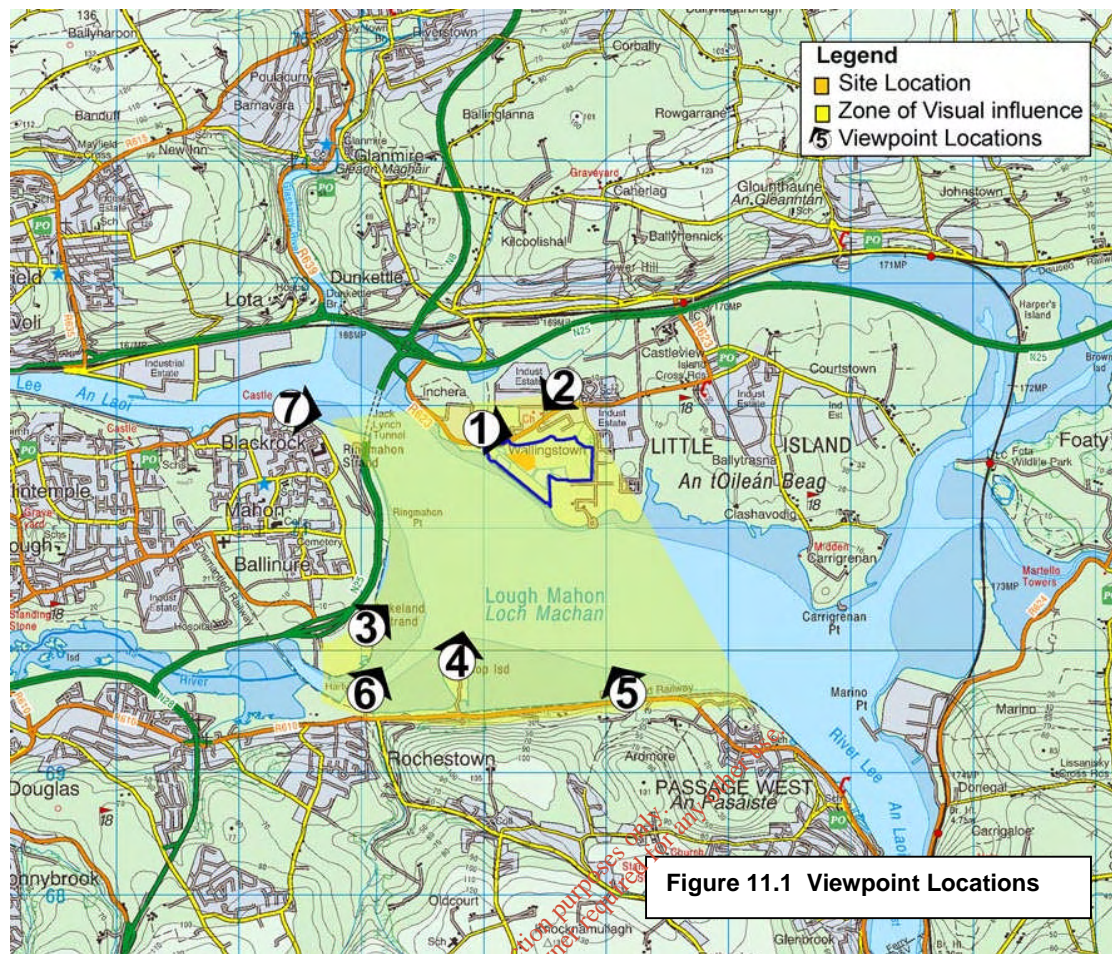
Also consulted in undertaking this study were:

- Department of the Environment and Local Government's Draft Landscape and Landscape Assessment Guidelines, 2003.
- Cork County Development Plan 2003.

11.2 Methodology

An initial desk study of topography, landform, location of archaeologically significant areas/features, ecological designations and scenic views and prospects were carried out using OSI maps and Heritage Council data. Other man-made features such as built environment and land-use were also taken into consideration. The Cork County Council Development Plan and Carrigaline Electoral Area Local Area Plan were consulted to help identify landscape character areas and significant landscape features.

The Application Site was surveyed during a site visit in January 2008, when the main landscape features and the landscape character of the area were identified and evaluated in terms of their vulnerability/sensitivity. The potential for visual impact from key locations in the vicinity of the site was assessed and further evaluated using photographic views (Figure 11.1).



Landscape impacts were analysed based on:

- The capacity of the existing landscape to absorb the proposed development; and
- Effects on landscape character and features (e.g. removal or alteration) as well as on the landscape values.

Visual impacts are evaluated taking account of:

- The visual envelope or zone or visual influence;
- The potential level of visual intrusion (i.e. effect impinged upon a view); and
- The potential for visual impact dependent on the proximity and extent of the proposed development to a sensitive viewpoint/ visual receptor.

Methodology relating classification and assessment of impacts is outlined in detail in the full report.

11.3 Existing Environment

The former Mitsui Denman (Ireland) Limited facility, at Wallingstown and Inchera, Little Island, previously encompassed approximately 40 hectares of land of which approximately 24 hectares were utilised for waste management activities, with the remaining lands utilized for manufacturing, production, office facilities, landscaping and ancillary infrastructure. The waste management area comprises IPPC licensed waste lagoons which are under the ownership of Thornbush Holdings ('the Thornbush Site'). The proposed development of a CD&E Facility is to be located on a restored area (ca. 2.2 ha) at the north western corner of the Thornbush Site. It is intended that the proposed facility will generate over its lifetime sufficient material for the proper capping and restoration of the Thornbush Site which is required under the terms of its IPPC licence and existing planning requirements.

