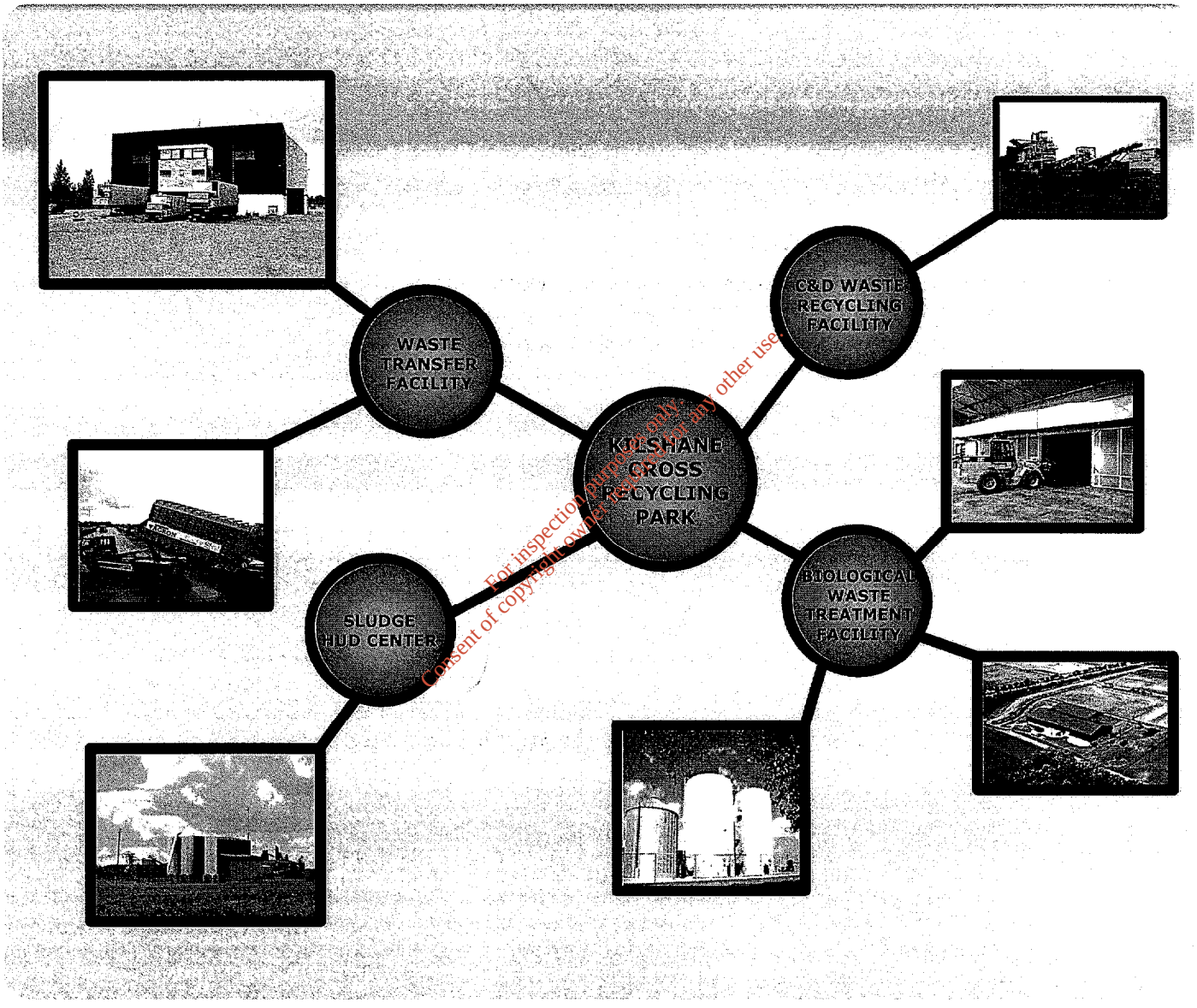
Fingal County Council
Comhairle Contae Fhine Gall

KILSHANE CROSS RECYCLING PARK



ENVIRONMENTAL IMPACT STATEMENT

VOLUME II: EIS MAIN TEXT

SEPTEMBER 2005

TES
CONSULTING ENGINEERS

Document Amendment Record

Client:	Fingal County Council
Project:	Kilshane Cross Recycling Park
Title:	Environmental Impact Statement for Waste Licence Application & Planning Application

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CONSULTING ENGINEERS

FINGAL COUNTY COUNCIL

KILSHANE CROSS RECYCLING PARK, NEWTOWN, DUBLIN 15

ENVIRONMENTAL IMPACT STATEMENT

VOLUME II: MAIN REPORT

SEPTEMBER 2005

1 INTRODUCTION

Fingal County Council proposes to develop a Waste Recycling Park at a site in the townland of Newtown, Kilshane Cross, Dublin 15. Please refer to the Site Location Map, Figure 1.1. The Recycling Park will consist the following waste management facilities:

- A **Construction and Demolition Waste Recovery Facility** processing 75,000 tonnes per annum (tpa);
- A **Biological Waste Treatment Facility** treating 45,000tpa of segregated domestic and commercial organic waste;
- A **Waste Transfer Facility** processing 65,000tpa of municipal solid waste; and
- A **Sludge Hub Centre** treating 26,511tpa of de-watered sludge cake from wastewater treatment facilities in County Fingal.

Fingal County Council is applying to the Environmental Protection Agency (EPA) for a Waste Licence and to An Bord Pleanála for Planning Approval. Fingal County Council owns the site of the proposed Recycling Park. The facilities will be developed using the Public Private Partnership (PPP) process, with each facility being developed and operated by different private contractors. The whole recycling park will be covered by a single planning approval and waste licence, with Fingal County Council being the licence and permission holders.

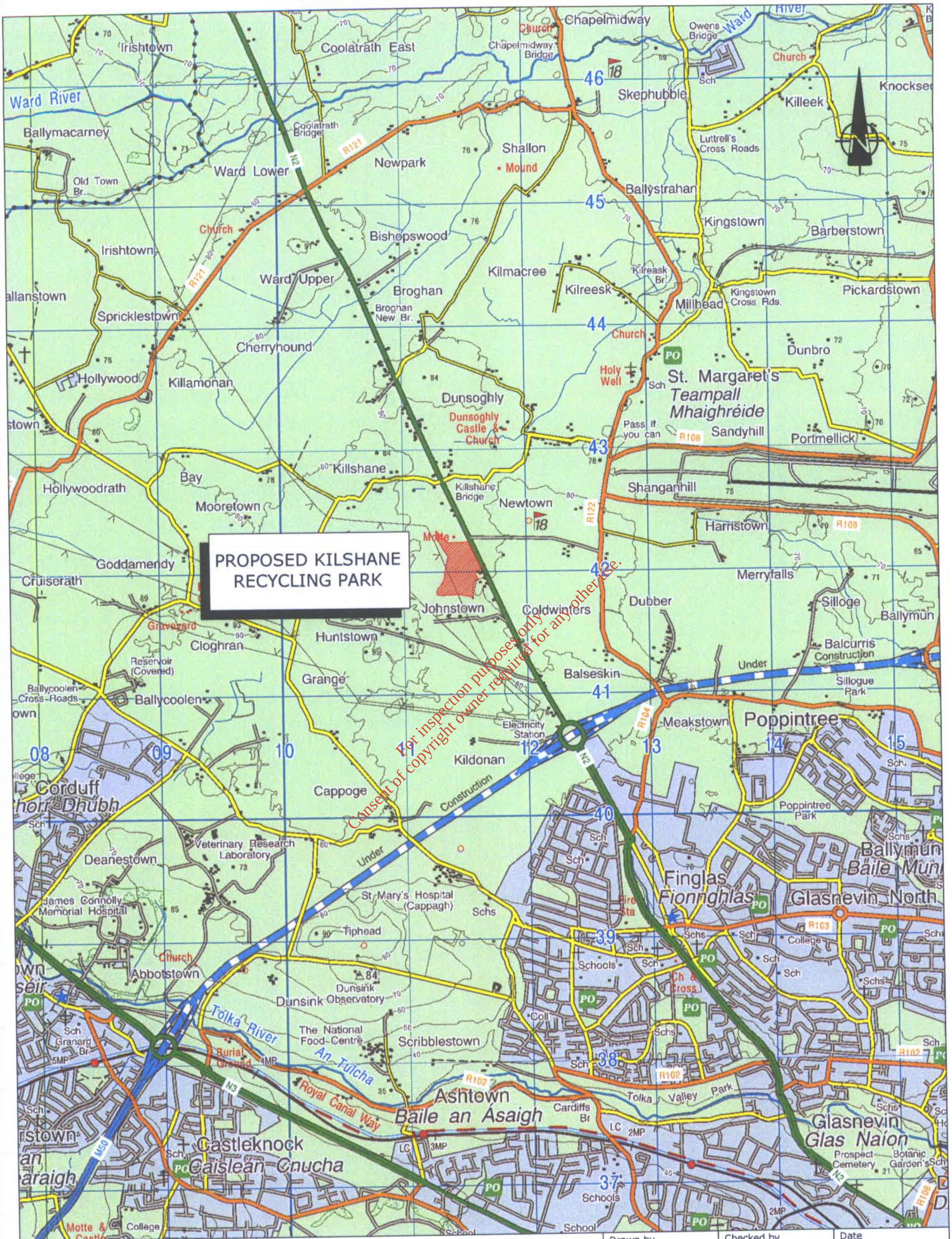
1.1 Site Location & Background

The Kilshane Cross site is situated approximately 1.5km north of the N2/M50 interchange, in the townland of Newtown, towards the southern end of County Fingal (refer to Figure 1.1). The site comprises overgrown grassed agricultural land in a single, large field surrounded by hedgerows. The site is bordered to the east by the N2 and to the west by a small stream, which is a tributary of the River Ward.

There are 15 No. houses within a 1km radius of the centre of the site. The majority of the houses are located to the north and east of the site along the N2. The Huntstown Quarry, which is operated by Roadstone Dublin Ltd., is located to the south and west of the site. The Viridian Huntstown Power Plant is adjacent to the southwest boundary of the site. The N2: Finglas to Ashbourne Road Scheme is currently being constructed to the east of the site. The new road scheme cuts through the northeast corner of the site.

The Kilshane Cross site is presently undeveloped. The majority of the surrounding landscape is agricultural. There are a number of businesses to the east and north along the N2 in the vicinity of the site. These include a fuel filling station and a car garage to the east, a horticultural nursery to the southeast and a building products supplier to the north. The Coldwinters Golf Club is located to the east of the site. The golf course is currently closed while the N2: Finglas to Ashbourne Road Scheme is being constructed. The golf course will be re-developed after the new road scheme has been completed.

The land to the east and north of the site rises gently to a ridge at 80m AOD. The site generally lies at 75m to 79m AOD. There is a high point to the north of the site on the eastern side of the N2 just above Dunsoghly, at 84m AOD. The wider landscape is generally flat to the south, approaching the M50. There is a landscaping bund, approximately 4-5m in height, running adjacent to the site's southern boundary.



Client	Drawing Title	Drawn by	Checked by	Date
FINGAL COUNTY COUNCIL	LOCATION MAP	Dermot Burke	Sean Finlay	September 05

Project: KILSHANE CROSS RECYCLING PARK

Drawing No. FIGURE 1.1 **Scale** 1/40,000

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1.2 Planning Context

1.2.1 National Spatial Strategy

In 2002, the government published the National Spatial Strategy (NSS) for Ireland 2002 to 2020. NSS is a coherent national planning framework that centres on the following five core messages:

- A wider range of work opportunities;
- A better quality of life;
- Better places to live;
- Effective urban and rural planning; and
- Getting things done.

The Spatial Strategy covers Ireland's seven regions, and also provides the framework for spatial policy for the Greater Dublin Area. There is a strong emphasis placed upon securing Greater Dublin's vital national role through improved mobility, urban design, social mix and transport (both national and international). The policies within the Spatial Strategy are currently being translated into regional and local policy.

1.2.2 Fingal Development Plan (Adopted 2005)

The Development Plan for the planning period 2005 to 2011 was finalised in June 2005 and supersedes the Fingal Development Plan 1999-2004.

Section 2.2 Strategy for Rural Areas

Strategy RS3 states the importance of sustaining the rural character of the countryside as a valuable resource.

Section 2.5 Development Strategy - Utilities

The quality of utilities available in the County is important to the aims of sustainable development.

"Water, sewerage, waste management, electricity, telecommunications and gas services provide essential infrastructure to meet business and residential needs"

Strategy UTS2 aims to contribute to the health and well being of the community and protect the

environment through the provision and development of sustainable cost effective water and sewerage services.

Section 2.6 Zoning

Zoning is required to provide an indication of the land use objectives for all lands within the County. Zoning policies must have regard to the principles of sustainable development. The approach to zoning has been reformed since the adopted Development Plan, to provide more effective interpretation and implementation.

Part V – Rural Areas

The Draft Plan aims to protect the future of the rural communities and allow them to grow in a sustainable way through the protection and support for essential local services.

The proposed Waste Recycling Park is located within Zoning Objective 'RU' relating to Rural and Agriculture. The objective for this zone is "*to protect and provide for the development of agriculture and rural amenity*". This zone seeks to preserve rural amenity by ensuring that new developments fit sensitively into the landscape and that natural features are protected. Utility Installations will be permitted in principle within this zone.

