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environmental management for business

Office of Environmental Enforcement,
South East Region,
Environmental Protection Agency,
P.O. Box 3000,
Johnstown Caste Estate,
Co. Wexford.

9th September 2004

RE: Review of Waste Licence No. 53-2 - *greenstar* Ltd – Fassaroe Depot

Dear Sir/Madam,

I enclose, on behalf of *greenstar* Ltd., an original and 3 no. copies of the Application to Review Waste Licence No. 53-2 and 3 no. copies of the Environmental Impact Statement. I also enclose the signed Declaration and a cheque relating to the fee for a review of a waste licence in accordance with Waste Management (Licensing) Regulations 2004 S.I. No. 395 of 2004 – Second Schedule Part 1 Waste Activity 3.1.

Should you have any questions, please call me.

Yours sincerely,

Jim O' Callaghan

0307204/JOC/PS
Encs.
c.c. Mr. Micheal Geary, *greenstar* Ltd.,

N DECLARATION

Declaration

I/we hereby make application for a licence/revised waste licence, pursuant to the provisions of the Waste Management Act 1996 and Regulations made thereunder.

I/we certify that the information given in this application is truthful, accurate and complete (see note below).

I/we have no objection to the provision by the Agency or local authority of a copy of the application or parts thereof to any person.

Signature:	EJBolger	MD	
Print name:	Eamon Bolger	A DENNISON	
Date:	31/08/2004	2/9/04	
Position in organisation:	Company Secretary	DIRECTOR	
On behalf of (name of organisation):	Greenstar Limited	GREENSTAR LTD.	

Note:

- *in the case of a partnership, all partners should sign the declaration; and,*
- *if the application is signed by an agent/consultant, the proposed licence holder must also sign and date the declaration.*

MD

EJBolger
Company Secretary

Company/local authority stamp or seal:

Note: Applicants are advised that a person who makes a statement in a licence application which is false or misleading is guilty of an offence under s45 of the Waste Management Act 1996. The contravention of this section may lead to a fine or, if convicted on indictment, imprisonment or a fine or both.

REMITTANCE ADVICE

greenstar
setting the standard

ENVIRONMENTAL PROTECTION AGY
HEADQUARTERS
PO BOX 3000
JOHNSTOWN CASTLE ESTATE
CO. WEXFORD

Greenstar Ltd.
6 Ballyogan Business Park
Ballyogan Road
Sandyford
Dublin 18
Phone: 01 294 7900
Fax: 01 294 7988

ACCOUNT CODE: CE0034 DATE: 8/9/2004 PAGE: 1/1

DATE	OUR REF	YOUR REF	DESCRIPTION	AMOUNT
31/8/2004	PI /008023	PO8468		15,000.00
			AMOUNT DUE	15,000.00

€

greenstar
setting the standard

Greenstar Ltd.
6 Ballyogan Business Park
Ballyogan Road
Sandyford
Dublin 18
Phone: 01 294 7900
Fax: 01 294 7988

Bank of Ireland
Kill O' the Grange, Blackrock,
Co. Dublin

90-11-83

Pay to the order of **********
ENVIRONMENTAL PROTECTION AGY

Hundreds of Thousands	Tens of Thousands	Thousands	Hundreds	Tens	Units
Zero	One	Five	Zero	Zero	Zero

Amount of euro in words, cent as in figures

IRELAND

Date 8/9/2004
euro euro euro
€ **15,000.00**

For and on behalf of
Greenstar Ltd.
Aisling Woods
Authorised Signature
Authorised Signature

ENVIRONMENTAL IMPACT STATEMENT

GREENSTAR LTD

FASSAROE, BRAY

CO. WICKLOW

LICENCE NO. 53-2

Prepared For: -

greenstar Ltd.,
Fassaroe,
Bray,
Co. Wicklow.

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
Rutland Street,
Cork.

2nd September 2004

ENVIRONMENTAL IMPACT STATEMENT

GREENSTAR LTD

FASSAROE, BRAY

CO. WICKLOW

LICENCE NO. 53-2

Prepared For: -

greenstar Ltd.,
Fassaroe,
Bray,
Co. Wicklow.

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
Rutland Street,
Cork.

2nd September 2004

1. INTRODUCTION

1.1 Greenstar

greenstar has operated its Fassaroe Depot since its acquisition in 2000. The facility's current licence (Reg. No. 53-2) allows *greenstar* to accept and process on site for recovery and disposal 129,500 tonnes of waste per annum, comprising household, commercial and construction and demolition non hazardous waste.

1.2 Existing Operations

The existing site activities include the transfer of waste and recovery of recyclable wastes. The facility is licensed to accept the following waste: -

- Household (25,000 tonnes),
- Commercial (69,500 tonnes),
- Construction & Demolition (35,000 tonnes),
- Hazardous (2 tonnes).

Household waste and commercial wastes (originating in factories, hotels, pubs and supermarkets) containing a putrescible fraction (e.g. food waste) is transferred off-site for disposal at an off-site landfill, as agreed with the Agency.

Household wastes arising from the kerbside collection and commercial wastes not containing putrescible materials are segregated into uncontaminated recyclable streams e.g. cardboard, bottles, plastic and cans for removal of site to recycling facilities approved by the Agency. Glass bottles which are either segregated off-site or deposited at the civic amenity area are removed off-site for recycling. The non-recyclable/recoverable residue is transferred off-site for disposal to an off-site landfill approved by the Agency.

All construction and demolition (C&D) waste is processed on site to maximise the volume suitable for recovery. Timber and metal are separated out; the wood is shredded on site and along with the metal is removed off-site to approved recovery/recycling facilities approved by the Agency. The residual material is screened in a trommel to remove the fine fraction containing subsoil and topsoil. This material is either used on-site for restoration purposes, or is sold for agricultural and / or horticultural purposes.

The heavy fraction from the trommel containing concrete, brick etc is then passed through a crusher to produce a crushed inert aggregate material. Green waste delivered to the facility is currently stored on site pending transfer to an off-site composting facility.

The only hazardous wastes accepted at the facility are machinery batteries that inadvertently arrive in waste deliveries. Any other materials suspected either to be hazardous or not acceptable under licence conditions (e.g. gas cylinders, sheets of asbestos) are temporarily stored on-site in the waste quarantine area, before removal off-site for treatment/disposal at an appropriate facility.

The licence allows the on-site composting of up to 2000 tonnes of biowaste in an in-vessel biowaste treatment system. However, *greenstar* has not yet introduced this system due to economies of scale.

1.3 Site Layout

The licence allows waste processing to take place inside the existing transfer building as well as out-doors. The out door activities are limited to wood chipping, in-vessel biowaste treatment, green waste segregating and processing of C&D waste and non putrescible commercial and industrial waste. However the licence also requires that the processing of the construction and demolition waste and the commercial and industrial waste be moved indoors following the construction of Phase II of the new transfer building.

There is a civic waste facility which is provided for use by the general public for deposition of household waste. This contains a number of receptacles for the recyclable materials including glass, metals and textiles. The materials collected in these are removed off-site for recovery/recycling.

Landfilling was historically carried out at the facility, however this stopped in 2002 and the current licence requires the landfill area to be reclaimed and restored.

1.4 Proposed Activities

The proposed changes to site activities that will impact on waste processing operations, site infrastructure and restoration works and have the potential to result in environmental impacts include an increase in the annual waste inputs, an alternative biowaste treatment system to be located in a different location, changes to the capping system to be placed over former landfill areas, the discharge of process and sanitary wastewater to the foul sewer and possible changes to operational and waste acceptance hours.