The design and site layout of the CD&E Facility is based on processing received CD&E Wastes into a fill material type 1C (as specified in Specification for Highway Works). By its nature it would be a temporary development which would enable the capping of the Thornbush Site as required by the existing IPPC licence and planning permission (Planning Ref: 1466/73), and its design reflects this timescale and longer term plans for the wider area.

The aspects of the proposed development that could potentially impact on the landscape character and contribute to its visual impact include:

- The reception and storage heaps of waste materials;
- The utilitarian character of the proposed facility;
- The negative perceptions of waste management facilities; and
- Potential shoreline and southerly visual impacts to the wider environs of Lough Mahon.

11.3.1 The Application Site

The Application Site is situated in the north west corner of the Thornbush Site, adjacent to the R623 Little Island Road. The character of the area is a function of the previous industrial processes. The Application Site includes a former waste impoundment lagoon. There is no inherent landscape value or quality in the site with the exception of the existing trees along the northern boundary which provide an effective screen. The Application Site is visually contained to the south by a large bund bordering the Thornbush Site which restricts views of the waters of Lough Mahon and the distant shoreline to the south.



View east across Application Site



View south across Application Site showing raised berm



Lagoon and tree screen to south of Application Site

11.3.2 Thornbush Site Context

The Thornbush Site occupies an extensive area to the east and south of the proposed C,D&E Facility. The purpose of the C,D&E Facility is to support reclamation and restoration of the overall site. The Thornbush Site can be described under the following areas:

11.3.2.1 Lagoon Area

This area lies south and south-east of the Application Site. It occupies most of the Thornbush Site and consists of waste disposal lagoons associated with the processing of manganese to produce Electrolytic Manganese Dioxide for the production of dry cell batteries.

11.3.2.2 Mixed Woodland

The Thornbush Site contains areas of woodlands located to the east of this proposed development.

The woods contain mature Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Oak (*Quercus robur*) and Holly (*Ilex aquifolium*) as well as a wide range of understorey and shrubby species. There are also planted conifers and Poplars along this southern boundary.

11.3.2.3 Surrounding Areas

The immediate environs to the north and east of the former Thornbush Site are bounded by extensive areas of industrial development including industrial parks developed by IDA Ireland and large industrial complexes of major national and international corporations. Many of these areas are landscaped and modern complexes contrasting with vacant appearance of the Application Site and the adjacent semi-derelict Thornbush Site.

11.3.2.4 Wider Context

Figure 11.2 illustrates the setting of the proposed development in the context of Little Island and Cork Harbour. Whilst Little Island is recognised as a strategic industrial rather than residential location there is a requirement in the County Development Plan to ensure an acceptable environmental quality. It is recognised that the island occupies a prominent position in the harbour and development must consider ecological issues in relation to both the wider areas designated for nature conservation. The harbour provides the distinctive setting for Cork City and its environs and has been classified in the County Development Plan as the City Estuary Harbour and Island Complex landscape character area. The landscape character assessment process in the County Development Plan does not provide detailed guidance as to the sensitivity of these areas however it is an objective to continue the process of landscape character assessment in line with the Draft Guidelines issued by the Department of the Environment and Local Government. This assessment follows that process in assessing the proposed CD&E Facility development particularly in the context of its contribution to the redevelopment of the adjacent former Mifur Denman site.

In doing so both the landscape and visual amenity of residential and scenic areas in the harbour environs need to be considered in terms of the potential development within the visual envelope of the harbour. The relevant scenic areas, routes, and residential areas are shown on Figure 11.1. Those lying around the southern and western shores of Lough Mahon, from Blackrock to Passage West, would be most sensitive to views of the site on Little Island. These views are, however of a working harbour in a rapidly developing city where the coastal edge is becoming increasingly urbanised. The County Development Plan describes Cork Harbour as

“.....a thriving mixed coastal zone in a distinctive landscape setting as well as being the focus for all major industrial development in the area.”

It is the balance between the natural maritime setting, the increasingly urban waterfront and the bustle of an industrial port and city which create the distinct identity of Lough Mahon and Cork Harbour.

11.4 Assessment

Landscape and visual impact assessment is essentially concerned with two things:

- the changes as a result of a development that affect the fabric, character, values and quality of the landscape as identified above; and
- visual changes that affect the views (and viewers) within a landscape.

11.4.1 Landscape Character

The proposed development represents a temporary development that is potentially visually intrusive with negative perceptions. However it is an essential requirement both to implement the restoration requirement of the Thornbush Site waste lagoons and the long term redevelopment of that site to a beneficial afteruse, exploiting and enhancing its waterfront location.

The Application Site benefits from the presence of substantial existing screen vegetation along its northern and western boundaries and the presence of bunding to the south. In addition, views of the development will be heavily restricted from the inner harbour area to the south of the site due to the presence of the bund that defines the southern and western boundaries of the wider Thornbush Site. Distance has a significant diminishing effect from opposite shoreline locations. The proposed development should, therefore, be an acceptable development for the lifetime envisaged.

11.4.2 Visual Impact

The visual impact survey was carried out by a qualified landscape architect on an overcast day in February 2008. Seven viewpoints within the defined zone of visual influence were assessed (Table 11.1, Figure 11.1).

Table 11.1: Viewpoints and Visual Impact Assessment Results

View No.	Location	Distance from Site	Degree of Change	Viewpoint Sensitivity	Classification of Impact	Predicted Impact short term	Predicted Impact long term
1	Middle Road	0.20km	Low	Low	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
2	Middle Road	0.30km	Low	Low	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
3	Jacobs Island	2km	Low	High	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
4	Hop Island	17.6km	Low	Medium	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
5	Car Park near Passage West	20.8km	Low	Medium	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
6	Hartys Quay	2.3km	Low	High	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>
7	Blackrock Castle	15.5km	Negligible	High	Neutral	<u>Low</u> <u>Neutral</u>	<u>Low</u> <u>Neutral</u>

All viewpoints experience a low or negligible impact in the short and in the long term. These results generally reflect the extent to which the proposed development is visually contained by existing boundary screening that includes a vegetation screen to the north and west, and existing bunding to the south. In addition, distance has a significant diminishing effect in views from the southern shoreline of Lough Mahon.