The local objective for this site as stated in the Development Plan is as follows;

Local Objective 258- *To facilitate the development of a recycling park incorporating a biological treatment facility, sludge treatment facility, construction and demolition waste facility, waste transfer station, incorporating a buffer zone near residential development Kilshane.*

Part VI – Transportation : Section 6.1 – Transportation

Road construction and improvement measures included include, *inter alia*:

- N2 (Cherryhound) to Harristown Distributor Road;
- Phoenix Park (N2 Interchange).

1.2.3 The Fingal Development Board (April 2002)

The Fingal Development Board published *A strategy for Economic, Social and Cultural Development in Fingal* (April 2002). The Strategy aims to provide a detailed exploration of a number of strategic issues to help face the challenges posed by the rapid growth of the County. The document provides a vision for the County of Fingal:

"*By the year 2011, Fingal will be readily identified as a County with a distinct social and cultural identity reaping the benefits of sustainable development where residents and organisations will share*

responsibility for maximising all of the County's advantages in enhancing the quality of life for all".

The Strategy provides a profile of the County, and explores the key strategic issues, which include County identity, land use planning, transportation, economic development, housing, health and social services, lifelong learning and environmental protection.

Chapter 3 covers strategic issues for Fingal, with Section 3.8 relating to 'environmental protection and providing a vision for Fingal's natural environment to flourish through regulation and education.

1.2.4 Regional Planning Guidelines for the Greater Dublin Area (2004 –2016)

The Dublin Regional Authority and the Mid-East Regional Authority, the two Regional Authorities that make up the seven counties of the Greater Dublin Region, have published 'Regional Planning Guidelines (RPG) Greater Dublin Area (2004 – 2016)'. The document provides a strategic development and planning vision and the framework for the delivery of that vision.

Under the Planning and Development Act 2000, planning authorities must have regard to any regional guidelines in force for the area when making and adopting their development plans. The RPG structure consists of two parts:

- Part A – An overall regional development report for the region; and
- Part B – Regional Planning Guidelines.

Part A: Regional Development Report for the Region

This Report provides the key issues relevant to strategic planning and socio-economic and physical planning in terms of broad trends, housing, employment, provision of services, accessibility, environmental issues, social and cultural development, and overall goals for the region.

Part B: Regional Planning Guidelines (RPG)

The Guidelines reflect a shared vision and consensus for the future development of the region.

Section 3

Section 3 of the RPG provides the goals and objectives for the Greater Dublin Area which include, *inter alia*:

- *"Goal 2 – creating a region functioning well with regard to sustainability, attractiveness and quality of life which is cost effective and properly functioning in its physical, economic, social and cultural dimensions;*
- *Goal 4 – to promote sustainability in relation to water management (objective – to co-ordinate settlement pattern with strategic plans for waste management and disposal); and*
- *Goal 5 – to provide sustainable infrastructure corridors."*

1.2.5 South Fingal Planning Study

This planning study was published in September 2004 as part of the development planning process in the South Fingal area. The principal objective of the study is to advise on a strategic "vision" and framework for South Fingal to 2011 – a rational and flexible strategy to manage the growing pressure for development north of Dublin city - in a way which benefits the local population whilst meeting national and regional level needs. The study area of south Fingal has a strong regional spatial and recreational role. The airport apart, the area is predominantly rural in nature, providing a physical and visual break between the built up areas of Dublin, Swords, Malahide and Blanchardstown. The current County Development Plan identifies the potential for recreation, and to act as a 'green lung' for the population of north Dublin and Fingal (See Figure 4.1 in Appendix 1).

1.2.6 Strategic Environmental Assessment

The Planning and Development (Strategic Environmental Assessment) Regulations 2004 require that SEA be carried out in respect of the following plans.

a) Regional Planning Guidelines
b) City and County Development Plans;
c) Development Plans by Town Councils, where the population of the area is 10,000 persons or more;
d) Local Area Plan for areas with a population of 10,000 persons or more, and
e) Planning Schemes in respect of Strategic Development Zones (SDZs)

The Directive only applies to certain plans and programmes, whose first formal stage began after July 2004. If the preparatory work started before 21 July, the Directive does not apply.

These regulations do not place a requirement on Waste Management Plans to carry out SEA. The

waste management plans for Ireland are currently being reviewed and a **non-statutory pilot SEA** is being carried out for the Midlands Waste Management Plan by request from the Department of the Environment.

1.3 Environmental Policy

1.3.1 National Waste Management Policy

The Department of the Environment, Heritage and Local Government (DoEHLG) published the national waste management policy statement in September 1998, entitled '*Changing Our Ways*', which includes a number of provisions relating to waste management infrastructure, including biological treatment facilities, waste transfer facilities and C&D waste recovery facilities, which are seen as necessary elements of an integrated waste management system for the country.

The Policy Statement set the following targets over a fifteen-year timescale:

- Diversion of 50% of household waste from landfill;
- The development of composting and other biological treatment facilities capable of treating up to 300,000 tonnes of biodegradable waste per annum;
- Recycling of 35% of municipal waste;
- Recycling of at least 50% of C&D waste within a five year period, with a progressive increase to at least 85% over fifteen years.

Within the *Changing Our Ways* policy statement '*The importance of regionalisation of waste management planning*' is emphasised. The proposed development of an integrated recycling park at the proposed location to serve the North Dublin and Fingal Regions is in line with this recommendation. The proposed facility also offers the benefits of 'economies of scale', which is necessary to construct and operate such a facility.

'*The importance of increased participation by the private sector in the provision of waste management service*' is also recommended within the scope of the Government's waste management policy. This recommendation primarily relates to the need to devolve the responsibility for the provision of waste management services from the Local Authorities who, up to 1998, were almost the exclusive providers of waste management services and in particular landfill sites. The proposed development will be developed and operated under the PPP process, with each facility being developed and operated by different private contractors. Fingal County Council is committed to the provision of sustainable development, which will link into the integrated waste management services in the Region.

The DoEHLG also published the national waste policy statement in March 2002, entitled '*Preventing and Recycling Waste - Delivering Change*' which evolved from and is grounded in the 1998 policy statement '*Changing Our Ways.*' The 2002 waste policy statement '*Preventing and Recycling Waste -*

Delivering Change' addresses the factors and practical considerations that are relevant to the achievement of Government policy objectives and for the prevention of and recovery of waste. The current legislative framework favours the reuse and recycling of organic and C&D waste.

The 2002 Waste Policy Statement:

- Highlights the necessary disciplines that must be imposed within waste management systems to secure real progress on waste prevention, re-use, and recovery;
- Outlines a range of measures that will be undertaken in the interests of minimising waste generation and ensuring a suitable expansion in re-use and recycling performance; and
- Identifies issues and possible actions that require further systematic consideration.

The 2002 waste policy statement concentrates on the 3 highest steps on the waste hierarchy recognising, as do the local and regional waste management plans, that emphasis must be given to the widest practicable realisation of waste prevention, minimisation, re-use, materials recycling and biological treatment before energy recovery through thermal treatment and final disposal in landfill. In this respect the proposal currently put forward by Fingal County Council includes for the recovery of 120,000 tonnes per annum of C&D waste and biological municipal waste, for the collection and transportation to further treatment of 65,000 tonnes per annum of municipal solid waste, and the treatment and conversion to a recycled product of 26,511 tonnes per annum of municipal sludge, which would otherwise be a waste product for disposal. Each facility will be specifically designed, utilising the best available technologies.

The 2002 waste policy statement also recommends the establishment of the National Waste Management Board to co-ordinate, monitor, review and advise on all aspects of waste management policy at all levels of the waste hierarchy.

With respect to biodegradable municipal waste and agri-industrial waste (biowaste), EU and Irish waste management policy and legislation now require that biowaste be diverted from landfill to alternative waste management methods at increasing rates over the coming years. For example, the EU Landfill Directive 99/31/EC prescribes a staged reduction in the quantities of biodegradable municipal waste entering landfills, as follows:

- Minimum 25% reduction by 2006;
- Minimum 50% reduction by 2009; and
- Minimum 65% reduction by 2016.

In the government's policy statement 'Preventing and Recycling Waste – Delivering Change' (2002) it

is stated that '*A network of centralised biological treatment facilities is required to deal with organic and green wastes. This requirement is only now beginning to be addressed, but the provision of the necessary capacity is readily within the scope of local authorities and the private waste industry, once segregated collection services are implemented*'.

And also:

Ultimately however, composting, whether carried out by the private sector or public authorities, should generate a product with a clear market value. To do so, it must be developed as a high quality product capable of competing with existing organic products (peat, manure) in terms of price and quality. It is necessary to create a clear identity for waste derived compost products, and build public confidence and trust in their suitability for use, through ensuring consistent quality.'

The proposed development will produce compost from biological municipal waste, which may also include organic material sourced from transfer stations. The material from transfer stations will include organic material from municipal waste sources, however it will be the responsibility of the facility operator to collect this waste and ensure that it is suitable for treatment at the proposed facility. The EPA has published a report entitled *Assessment and Evaluation of Outlets of Compost Produced From Municipal Waste (2000-MS-6-M1)*, 2002, which concludes that reliable and stable outlets for compost produced from the organic fraction of municipal waste can be developed if putrescible biodegradable municipal waste (PBMW) is produced in such a manner that it can be ascribed some value, monetary or otherwise. This can be brought about by ensuring that the PBMW imported to the facility is of the highest possible quality to achieve resultant compost of high quality. This report further concludes that there is therefore an urgent need for environmental and marketing compost standards and that both national and regional procurement policies are to be developed.

The Policy Statement reinforced the requirements in relation to C&D waste recycling and recovery as set down by *Changing Our Ways*, namely up to 85% recycling of C&D waste produced by 2013. The Policy Statement put the onus to meet the target on construction industry and called for the generation of markets and improved demand for recycled or recyclable materials, especially in the manufacturing and construction sectors.

In response, a dedicated Task Force (B4), comprising representatives of all the major sectors in the Construction and Demolition industry, was established by the Forum for the Construction Industry to co-ordinate the development of an agreed construction industry programme to meet the specified recycling targets. The Task Force has reported to the Minister for the Environment and Local Government and the industry is now being asked to take financial responsibility for implementing its recommendations.

The Task Force has made 66 recommendations, which have been taken forward through the establishment of the National Construction and Demolition Waste Council (NCDWC), recommended in the Report. Other recommendations of the Task Force included:

- 0.7- Facilities need to be established for Recycling of C&D Waste. Market Guidance and Incentive Programmes are required to facilitate investment;
- 0.7- Storage depots/transfer stations and recycling facilities need to be established in order to produce secondary material. These facilities need to be strategically situated (i.e. sites close to the source of C&D waste and to the markets for crushed aggregates);
- 0.7- Procurement of recycling/waste handling stations should commence as early as possible. Their availability is central to initiate change;
- 4.4- Storage Depots and Recycling Facilities need to be established in order to produce secondary materials. These facilities need to be strategically situated (i.e. sited close to source of C&D Waste and to the markets for crushed aggregates).

The Council largely consist of representatives of the organisations represented on the Task Force together with other parties identified as having a contribution to make, such as the National Roads Authority, which has an important role in determining specifications for road works. Funding will be shared by the participants.

The DoEHLG published a review of the Irish waste management sector in April 2004, entitled '*Waste Management – Taking Stock and Moving Forward*' which made reference to both the 1998 policy statement '*Changing Our Ways*' and the 2002 policy statement '*Delivering Change*'. The 2004 document reinforces the policies as set down by the previous documents and addresses the progress in the modernisation of waste management in Ireland. In relation to biodegradable waste, the document recognises that there is a need to make early and substantial progress on the provision of biological treatment facilities. The document proposed a number of Key Points for the future progress of policy issues, one of which, Key Point 7, stated:

"The draft National Biodegradable Waste Strategy now being published for consultation will be finalised by end-June 2004. Implementation of the Strategy (aspects of which are already in progress) will move ahead in accordance with the timetable set out in the Strategy itself."

This Strategy is discussed in Section 1.3.2. The document also addressed the progress in the C&D waste recovery area. The EPA's National Waste Database Report for 2001 indicated a 65% recovery rate for C&D waste, representing substantial progress towards the 85% recovery objective set for 2013. It states that very significant progress has been made in implementing Producer Responsibility Initiatives in relation to C&D waste and that the National Construction and Demolition Waste Council

(NCDWC) has outlined details of a voluntary industry initiative aimed at achieving further progress in the recovery of C&D waste.

1.3.2 Draft Dublin Waste Management Plan

The draft Dublin Waste Management Plan (WMP) for 2005 to 2010 was made available to the public in April 2005. The WMP was developed jointly by Dublin City Council, South Dublin County Council, Fingal County Council and Dun Laoghaire-Rathdown County Council. The Dublin Region adopted a *Regional Waste Management Strategy* in 1997, which set out to replace a system that over-relied on landfill disposal with a new approach based on integrated waste management over a 20 year period. The first regional WMP became effective in 2001 and the first formal Review of the Plan has recently taken place during 2004-2005, culminating in the replacement Plan and the publication of the current draft WMP. The draft Plan is based on EU and Irish national waste management policy, and sets out a policy to implement a balanced, sustainable and affordable waste management system in the Dublin Region.