1.4.1 Increases in Waste Inputs

greenstar proposes to increase the volumes of waste accepted at the facility from the current 129,502 to 200,000 tonnes. It is not proposed to change the types of waste accepted. The increase will be *pro rata* for all the waste types, with the exception of hazardous waste, as shown on Table 1.1.

Table 1.1 Proposed Increase in Waste Volumes

Waste Type	Maximum Tonnage Per Annum (Current)	Maximum Tonnage Per Annum (Proposed)*
Household	25,000	38,600
Commercial	69,500	107,358
Construction and Demolition	35,000	54,040
Hazardous (Batteries)	2	2
Total	129,502	200,000

*Subject to Market Conditions

1.4.2 Biowaste Treatment

It is proposed to increase the amount of waste that can be composted from 2,000 tonnes to 10,000 tonnes per annum. This will result in a change in the biowaste treatment system from that currently allowed in the waste licence and will also require the relocation of the biowaste treatment plant to accommodate the increased volumes. The proposed location of the alternative biowaste treatment plant and details of it's design are presented in Section 5.

1.4.3 Capping System

The current licence specifies the capping system that should be installed over the former landfilled areas. This is a prescriptive design and does not take into consideration site specific conditions. *greenstar* proposes a different specification for the capping system, which is based on site conditions and the results of the environmental monitoring programme. Details of the proposed capping system are provided in Section 5.

1.4.4 Process and Sanitary Wastewater

Currently process and sanitary wastewater generated at the facility is either removed off-site for treatment or discharged to an on site septic tank and proprietary wastewater treatment system and percolation area. *greenstar* proposes to discharge all process and sanitary waste water to a new foul sewer currently being installed on an adjoining property. This sewer will connect to the municipal foul sewer.

Following the connection the use of the on-site septic tank will cease. Further information on the changes to the foul water drainage system is provided in Section 5.

Part of the agreement with the adjoining property owner in relation to the sewer connection involves the transfer of ownership of a small portion of the existing facility. While this will result in a change to the licensable area it will have no impact on existing or proposed waste activities.

1.4.5 Operational Hours

greenstar is seeking to have the authority, subject to the Agency's approval, to amend the operational and waste acceptance hours at the facility. This is to facilitate the efficient operation of the facility and meet customer demands in relation to waste collection. Further information is provided in Section 5.

1.4.6 Other Changes

greenstar is also seeking the authority to engage waste collectors and waste treatment/recycling/disposal service providers without the prior approval of the Agency. This will not result in any environmental impact.

2. PLANNING POLICY AND CONTEXT

2.1 Introduction

This Section describes the main planning policy statements and legislation that affects the proposed changes to waste activities and describes how the proposals are consistent with relevant waste management policy objectives.

2.2 National Waste Management Policy

National policy on waste management is based on the Department of the Environment and Local Government's policy statement of September 1998, "Changing Our Ways", in which the Government affirmed its commitment to the European Union (EU) hierarchy of waste management. In order of preference this is: -

Prevention
Minimisation
Reuse
Recycling
Energy Recovery
Disposal

The policy statement was based on, and is supported by, EU legislation that requires the diversion of organic wastes from landfill to alternative waste treatment facilities at increasing rates over the coming years. The EU Landfill Directive 99/31/EC prescribes the following staged reduction in the quantities of biodegradable waste disposed to landfill, based on 1995 figures: -

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

Article 6 of the Directive requires Member States to take measures to ensure that waste must be subject to treatment before being landfilled. Treatment is defined as: -

"the physical, thermal, chemical or biological processes including sorting that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery".

"Changing our Ways" confirms the need to divert biodegradable waste from landfill and sets a target of 65% reduction for such waste consigned to landfill by 2013. The achievement of these targets requires the development of new and **the expansion of existing alternative waste recovery facilities, including composting and other feasible biological treatment facilities.**

The most recent policy statement 'Waste Management – Taking Stock and Moving Forward' confirmed Ireland's national policy approach remaining *'grounded in the concept of integrated waste management, based on the internationally recognised waste hierarchy, designed to achieve, by 2013, the ambitious targets set out in Changing Our Ways'.*

A Draft National Strategy on Biodegradable Waste was published in April 2004, which outlines Government policy in relation to diverting biodegradable wastes from landfill in accordance with the EU Landfill Directive. The policy document states *'For biodegradable waste that must be collected and managed, materials recycling and biological treatment are favoured, since they recover the material for new beneficial uses.'*

2.3 Regional Waste Management Policy

2.3.1 Wicklow Waste Management Plan 2000 - 2004

Regional waste management policy is set out in the Wicklow Waste Management Plan 2000 – 2004, which was adopted on 17th April 2000. The plan acknowledges the waste management infrastructure deficit in Wicklow and the need for increased capacity in order to meet targets set out in the plan. The overall policy outlined in the Plan is to '*move quickly to a 'maximum recycling' scenario, which will meet the wishes of the public and also meet the mandatory targets for recycling set out by government'.*

In relation to recycling it is Council policy to '*provide for additional sorting and baling capacity for recyclable commercial/ industrial waste...it is expected that the private sector will develop this capacity'.*

2.3.2 Draft Wicklow County Development Plan, 2004 - 2010

It is a strategic planning objective of Wicklow County Council (Outlook, 2002) to manage wastes in the County in a sustainable manner having full regard to national and EU Waste Management Policies. Specific steps to ensure that an adequate waste management service in the County includes: -

- Development of a proactive policy to promote competition and choice in the management, collection and disposal of waste:

- Promotion of the principles of the EU Waste Hierarchy among the commercial and domestic sectors-to include reduction through reusable packaging, **composting** etc.

- Promotion of community, business and individual responsibility for managing waste in the County.

2.4 Waste Licence

The current licence takes cognisance of the national and EU waste policy objectives and Condition 11.3 requires *greenstar* to examine waste recovery options and to identify means of contributing to the achievement of the recovery targets set in national and EU waste policies, which shall include the following: -

a) The contribution of the facility to the achievement of the targets for the reduction of biodegradable waste to landfill, as specified in the Landfill Directive.

b) The separation of recyclable material from the waste.

c) The recovery of Construction and Demolition Waste.

d) The recovery of metal waste and white goods.

e) The recovery of commercial waste, including cardboard.

f) Composting of biodegradable or green waste.

g) Inert waste to be used for cover/restoration material at the facility.

The proposed increase in the wastes accepted at the facility for sorting, recovery, recycling and biowaste treatment is consistent with objectives specified in the waste licence and will further reduce the volume of waste going to residual landfill.

2.5 Need for the Development

greenstar has identified market opportunities to significantly increase the quantities of recoverable/recyclable/compostable waste collected from commercial enterprises and households in the facility's catchment. *greenstar's* proposals in relation to increasing the volumes of waste accepted for recovery, recycling and biowaste treatment at the facility, are consistent with the objectives identified in National and Regional waste policies on waste management.

The proposed amendments of site activities which are required to efficiently manage the additional waste inputs will increase the recycling of biodegradable materials and reduce the volume of waste disposed to landfill. This will contribute to meeting the needs identified in national waste policy statements and the objectives of the Wicklow Waste Management Plan 2000-2004. The changes to the current waste activities are also consistent with the Wicklow County Council's strategic planning objectives in relation to waste management.

3. ALTERNATIVES

3.1 Introduction

This Section describes the alternative options to manage the increases waste inputs and expansion of the biowaste treatment process. A 'do nothing' scenario is presented in the context of the need for the enhancement of the waste management infrastructure on a local and regional l level.