11.5 Mitigation

Mitigation would consist of appropriate fast growing vegetation planted on the proposed berms in the north of the Application Site.

Planting species for screening should consist of a mix of native species outlined below in Table 11.2.

These should generally be planted at 3 / sq.m, in groups 15 – 35, in well prepared planting pits, using temporary protective planting tubes or similar to assist establishment.

Dominant tree species should be planted at 2m centres, using small stakes, throughout the shrubby mix in groups of 5 – 15no.

Table 11.2: Species Mix

Species	Common Name	%	Size (cm)
<i>Fraxinus excelsior</i>	Ash	30	60-90
<i>Crateagus monogyna</i>	Hawthorn	10	60-90
<i>Pinus sylvestris</i>	Scot's pine	10	60-90
<i>Alnus glutinosa</i>	Alder	20	60-90
<i>Prunus spinosa</i>	Blackthorn	5	60-90
<i>Corylus avellana</i>	Hazel	5	60-90
<i>Ilex aquifolium</i>	Holly	5	60-90
<i>Quercus robur</i>	Oak	5	60-90
<i>Betula pendula</i>	Birch	10	60-90

11.6 Residual / Likely Significant Effects

The proposed development must be seen in terms of the wider restoration of the adjacent derelict site. In this context it facilitates the enhancement of the general environs over time and is therefore appropriate to and complementary to the values inherent in the landscape.

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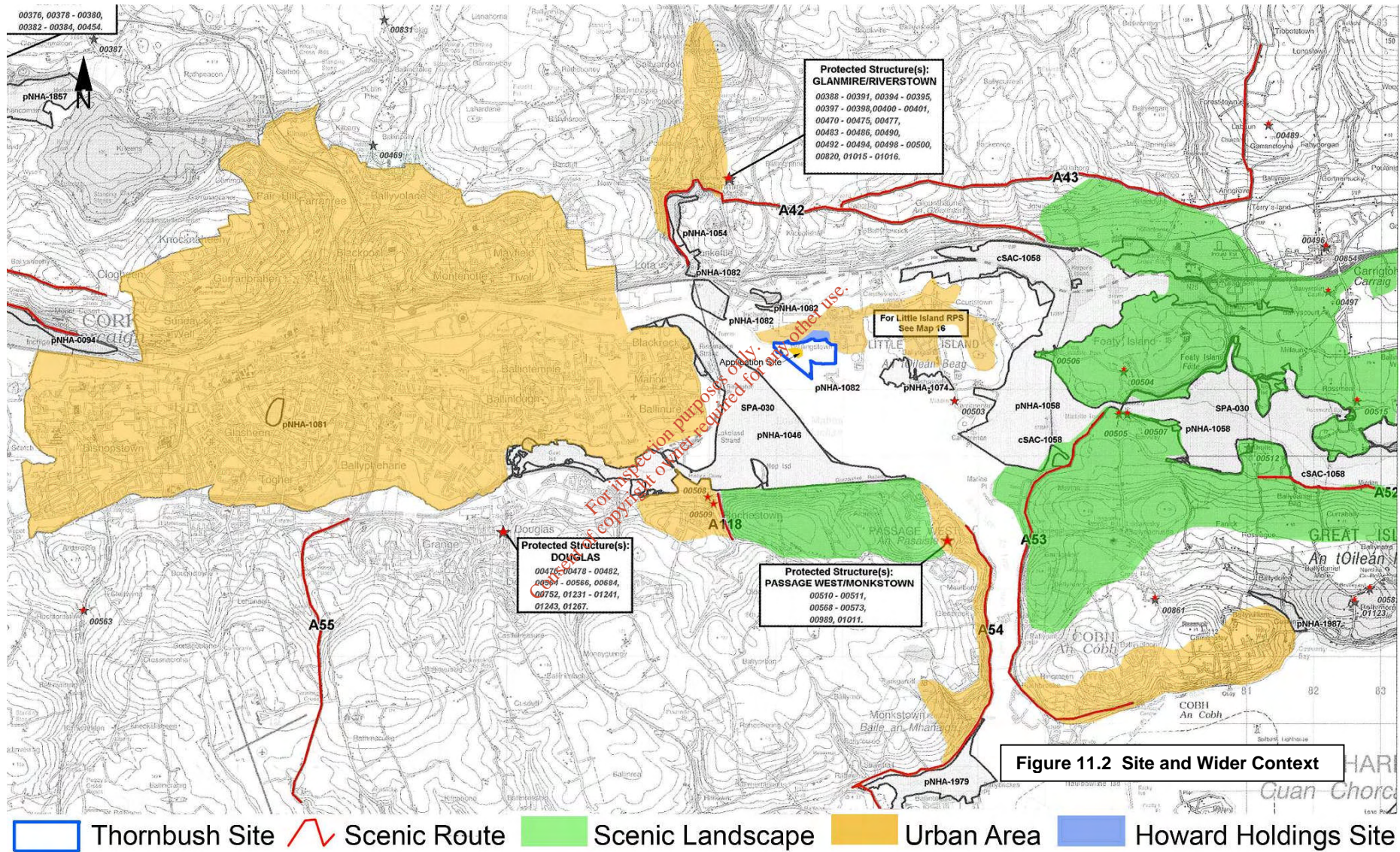


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12.0 MATERIAL ASSETS

12.1 Introduction

This section of the EIS addresses the potential impacts on material assets located in the vicinity of the Application Site. Material assets comprise the physical resources in the environment, which may be of human or natural origin. The objective of the assessment is to ensure that these assets are used in a sustainable manner with respect to the proposed development at Little Island.