1.3.2.1 Current Waste Generation & Existing Waste Management Infrastructure

Since the adoption of the previous Waste Management Plan (1998) waste arisings have continued to grow in the Dublin Region reflecting the national trend. The quantity of household waste generated in the Region in 2003 is estimated at 459,282 tonnes. This is 20% higher than in 1997. The increase is due to the growth in the number of households, and a growth of 1.6% per annum in the amount of waste each household is generating. It is estimated that the amount of household waste generated in the Fingal County Council functional area has risen from 61,601tonnes in 1997 to 78,181tonnes in 2003. Table 1.1 gives a breakdown of the household waste collected in the Fingal County Council area in 2003.

The draft Plan estimates that a total of 3.9 million tonnes of C&D waste was generated in the Dublin Region in 2003. In 1997 1,223,013 tonnes were disposed of in landfills, in 2003 715,000 tonnes was sent to landfill, however the vast majority of this material was reported as being used in landfill engineering or site restoration works. One other factor in the large increase in the estimate of C&D waste has been the volumes of material sent to sites under Waste Permit. Records indicate that large volumes of material are being deposited in Counties Kildare, Wicklow and Meath, as well as in Fingal and to a lesser extent in South Dublin and Dun Laoghaire-Rathdown. The draft Plan estimates that 81% of C&D waste is deposited at permitted sites, 14% is recovered at licensed facilities, 4% is recycled and 1% is disposed at residual landfills.

Table 1.3.1 Household Waste Collected in the Fingal County Council Functioning Area, 2003

Waste Source	Tonnage
Bring Banks	3,346
Recycling Centre & Green Composting	444
Kerbside	7,243
Mobile Hazardous Waste Collection	0
Total Recycled	**11,033**
Residual Waste Kerbside Collection	62,916
Delivered for Disposal	4,232
Total Disposed	**67,148**
Total Arising	**78,181**
Recycling Rate %	**14%**

Source: Local Authority 'National Waste Database' questionnaires 2003

The draft Plan identifies that approximately 17,954tonnes (dry-solids) of non-hazardous sludge (municipal and industrial sludge) are generated within the Dublin Region per annum. This is further broken down into 14,969tonnes of municipal wastewater sludges, 1,500tonnes of water treatment sludges and 1,485tonnes of industrial sludges.

The draft Plan details the current waste management infrastructure in the Dublin Region. The existing infrastructure includes:

- 3No. Waste Transfer / Bailing Facilities for the transfer of municipal waste to the municipal landfill at Arthurstown, Co. Kildare. There are several large-scale transfer facilities operated by the private sector. The current throughput of commercial/ industrial waste through Material Recovery Facilities (MRFs) and transfer facilities in the Region is estimated to be between 450,000 to 500,000tonnes in 2003.

- There is currently no capacity in the Region to biologically treat biowaste. In accordance with the previous Waste Plan, the Dublin Local Authorities have carried out a feasibility study for biological waste, which recommended developing two facilities each with a capacity of up to 45,000 tonnes/ annum of source separated municipal organic waste. This is being implemented by DLRCC (at Ballyogan) and by FCC (at Kilshane). The Ballyogan facility is expected to become available in 2006, with Kilshane in 2007/ 2008, should the necessary licensing/ planning approval be forth coming.

- There are a number of facilities in the Region dealing with C&D waste; these include 3No. permitted facilities for the recycling of C&D wastes, 9No. landfill facilities and 9No. waste transfer stations.

The draft Plan does concede that while recycling of waste has improved dramatically over the past 6 years, the Region is still a long way from reaching it's recycling and recovery goals. Waste growth is set to continue with increases in population and economic activity, so the infrastructure required must also expand to cope with these pressures. A significant deficit exists for the composting of biowaste material. Facilities to manage household biowaste are in development by the Local Authorities. Facilities to manage commercial/ industrial biowaste are being advanced by the private sector. There is a reasonable level of capacity available for the transfer of waste but further expansion/ upgrading including new facilities is likely to maximise the efficiency of waste transfer. The Waste to Energy/Thermal Treatment Facility is urgently required to meet Plan targets and EU Landfill Directive targets. This is being advanced by the Local Authorities through a PPP contract.

1.3.2.2 Future Waste Projections

The draft WMP predicts that the number of households in the Dublin Region will exceed 500,000 by 2014 and the level of waste produced by each household will level off at 1.25 tonnes per household by the year 2006. This will result in the project increase of household waste arisings from 492,187tonnes in 2005 to 651,513tonnes in 2020. Commercial/industrial waste arisings are also predicted to rise from 701,328tonnes in 2005 to 922,616tonnes in 2020. The draft Plan does not give a projection for the generation of C&D waste but it states that there is some indication for an evening off or contraction in construction activity in the years ahead, which may translate into a reduction in the amount of C&D waste being produced. Factors that will influence the generation of C&D waste include the National Spatial Strategy, prefabricated construction, underground parking and higher waste management costs

1.3.2.3 Waste Targets, Policies & Objectives

The original targets of the Dublin Waste Strategy are deemed valid future targets for the Dublin Region, although the original time-frame for meeting the targets was over-ambitious. The key milestone for meeting these targets should be once the Waste to Energy plant is operational. It is suggested that the target date be extended to 2010. Table 1.3.2 details the waste stream targets for 2013.

Table 1.3.2 Waste Stream Targets for 2013

Source	Recycling	Waste to Energy	Landfill
Households	60%	39%	1%
Commerce/Industry	41%	37%	22%
Construction/Demolition	82%	0%	18%
Total	**59%**	**25%**	**16%**

Some of the policies and objectives given in the draft WMP include:

- The Dublin Local Authorities propose to introduce an additional household waste collection ('brown bin') for organic waste generated by households. This will be introduced on a phased basis once biological treatment capacity is established. The household waste collection system (including the grey/black bin) may switch to an alternating fortnightly collection for household waste at this time.

- A source separated organic collection be introduced for commercial organic waste. For organic waste, the programme will focus on sectors with greater generation of organic waste, namely hotels, restaurants, canteens, larger institutions and companies working with food. Treatment capacity is currently under development, therefore regulation of the dry recyclables will occur first. The intervening period will be used to discuss the practicalities

- A biological treatment plant will be located in the Ballyogan Recycling Park, with a capacity of up to 45,000 tonnes/annum. Statutory approval (planning and waste licence) is already in place for a composting facility. Procurement of an operator for the facility is underway. The facility is being developed by Dun Laoghaire Rathdown County Council on behalf of the four Local Authorities.

- A second biological treatment facility will be developed to serve the northern catchment, again with a capacity of up to 45,000 tonnes/annum. A preferred location at Kilshane has been selected, as part of an integrated waste management facility. Procurement and preparation of an EIS for the proposed development are commencing in 2005. Fingal County Council is developing this facility on behalf of the four Local Authorities.

- Fingal County Council propose to develop a waste transfer/compaction facility (65,000 tonnes/annum) at Kilshane Cross (alongside proposed biological treatment, C&D waste recycling, and sludge drying) in order to accept municipal waste for onward transfer to energy recovery or disposal facilities.

- Develop a Waste to Energy (Incineration) plant at the preferred location on Poolbeg Peninsula, Dublin 4. This will have a capacity of approximately 400,000 to 600,000 tonnes/annum, and will treat non-hazardous municipal waste.

- Achieve more sustainable waste management practices in the construction and demolition sector. Provision of additional C&D Waste Recycling Facilities in the Region for recycling of C&D waste – including separation of materials, and crushing/ grading of rubble for re-use as aggregate. Fingal County Council propose to establish a C&D waste recycling facility at Kilshane Cross as part of an integrated recycling facility.

1.3.3 (Draft) National Strategy for Biodegradable Waste

The draft National Strategy for Biodegradable Waste (DoEHLG, April 2004) provides a robust framework for meeting the ambitious landfill diversion targets for biodegradable waste. The fundamental principles of the Strategy are summarised as follows:

- Employing a combination of instruments to promote waste reduction- including awareness measures, economic incentives and regulatory measures;
- Continuing to develop an integrated waste system building on proposals and policies of regional waste plans and strengthening these where necessary;
- Striving on source separation of biodegradable wastes by the producer, followed by separate collections by the collector, enabling high quality recyclables to be recovered;
- Striving to maximise the recovery of materials firstly, and energy secondly as a sustainable means of treating waste, rather than diverting from landfill to other forms of disposal;
- Developing partnerships with other sectors (industry, agriculture, fisheries, etc.) enabling cost effective treatment systems to be established suited to Irish conditions.

Food and garden waste accounts for 40% of the total BMW produced. Separate collection of this organic waste will enable approx. 22 % of BMW to be diverted from landfill or 424,788 tonnes by 2009. The Strategy proposes targets for households for 2009, to include:

- Minimum of 30% separate collection and biological treatment of food waste (from households not involved in home composting) by 2009
- 7 % home composting of garden waste and food waste of vegetable origin – targeted in areas where separate collection not in place
- 88% biological treatment of garden waste – 40% via home composting and 48% via green waste

composting by 2009.

- Separate collection and biological treatment of 40% of food waste from commerce.

The Strategy also proposes the following performance indicators for monitoring the Strategy implementation:

Indicator	Target 2006	Target 2009	Target 2016
Biological Treatment-Tonnage Treated	164,270	351,539	652,908

Local authorities will need to take account of the implications of this Strategy in the context of updating their waste management plans, particularly in terms of the further roll-out of segregated collection of household dry recyclables and organic wastes, together with the provision of associated material recovery/biological treatment infrastructure. The proposed biological treatment facility is in line with the requirements of the draft Strategy, which states that:

'*...in order to meet the targets of the plans, a several fold increase in the recycling capacity and biological treatment capacity is required*'.

The draft Strategy is designed to secure the diversion of biodegradable municipal waste from landfill, the key benefits of which will be to reduce the methane emissions from landfills and to encourage the separate collection of biodegradable waste. The proposed facility is strategically located within the North Dublin Region for several major sources of household and commercial organic waste. Reference is made within the draft Strategy to a study entitled 'Waste Management Options and Climate Change' which was published by the European Commission in December 2001. The overall context of this study concluded that emissions of greenhouse gas associated with transportation of waste residues and recovered materials are small in comparison with the much larger greenhouse gas fluxes in the system, such as those related to avoided energy/ materials, landfill gas emissions and carbon sequestration.

1.3.4 EU Directives and other International Agreements

The most important EU Directives influencing waste management planning and in particular the treatment of organic waste are summarised in the following sections. It should be noted that there are a large number of such legislative tools – however, only the most relevant are summarised in this section.

- *Council Directive 91/156/EEC on Waste*, which states that permits are required by all establishments carrying out storage, treatment, recovery, and/or disposal of waste. Compliance with the Waste Management Hierarchy as laid out in the EU Fifth Action Programme is also a requirement of this Directive.
- *Council Directive 99/31/EC on the Landfill of Waste* (adopted on the 26th of April 1999) – this sets a number of stringent standards and targets for landfill operators. These include the following:
    - *A staged reduction in the quantities of biodegradable waste entering landfills. The first target which must be met relates to the year 2005, when the quantity of biodegradable municipal waste going to landfills must be reduced to 75% of the total amount (by weight) produced in 1995.* This target and subsequent targets will be met by the provision of the waste recovery facilities and home composting schemes;
    - *Only waste that has been subject to treatment may be landfilled* (i.e. biodegradable waste should be either source separated or mechanically separated prior to import to a landfill facility). Waste acceptance procedures will be put in place at the proposed waste management facilities to ensure compliance with these requirements;
    - *Liquid waste can no longer be accepted at landfills.* These wastes will not be accepted at the proposed site and strict waste acceptance procedures will be put in place to ensure compliance

Many of the requirements contained in the Landfill Directive have already been introduced in Ireland. In particular the Waste Management Act, 1996 designates the Environmental Protection Agency as the sole licensing authority for landfills. The Waste Management (Licensing) Regulations, S.I. No. 133 of 1997, as amended by the Waste Management (Licensing) (Amendment) Regulations S.I. No. 162 of 1998 provide for the commencement and operation of the system of licensing by the Agency of waste disposal activities. Both the 1997 and 1998 Regulations were revoked and replaced by the Waste Management (Licensing) Regulations 2000, S.I. No. 185 of 2000.

The Waste Management Licensing Regulations specify the classes of activity that require licensing by the EPA and prescribe dates for the submission of licences for existing facilities. In particular, a waste licence application for all new waste treatment sites must be submitted to the EPA for their consideration.

The 2000 Regulations have been amended by the Waste Management (Licensing) (Amendment) Regulations 2002, S.I. No. 336 of 2002 and the European Communities (Amendment of Waste Management (Licensing) Regulations 2000) Regulations 2002, S.I. No. 337 of 2002, primarily for the purpose of giving legal effect to certain requirements of Council Directive 1999/31/EC on the landfill of waste. The amendments provide for the classification of landfill facilities by the EPA, prohibit the acceptance or disposal in landfill facilities of specified wastes, and provide that only specified wastes

may be accepted for disposal in different classes of landfill.