3.2 Alternative Locations

The alternative to an increase in the volume of materials accepted and biowaste treatment capacity at the facility would be to establish a new materials recovery and treatment facility. This is not, in the context of *greenstar's* existing and projected customer base, environmentally or commercially the best practical solution, as it would involve the unnecessary duplication of the services already provided by the current facility.

greenstar considers that increasing the waste throughput at the existing facility is the most appropriate to meet market demands and increase diversion of waste from landfill. The facility location is ideal to expand on the services offered to its existing commercial, industrial and local authority customer base.

The facility infrastructure, including the existing buildings and the new transfer building currently being constructed, can readily accommodate the proposed increases in wastes and the associated augmentation of the segregation, recovery and transfer operations. With the exception of the processing of the C&D waste and certain elements of the biowaste treatment, all of the waste activities will be carried out indoors.

The potential for adverse environmental impacts associated with the proposed changes to waste activities will be minimised by the method of site operations, the site location and ground conditions which have been proven to facilitate the implementation of effective mitigation measures.

3.3 Alternative Site Layouts

The only required amendment to the current site layout is the relocation of the biowaste treatment system to an area that can accommodate the increased processing capacity. *greenstar* identified a location in the northern part of the site as being the most suitable in terms of, integration with the existing infrastructure to minimise disruption during construction and operation and distance from potential sensitive receptors.

3.4 Alternative Materials Recovery & Transfer Processes

The existing design will, when the new Transfer Building is completed, ensure that all waste off-loading, segregation, recovery, storage and transfer operations, with the exception of C&D, will take place internally. This is to provide the appropriate operational controls to minimise adverse environmental impacts.

The Agency's draft BAT guidance for Materials Recovery facilities indicates that all waste recovery activities should be housed indoors. However, *greenstar* considers that in the case of processing C&D waste, which is essentially inert, this is not necessary where the site location and method of processing ensure adequate environmental controls can be applied that effectively mitigates off-site impacts.

Alternative waste processes include on-site segregation of mixed waste. However, it is considered that this is not appropriate due to expected changes in the waste collection methods in the region. It is likely that source separation of household waste will be in the short term. It is the intention of *greenstar* to require commercial waste customers to introduce source segregation and, in particular, to divert the putrescible content from the potentially dry recyclable content (paper, plastic, cardboard). Therefore, *greenstar* considers that on-site separation of the mixed waste is not a viable long term process.

3.5 Alternative Biowaste Treatment Processes

The current Waste Licence permits the use of in-vessel biowaste treatment to treat up to 2000 tonnes of waste annually. This system while effective is not designed to treat the projected volumes of 10,000 tonnes. *greenstar* conducted extensive market research to identify a suitable system.

Although the classification of composting systems is arbitrary, in general they fall into four categories: -

- Outdoor systems;
- Hangar systems;

- Continuous flow systems.; and,
- Tunnel and container systems (In-Vessel).

Outdoor Systems

Outdoor systems are generally simple in design and construction. The two main types are the windrow system and the static pile system. In the windrow, the material is placed in rows and turned periodically, usually by mechanical equipment. Oxygen is supplied primarily by natural ventilation. In the static pile system there is no agitation or turning of the material. An air distribution system is provided beneath the composting material to allow either forced or induced aeration.

Process and emission control measures are limited, apart from aerated static pile systems, where the process air is collected and treated. Since operations are directly affected by weather conditions, the biowaste treatment process usually takes several months.

Hangar Systems

Hangar systems comprise a static pile system located indoors with the provision of air control systems and machinery for automatic turning and transport of the waste. The treatment capacity of hangar systems is fixed, since modular enlargement cannot be achieved very easily. However, the operational capacity of the facility is quite flexible as the height and length of the static pile and rate of aeration can be adjusted according to the volume of waste.

Continuous Flow Biowaste Treatment Systems

In continuous flow systems the waste is moved either horizontally or vertically through a reactor which is subject to forced aeration. The system 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-biowaste treatment step is required.

Tunnel and Container Biowaste treatment Systems (In-Vessel Biowaste Ttreatment)

Tunnel and container biowaste treatment systems allow comprehensive process control since the waste is composted in relatively small enclosed tunnels or containers. The process control parameters, e.g. aeration rates, air moisture and oxygen contents, can be regulated by a central process computer. Due to the modular lay-out of the tunnel or container systems, several units can be operated independently, which guarantees greater flexibility in treating different organic waste streams independently at the same time.

3.5.1 *Preferred Technology*

The selected system comprises two primary components, an in-vessel batch reactor for high-rate biological transformation and a vacuum aerated static pile (ASP) system for subsequent curing and maturation. This is a variation of the system approved under the current licence.

Both systems combine effectively to produce a fully recycled product within an 8 - 10 week time-frame while maximising control over environmental emissions and ensuring the compost quality specified in the licence is achieved.

Furthermore recent EU animal by-product (ABP) Regulations specify treatment requirements for food waste containing meat (EC, 2002). The system design complies with the requirements of the regulations and with the best practice for the treatment of catering waste as recommended DEFRA in the UK (Gale, 2002) and the British Standards Institution (BSI) composting protocol PAS 100 (BSI, 2003). This includes: -

(a) An enclosed tipping area for incoming food waste (Reception Building).

(b) Intensive feed-stock blending to ensure subsequent heating.

(c) In-vessel aerobic transformation for the first 14 days within an enclosed batch reactor which cannot be by-passed.

(d) Continuous electronic monitoring of temperature against time during the in-vessel phase.

(e) Bio-filtration of exhaust air from the batch reactors.

(f) The 14 day batch cycle ensures pasteurisation, odour control and the elimination of vector attraction in the subsequent stages.

(g) A subsequent vacuum aerated static pile phase to act as a second barrier to ensure pathogen kill. The curing phase consists of six weeks of aeration with at least one pile turn to ensure the generation of a stable product.

(h) Bio-filtration of exhaust air from the aerated piles.

(i) A time/temperature protocol of 60 °C for two days in each of the two phases giving a total of four days at and 60 °C. The system can however be adjusted to achieve the 70°C for one hour set point if necessary.

To date, there have been similar systems installed at three facilities in Ballinasloe, Dungarvan and Waterford City.

3.6 "Do Nothing" Scenario

The primary objective of the proposed changes to the waste activities is to increase waste recovery and treatment rates and further reduce the volumes of residual waste disposed to landfill. The proposed changes will provide an environmentally sound recycling process for inorganic wastes and treatment for organic materials. A do-nothing alternative will result in ongoing landfilling of these wastes, which is in contrary to national and local waste policy objectives.

In the event that the biowaste treatment facility is not developed the on-going deficit in the waste management infrastructure may delay the implementation of regional and local waste policy objectives in relation to minimising the volumes of treated waste disposed to residual landfill.

4. FACILITY DESCRIPTION

4.1 Introduction

This Section presents an overview of the facility and the surrounding area. More detailed descriptions of the various aspects of the site (e.g. site operation, climate, geology, surface water drainage, landscape etc.) are presented in the following Sections.