12.2 Methodology

The information for the assessment of the impacts of the Application Site was obtained from:

- Cork County Development Plan (2003-2009);
- Census Returns (CSO 1996, 2002 and 2006); and
- Recycled Aggregates (2005) EIS – C&D Waste Recovery Facility, Little Island, Co. Cork.

The material assets, which have been identified as being within and adjacent to the Application Site, and which may be directly affected by the Application activities, are detailed below and assessed in line with the Environmental Protection Agency (EPA) Advice Notes on Current Practice (2003). Material assets considered include economic assets such as utilities and transportation as well as social assets.

12.3 Existing Environment

The proposed development site ('the Application Site') is located within an industrial area of Little Island. The predominant land use in the vicinity of the site comprises industrial/commercial operations. The Application Site is located within an area zoned Primarily Industry/Enterprise under the Cork County Development Plan (2003-2009).

The material assets that have been identified within the Application Site and in the surrounding landscape are listed below:

- Natural Resources;
- Land Resource;
- Road Network and Access;
- Public Utilities;

- Architectural and Archaeological Heritage; and
- Scenic Routes.

Issues concerning the road network, architectural/archaeological heritage and scenic routes are addressed in Sections 3 (Traffic), 13 (Archaeology and Cultural Heritage) and 11 (Landscape) respectively and are not considered further in this Section.

12.3.1 Natural Resources

The proposed development is intended to facilitate the recovery of wastes from construction and demolition activities. As such, it is considered to be in keeping with sustainable development practices. Furthermore, the re-use, recovery and recycling of materials will have a beneficial impact overall since it will reduce the requirement for extraction/production of resources.

The recycling of construction and demolition wastes enables large quantities of resources to be used rationally which otherwise would have to be extracted from the diminishing stock of non-renewable resources. The recycling of mineral wastes enables the environmental impact of quarrying or mining to be reduced.

12.3.2 Land Resource

The Application Site is described in detail in Section 2 (Proposed Development) and Section 5 (Flora and Fauna). The site comprises ca. 2.2 ha and is part of a larger derelict waste lagoon site within an area of Little Island zoned for industry and enterprise. The proposed development will facilitate restoration of the wider waste lagoon site which is required under existing planning and IPPC licence requirements.

12.3.3 Public Utilities

Public utilities in the area include:

- Water Services;
- Foul and Stormwater Sewers;
- ESB; and
- Telecommunications

Connections are being sought with the relevant authorities/providers

12.4 Impacts

The impacts of the Application Site are discussed below:

12.4.1 Natural Resources

The proposed facility will have a positive impact by providing an outlet for construction and demolition waste in the Cork City area. The proposed development is in keeping with Cork Waste Management Policies as outlined in the Cork City and Cork County Waste Management Plans (2004) which aim to reduce the amount of waste sent to landfill and recycle as much as possible.

12.4.2 Land Resource

It is the responsibility of the landowner to ensure that the lands are restored. This process involves the successful capping of the waste lagoons and restoration of the IPPC licensed site with the overall objective to reduce as far as possible the negative effects on the environment. The beneficial afteruse of the Application Site must take into account the surrounding landuse and development objectives of the general area. The proposed development will therefore have a positive impact in terms of restoring the Application Site and adjacent waste lagoon site, in a planned, orderly fashion, for 'beneficial afteruse'.

12.4.3 Public Utilities

No diversions of public utilities are proposed at this juncture. However, should a requirement arise, the relevant public utility companies will be contacted.

The Application Site will require connection to water, stormwater and foul sewers and will require connection to ESB and Telecommunications.

The impact of the Application Site on the existing utilities is considered to be insignificant.

12.5 Mitigation Measures

Mitigation measure concerning the road network, architectural/archaeological heritage and scenic routes are addressed where necessary in Sections 3 (Traffic), 13 (Archaeology and Cultural Heritage) and 11 (Landscape) respectively and are not considered further in this Section.

No additional mitigation measures are required to ameliorate impacts to Material Assets.

12.6 Residual / Likely Significant Effects

No residual impacts are envisaged as part of this Application.

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13.0 ARCHAEOLOGY AND CULTURAL HERITAGE

13.1 Introduction

This section presents the major findings of an archaeological and cultural heritage report prepared by Miriam Carroll and Annette Quinn of Tobar Archaeological Services (see Volume 2 Appendix 4 for full report). It presents the results of an archaeological impact assessment for a proposed CD&E facility at a ca. 2.2 ha site in Inchera and Wallingstown, Little Island, Co. Cork ('the Application Site').

The Application Site is located in the north-western corner of a ca. 29 ha Brownfield site comprising waste lagoons, ponds and reclaimed lands ('the Thornbush Site'). Its development in the 1970s was undertaken by Mitsui Denman and involved construction of large artificial lagoons to facilitate waste material from an adjacent industrial plant. It was subsequently bought by Thornbush Holdings, who are obliged to restore the site under the existing planning permission (Planning Ref: 1466/73) and the IPPC licence (No. P0389-01). The proposed CD&E waste recovery facility will facilitate the restoration of the Thornbush Site.

The aim of this report is to assess the overall impact of the proposed development on the cultural heritage landscape of the Application Site itself and the surrounding area. The report amalgamates desk-based research and the results of field walking to identify areas of archaeological significance or archaeological potential, likely to be impacted by the proposed development. The visual impact of the proposed development on newly discovered monuments as well as known recorded monuments is also assessed. A number of mitigating measures are recommended in order to minimise any such impacts.