The 1997 Kyoto Protocol to the UNFCCC set legally binding targets for developed countries for the period 2008-2012. This Protocol includes commitments to a reduction of hydrofluorocarbon (HFC), perfluorocarbon (PFC) and sulphur hexafluoride (SF6) gases, in addition to the three gases covered under the 1992 UNFCCCC agreement (i.e. Carbon Dioxide-CO2, Methane-CH4 and Nitrogen Dioxide-NO2). Under the Kyoto Protocol, the EU agreed to reduce its emissions of greenhouse gases by 8% below 1990 levels by the period 2008-20012, which increases to 13% when the provisions of the internal EU burden sharing arrangements are accounted for. It is anticipated that Ireland will actually increase Carbon Dioxide emissions by approximately 25%.

The requirement to reduce greenhouse gas emissions is one of the primary factors underlying the recent upsurge in European interest in anaerobic digestion technology. Anaerobic digestion of single or combined organic wastes provide a mechanism for the production of methane from biomass, thereby generating a renewable form of energy and resulting in a net reduction in carbon dioxide emissions.

1.3.4.1 Recent EU Developments on Biowaste

EU Working Document on Biowaste

At present, there is no EU or national waste legislation, which specifically applies to the management of biodegradable waste. A Proposed European Community Initiative on the Biological Treatment of Biowaste is currently at the technical discussion stage, and forms the main guidance document for biowaste management in the EU. The current status of the initiative is set out in Working Paper of 12th February 2001, Ref. DG ENV.A.2/LM/biowaste/2nd draft. No official decision has yet been formally taken on the manner through which the proposed Community Initiative is advanced or the final legislative status of any proposal, but the anticipated timetable may be along the following lines:

- Current consultations with Member States, consumer groups and industry on the biological treatment of biowaste [c. 2002 to 2003];
- Possible European Commission Proposal for a Directive on the biological treatment of biowaste [c. 2004];
- Possible adoption of a Directive by Parliament and Council on the biological treatment of biowaste [c. 2006], and,
- Possible transposition of Directive into national legislation [c. 2008].

The Working Document defines a hierarchy for the preferred biowaste management options: *'An improved management of biowaste in the Community should encourage, in this order:*

1. The prevention or reduction of biowaste production (e.g. sewage sludge) and its contamination by pollutants;
2. The reuse of biowaste (e.g. cardboard);
3. The recycling of separately collected biowaste into the original material (e.g. paper and cardboard) whenever environmentally justified;
4. The composting or anaerobic digestion of separately collected biowaste, that is not recycled into the original material, with the utilisation of compost or digestate for agricultural benefit or ecological improvement;
5. The mechanical/biological treatment of biowaste; and,
6. The use of biowaste as a source for generating energy.

The Working Document proposes standards for the design and operation of composting and anaerobic digestion facilities, and the quality of end products. These proposed standards have been used as guidance in the design of the proposed biological treatment facility, together with operational experiences gathered from facilities in other European countries.

The deadline for the ratification of the Working Document was 31/12/2004; however, there has been a delay in the decision. In February 2003, the Commission started phase 2 of the Soil Strategy, inviting member states and stakeholders from industries for a one-year elaboration of concrete policy recommendations. Five working groups (Organic Matter, Erosion, Contamination, Monitoring, Research), accompanied by an advisory forum gave their recommendations on the areas of Policy, Research and Monitoring. It is envisaged that the proposed Soil Framework Directive will be a merger of the biowaste and sludge initiatives and the final Directive will include the following three measures:

- The Soil Monitoring Directive;
- The Biowaste/Compost Directive; and
- The Revised Sludge Directive.

The deadline for the Soil Framework Directive has been set for 2005.

EU Regulation on Animal By-Products

The EU Regulation of the European Parliament and of the Council laying down health rules concerning animal by-products not intended for human consumption (Ref.: EC1774/2002 Animal By-Products Directive) exerts considerable influence over the manner in which biowaste is managed in

the future.

The regulation seeks to establish rules and procedures to address the food safety and health issues that could potentially arise from the beneficial re-use of by-products derived from animal waste.

From the perspective of municipal biodegradable waste, it is of particular significance that catering waste and mixtures of material containing catering waste are included within the definition of animal by-products within the regulations. Catering waste is defined as 'all waste food originating in restaurants, catering facilities and kitchens, including central kitchens and household kitchens'.

Catering waste is classified as a Category 3 material, and can therefore be directly transformed in a composting or anaerobic digestion plant. The regulations define one exception to catering waste being a Category 3 material. Article 4(1)(e) states that 'catering waste from means of transport operating internationally' is classed as a Category 1 material. The proposed biological treatment facility at Kilshane Cross does not intend to accept any such Category 1 – catering waste material at their facility.

As per the regulations Article 6(2)(g), Category 3 – catering waste materials shall be (among other options):

- Transformed in a biogas plant or in a composting plant approved in accordance with rules laid down under the procedure referred to in Article 33(2); or pending the adoption of such rules, in accordance with national law.

Where reference is made to Article 33(2), Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The design of the proposed facility will meet the required process standards and will also have the flexibility to incorporate additional European standards should they arise in the future.

1.3.4.2 EU & Irish Legislation Relating to Sewage Sludge

The Sewage Sludge Directive (Council Directive 86/278/EEC).

This Directive seeks to encourage the use of sewage sludge in agriculture and to regulate the use of sludge in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, it prohibits the use of untreated sludge on agricultural land, unless it is injected or incorporated into soil. Treated sludge is defined as having undergone '*biological, chemical or heat treatment long-term*

storage or any other appropriate processes so as significantly to reduce its fermentability and the health hazards resulting from its use'. To provide protection against potential health risks from residual pathogens, sludge must not be applied to soil in which fruit and vegetable crops are grown, or less than ten months before fruit and vegetable crops are to be harvested. Grazing animals must not be allowed access to grassland or forage land less than three weeks after the application of sludge. The Directive also requires that sludge should be used in such a way that account is taken of the nutrient requirements of plants and that the quality of the soil and of the surface and groundwater is not impaired.

The main Irish legislation that gives effect to the Directive is as follows:

- European Communities (Use of Sewage Sludge in Agriculture) Regulations 1991 (S.I. 183/1991);
- Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998 (S.I. 148/1998);
- Waste Management (Use of Sewage Sludge in Agriculture) (Amendment) Regulations, 2001 (S.I. 267/2001).

All of these regulations are for the purposes of giving effect to provisions of the Sludge Directive (Council Directive 86/278/EEC).

The Regulations specify rules for the sampling and analysis of sludges and soils. They set out requirements for the keeping of detailed records of the quantities of sludge produced, the quantities used in agriculture, the composition and properties of the sludge, the type of treatment to be used and the sites where the sludge is used. Limit values for concentrations of heavy metals in sewage sludge intended for agricultural use and in sludge-treated soil are also given.

The Urban Waste Water Treatment Directive (Council Directive 91/217/EEC)

This directive sets out requirements for the provision of collection systems and wastewater treatment. It also set out the following deadlines for secondary treatment of wastewaters coming from agglomerations:

- At the latest by the 31st December 2000 for agglomerations of more than 15,000 p.e. (population equivalent)[1];

[1] Population equivalent (p.e.) is the unit of measure used to describe the size of a wastewater discharge. Population equivalent is the biodegradable load (matter) in wastewater having a 5-day biochemical oxygen demand (BOD) of 60g of oxygen per day. Population equivalent doesn't necessarily reflect the actual population of a community. BOD is a widely used measure of 'pollution potential'- BOD is a measure of oxygen use, or demand, by bacteria breaking down the biodegradable load in sewage treatment plants or environmental waters. BOD is the basis for deriving the Population Equivalent of a catchment of the sewage works.

- At the latest by the 31st December 2005 for agglomerations between 10,000 and 15,000 p.e.;
- At the latest by the 31st December 2005 for agglomerations of between 2000 and 10000 p.e. discharging to fresh water and estuaries.

The Directive banned the marine disposal of wastewater sludge from the 31 December 1998 and encourages the use of wastewater sludge, where appropriate, and recommends that disposal of wastewater sludge be minimised where possible. There are more stringent provisions for agglomerations discharging into sensitive areas such as fresh waters and estuaries. The progressive implementation of the Urban Waste Water Directive in all Member States is increasing the quantities of sewage sludge requiring treatment and disposal. This increase is mainly due to the practical implementation of the Directive as well as the slow but constant rise in the number of households connected to sewers and the increase in the level of treatment (up to tertiary treatment with removal of nutrients in some Member States).

The Urban Waste Water Treatment Regulations, 2001 (S.I. No.254 of 2001) gave effect to the Directive.

EU Working Document on Sludge

An EU Working Document on Sludge, currently in its third draft, deals with all aspects of sludge management. The main headings covered in the draft document include:

- *Definitions*: definitions for sewage sludge, septic tank sludge and industrial sludges;
- *Use of Sludge on Land*: detailing the appropriate uses of sludge on land
- *Limit Values*: detailing provisions on concentrations limit values for heavy metals and organic compounds in both sludges and soils;
- *Obligation for Treatment*: measures to reduce the likelihood of spreading pathogens into the environment and to build up consumers' confidence
- *Conditions for use of Land*: detailing appropriate conditions for the application of sludge to land, the type of crops that can be grown on such land and harvest time for such crops;
- *Producer Responsibilities and Certification*: detailing provisions on sludge producer responsibility and certification;
- *Information Requirements*: details the information that the producer of the sludge should supply to the receiver;
- *Codes of Practice*: proposes to set up codes of good practice for the use of sludge in the different outlets;

- *Prevention of Pollution*: proposes the setting up of a global strategy to ensure the long term availability for the beneficial use of sludge;

The draft working document also lists appropriate sludge treatment processes, limit values for concentrations of heavy metals in soil, limit values for concentrations of heavy metals, organic compounds and dioxins in sludge for use on land, sampling frequencies, and analysis and sampling methods.

1.4 The Proposed Development

It is proposed to develop a Recycling Park at Kilshane Cross, which will consist a number of waste management facilities in the one site. The following are the facilities to be included in the Park:

- A Construction and Demolition Waste Recovery Facility processing 75,000 tonnes per annum (tpa);
- A Biological Waste Treatment Facility treating up to 45,000tpa of segregated domestic and commercial organic waste;
- A Waste Transfer Facility processing 65,000tpa of municipal solid waste; and
- A Sludge Hub Centre treating up to 26,511tpa of de-watered sludge cake from wastewater treatment facilities in County Fingal.

Each of the above facilities is described in the following sections.

1.4.1 The Construction & Demolition Waste Recycling Facility

Currently, Barnmore Demolition and Civil Engineering Limited, on behalf of Fingal County Council, are operating a Construction and Demolition (C&D) Waste Recycling facility at Balleally Landfill in North County Dublin. C&D waste, sourced from existing Barnmore demolition contracts, is brought to the facility for processing. The plant on-site consists of a crusher, which was purchased by the Council, being used in tandem with a crusher owned by Barnmore. It is understood that Barnmore accepts no C & D waste from third parties for processing. The material is crushed and stockpiled on-site.

It is proposed to move the current operations from Balleally to the proposed Recycling Park at Kilshane Cross. The proposed facility will deal with up to 75,000 tonnes per annum of C&D waste, which will be sourced from existing demolition contracts and from third parties. Drawing No. 1234/01/203 shows the location of the C&D Recycling Facility in the Recycling Park. As can be seen from this drawing, it is proposed to use a central arterial access road to serve the Recycling Park with a separate spur serving the proposed C&D area, which is located on the northern end of the site.

The plant currently in operation at the Ballealy Landfill will be transferred to the Kilshane Cross site. A single dedicated weighbridge, wheelwash, site office and car park will be located at the entrance to the facility. C&D waste entering the Recycling Park will be directed to the northwestern end of the site, where it will be tipped and fed into a crusher system. A front loader will then transfer the processed aggregate to the aggregate stockpile storage area. The stockpile area will consist of a number of piles of segregated materials (i.e. crushed stone, crushed concrete, etc.). The grade of

material recovered will be largely dependent on available market outlets and the processing equipment will have the flexibility to produce a number of grades. In addition, homogenous loads (topsoil, subsoil, bricks, etc.) will be stockpiled without processing. It is envisaged that the stockpiled materials will not be stored on-site for long periods and that materials will be processed dependent on available market outlets.

The recovered material for further recycling (i.e. wood, metals, etc.) will be stored prior to removal off-site by third party recycling companies. There may be an option to send the recovered wood to the biological facility for treatment.

1.4.2 The Biological Treatment Facility

It is proposed to develop the biological treatment facility (BTF) under the PPP process. Fingal County Council will develop the facility in partnership with a private sector supplier under a Design Build Operate (DBO) contract. The BTF will be constructed and operated under a DBO contract for the collection, treatment, temporary storage and marketing of the treated product. The likelihood is that subject to receipt and assessment of tenders the preferred method for biological treatment detailed in the DBO tendering process will be an "in-vessel" treatment system and will be based on either an enclosed composting system (tunnel composting, container composting, continuous flow composting reactors, etc.) or an anaerobic digestion facility. This will facilitate the DBO process, to keep the options open for the type of biological treatment to be utilised in the proposed BTF and to attract a wide range of process suppliers. A full description of the composting technologies to be considered for the BTF for Kilshane Cross is given in Section 3.2.6. The following is a generic description of both a variety of enclosed composting systems and an anaerobic digestion facility.