4.2 Facility Location

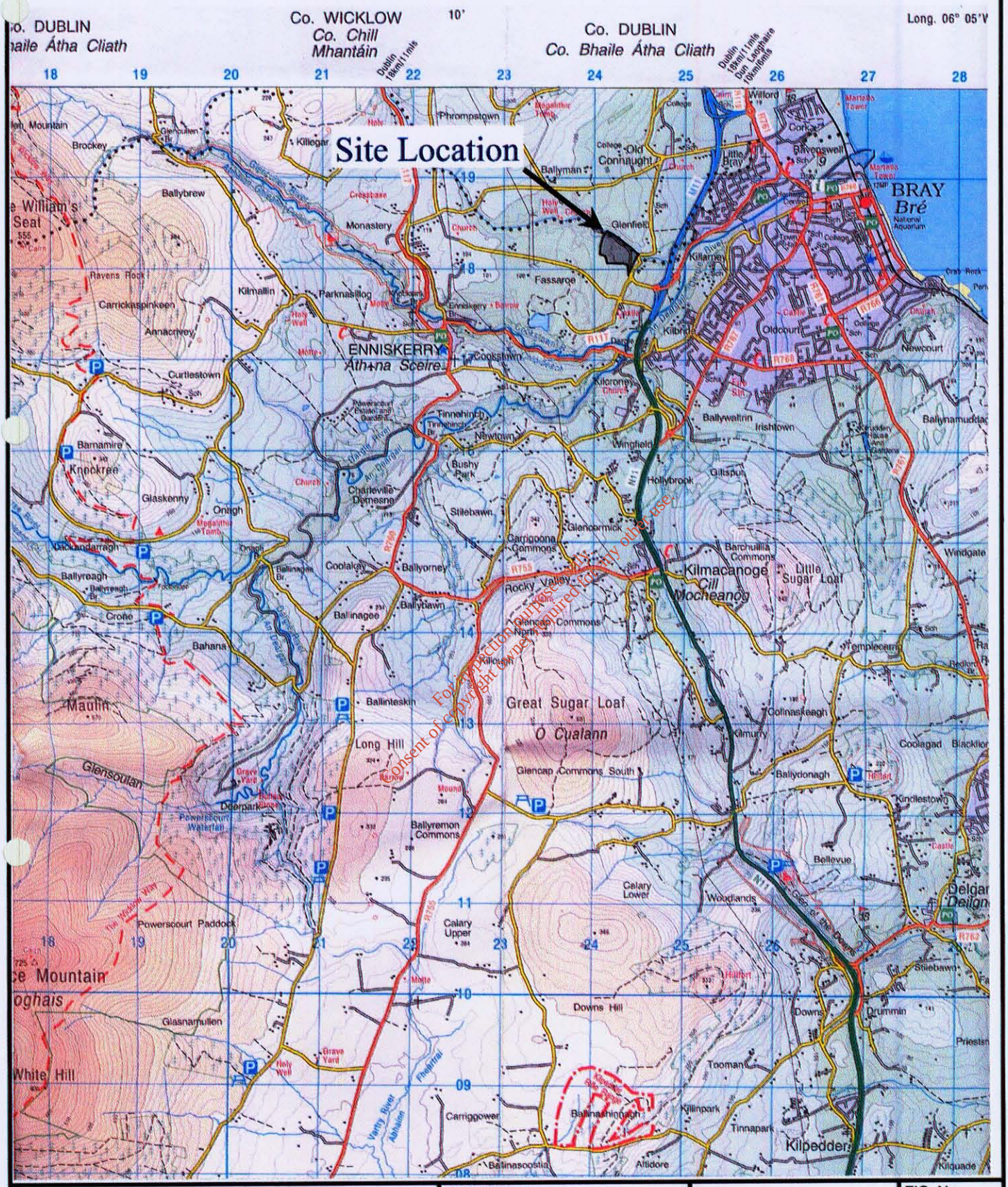
The facility is located at Fassaroe Lane, Bray, Co. Wicklow at National Grid Reference E3242, N2179, approximately 350 m west of the M11 motorway that links north Wicklow with Dublin City (Figure 4.1). The facility is in the townland of Fassaroe approximately 3 km west of Bray town centre and 2 km north east of Enniskerry village.

The site occupies 7.7 hectares of what was originally a sand and gravel pit. Much of the pit has been partially backfilled with inert materials. A number of buildings have been constructed and parking and hardstanding areas provided to facilitate waste handling and transfer operations.

4.3 Site History

Waste has been deposited at the site since 1947, however prior to 1995 records of the waste inputs were not maintained. In August 1998, the former owners of the site, Noble Waste Disposal Ltd applied to the Agency for a Waste Licence to operate the site as a waste recovery and transfer station and an inert landfill. The Agency issued a licence for these activities on 22nd December 1999 (Waste Licence Reg. No. 53-1).

The facility accepted non-hazardous commercial and industrial waste, domestic waste and construction and demolition waste. Celtic Waste Limited (now trading as *greenstar* Materials Recovery Ltd) acquired Noble Waste, including the facility, in November 2000. Upon acquiring the facility greenstar ceased landfilling activities and waste has not been landfilled on-site since the 27th November 2000.



O' Callaghan Moran & Associates.
Granary House, Rutland Street,
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Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

CLIENT: greenstar — setting the standard

TITLE: Site Location Map

Details

O.S. Licence Agreement Number AR 0038702

Ordnance Survey Ireland. Government of Ireland.

FIG. No 4.1

Scale: NTS

Rev.: A

On 3rd April 2003 the Agency granted a revised Waste Licence for the facility (Waste Licence Reg. No. 53-2). The revised licence allows the use of inert construction and demolition waste in the reclamation and restoration of the partially infilled areas of the site. The licence also allows trial composting of biodegradable waste and green wastes limited to 2,000 tonnes per year and increased the volume of wastes that can be accepted at the facility from 105,000 tonnes to 129,500 tonnes per annum.

There have been a number of environmental incidents at the facility since the issue of the original Waste Licence, all of which have been reported to the Agency. The significance of these incidents was assessed in the original Environmental Liability Risk Assessment (ELRA), which was submitted to the Agency in August 2001. The ELRA concluded that none of these incidents had resulted in significant environmental pollution. A revised ELRA, submitted to the Agency in September 2003, further concluded that there were no long-term liabilities associated with site activities and that future liabilities were confined to emergency situations such as oil spills and fire.