13.2 Methodology

The assessment of the archaeology and cultural heritage of the Thornbush Site included desk based research as well as field walking. A desk-based study of the Thornbush Site and environs was undertaken in order to assess the archaeological potential of the area and to identify areas of archaeological significance within or near to the Application Site.

Field walking of the Thornbush Site was undertaken to determine if previously unrecorded monuments were located within the site and to assess any potential impacts on known or previously unrecorded monuments and areas or buildings of historical, archaeological or cultural heritage significance. The potential impact of the proposed development on Protected Structures or proposed Protected Structures on or within the vicinity of the site was also assessed.

13.3 Existing Environment

The Thornbush Site is located in Little Island c. 4km east of Cork city. Little Island is bound to the north by the N25 Cork-Waterford road and to the south by the waters of Lough Mahon. While primarily utilised for agriculture in the nineteenth and early twentieth century Little Island is now largely industrialised and contains numerous industrial estates and factories. The Thornbush Site, inclusive of the Application Site, is situated on the south-west side of Little Island in the townlands of Wallingstown and Inchera (Figure 13.1).

13.3.1 Place Name Evidence

Place name evidence can often refer to existing archaeological monuments in the locality or to sites which are no longer visible above ground or whose location has long been forgotten. Townland names may also refer to natural features in the landscape such as mountains and lakes or the terrain of the immediate landscape. The Thornbush Site is located within the townlands of Inchera and Wallingstown. Placenames such as Wallingstown are more likely to refer to an important person or family who lived in the locality and who lended their name to that place. Lewis refers to 'Wallinstown House' which was the principle seat of Little Island in the 19th century. The placename Inchera may be derived from the Irish inis which refers to an island or a low meadow along a river (Flanagan and Flanagan 2002, 99-100 and Joyce 1870).

13.3.2 Archaeological Heritage within the Application Site

There are no archaeological monuments located within the Application Site.

13.3.3 Archaeological Heritage within the surrounding Study Area

The site of one recorded archaeological monument (RMP CO075-052 Horizontal Wheeled Mill site) is located within the Thornbush Site (Figure 13.1), but outside of the Application Site. It is situated at the north-east side of the site in the area of now infilled lagoons, c. 370m to the east of the Application Site. This portion of the site is proposed for future infilling and restoration.

13.3.3.1 Horizontal Wheeled Mill Site – RMP CO075-052

The site of a horizontal and vertical water mill (RMP CO075-052) is located within the Thornbush Site in the vicinity of an infilled lagoon (Figure 13.1) (NGR – 17426/07198). The monument consists of the site of two seventh century watermills which were uncovered during ground works in the late 1970s. Elements of the two wooden mills were uncovered on the site in c. 1978-9 during the excavation of large storage lagoons for Mitsui-Denman Ireland.

The subsequent rescue excavation of the mills showed that two types of watermill, horizontal and vertical, were present on the site. Timbers from the mills were dated by dendrochronology to the year 630 A.D and represent the earliest known close association of each type of watermill (Rynne 1993, 25 and 28). The siting of the mills is also significant and suggests that they essentially were tidal mills harnessing the ebb and flow of the tide. The area in which the mills were found now consists of reclaimed land, however, it would have been significantly closer to the shoreline in the 7th century A.D. At this time Little Island would have been a true island with extensive areas of tidal marsh around its shoreline (ibid., 29). The foundations of the mills were covered by up to 1.5m of estuarine gravel and mud which indicates that the tidal waters of Lough Mahon extended inland as far as the mill sites in the seventh century (ibid.). Excavation showed that the mill foundations were also built on riverine mud which further suggests that they were constructed on what was then a tidal marsh. Cartographic evidence shows that an area of estuarine mud located to the west and south-west of the mill sites was reclaimed sometime in the mid-late nineteenth century.

The discovery of these mills is significant as they provide hitherto undiscovered evidence for the use of both horizontal and vertical watermills in 7th century Ireland and also suggest that large-scale harvesting of crops was being undertaken in the Little Island region at this time. The area in which the mills were found underwent extensive groundworks in order to construct the 8m deep lagoons. Consequently, the water mills were fully archaeologically excavated and removed. The lagoons in this area are now largely infilled with waste material and it is proposed that the site will be further infilled with material from the CD&E facility to a height of 2m.

The description of the watermills as published in the Archaeological Inventory of County Cork Vol. II – East and South Cork (Power et al., 1994) is presented in Appendix I.

A programme of field walking of the Thornbush Site was also undertaken in order to detect the presence of previously unrecorded monuments, however, no such monuments were noted.

13.3.3.2 Grotto

An interesting structure is located at the west side of the Thornbush Site, but outside of the Application Site, on the northern shore of Lough Mahon (Figure 13.1). It is situated approximately 100m to the south-west of the Application Site and is separated from the latter by a water-filled lagoon and an earthen berm. While it has been referred to as a 'grotto' its precise function is unclear. The structure would appear to consist of a rectangular building which has been surmounted with an arch of random rubble stone. It is this arch which gives the appearance of a modern-day grotto, however, it is unclear if it ever functioned as such. The stone arch now acts as a roof to a rectangular structure which is largely built of red brick. The south-west facing elevation of this structure, however, is faced with large, dressed limestone blocks and also displays three blocked door openings and an oculus. A low ogee-headed doorway is located centrally in this elevation and is flanked on either side by a pointed-arched

doorway. The central door opening is surmounted by a blocked oculus. The general appearance of this elevation is a decorative one due to columns carved in relief on either side of each door opening and leaf ornamentation beneath the oculus.