The proposed development will comprise a BTF for the conversion of a range of organic residues to compost and/or liquid digestate fertiliser. The location of the BTF is shown on Drawing No. 1234/01/203. Generic layouts of a range of enclosed composting processes and anaerobic digestion systems are given in Appendix 2.

The BTF will treat up to 45,000 tonnes of biological waste. The main organic waste streams to be treated include:

- Biodegradable Municipal Waste (BMW) from the separate collection scheme;
- Organic wastes from civic amenity sites, material recovery facilities and waste transfer stations; and

- Commercial organic waste streams;

1.4.2.1 Enclosed Composting Systems

The composting plant will comprise a fully enclosed dedicated warehouse type building with all treatment processes, including acceptance of waste, composting, refinement and storage of final products carried out within the building, which will be under negative pressure. Thus, the facility will, in effect, be an "in-vessel" composting system no matter what technology is eventually chosen. The building will have a height varying from approximately 10 to 13m.

The organic waste coming to the composting facility will be received at the reception area. The incoming waste will be inspected in a dedicated waste inspection area, and if required suspect waste will be transferred to a separate waste quarantine area for removal off-site. After inspection, the waste may require some pre-treatment, which may consist of additional screening or shredding. This may be required in order to insure that the organic waste is the appropriate size for efficient composting, i.e. 8 to 10cm.

After pre-treatment the organic waste is usually mixed with a bulking agent, i.e. woodchips, cardboard, etc. This mixing will ensure that the material for composting will have a proper dry solid content (approx. 40%) and Carbon to Nitrogen (C/N)-ratio (approx.30:1). The "recipe" of the mixed organic material will depend on the composting process to be used. The mixed material is then transferred to the first stage of the composting process. This stage will vary depending on the compost technology chosen.

For a tunnel composting system, the first phase of treatment will involve placing the mixed material into a number composting tunnels. Composting tunnels are usually reinforced concrete boxes, approximately 20-30m long and 5m wide. The tunnels are usually fitted with individual process control systems for both air and water. This means that composting conditions can be separately controlled in each of the tunnels. One compost tunnel is usually filled every day using a front-end industrial loader. The floors of the tunnels consist of aeration channels embedded in the reinforced concrete, which provide for forced aeration (air blown) in the tunnels. Air collection ducts are provided in the roof of each of the tunnels, which connect to an air treatment system. The aeration channels also act as collection ducts for leachate generated during the composting process. Leachate is collected from each tunnel and is re-used to aid the composting process.

For a container composting system, the first phase of treatment involves filling containers with the mixed material. The number of containers depends on the amount of waste being composted. The

containers are usually 8m long x 2.5m wide x 3m high roll-off containers and are connected to an aeration system. A temperature probe is inserted to the side of the vessel to monitor temperature fluctuations during the initial compost phase. Air lines (for aeration of the material) and a leachate collection hose are also connected to each container. The composting vessels are individually connected to a computer controlled aeration system to provide the necessary oxygen for the composting process. Leachate is also collect from each container and is re-used to aid the composting process.

For a hangar compost system, the first phase of treatment involves placing the organic mixture in a number of composting isles. The isles usually measure between 10-15m in width by 50-100m in length by 2-4m in height. The composting aisles are fully enclosed on both sides by reinforced concrete walls and cladding. At the end of each aisle there is a composting aisle enclosure system, which consists of concertina type folding doors, which slide open and closed on rails. These doors are opened during loading, unloading and turning operations. The doors are kept closed during the composting process. An air collection system is installed in the roof above each composting aisles, which collects air for treatment. The composting aisle floor is usually graded and drains into leachate collection sewers. These sewers direct the leachate or composting effluent toward underground effluent collection tanks, fitted with water filters and water scrubbers. Treated water is reused in the composting facility. Excess process water is diverted to on-site effluent collection system.

For a continuous flow composting system, the biowaste flows horizontally or vertically through a reactor while the forced aerated composting process occurs. The most well known type of system is the Dano-drum system, where the biowaste flows through an enclosed rotating drum placed under a slight inclination. Continuous flow composting systems allow adequate control of the process conditions. However, since the retention time in the reactor is relatively short (typically 1-2 days) an extensive post-composting step is required.

The retention period of the first phase of composting can vary between 2-8 weeks, depending on a number of factors, namely:

- The type of organic waste being composted;
- The composting technique being used;
- The frequency of turning required;
- The amount of air being supplied to the compost;
- The temperature; and
- The moisture content of the organic mixture.

The second phase of composting is maturation and is generally standard for all types of composting

techniques. After phase one composting, the pre-mature compost is placed onto an aeration floor, based on a forced aeration system. An air extraction system, consisting of air collection ducts, water scrubber and biofilter are installed to treat the process air and to mitigate against odour emissions. The maturation process can vary from 2-8 week, depending on the composting technique used and the quality of compost required. After the maturation phase the final stage of the process is compost refinement and storage. The matured and stabilised compost is sieved to remove impurities to the extent required by the relevant compost standard. The refined compost product is then brought to an enclosed storage area for temporary storage or bagging, depending on the market outlet.

The composting maturation, refinement and storage areas are separated from the rest of the building to minimise cross contamination between the waste coming into the facility and the mature compost product. All products produced by the facility will meet the quality and composition criteria as set down in the Waste Licence.

The collected air from all parts of the composting process will be treated. The process used to treat the air will depend on the composting process used and may include biofilters, carbon filters, water scrubbers, etc. The air treatment system will be fully enclosed and the treated air will be emitted to outdoors through a stack. Emissions from the stack will be sampled regularly and emission limit values (ELVs) will be set by the Waste License.

1.4.2.2 Anaerobic Digestion Systems

The design and layout of the anaerobic digestion (AD) facility will be based on extensive operational experiences in Europe. The final design and the construction of the AD Unit will be subject to specialist contract. The primary objective of AD facilities is to produce a liquid fertiliser (digested slurry) with beneficial agricultural characteristics, and –as a secondary objective- generate revenues from the sale of electricity produced from biogas.

After registration at the weighbridge, the incoming waste is directed to the AD reception building. The waste is unloaded into a reception tank and is visually inspected by one of the operators. All coarse materials (plastic, wood, stone, etc.) are removed by a separator, in order to prevent damages to the system. Any suspect material is quarantined for removal off-site. The waste is then pumped to a storage tank.

Prior to anaerobic digestion the waste is transported to a sanitation tank. Between the storage tank and the sanitation tank a macerator is placed, which allows for the shredding of coarse particles in the waste, while it is being pumped through to the sanitation tank.

As per the Animal By-Products Directive (EC 1774/2002) sterilisation of the organic material will be achieved in the sanitation tank by heating the material to a core temperature of more than 133C for at least 20 minutes without interruption at a pressure (absolute) of at least 3 bars, produced by saturated steam, (from CHP unit). The heat treatment is applied as the sole process sterilisation phase, to kill off pathogens (bacteria and viruses) and prion proteins). The sanitation tank is operated as a batch process and is completely mixed.

After sanitation, the sanitised organics are pumped to the AD tank. There are a variety of AD processes, as described in Section 1.5.2.1. The type of AD process will be subject to specialist contract. Generally, the temperature in the anaerobic digestion tank is maintained at 35°C (mesophilic conditions). At this temperature, mesophilic microorganisms have their maximum activity, resulting in maximum biodegradation of organic material in minimum process time. Several types of mixing systems are available for the mixing of the slurry in the digestion tank, for example mechanical stirrers, biogas recirculation, or combinations of both. The average retention time of the organics in the AD-tank is approx. 12-30 days.

The digested material (digestate) extracted from the AD tank is slurry, which is low in dry solids (5-10%). The digested material can be marketed as slurry or it can be dewatered to increase the dry solids content, making the product easier to handle. This will depend on the final market outlet.

The biogas produced during the digestion process is primarily composed of methane (CH4 55-60%) and carbon dioxide (CO_2 40-45%), with smaller amounts of hydrogen sulphide (H_2S) and ammonia (NH_3). The biogas is saturated with water and may contain dust particles. Prior to utilisation, the methane should be treated in order to remove water/dust and H_2S. Water is removed by separation of condensed water and is usually done by use of water taps in the gas-pipe. In case the efficiency proves to be insufficient, additional equipment, e.g. demister, cyclone separator or moisture trap, may be required. A number of techniques are available for H_2S-removal from biogas. One of the most suitable techniques for H_2S-removal is air dosing to the reactor. This technique is based on the biological aerobic oxidation of H_2S to elemental sulphur by specialised microorganisms. The removal efficiency of H_2S is 80-90%. The type of biogas treatment used will be subject to specialist contract.

The biogas production fluctuates in time. Production fluctuates over both longer and shorter periods of time. Long period fluctuations, i.e. over days or hours, occur due to changes in loading of the AD-tanks. Short period fluctuations, i.e. over minutes or seconds, are inherent to the biological nature of the process. Short period fluctuations are compensated for by the installation of a biogas buffer in the gas line. This buffer comprises a large flexible gas container with a variable volume, placed in another rigid container.

The biogas can be utilised in a Combined Heat and Power (CHP) unit, in which a gas engine coverts the biogas into electricity and heat at temperatures between 60°C and 500 °C. The heat from the flue gas exhaust, the lubrication oil cooler and the cooling water system can be recovered (as steam and via a heat exchanger) and can be used for sanitation of the incoming waste in the sanitation tank. The CHP unit will have to comply with the emission standards as proposed in the European Community Initiative on the Biological Treatment of Biowaste, as detailed in Section 1.3.2. A flare can be installed adjacent to the biogas buffer for situations in which the biogas cannot be utilised in the CHP-unit. Based on experiences in operational digestion facilities, the flare is in use for less than 5% of the time. The waste license will set ELVs for both the flare and the CHP unit

1.4.3 The Waste Transfer Facility

The Waste Transfer Facility will deal with up to 65,000 tonnes per annum of municipal solid waste collected from the Fingal County Council domestic refuse collection routes. The Fingal County Council refuse collection vehicles (RCVs) will bring the waste to the facility for transfer to large ejector trailers. The filled trailers will then bring the bulked-up waste management to facilities in region.

The optimum size for the Waste Transfer Facility is 2,400m^2, based on projected residual waste for the proposed catchment area. Given the required footprint, the optimum location for the transfer station within the Recycling Park will be adjacent to the southeastern boundary of the site (see Drawing No. 1234/01/203). RCVs will enter the building from the south and will tip the residual waste on to the waste tipping area. Front loaders or grabs will load waste into ejector trailers from the side. The ejector trailers will enter the building from the west of the building to the loading area. These articulated trailers will exit from the east side of the waste transfer building. The advantage of this system is that all of the operations will be carried out indoors, thereby mitigating any impacts on neighbouring residences.

1.4.4 The Sludge Hub Centre

The Sludge Hub Centre (SHC) will treat up to 26,511tonnes (wet) per annum of dewatered sludge cake (approximately 18% dry solids) by thermal drying. In the Sludge Management Plan for Fingal County the preferred procurement route has been identified as Design, Build and Operate (DBO) using the Restricted Procedure, involving a 20-year operating period. The successful tendering contractor will therefore have to submit a design incorporating the best technology currently available that

demonstrates minimal environmental effect during the construction and operation of the facility. At this stage, the detailed specifications of the SHC are not fully known, due to the plan to invite tenders on a DBO basis. The position of the SHC at the Kilshane Cross site and an indicative facility layout are shown in Drawing Nos. 1234/01/203. This encompasses the upper limits of plant design for the range of technologies that are acceptable, and may be proposed, under the tendering system for the DBO contract. The following is a generic description of a SHC for the treatment of municipal sludge.

There are many variants of thermal driers, but all require energy input to release the molecular entrained water. Drying is achieved either by convection drying when hot gas / air is blown through the sludge or by conduction drying whereby the sludge is brought into contact with a heated surface. The different types of drier are discussed in Section 1.5.2.2.

The first step of the sludge drying process is sludge reception. The sludge reception area normally consists of an apron belt feeder or similar, with an integral cake pump, which delivers cake onwards to the drier. The belt feed is covered with a canopy and has an air extractor. The rate of forward feed of the cake feed pump is be variable, but is matched to the capacity of the drier.

The next step is sludge drying. Sludge driers are capable of handling sludge cake of variable consistency. Drier designs that bring the drying medium into contact with the sludge also include the conditions for the handling and treatment of odour emissions. Designs that mix dried product with incoming sludge cake ensure adequate mixing over the range of dewatered cake characteristics to be expected.

After drying, product is cooled and stored in a safe manner in dried product storage silos or equivalent ground bins. Particular care is taken to avoid dusty conditions leading to flashover or other fire risk. The dried product will have to be stored in compliance with the European Communities (Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres) Regulations, 1999 (S.I. No. 83 of 1999). The dried product storage capacity is usually at least equivalent to one weeks production at average throughput rates. A multiple silo system permits dried product to be discharged to a truck or to a conveyor feeding a bagging unit. This system allows for feeding to one unit, while drawing from the other silo.

Dust generated from conveyors, during silo filling, truck filling or bag filling operations is controlled via a dust extraction system in the vicinity of the truck loading bellows and the bag filling nozzle. Conveyor covers at points of product drop, which are ducted to a dust filter, also control dust generation. The dust extract system is usually linked to the dried product handling, storage and transportation system so that dust extraction starts to function as soon as the dried product is actively handled.