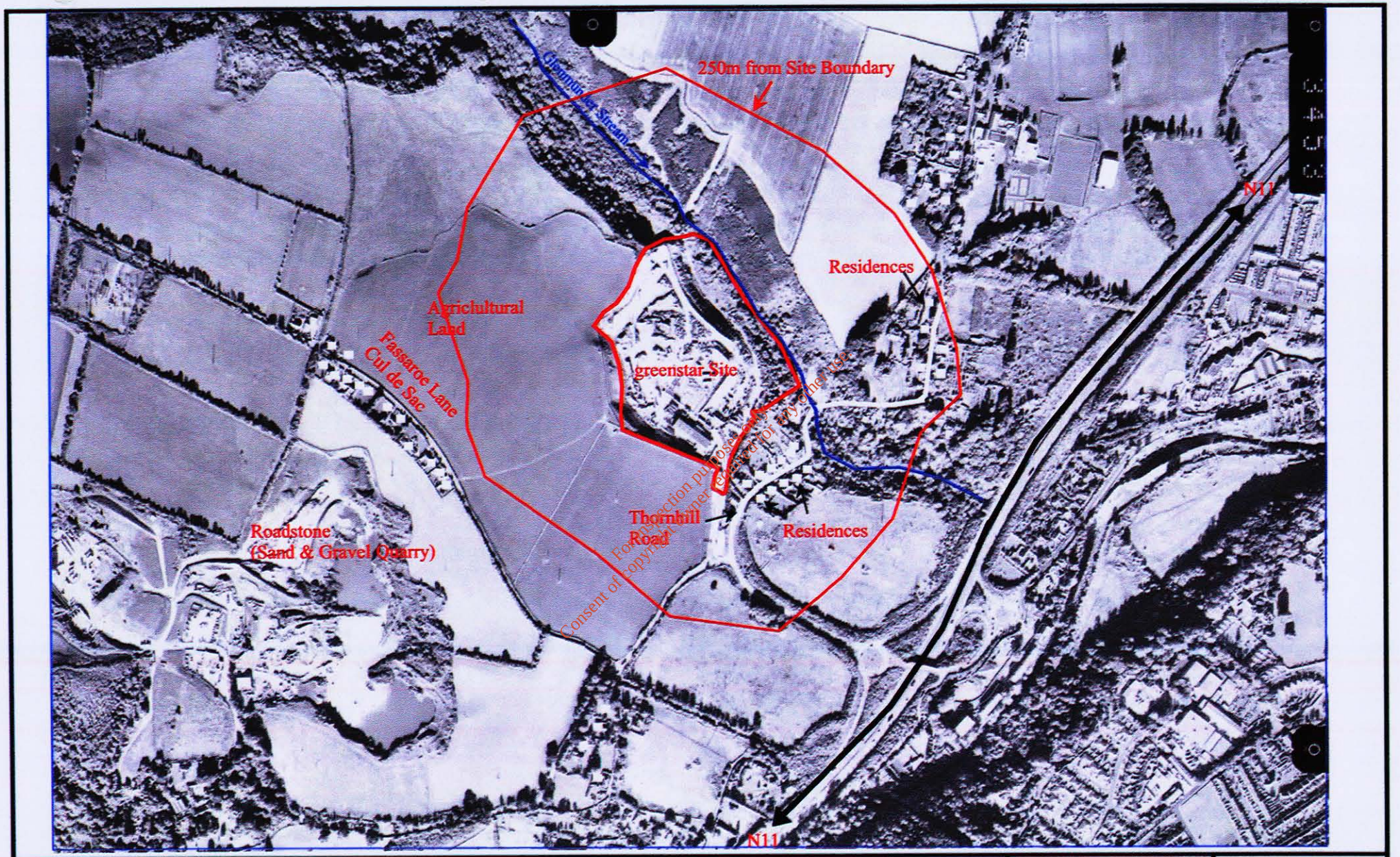
4.4 Topography & Surrounding Land Use

The site is situated at an Ordnance Datum (OD) level of between 109 and 96 metres (m). The topography slopes to the north east towards the Glenmunder River, which runs along the north eastern boundary of the site.

The ground to the north of the site slopes steeply to the valley through which the Glenmunder River runs and then rises sharply. The area to the immediate north, east and west although zoned for commercial use has not yet been developed. Much of this area is covered in trees and bushes. The immediate areas to the west and south are under crop and the ground slopes very gently to the south east. A public road forms part of the eastern boundary, beyond which the land slopes to the east.

The land uses in the surrounding area consist of a mixture of agricultural, quarrying, commercial and residential use. The nearest private residences are located along the county road to the south east of the site. There are approximately 17 residences within 250 m of the site as shown on Figure 4.2, with the closest being approximately 20 m from the south eastern boundary. All other sides are surrounded by either scrub or agricultural land. There is a sand and gravel quarry approximately 400 m to the south west of the site operated by Roadstone which is now mainly used as a brick and block depot.

The roadway leading to the facility (Fassaroe Lane) is currently being realigned and upgraded to allow for third party commercial development of land adjacent the southern boundary. The works include a widening of the roadway leading to the site and the construction of a new roundabout close to the facility entrance. This work will involve land take of a small section of the existing licensed area at the current site entrance and the relocation of the site entrance (Ref. Section 5.6).



O'Callaghan Moran & Associates
Granary House, Rutland Street
Cork Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

Client: greenstar

Title: Surrounding Landuse

Details: O.S Licence Agreement Number AR 0038702

Ordance Survey Ireland.
Government of Ireland

Figure Number: 4.2

Scale: NTS

5. PROJECT DESCRIPTION

5.1 Introduction

This Section describes the existing and proposed waste activities including waste handling and treatment, the design and operation of the biowaste treatment system and support activities. It discusses the environmental control measures incorporated in the facility design and those applied during site operations to eliminate and or mitigate environmental impacts. Where relevant, reference is made to more detailed evaluations in other Sections of the EIS.

5.2 Proposed Changes

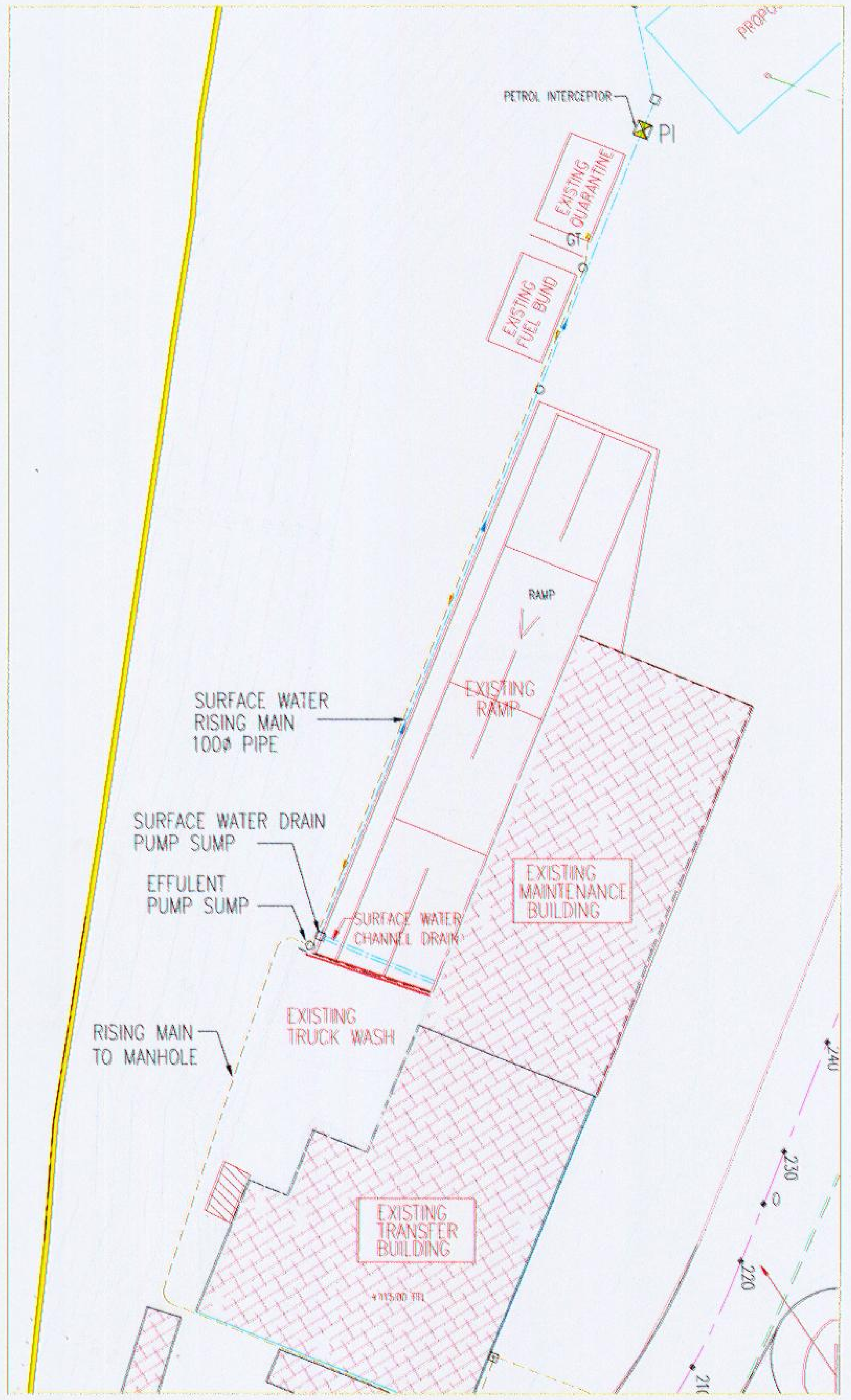
The proposed changes to the existing waste activities that will affect the facility infrastructure include an increase in the volume of waste accepted, the construction of a biowaste treatment plant in the north west area of the site that will include reception warehouse, biowaste treatment units, storage areas and access roads.