The interior of the structure may be accessed from the north through a small stone and red brick built annex which has two pointed arched windows and a blocked doorway. This portion of the building is not covered by the stone arch and is more likely to be associated with the main rectangular structure. A narrow passageway leads from the annex into the single room which comprises the interior of the rectangular structure. Access would not originally have been gained from here as a portion of the wall dividing the annex from the main structure has been breached. The walls in the room of the main structure are constructed of red brick and are partially plastered. A number of blind arched recesses are also visible in the north, east and west elevations. The ceiling of this room is now formed by the stone arch.

The top of the stone arch may be accessed by a set of stone steps built into the south-east side of the arch. The summit of the arch consists of a flat circular platform constructed of red brick. This area affords extensive views of Lough Mahon to the south, east and west.

This building, while located within the overall site boundary, will not be directly impacted by the current development proposals and is situated c. 100m to the south-west of the Application Site. The structure is not a recorded monument and is not listed in the Record of Protected Structures of the County Development Plan. In this regard the building has no formal legislative protection but should be retained in situ in the interest of the continued preservation of the architectural heritage of the area.

13.3.4 Archaeological Heritage within 1km of the study area

Seven recorded monuments are located within 1km of the Thornbush Site and are listed below in Table 13.1. A full description of each monument from the Archaeological Inventory of County Cork Vol II – East and South Cork (Power et al. 1994) or the Archaeological Survey files/excavations database as appropriate is presented in Appendix II while a general discussion of the monument types represented in the area is outlined below.

Table 13.1: Archaeological Heritage within 1km of the study area

MONUMENT NO.	NAT. GRID REF.	TOWNLAND	CLASSIFICATION
CO075-020/01	17447/07196	Wallingstown	Graveyard
CO075-020/02	17445/07194	Wallingstown	Church
CO075-021	17454/07194	Wallingstown	Tower House
CO075-082	17500/07240	Castleview	Fulacht Fiadh
CO075-084	17517/07239	Castleview	Corn Drying Kiln
CO075-085	17510/07237	Castleview	Miscellaneous

CO075-086	17504/07239	Castleview	Miscellaneous
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A number of monument types are represented within 1km of the Thornbush Site and consist of the following: Church and graveyard, tower house, fulacht fiadh, corn-drying kiln and miscellaneous excavated features.

The monument types represented range in date from the prehistoric period to the medieval period.

13.4 Assessment of impacts

13.4.1 Impact on archaeological monuments within the Application Site

There are no records of archaeological monuments within the Site and no previously unrecorded monuments were detected during field walking. The Site is also located an adequate distance from the area of the watermills in an infilled lagoon and will not impact on the recorded monument. Therefore, no direct or indirect impacts are anticipated on archaeology within the Site.

13.4.2 Recorded archaeological monuments within the Thornbush Site

One recorded archaeological monument (RMP CO075-052) exists within the Thornbush Site, but outside of the Application Site. It consists of a horizontal wheeled mill site which was fully archaeologically excavated during the 1970s when it was discovered during deep excavation works associated with the construction of lagoons for an industrial plant located further to the north. No impacts on this monument are anticipated.

No previously unrecorded monuments were detected within the Thornbush Site during field walking.

13.4.2.1 Direct impacts

No direct archaeological impact on the recorded monument located within the Thornbush Site (RMP CO075-052 – horizontal wheeled mill) is anticipated. The watermills were fully archaeologically excavated at the time of their discovery and consequently were removed from the site. Previous development of the site for Mitsui Denman involved the excavation of the aforementioned lagoons up to a depth of 8m. The proposed CD&E waste recovery facility is located an adequate distance from the site of the watermills in an infilled lagoon and will not impact on the recorded monument.

13.4.2.2 Visual Impacts

The recorded archaeological monument located within the Thornbush Site does not have any above-ground remains and was fully archaeologically excavated and removed from the site. Consequently, the development proposals at the Application Site will not have any visual impact on the monument. No recorded monuments or newly detected sites are located within the Thornbush Site, therefore it is unlikely that development works will have any direct visual impact.

13.4.3 Impact on archaeological monuments within 1km of the Thornbush Site

13.4.3.1 Direct Impacts

Seven recorded archaeological monuments listed in the Record of Monuments and Places (RMP) are located within 1km of the Thornbush Site. The church and graveyard (RMP CO075-020/01 and 02) and tower house (RMP CO075-021) are located to the north of the Thornbush Site and are separated from the latter by the now decommissioned Mitsui Denman industrial plant. The proposed entrance to the Application Site is currently located at the west side of the Thornbush Site over 300m from the aforementioned recorded monuments. These monuments are therefore unlikely to be directly archaeologically impacted by the proposed development. The recorded monuments at Castleview are located over 700m to the north-east of the Thornbush Site and were fully archaeologically excavated at the time of their discovery. The distance of these monuments from the Thornbush Site mitigates against any direct archaeological impact.

13.4.3.2 Visual Impacts

The visual impact of the proposed development at the Application Site on recorded archaeological monuments in the vicinity of the site is minimised by the distance of such monuments from the site boundary (i.e. in excess of 200m). No archaeological monuments are readily identifiable in the landscape from the Thornbush Site and are screened from view by existing boundaries and/or buildings. The area immediately surrounding the tower house and church and graveyard has been extensively developed for industrial purposes over the last number of decades therefore the original environment and setting of the monuments has already been significantly altered. It is unlikely, therefore, that the proposed development will have any significant negative visual impact on the archaeological landscape.

13.5 Mitigation measures

While one recorded monument (CO075-052 – Water mills) is located within the Thornbush Site no above-ground or sub-surface remains of the mills now exist on the site. The construction of the CD&E facility at the Application Site will involve infilling the remainder of a partially infilled lagoon. As extensive groundworks have already taken place in this area no further archaeological input is anticipated for this development.