Depending on the model of the drier and burner chosen, it is possible to oxidize odorous emissions in the drier by ensuring at least two seconds residence time in the burner at a temperature of not less than 850°C. Other alternatives for odour scrubbing include biological filter or carbon filter. It is proposed to treat the liquor generated during the drying process (condensate) in Ringsend WWTP by pumping it to the North Dublin Interceptor Sewer route, which will join the Dublin sewerage network.

1.5 Alternatives Considered

This section outlines the alternatives to the proposed development examined by Fingal County Council, and presents the main reasons for the selection of the proposed site location and various options for waste processing techniques for each facility. A 'do nothing' scenario is presented in the context of need for expansion of the waste management infrastructure on a regional and local basis.

1.5.1 Alternative Sites

This section outlines the alternatives in relation to the location of the proposed development and details the options for each element of the Recycling Park.

1.5.1.1 Alternative Sites for the Biological Treatment Facility

The *Feasibility Study for Biological Treatment of Waste in the Dublin Region- Main Report* (TES Sept. 1999) split the Dublin Region into two areas for the collection and treatment of organic waste. The south region covering Dún Laoghaire-Rathdown and parts of South Dublin County Council and Dublin City Council functional areas. The north region covers Fingal County Council and the remainder of the South Dublin County Council and Dublin City Council functional areas. The composting facility in the south region was to be sited at Ballogan Landfill. The site for the composting facility for the north region was not decided upon at that stage.

Following on from the Main Report, the *Feasibility Study for Biological Treatment of Waste in the Dublin Region- Identification of Sites* (TES, December 1999) established the centroid for the generation of household organic waste for the north region as being in to the north of the Dublin City Council functional area, i.e. the Whitehall/Glasnevin area. This meant that the composting facility would have to be sited in the Dublin City Council or Fingal County Council functional areas. The exact location of the composting facility depended on a number of factors, including:

- Proximity to centroid of organic waste arisings;
- Compliance with the requisite land use planning & zoning objectives;
- The proposed footprint area of the site;
- Current access to the site; and
- The ownership of the land.

There were no such sites in the Dublin City Council area. The report recommended a Fingal County Council site in Cappoge, which was adjacent to the M50 and the Dunsink landfill site.

The *Feasibility Study for Biological Treatment of Waste in the Dublin Region- Preliminary Site Investigation Report* (TES, June 2000) assessed the suitability of the site to house the composting facility. The site was 15 hectares in size and approximately fifty percent of the site was used as allotments. Part of the report dealt with accessibility to traffic. It was envisaged that traffic would access the site via significant infrastructural upgrades, which were planned to allow ease of access to the proposed National Stadium on the site of the Abbotstown Veterinary Research Laboratory, which is adjacent to the Cappoge site.

As part of the further planning for the National Stadium, it was decided to use part of the 15 hectare Cappoge site as an overflow car park. Subsequent to this the Government shelved the plans for the National Stadium and the proposed infrastructural upgrades did not go ahead. Due to these factors, the Cappoge site became unsuitable for the location of the composting facility. The Kilshane Cross site was not available at this time.

In early 2001, the four Dublin Local Authorities proposed to develop a single dry recyclable waste recycling facility, which would serve the entire Dublin region and that this facility would form part of a municipal recycling facility. The possible location for this recycling facility was the Fingal County Council owned site at Kilshane Cross. Fingal County Council acquired the site in November 2000, which consisted of 15.8 hectares. The proposed recycling facility would consist of:

- Dry Recyclables Recovery Facility: for the acceptance of source-segregated waste from the Dublin region; and
- Site Offices/Equipment Storage/Maintenance Buildings: for administration staff for the above facility.

Oxigen Environmental Ltd. commissioned TES Consulting Engineers to carry out a 'Fatal Flaw' Assessment of the property located at Kilshane Cross. This assessment included an environmental baseline study, an archaeological assessment and a traffic study. The assessment concluded that the Fingal County Council owned site at Kilshane Cross fulfilled all of the required criteria and did not possess any 'fatal flaws', which would preclude it from development as a recycling facility. Subsequently the plan to develop a single dry recyclable waste recovery facility for the whole of the Dublin region was abandoned. The Kilshane Cross site then became the preferred site for the development of the composting facility for the North Dublin region.

1.5.1.2 Alternative Sites for the Sludge Hub Centre

The adopted Sludge Management Plan (SMP) for County Fingal (2002) compared different options for the treatment of non-hazardous sludges generated in the Fingal County Council functional area. The SMP considered a number of elements, including:

- Quantities of non-hazardous sludge arising in County Fingal;
- Existing strategies (and their continuation) for the management of non-hazardous sludges;
- Sludges requiring new management strategies;
- The potential for agricultural use of biosolids; and
- The potential location of sludge hub- and satellite-centres.

The Plan proposed the setting up of a centralised treatment facility (Hub Centre), which would be fed by intermediate transfer stations (Satellite Sites), located in outlying rural wastewater treatment plants. A desktop evaluation by Entec and O'Dwyer of four possible sites owned by Fingal County Council, evaluated the potential for the location of the Sludge Hub Centre (SHC). The sites at Kilshane and Dunsink were identified as preferred options for the SHC. The final choice of location for the SHC was made following an evaluation of the indicative assessment of the potential environmental effects associated with the development for the two sites. The site at Kilshane was chosen as the best option due to its minimal potential for significant adverse environmental effects, site area, its good primary links to the rest of Fingal and it close proximity to the proposed North Dublin Interceptor Sewer route, which provides potential further opportunities to link the liquor discharge from the SHC directly into the Dublin sewer network. Refer to Figure No.1.2 for a map showing the proposed sludge management network

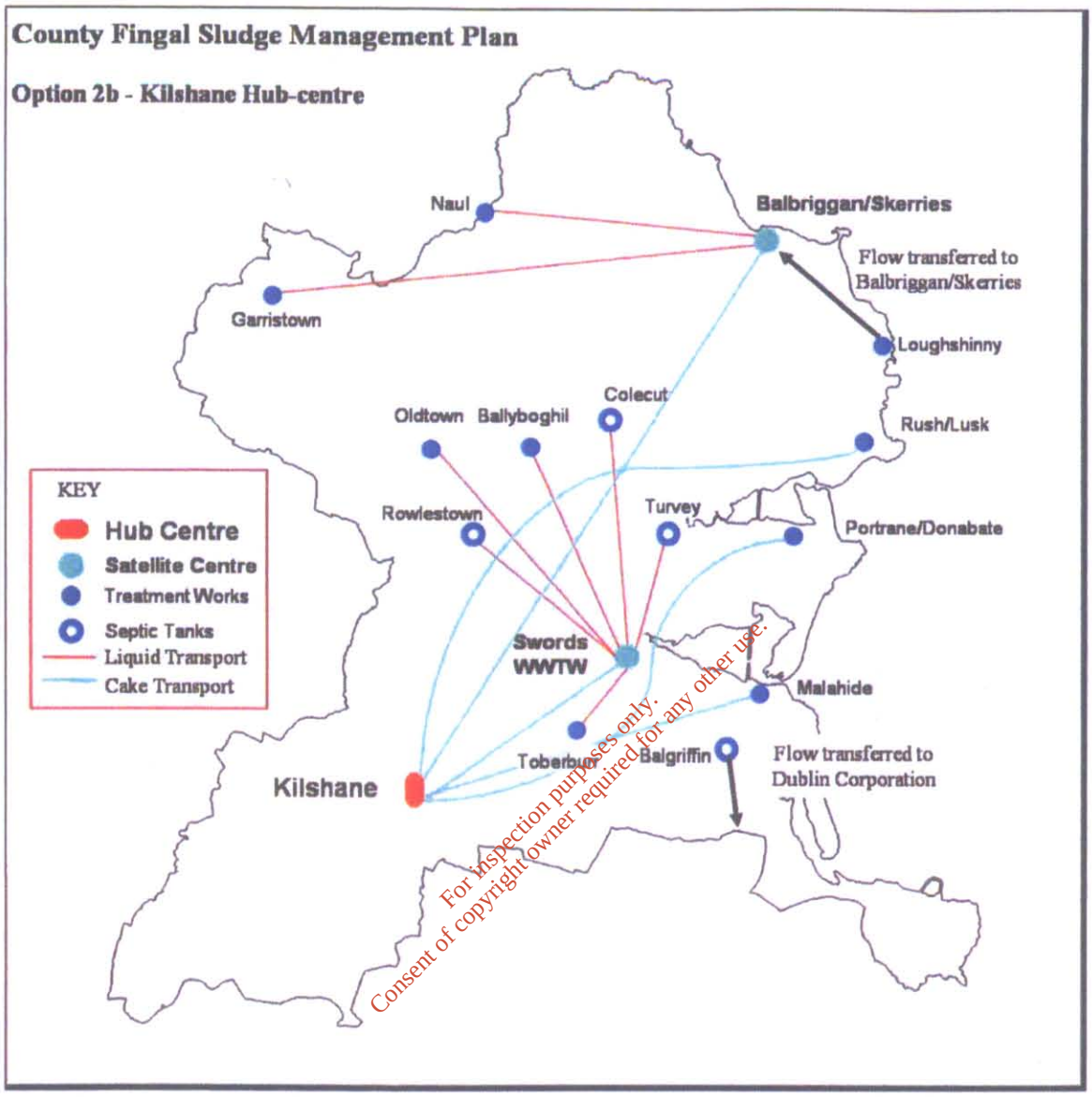

Figure 1.2 Proposed Sludge Management Network

1.5.1.3 Alternative Sites for the C&D Waste Recovery Facility

Fingal County Council currently contract out the recycling of C&D waste to Barnmore Demolition & Civil Engineering Ltd. Barnmore carries out its operations at Ballealy Landfill in north county Dublin. The recycling operations at Ballealy are currently under review and it is proposed to move operations to another site. Fingal County Council are contracted to provide a site for Barnmore to carryout the C&D waste recycling. However, there are few sites that can provide ease of access, space, flexibility and minimal impact on the local environment and community. The site at Kilshane Cross fulfils the siting criteria and has the advantage of being located on the N2 primary road and being close to the M50.

Barnmore has assessed a site in the townland of St. Margaret's. However, this site would not be suitable in the long term due to its proximity to residential properties and the access to the site would be via the regional road network. These roads would not be ideal to accommodate the high volumes of heavy goods vehicles and trucks that would be generated by recycling up to 65,000tonnes of C&D waste per year. It is proposed to temporarily locate the recycling operations to the site in St. Margaret's until planning approval and a license is acquired for the Kilshane Cross site. This period is estimated as approximately 2 years. Barnmore would secure a waste permit and planning permission for the St. Margaret's site to process C &D waste at a reduced tonnage. Operations would be moved to Kilshane Cross as soon as the planning permission and permit would be acquired. The temporary nature and the reduced tonnage at the St. Margaret's site will ensure minimal impact on the environment and the surrounding population.

1.5.1.4 Alternative Sites for the Waste Transfer Facility

The siting of the Waste Transfer Facility (WTF) for the collection, bulking up and transportation of residual waste collected in the Fingal area is dependant on the waste collection system and the site's proximity to population centres. There are currently 5No. distinct waste collection areas in Fingal County, namely:

- Restricted Van Collection Areas,
- Rural Areas;
- Swords;
- Blanchardstown; and
- North County Dublin

Residual domestic waste is collected by a number of Refuse Collection Vehicle (RCV) fleets through out the week. The main collection areas are Blanchardstown, Swords and North County Dublin. The position of a WTF would have to be in the vicinity of the two main population centres of Blanchardstown and Swords. The site would also have to have easy access to the M50, to provide a route to North County Dublin and the rural areas. The optimum size of the WTF to deal with the existing and future waste arisings in the Fingal Area is 2,400m^2. Another factor that may affect the siting of the WTF in the long term is the possibility of treating the collected residual waste at the Municipal Waste to Energy (WTE) plant proposed for Ringsend. Therefore, the location of the WTF would have to be close to the M50 and the N1 and N2 primary road routes. The only Fingal County Council owned site in this specific area that fulfils these siting criteria, as well as having minimal environmental impact is the Kilshane Cross site.

1.5.1.5 Summary

The Kilshane Cross site is the most appropriate location of each of the proposed facilities. There is no other Fingal County Council owned site in the functional area that could accommodate any of the facilities individually. Grouping the facilities in one site allows for economies of scale in relation to transportation, planning, licensing and land costs. The site's location on the N2 provides easy access to the M50, other primary road routes and all parts of the Fingal County Council functional area, as well as the other Dublin Local Authority Areas.

The Kilshane Cross site is close to the centroid of waste generation of both household organic waste for the North Dublin Region and of household residual waste for Fingal County. The site will be close to the proposed North Dublin Interceptor Sewer route, which provides potential further opportunities to link the liquor discharge from the SHC directly into the Dublin sewer network. The site is also appropriately located adjacent to the M50 and the N1 for the long term, when may be possible to treat collected residual waste at the Municipal WTE plant proposed for Ringsend. There are a number of existing large-scale developments in the vicinity of the site, namely the Roadstone Huntstown Quarry, the Viridian Power Plant, Dublin Airport and the new N2; Finglas to Ashbourne Road Scheme, which is currently under construction. The proposed facilities will have minimal impact on the existing local environment and community.