It is proposed to continue processing C&D wastes externally. This will be carried out in the area currently used to process commercial and industrial waste, following the relocation of this activity inside the new Transfer Building. It is also proposed to carry out a minor realignment of the facility boundary and upgrade the site entrance in conjunction with off-site development works underway in the area.

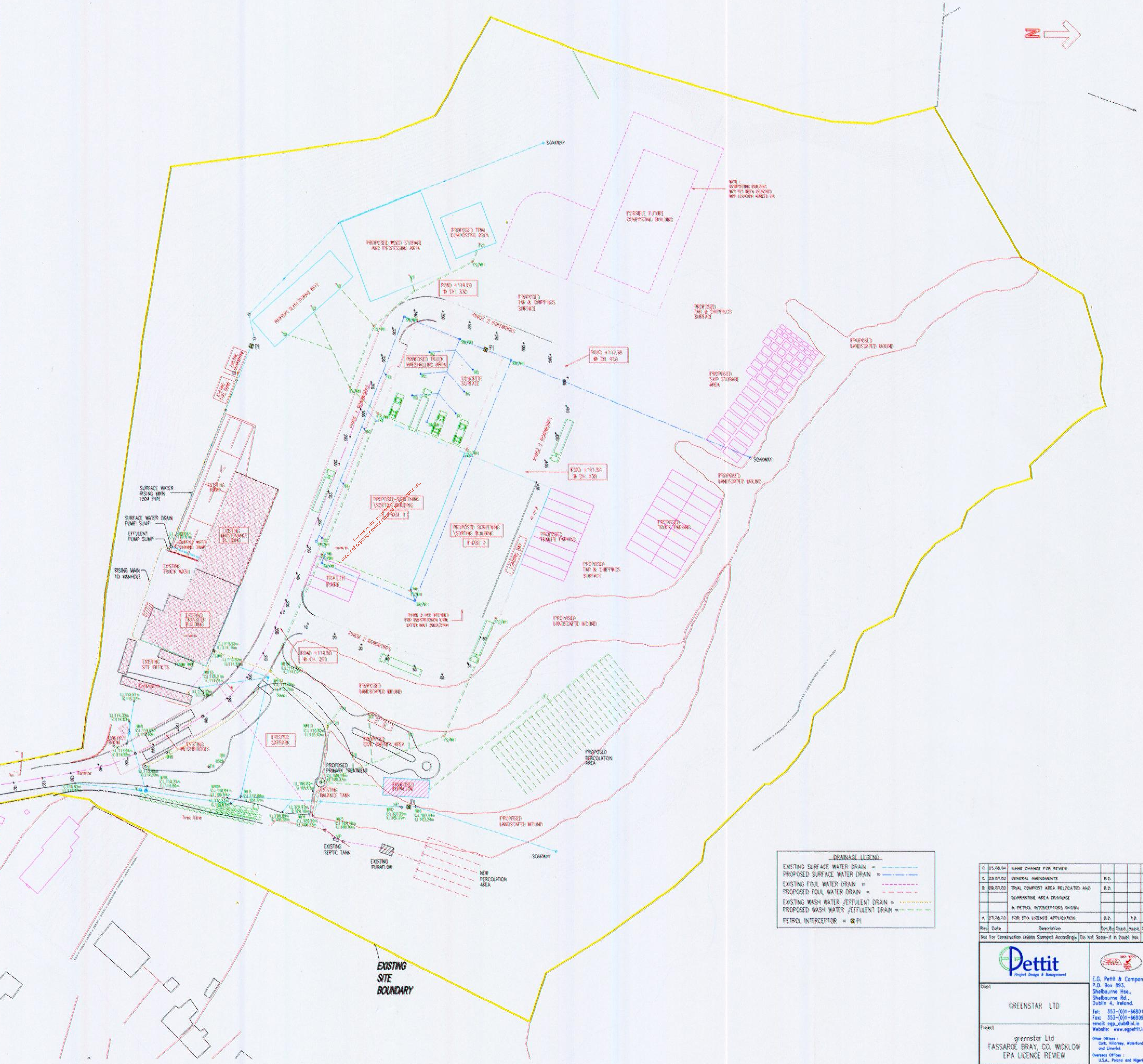
Other changes that will not impact of the infrastructure and relating to operational hours and approval of waste contractors are also proposed.

5.3 Materials Recovery and Transfer

The facility is currently permitted to accept 129,500 tonnes of non-hazardous wastes for processing. The current licence allows waste processing to take place inside the transfer buildings as well as out-doors. The out-door activities are limited to wood chipping, segregating and processing of C&D waste and non-putrescible commercial/industrial waste. The licence requires the processing of construction and demolition waste and non-putrescible commercial/industrial waste to be moved indoors once Phase II of the new transfer building is completed. The existing licensed site layout is shown on Drawing No. B7498-C012-C.



EXISTING DRAINAGE AT QUARANTINE AREA/TRUCK WASH AREA



PREVIOUS REVIEW SITE LAYOUT PLAN

DRAINAGE LEGEND

EXISTING SURFACE WATER DRAIN =	
PROPOSED SURFACE WATER DRAIN =	
EXISTING FOUL WATER DRAIN =	
PROPOSED FOUL WATER DRAIN =	
EXISTING WASH WATER /EFFULENT DRAIN =	
PROPOSED WASH WATER /EFFULENT DRAIN =	
PETROL INTERCEPTOR =	PI

Rev.	Date	Description	Drn.By	Chkd.	Appd.	Client
C	25.08.04	NAME CHANGE FOR REVIEW				
C	25.07.02	GENERAL AMENDMENTS	B.D.			
B	09.07.02	TRIAL COMPOST AREA RELOCATED AND QUARANTINE AREA DRAINAGE & PETROL INTERCEPTORS SHOWN	B.D.			
A	27.06.02	FOR EPA LICENCE APPLICATION	B.D.		T.B.	

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Client: GREENSTAR LTD

Project: greenstar Ltd
FASSAROE BRAY, CO. WICKLOW
EPA LICENCE REVIEW

Drg. Title: CIVIL
EXISTING LICENSED LAYOUT PLAN & EXISTING SITE BOUNDARY

Job No.	File No.	Scale	Drg. No.
B7498	7498C012-C	1:1500	B7498-C012-C

It is proposed to increase the overall annual waste inputs from the 129,500 tonnes to 200,000 tonnes and to increase the individual limits for the Household, Commercial and C&D waste. It is not proposed to change the waste types accepted. However, it is proposed to continue the processing of C&D wastes externally after the construction of Phase II of the new transfer building. The processing of non-putrescible Commercial/Industrial waste will be moved indoors once Phase II is completed. The proposed site layout for the facility is shown on Drawing No. B8575-C003-A.