A structure of architectural significance is located within the Thornbush Site to the west of the Application site. The building referred to as a ‘grotto’ will not be directly impacted by the proposed CD&E waste recovery facility and is currently screened from view by a thicket of trees. It is recommended that no groundworks take place in the vicinity of the structure and that the trees surrounding the building be maintained in the interest of the continued preservation of the architectural heritage of the area.

13.6 Residual / Likely Significant Effects

No archaeological monuments are located on the Application Site. One recorded monument (RMP CO075-052) is located within the Study Area. The monument is located in the portion of the site proposed for infilling and is situated c. 369m to the east of the Application Site. The monument was fully archaeologically excavated and removed from the site at the time of its discovery in the 1970s and therefore will not be directly or indirectly impacted by the development proposals. Those recorded monuments located outside the proposed development site but within approximately 1km of the development boundary are also unlikely to be directly affected by the current proposals.

The potential for impacts on previously unrecorded archaeological remains which may exist within the development site is also low due to the extensive groundworks which took place on the site for the excavation of the lagoons.

Potential visual impact on the recorded monument within the Study Area by the proposed development is negated by the fact that no above-ground remains of the monument now exist. The distance of the recorded monuments located outside the site boundary and the industrial nature of the immediate environs also mitigates against such an impact.

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CARTOGRAPHIC SOURCES

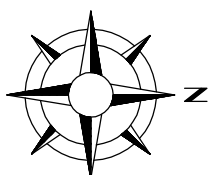
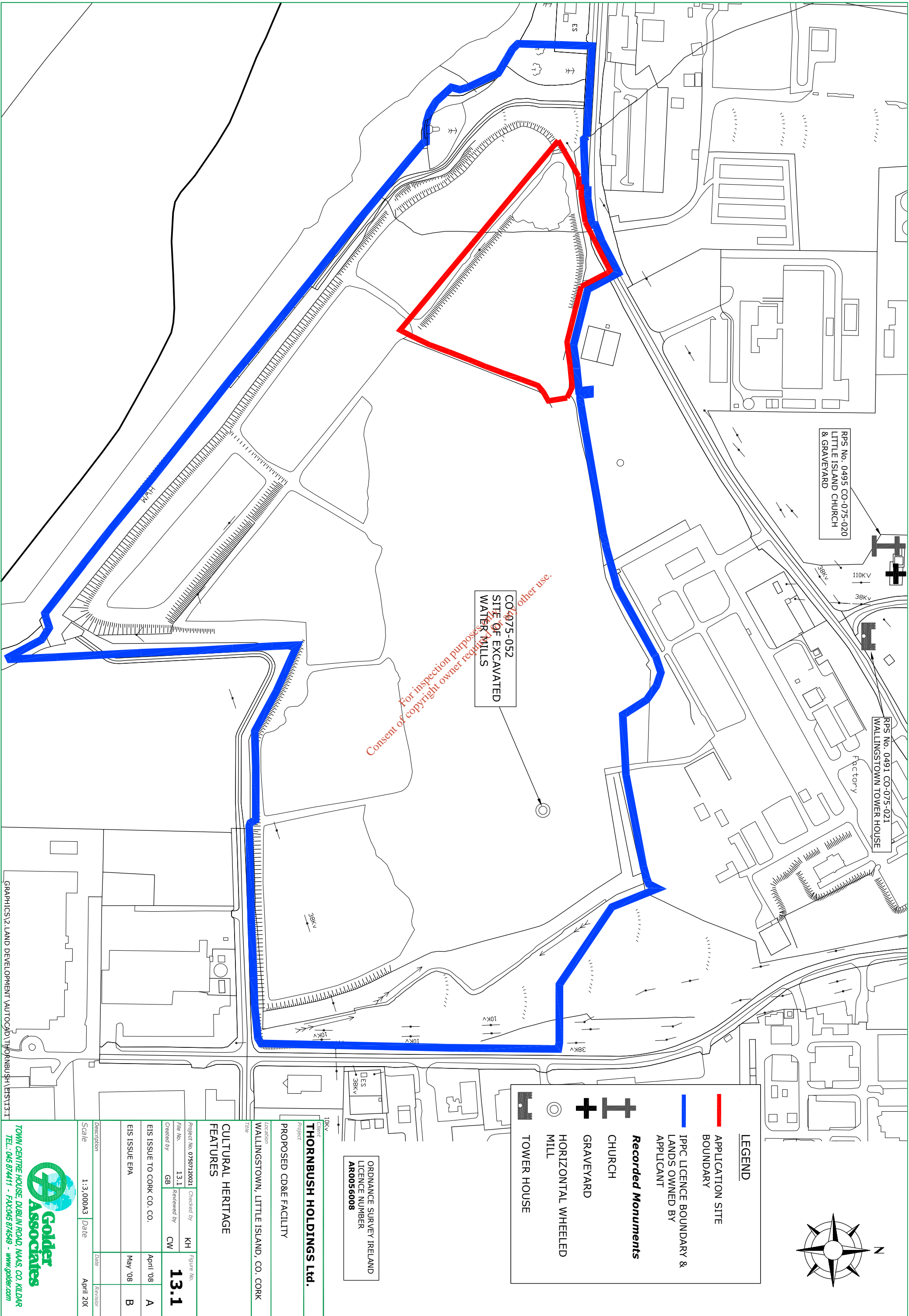
Record of Monuments and Places (RMP) for County Cork, Sheet 75.

1st Edition 6" OS map (1841) Sheet 75.

2nd Edition 25" OS map (1898) Sheet 75.

FIGURES

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LEGEND	
—	APPLICATION SITE BOUNDARY
—	IPPC LICENCE BOUNDARY & LANDS OWNED BY APPLICANT
	CHURCH
	GRAVEYARD
	HORIZONTAL WHEELED MILL
	TOWER HOUSE

ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056008

Client
THORNBUSH HOLDINGS Ltd.