1.5.2 Alternative for Technologies

This section examines the alternatives in relation to the technologies for the treatment of the various types of waste for each element of the Recycling Park.

1.5.2.1 Alternative Technologies for the Biological Treatment Facility

The *Feasibility Study for Biological Treatment of Waste in the Dublin Region- Main Report* (TES Sept. 1999) examined a number of biological treatment technologies that would be suitable for the treatment of domestic and commercial organic waste generated in the Dublin Region. The Report investigated a number of composting techniques, including:

- Static Pile Composting;
- Windrow Composting;
- Hangar Composting
- Tunnel Composting Systems;

- Container Composting Systems; and
- Continuous Flow Composting Reactors, including
    - Vertical Reactors,
    - Horizontal Reactors.

The Report also examined other biological treatments, such as:

- Biological Drying;
- Vermicomposting; and
- Anaerobic Digestion Systems, including:
    - Wet Single-Step,
    - Wet Two-Step,
    - Dry Continuous,
    - Dry Batch,
    - Sequencing Batch.

Following the technology assessment, the Report proposed a number of scenarios that reflect the specific local conditions and biological treatment needs for the Dublin Region. Four different organic waste management scenarios were devised for the Dublin Region, namely:

- Eco-Pods;
- Batch Tunnel Composting;
- Continuous Flow In-vessel Composting; and
- Anaerobic Digestion.

Eco-Pods

Eco-Pods are a low-technology approach to in-vessel composting which has been developed specifically to deal with both household and commercial biowaste. A custom-made machine (the '*CT-5 Mini-Podder*') is used to insert biowaste into large polythene bags (up to 60m long and 1.5m wide) known as '*Eco-Pods*'. Each Pod can hold up to 75 tonnes of material and takes less than two hours to fill. Aeration pipes are inserted into the Pods simultaneously with the waste and subsequently connected to a timed fan. This forced aeration can be modified throughout the composting process to meet process requirements. Vents placed along the sides of the Pods allow excess moisture and carbon dioxide (CO_2) to escape and provide access for temperature measurements. Sanitisation of the material in each sealed Pod is achieved by the attainment of temperatures of approximately 70°C. The compost produced usually requires a short period of maturation either outdoors or in a hangar.

It was envisaged that the Eco-Pod system could be operated at several locations across the Region. In

the North Dublin Region the system would be suited to closed landfills (e.g. Dunsink and Balleally) or at Civic Amenity Sites or Recycling Centres.

Batch Tunnel Composting

Batch Tunnel Composting had previously been chosen as the preferred technology for the South Dublin Region. This composting technique utilises modular containers (the 'tunnels') for composting. A standard composting tunnel is 4-8 meters in width, 20-40 meters long and 4-5 meter high. The number and size of tunnels used at any one facility depends entirely on the required capacity.

Each tunnel is provided with its own forced aeration system and due to the re-circulation of air, the aeration capacity per m^2 of floor space in the tunnels is very high. In addition, because the composting is undertaken in a small enclosed area it is possible to have 'on-line' monitoring of temperature, oxygen levels and humidity, i.e. each of these parameters is measured in real time. This allows, for example, the supply of air and the re-circulation ratio to be adjusted automatically. Such monitoring also allows for the tracking of the system's performance over longer periods of time and such information is useful in optimising system performance.

In a tunnel system, the composting process is usually conducted in two phases. The first phase of the composting process takes place in tunnels; the second phase may take place in either tunnels or in an aerated pile system. The first phase usually takes approximately 1-2 weeks, the second phase 2-4 weeks. Emptying of the tunnels is conducted by a front-end loader.

The excess air from the tunnels is usually treated in a biofilter, followed by a scrubber. The leachate from the composting material is collected in drains in the floor of the tunnel and re-circulated by means of a sprinkler system.

The tunnel composting would be operated at one location in the North Region at an Integrated Recycling Centres.

Continuous Flow In-vessel Composting

Flow reactor processes are usually classified according to the manner in which material passes through them, e.g. vertical flow or horizontal flow reactors.

In vertical composting reactors the biowaste is fed in at the top of the reactor and moves gradually to the bottom, either by plug-flow or via a system of decks. Aeration of vertical flow reactors is either counter-current or with-current. Vertical flow reactors are further defined according to bed conditions

in the reactors. A distinction can be made between agitated and non-agitated bed reactors.

In horizontal reactors organic material, after undergoing mechanical pre-treatment, is fed into a rotating drum where waste is shredded and homogenised, while at the same time the composting process begins. The retention time of the biowaste in the drum is usually just a few hours. The material that leaves the drum is then sieved. Material that passes through the sieve is transported to a second composting stage, most commonly consisting of aerated piles in a hangar, while the material that is retained by the sieve is transported back to the input of the drum for further shredding/composting. The exact dimensions of the drum are determined by the treatment capacity of the plant.

The in-vessel composting system would have a small footprint and could be sited at two separate locations in the North Dublin Region, i.e. one in the west and one in the north.

Anaerobic Digestion

Anaerobic digestion is the biological conversion of the organic fraction of waste, in the absence of oxygen, to 'simple' end products, principally methane and carbon dioxide. The process can either treat wet (10-15% dry solids) or dry (20-40% dry solids) feedstock and the main parameters affecting the anaerobic digestion process include temperature, pH, dry matter content and the retention time.

It is envisaged that the anaerobic digestion facility would be at a single location, in the north or Northwest of the Region. There is an option to include some of the paper and cardboard content of the municipal waste stream in such a facility, in order to potentially increase organic regional recycling rates. However, it should be noted that such an approach would have a significant impact on any waste-to-energy facility in the Region, as the calorific value of paper and card is high. It would, however, comprise a more favourable situation with respect to the Waste Management Hierarchy than waste-to-energy.

It is assumed that a 'dry' system will be utilised, with digestion (at least initially) of source-separated organics only. International experience has indicated that the most successful anaerobic digestion implementation programmes tend to be those that involve co-digestion of biowaste with liquid wastes such as animal slurries or treatment sludges. It is not envisaged that the latter approach would be suitable for the Study Area as a result of the difficulties involved in securing contractual agreements with farmers for agricultural wastes. The latter is important in terms of financing considerations. Similarly, the quantities of animal slurries produced in the North Dublin Region are relatively low and most are currently landspread at little cost to the producer.

The recommendation of the Report was that the preferred scenario for biological treatment for the

Dublin Region was Batch Tunnel Composting, due to its flexibility, modular operation, high controllability, small footprint and improved control over odours and emissions.

In order to facilitate the Design Build Operate (DBO) process, to keep the options open for the type of biological treatment to be utilised in the proposed biological treatment facility and to attract a wide range of process suppliers, a decision on the type of process to be used has not been made at this stage. It is envisage that the biological treatment process will be an indoor facility. The process will in effect be an "in-vessel" treatment system and will be based on either an enclosed composting system (tunnel composting, container composting, continuous flow composting reactors, etc.) or an anaerobic digestion facility.

This EIS outlines the various options for the biological treatment facility and assesses the potential environmental impacts of each system. The worst-case emission scenario is analysed for each environmental parameter and mitigation measures are proposed for the worst-case scenario. The suppliers tendering to construct and operate the proposed facility will have to comply with all conditions and emission limits of the planning permission and the waste license. The design of the proposed facility will also have to comply with both Irish and European legislation (Refer to Section 1.3).

Compost Quality Requirements

Regardless of the type of compost process, the final compost must meet standards in relation to the microbiological and chemical quality. With respect to sanitation, Annex II of the Working Paper on Biowaste requires the following: -

'The composting process shall be carried out in such a way that a thermophilic temperature range, a high level of biological activity under favourable conditions with regard to humidity and nutrients as well as an optimum structure and optimum air conduction are guaranteed over a period of several weeks.'

With respect to temperature in relation to treatment time, the EU Working Paper on Biowaste requires that *'In the course of the composting process the entire quantity of the biowaste shall be mixed and exposed to an appropriate temperature'*. The proposed EU Regulation on Animal By-Products requires sanitation at 70°C for one hour. However, it allows alternatives, i.e. lower temperatures for a longer period of time. The Irish Animal By-Products Guidelines issued in October 2004 allow for lower temperatures once a technology can prove that the required sanitation has been met at given operation temperatures. At the proposed facility a temperature > 55 - 60°C for 3 weeks will be achieved.

The EU Working Paper defines three environmental quality classes for compost, as shown in Table 1.5.1 below.

Table 1.5.1 Class of Compost

Parameter	Class 1[1]	Class 2[1]	Stabilised Biowaste
Cd (mg/kg dm)	0.7	1.5	5
Cr (mg/kg dm)	100	150	600
Cu (mg/kg dm)	100	150	600
Hg (mg/kg dm)	0.5	1	5
Ni (mg/kg dm)	50	75	150
Pb (mg/kg dm)	100	150	500
Zn (mg/kg dm)	200	400	1,500
PCBs (mg/kg dm)	-	-	0.4
PAHs (mg/kg dm)	-	-	3
Impurities > 2 mm	< 0.5%	< 0.5%	< 3%
Gravel and stones > 5 mm	< 5%	< 5%	-

[1] *Normalised to an organic matter content of 30%.*

Stabilised biowaste is defined as *"resulting from the mechanical/biological treatment of unsorted waste or residual municipal waste as well as any other treated biowaste which does not comply with the environmental quality Classes 1 or 2.'*

More specifically, to classify a material as Stabilised Biowaste, the following standard applies: -

'If residual municipal waste undergoes a mechanical/biological treatment prior to landfilling, the achievement of either a Respiration Activity after four days (AT_4) below 10 mg O_2/g dm or a Dynamic Respiration Index below 1,000 mg O_2/ kg VS/h shall deem that the treated residual waste is not any more biodegradable waste in the meaning of Article 2 (m) of Directive 1999/31/EC'.

With respect to use of compost the Working Paper: -

'Member States may authorise the use of stabilised biowaste fulfilling the requirements as a component in artificial soils or in those land applications that are not destined to food and fodder crop production [such as final landfill cover with a view to restoring the landscape, landscape restoration in old and disused quarries and mines, antinoise barriers, road construction, golf courses, ski slopes, football pitches and the likes].'

The quality of the compost depends on the quality of the incoming waste. Once a brown bin collection system has become well established, the level of contamination with the brown bin feedstock will improve. The facility will aim to produce high quality compost which will be inline with regulatory requirements. High quality compost will also provide for more market opportunities for the finished product.

1.5.2.2 Alternative Technologies for the Sludge Hub Centre

The adopted SMP for County Fingal considered a range of treatment and reuse or disposal options for sludge. The investigation of options for the treatment of sludge arisings identified the following processes as options for the final treatment solution:

- Thermal drying and fuel use in industry;
- Thermal drying and agricultural use of product;
- Thermal drying and gasification; or
- Thermal drying and incineration of product.

There are many variants of thermal driers, but all require energy input to release the molecular entrained water. Drying is achieved either by convection drying when hot gas / air is blown through the sludge or by conduction drying whereby the sludge is brought into contact with a heated surface. In the case of convection drying, the gas/air flowing through the drier can be heated directly or indirectly. With direct heating the hot waste gas from the combustion chamber is fed into the drier, while with indirect heating, air is heated via a heat exchanger. With conduction drying, heat is usually provided by either steam or from a hot oil system.

There are various types of thermal driers operating in Europe, including:

- Horizontal drum driers (e.g. rotary driers, paddle driers and thin film driers)
- Vertical tray drier pelletisers
- Conveyor belt driers
- Fluidised bed driers

Other types of driers which meet the dried product criteria and meet the environmental emissions standards may also be provided

Rotary driers consist of a horizontal drum, which rotates around its axis. The sludge to be dried is moved through the drum by internal fittings (paddles / blades) or taken up by the drying gas flowing axially through the drum. In the case of convection driers, gas input temperatures can be as high as

450°C. As Rotary driers should not be used for sewage sludge in the adhesive phase (40-60% dry solids) mechanically dewatered sludge is mixed with dried product (normally under / over sized) to achieve fluidity before it is fed into the drying drum. In a paddle drier, a heated paddle or series of discs rotate in a mass of sludge held in a heated stationary chamber with dried material cascading from the end of the drier.

With a thin film drier, sludge is spread onto the outer heated wall of the drier by a rotor. The drier can be used to dry sludge to over 90% dry solids, but its main advantage is that it can handle the difficult sticky phase between 40 – 60% dry solids without back mixing. A single stage thin film unit is often used in conjunction with a paddle drier to take the sludge from 60% to over 90% dry solids.

In a vertical tray drier, recirculated granules coated with sludge are rolled over heated trays by a slow ploughing movement and transported by gravity from one tray to the next, until they reach the outlet at the bottom of the drier.

With the different types of sludge drier design, many models share a feature of inlet mixing of dewatered sludge with a fraction of the dried product, or perhaps a dust extract return flow to increase the dry solids content of the cake to be dried.