5.4 Biowaste Treatment Plant

The proposed biowaste treatment plant will comprise a reception building, ten (10) concrete in-vessel biowaste treatment tunnels, six (6) vacuum Aerated Static Piles (ASP) and associated biofilters, office/control room, leachate storage tanks and finished product storage areas. The proposed layout of the biowaste treatment area is shown on Drawing No.B8575-C005-A.

The proposed maximum amount of waste that will be treated at any one time will be 1,722 tonnes. This comprises the waste in the digester units, the biowaste in the ASP and the amount stored on- site. This figure does not take into account weight loss that occurs during the biowaste treatment process, which can be in the region of 50% of the initial weight.

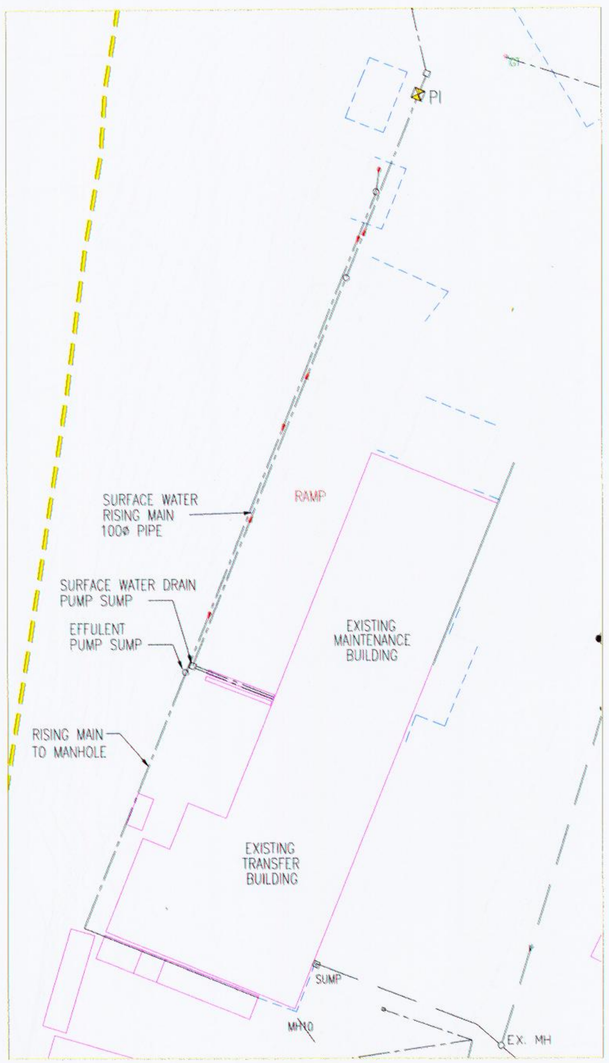
5.4.1 Process Description

The proposed system involves five steps: -

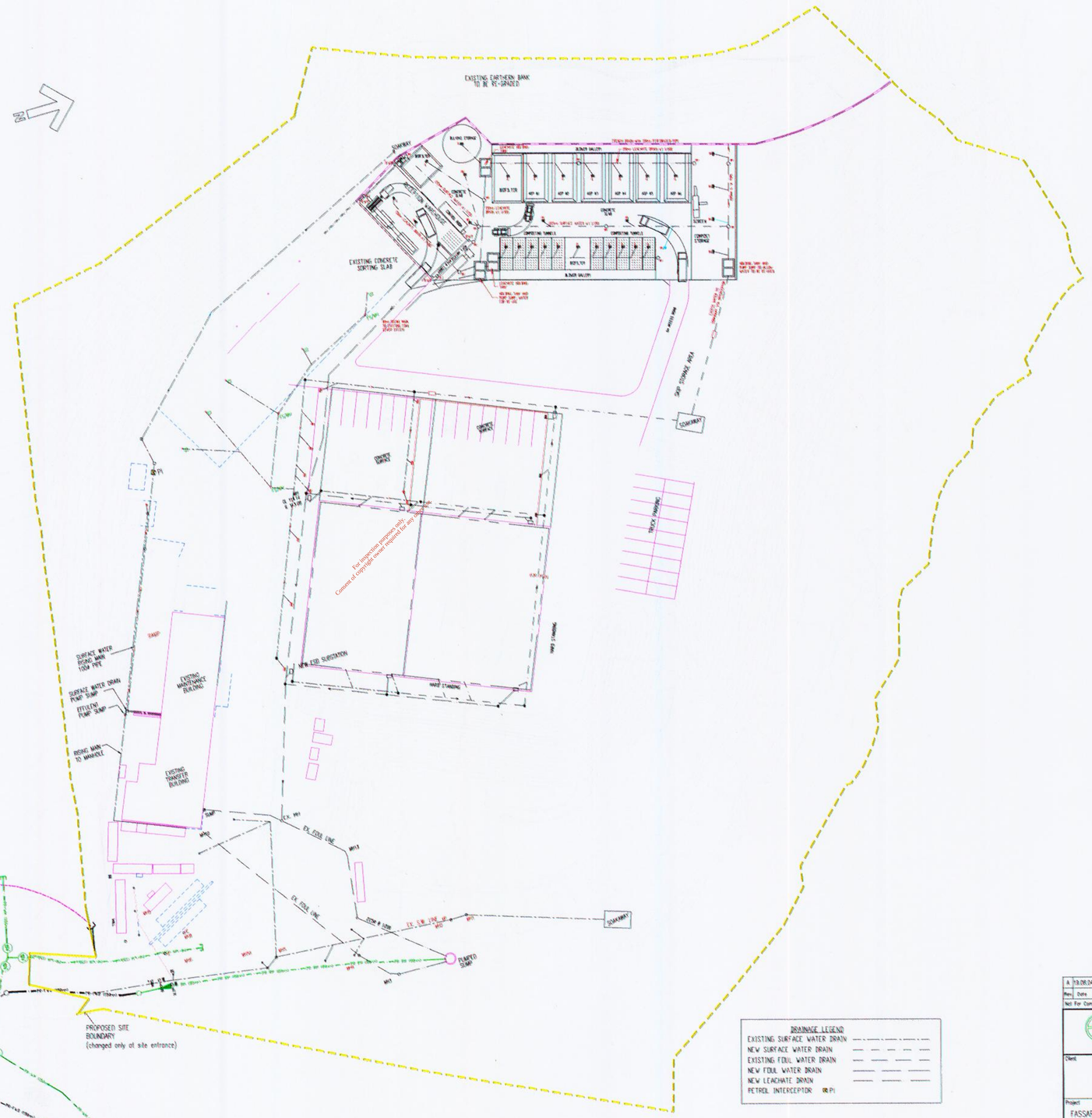
1. Waste Reception.
2. Feed stock Preparation.
3. In-Vessel Biowaste Treatment.
4. Aerated Curing.
5. Screening & Product Storage.

1. Waste Reception

Material will be unloaded within the Reception Building for initial inspection and removal of bulk contaminants. The maximum amount of bulked waste that will be stored on-site before biowaste treatment at any one time will be one day's waste input - approximately 40 tonnes of bulk material & food waste. Normally, all of the food waste will be mixed and placed in the digester unit on the same day as delivery.