Project
PROPOSED CD&E FACILITY

Location
WALLINGSTOWN, LITTLE ISLAND, CO. CORK

Title
CULTURAL HERITAGE FEATURES

Project No. 07507120021	Checked by KH	Figure No.
File No. 13.1	Reviewed by CW	13.1
Created by GB		
EIS ISSUE TO CORK CO. CO.	April '08	A
EIS ISSUE EPA	May '08	B
Description	Date	Revisor
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GRAPHICS: 2. LAND DEVELOPMENT (AUTOCAD) / THORNBUSH/EST13.1

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Table 14.1 Interactions

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14.0 INTERACTIONS OF THE FOREGOING

This chapter describes interactions/inter-relationships between various aspects of the environmental impact assessment for the development of a CD&E Facility at the Application Site.

In examining the interactions of the potential impacts for this development one must investigate the combined physical, environmental, visual and socio-economic impact of the development on the receiving environment. Table 14.1 illustrates the interaction of impacts assessed for this project.

Table 14.1 Interactions

	Traffic	Humans	Flora & Fauna	Soils & Geology	Water	Air	Noise	Landscape	Material Assets	Archaeology
Traffic										
Human Environment	x									
Flora & Fauna										
Soils & Geology										
Water			x	x						
Air	x	x	x							
Noise	x	x	x							
Landscape		x		x						
Material Assets	x	x								
Archaeology		x							x	

14.1 Traffic/Humans

Traffic flow levels indicate that the increased traffic volume will be well within the carrying capacity of the local road network. Furthermore, deliveries will be managed so as to avoid surges in traffic associated with the site and thus minimise any potential adverse impacts.

14.2 Traffic/Air

Due to the estimated volumes of traffic associated with the site it is anticipated that traffic will have a minimal affect on air quality. All trucks will be maintained so as to minimise engine emissions. Nuisance dusts will be more likely during the construction phase when vehicles may transfer material off site on their wheels. A mobile wheelwash will be provided at the earliest stage to prevent this and inspection and cleaning of adjacent roads, where necessary, will ensure that avoided nuisance dusts.

14.3 Traffic/Noise

Existing background noise levels in the vicinity of the Application Site are elevated at peak times due to traffic noise. The proposed site is not expected to increase traffic levels to the extent that local environment noise levels will be affected.

14.4 Traffic/Material Assets

Impacts on the local road network will be negligible given the low volumes of traffic predicted.

14.5 Humans/Material Assets

The proposed development will develop employment opportunities in the local area during the construction and operation phases. Financial benefits will be accrued by local contractors engaged in the construction and decommissioning phase and those associated with the operation of the facility. It is the responsibility of the landowner to ensure that the lands are restored for beneficial afteruse. This process involves the successful capping and restoration of the waste lagoons with the overall objective to reduce as far as possible the negative effects on the environment. The beneficial afteruse of the Site must take into account the surrounding landuse of the site and development objectives of the general area.

14.6 Humans/Landscape

Due to the existing urbanised nature of the area surrounding the Application Site, and proposed mitigation measures including retention and enhancement of screening vegetation, and installation of screening berms, the proposed development will have a minor or negligible affect on the landscape. The Thornbush Holdings site consists of a series of waste lagoons developed over a twenty year period by Mitsui Denman (Ireland) Limited. The waste lagoons are required to be restored and capped in accordance with the terms of the planning permission and IPPC licence. The proposed development will therefore have a significant beneficial affect on the environment and landscape by supporting the overall restoration of the former waste lagoons.

14.7 Humans/Noise

Overall, the proposed development will have a negligible impact at the nearest receptors. The noise impact of construction noise will be short-term in nature and is not considered significant. Noise levels during operation will follow strict noise criteria targets to prevent noise from becoming a nuisance issue, and berms installed at the proposed facility will provide acoustic screening.

14.8 Humans/Air

During the construction phase the major potential air pollutants of concern will be nuisance dusts generated by earth-moving operations and vehicular movements on and off site. Due to the small area of the Application Site and mitigation measures including a dust minimisation plan, it is anticipated that adverse impacts will be negligible. Furthermore the capping and restoration of the IPPC licensed site will have a positive impact on long term air quality by preventing through sealing the waste any potential dust generation from the exposed waste lagoons.

During the operation phase, dust suppression systems in addition to berms installed at the proposed facility will minimise and prevent potential emission sources, ensuring that there are no significant impacts on human beings.

14.9 Archaeology/Humans & Material Assets

The grotto feature adjacent to the site, located along a public walkway, will not be impacted by the proposed development.

14.10 Flora and Fauna/ Air & Noise

The flora and fauna at the site are not notable in terms of species diversity, habitat extent and conservation value. All the species recorded at the site during the current survey are already widely represented locally, and at regional and national levels. The greatest potential for impacts on the ecology of the site is during the Construction Phase of the development, when current site habitats will be permanently removed, which will impact on floral and faunal elements. The Operational Phase will not present any additional impacts to those arising during construction. It is likely that bird and mammal species displaced due to habitat loss and noise associated with the proposed development will inhabit linked habitats. The capping of the waste lagoons will seal the waste material on-site thus minimising potential pollutant pathways that may impact on ecological systems. The proposed development will therefore have a positive impact on the ecological systems.

14.11 Soils & Geology/ Water, Flora and Fauna, Landscape

Restoration of the waste lagoons will result in a positive impact with respect to landscape in terms of the potential beneficial after-use of the site, and the potential to enhance the site. Restoration will also have a positive impact with respect to capping the existing wastes, thus controlling site drainage and preventing run-off impacting on local water quality, and in turn on aquatic and terrestrial flora and fauna.