With rotary drums, sludge is dried at temperatures varying between 420 and 660°C within the rotary drum, but sometimes with an inlet temperature at the primary burner itself of over 800 deg C, where with a contact time of the order of 2 seconds, odourous compounds can be fed to be oxidised for odour control. The drum heating design can involve two heating circuits, a primary circuit capable of using multiple fuel sources, and indeed waste heat from a CHP or other motor, and a secondary circuit fed from the primary by heat exchanger. Evaporation of water from the sludge takes much of the heat energy from the hot air, but the temperature of the sludge solids themselves does not rise above 80-85% for odour control and control of overheating of the biosolids.

Belt driers hold the sludge in an extruded form on the belt or slotted plate as drying proceeds. The slotted plate is drawn slowly through the different temperature zones of the drier, which operates at lower temperatures than rotary drum, in the region of 130-140°C. Air loaded with moisture is withdrawn from the drum, condensed, with heat exchange to the inlet sludge, and the condensate is treated in the waste system. Dried air is recirculated, but typically a fraction is withdrawn to hold the overall installation under negative pressure for odour control. This air is passed through an odour scrubber before release to atmosphere.

Atmospheric emissions from such a drying system would be required to comply with TA Luft 1986 standards.

To the extent that this is a DBO Contract, the appointed Contractor will have relative freedom in designing the drying process units that they feel are most appropriate for the project in terms of economic design from both the constructional and operational perspective. Notwithstanding this fact, there are both broad constraints and unit specific constraints that must apply to all designs.

Since the publication of the SMP, it has been decided to build and operate the Sludge Hub Centre (SHC) on the same site as the other waste facilities in the Kilshane Cross Recycling Park. As a result, there are potential synergies available at the proposed Recycling Park, particularly the potential to transport the dried sludge product via the proposed Waste Transfer Station to a Waste to Energy plant in the future. This option will be considered along with other options for the end use of the dried sludge product, i.e. re-use in agriculture or re-use as a fuel in manufacturing.

Since the publication of the SMP, it has become clear that the market place of PPP contractors are not currently prepared to take the technology risk of providing on-site energy recovery plants such as gasification. With the advantage of the above mentioned synergy for off-site energy recovery, it has been decided to proceed with a 'drying only' solution for the Kilshane Cross site.

The worst-case emission scenario is analysed for each environmental parameter and mitigation measures are proposed for the worst-case scenario. The suppliers tendering to construct and operate the proposed thermal drier will have to comply with all conditions and emission limits of the planning permission and the waste license. The design of the proposed facility will also have to comply with both Irish and European legislation (Refer to Section 1.3).

1.5.2.3 Alternative Technologies for the Waste Transfer Facility & the C&D Recycling Facility

The proposed design for the Waste Transfer Facility ensures that all waste off-loading and transferral operations will take place internally, thus minimising environmental impact. Fingal County Council considers that at the Kilshane Cross site open-air waste transferral is not consistent with Best Available Techniques (BAT).

Waste transfer techniques are generally straight forward, with waste being deposited on a tipping floor from RCVs. The waste is then transferred to large trailers, by mechanical grabs or front-end loaders, for transportation off-site. The main variations in the process occur in the transfer method. The waste can be dumped directly into the large trailer via a ramp and an elevated hopper system. This method rules out the requirement for a tipping floor and mechanical grab. Another alternative is waste can be loaded into a hopper from the tipping floor by a mechanical grab and the waste is transferred to the large trailer by a conveyor belt system.

Likewise, the recovery of C&D waste is a fairly straightforward process, with not much variation. Operations are generally performed outdoors with a reception area for waste tipping, a processing area incorporating screens and crushers, and a stockpiling area for the storage of segregated material. The types of crushing unit and screen to be utilised will depend on the type of waste entering the facility and the end-use of the recovered material. Timber shredders and magnetic units can be provided for the treatment of wood wastes and the recovery of metals (i.e. reinforcement bars).

In both cases the worst-case emission scenario is analysed for each environmental parameter and mitigation measures are proposed for the worst-case scenario. The operators of the Waste Transfer Facility and the C&D Waste Recovery Facility will have to comply with all conditions and emission limits of the planning permission and the waste license. The design of the proposed facility will also have to comply with both Irish and European legislation (Refer to Section 1.3).

1.5.3 Do-Nothing Scenario

There is considerable pressure on local authorities throughout the Region, to provide additional facilities both for the recovery and safe disposal of solid waste. The lifespan of landfills in the Region is limited, and requires the development of alternative waste treatment facilities. The proposed facility will provide an environmentally sound recycling process for both organic residues and inert C&D waste for the North Dublin region, as well as treatment of sludge from the Fingal County Council functional area. The "do-nothing" alternative will merely contribute to an ever-looming waste management crisis.

A do-nothing alternative will also result in the continued landfilling of organic waste and C&D waste, which is in contradiction with European and Irish legislation that is geared towards the step-wise reduction of waste being consigned to landfill. Failing to comply with the European Landfill Directive may in future result in financial penalties being imposed upon Ireland.

Biological treatment of biowaste by composting allows the production of hygienic, stabilised and dry compost. Compost has many beneficial attributes including:

- Acts as a soil conditioner
- Supply of organic matter to the soil
- Acts as an Organic fertiliser with slow release of plants nutrients
- Can suppress plant disease

- Carbon Sequestration

High quality compost will be produced at the facility. Market outlets for the product will include replacement of peat derived products used by local authorities and other sectors, use by hobby gardeners and landscapers, in horticulture and maybe land remediation or as landfill cover. The development of a Quality Assurance Scheme or National Compost Standards will also serve to market compost products in the future.

The "do nothing" approach in relation to sewage sludge would mean that the sludge produced at waste water treatment plants (WWTP) throughout County Fingal would have to be either treated on-site at each WWTP, landspread on agricultural land banks or disposed of at licensed landfill sites. None of these options are desirable for environmental and economic reasons. Also, municipal sludge disposal at landfill sites is either prohibited by licence or is about to be prohibited. The National policy on sludge management is to establish regional Sludge Management Plans and develop centralised treatment of sludge and to encourage reuse where possible. The "do nothing" approach would mean that it would not be possible to implement the Sludge Management Plan for Fingal County.

1.6 EIS & Limitations of EIS Process

1.6.1 Legislative Background

Environmental Impact Assessment (EIA) derives from European Communities Directive 85/337/EEC (as amended by Directive 97/11/EC) on the assessment of the effects of certain public and private projects on the environment.

This EIS contains information on the scale and nature of the proposed development, a description of the existing environment, impact assessment of the proposed development and mitigation measures to avoid, reduce and where possible remedy significant adverse effects on the receiving environment.

This Environmental Impact Statement, as part of the EIA process, has been prepared pursuant to the provisions of Part X of the Planning and Development Act, 2000 and the Planning and Development Regulations, 2001 (S.I. No. 600 of 2001) which give effect to the EIA Directives.

The structure and content of the Environmental Impact Statement has regard to the following guidance documents, as published by the Environmental Protection Agency:

- Guidelines on the information to be contained in Environmental Impact Statements (2002).
- Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (1995).

The overall EIS is arranged in four volumes, as follows:

- Volume I: Non Technical Summary
- Volume II: Environmental Impact Statement
- Volume III: Appendices
- Volume IV: Drawings

Volume II of the EIS contains the main text body and is divided into four sections, which are detailed below:

- Section 1: Introduction
- Section 2: The Existing Environment
- Section 3: Description of the Proposed Development
- Section 4: Potential Environmental Impacts and Mitigation Measures

1.6.2 Limitations of EIS Process

At this stage, the detailed engineering specifications of the different elements of the Recycling Park are not fully known. This is due to the fact that the proposed facility will be developed using the Public Private Partnership (PPP) process, with each facility being developed and operated by different private contractors. The exact nature of the contractual arrangements has also to be finalised. The PPP process will require the bidding contractors to submit their preferred designs for consideration.

In the cases where assumptions have had to be made, the EIS has considered the worst-case scenario, and/or has specified design limits on emissions necessary to meet emission limits or designated standards. The specific environmental limits specified by the EPA will be incorporated in into the Contract Documents of the final contract in terms of design envelopes. These design envelopes will clearly define the range of emissions that will be permitted, and each submitted proposal will be examined to ensure strict adherence with the appropriate design envelopes.

1.7 Study Team and Contributors to the EIS

This EIS has been prepared by a team of consultants co-ordinated by TES Consulting Engineers. The relevant inputs of the various members of the Study Team are as follows:

Table 1.7.1 List of Contributors to the EIS

Main Contributor	Contribution
TES Consulting Engineers	Project Direction and Management, Evaluation of sub-consultants reports, Reporting and Production of EIS Document, Design of Waste Transfer Facility, Design of C&D Recycling Facility, Site Design. Preparation of Human Beings/Socio-Economic, Ecology, Soils & Geology, Water, Air/Climate, Noise & Vibration.
Frank Burke & Associates	Traffic and Roads
Brady Shipman Martin Tiros Resources Ltd.	Landscape & Visual Impact
Arch Consultancy	Cultural Assets and Heritage
ALcontrol Geochem Ireland Ltd	Surface Water and Ground Water Analysis
Enterprise Ireland	Dust Analysis
RPS MCOS	Design of Biological Treatment Facility
Entec & O'Dwyer	Design of Sludge Hub Centre

All contributors assessments are given in the main EIS text body of Volume II. Supplementary information and auxiliary data is provided in the Appendices, contained within Volume II. The drawings contained in Volume III relate to the EIS and are referenced throughout the main text body.

1.8 Consultation

The purpose of this section is to provide an overview of the consultation process followed to date in respect of the proposed facility. In accordance with Section 4 of the *Guidelines on the Information to be Contained in Environmental Impact Statements (2002)*, the consultation process consisted of consultation with competent bodies, statutory bodies, interested parties and the public. The primary objective of involving competent bodies, statutory bodies, and interested parties at an early stage is to aid scoping of the EIA.

1.8.1 Statutory Consultation

The following are a list of statutory bodies and non-government organisations (NGOs) that were consulted as part of the scoping exercise for the EIS:

Statutory Bodies	Action
An Bord Pleanála	**Written Correspondence, sent 31/1/05;**
Bord Failte Eireann	**Written Correspondence, sent 31/1/05;**
Bord Gais Eireann	**Written Correspondence, sent 31/1/05, reply 15/2/05;**
Coillte Teoranta	**Written Correspondence, sent 31/1/05;**
Department of Agriculture & Food	**Written Correspondence, sent 31/1/05, reply 18/2/05;**
Department of Arts, Heritage, Gaeltacht & the Islands	**Written Correspondence, sent 31/1/05;**
Development Applications Section, The Department of the Environment, Heritage & Local Government	**Written Correspondence, sent 31/1/05, reply 7/2/05;**
Department of Enterprise, Trade & Employment	**Written Correspondence, sent 31/1/05, reply 2/2/05;**
Department of the Marine & Natural Resources	**Written Correspondence, sent 31/1/05;**
Department of Public Enterprise	**Written Correspondence, sent 31/1/05;**
Dublin Airport Authority	**Written Correspondence, sent 31/0105; reply 15/2/05; Meeting 9/3/05**
Electricity Supply Board	**Written Correspondence, sent 31/1/05, reply 24/2/05;**
Environmental Protection Agency	**Meeting 14/06/04, Written Correspondence, sent 31/1/05, reply 8/2/05;**
Health and Safety Authority	**Written Correspondence, sent 31/1/05;**
Health Service Executive	**Written Correspondence, sent 31/1/05, reply 2/3/05;**
Local Conservation Ranger, National Parks & Wildlife Service	**Written Correspondence, sent 31/1/05;**
Teagasc	**Written Correspondence, sent 31/1/05;**
The Eastern Regional Fisheries Board	**Written Correspondence, sent 31/1/05 & 10/2/05, reply 7/2/05;**
The Irish Aviation Authority	**Written Correspondence, sent 31/1/05 reply 7/2/05;**
The National Roads Authority	**Written Correspondence, sent 31/1/05, reply 22/2/05;**
The Office of Public Works, Engineering Services	**Written Correspondence, sent 31/1/05; reply 9/3/05**

Non-Government Organisations	Action
An Taisce	**Written Correspondence, sent 31/0105;**
BirdWatch Ireland	**Written Correspondence, sent 31/0105;**
Irish Farmers Association	**Written Correspondence, sent 31/0105;**
Irish Wildlife Trust	**Written Correspondence, sent 31/0105, 10/2/05;**
The Heritage Council	**Written Correspondence, sent 31/0105;**
National Museum of Ireland	**Written Correspondence, sent 31/0105;**

Replies from the statutory consultees are given in Appendix 3

1.8.2 Public Consultation

Preliminary consultations involved a door-to-door visit to residences within a 1km radius of the site by members of the Council on the 13/01/05. A map showing the location of the proposed Recycling Park and a letter outlining the proposed development were given to each residence. A public consultation meeting was then held in the "White House" Public House, The Ward, Co. Dublin on the 21/02/05. The meeting was advertised in the local press prior to the meeting and approximately 60No. members of the public attended. An information pack, including the presentations, a location map and a site layout map, was given to the attendees. A list of the attendees was taken on the night and is given in Appendix 3. After the meeting, the Fingal County Council sent a further information letter to the local residences, answering some of the issues raised at the consultation meeting. The letter is also given in Appendix 3.

Local businesses were also included in the consultation process. These businesses included the Huntstown Power Company Ltd., Roadstone Dublin Ltd., Beech Vista Nursery Garden Center and Abby Builders Merchants Ltd.