EXISTING DRAINAGE AT QUARANTINE AREA/TRUCK WASH AREA



DRAINAGE LEGEND

EXISTING SURFACE WATER DRAIN	
NEW SURFACE WATER DRAIN	
EXISTING FOUL WATER DRAIN	
NEW FOUL WATER DRAIN	
NEW LEACHATE DRAIN	
PETROL INTERCEPTOR	PI

PROPOSED SITE LAYOUT PLAN
SCALE 1:1500

Rev.	Date	Description	Drn./Ch'd	Chkd.	Apvd.	Client
A	13.08.04	ISSUED FOR INFORMATION	CYC	JSHE	JSHE	

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Client: GREENSTAR LTD.

Project: FASSAROE LICENCE REVIEW 2004
BRAY, Co.WICKLOW

Drg. Title: CIVIL
PROPOSED SITE LAYOUT PLAN WITH DRAINAGE & SITE BOUNDARY

Job No.	File No.	Scale	Drg. No.
88575	8575C003	1:1500	88575-C003-A

Dig. Nr. B8575-C005-A | File Nr. 8575C005

N

BOTTOM OF BANK

PROPOSED BOTTOM of EMBANKMENT

FRENCH DRAIN with 150mm PERFORATED PIPE

PROPOSED BOTTOM of EMBANKMENT

FRENCH DRAIN CONNECTS TO MANHOLE

BULKING STORAGE

LEACHATE HOLDING TANK

BLOWER GALLERY

150mm LEACHATE DRAIN at 1/180

BIOFILTER

BIOFILTER

ASP #1

ASP #2

ASP #3

ASP #4

ASP #5

ASP #6

FRENCH DRAIN CONNECTS TO MANHOLE

225mm S. W. PIPE

RECEPTION WAREHOUSE

CONTROL ROOM

CONCRETE SLAB

225mm SURFACE WATER at 1/150

150mm LEACHATE DRAIN at 1/180

CONCRETE SLAB

225mm SURFACE WATER at 1/150

SCREEN

COMPOSTING TUNNELS

COMPOSTING TUNNELS

COMPOST STORAGE

EXISTING CONCRETE SORTING SLAB

150mm LEACHATE DRAIN at 1/180

40ft ARTICULATED LORRY

BIOFILTER

BLOWER GALLERY

HOLDING TANK AND PUMP SUMP TO ALLOW WATER TO BE RE-USED.

TOP OF BERM

80mm RISING MAIN TO EXISTING FOUL SEWER SYSTEM

LEACHATE HOLDING TANK

HOLDING TANK AND PUMP SUMP, WATER FOR RE-USE.

6m ACCESS ROAD

EXCESS WATER TO SOAKAWAY VIA INTERCEPTOR

LEGEND

RG	ROAD GULLEY (TO STORM SEWER)		SURFACE WATER DRAIN
G	LEACHATE COLLECTION GULLEY (TO FOUL SEWER)		LEACHATE DRAIN
MH	MANHOLE	NOTE: ALL LEACHATE DRAINS TO PASS UNDER STORM WATER DRAINS.	
AJ	ARMSTRONG JUNCTION		
R.W.P.	RAINWATER DOWNPIPE		

Rev.	Date	Description	Drn.By	Chkd.	Appd.	Client
A	19.08.04	ISSUED FOR COMMENT	CNC	JSNE	JSNE	

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Client: GREENSTAR LTD.

Project: FASSAROE BIOWASTE TREATMENT BRAY, CO.WICKLOW

Drg. Title: CIVIL
PROPOSED BIOWASTE TREATMENT LAYOUT

Job Nr.	File Nr.	Scale	Drg. Nr.
B8575	8575C005	NTS	B8575-C005-A

In the event that food waste arrives late in the day, this will be stored inside the building for a maximum of 24 hours prior to introduction into the biowaste treatment process. It will be placed on a bed of shredded bulking agent to absorb moisture and covered with a layer of bulking agent to inhibit flies and odour. In the event of equipment failure, preventing the mixing of the waste and the loading of the digester, food waste will not be accepted until the equipment is repaired. The stored food waste will be quarantined or removed off-site for disposal if it cannot be placed in the digester within 24 hours of receipt.

2. Feed Stock Preparation

Following the initial inspection of the waste it will be loaded into a mixer located inside the reception building using a loading shovel. *greenstar* already processes timber waste at the facility and it is intended to use wood chips as a bulking agent in the biowaste treatment process.

The proper blending of these components is essential to the generation of a balanced mix with the correct moisture level, nutrient ratio and porosity to ensure effective heating of the material. Blending is also an effective odour prevention technique as correctly blended material will be less likely to become anaerobic and odorous. During the unloading and blending process air will be drawn from the building and treated in a bio-filter.

3. In-Vessel Units

The blended "biomass" will then be transferred to the in-vessel tunnels. Once full, the tunnel doors will be closed and the initial stage high rate biological process will begin. There are ten (10) tunnels proposed with one being filled each working day over a two week cycle.

The tunnels are designed to optimise the initial high rate aerobic bio-transformation process. Each of the 100 m^3 concrete tunnels has a capacity of approximately 2.7 tonnes of biomass per day on a 14 day cycle (1,000 tonnes per unit per year). Air will be delivered to the tunnel through an aerated floor with the exhaust air drawn out through the roof for treatment in a bio-filter.

The in-vessel system offers a number of environmental advantages: -

(a) Vermin are excluded during the initial phase when the material has a high food value.

(b) All leachate is captured and directed to the leachate collection system.

(c) All exhaust air is directed to a biofilter that removes off-odours.

(d) Wind blown litter is eliminated.

(e) Rain is excluded and therefore leachate is minimised and water-logging of the biomass is avoided.

The air-flow through the tunnels will be regulated by temperature and oxygen measurements automatically taken from within the biomass. This air-flow will operate in two modes: -

- Oxygenation mode supplies enough air to support aerobic respiration in the pile.
- Cool-down mode supplies air as a heat exchanger to cool the biomass when temperatures rise above the pasteurisation point.

This "temperature/oxygen feed-back" mechanism is automatically controlled by a programmable logic controller (PLC) linked to proprietary software. The software also logs the time/temperature data for regulatory compliance. This managed air-flow maintains aerobic conditions at an optimum during the initial 14 day high rate cycle.

4. Aerated Curing

At the end of the initial 14 day cycle the biomass will have been pasteurised, have lost most of its food value and will be suitable to transfer to the ASP. The ASP will accelerate the curing phase. The ASP works by drawing air under vacuum through the maturing biomass to maintain aerobic activity. This air is re-pressurised and forced through a biofilter to remove any residual odours. Consequently, all exhaust gas at the site will be collected and treated. Any residual leachate and condensate is also collected and stored for re-use.

The material is typically maintained in the ASP for six to eight weeks. The temperature of each pile will be monitored on a continuous basis using radio-transmitter temperature probes. The air-flow to each ASP will be regulated by valves on the manifold delivery pipes. During the six to eight week period the piles will be turned at least once to avoid compaction while minimising the incidental release of odours.

5. Screening & Product Storage

After approximately 8 - 10 weeks, the humified biomass (mature compost) is ready for screening. The screening involves the passing the material through a trommel that will separate the material into a fine fraction (<15 mm) and oversized material. The proposed maximum amount finished product that will be stored on-site at any one time will be 1 week's production or approximately 150 m^3. This material will be stored at the location shown on Drawing No. B8575-C005-A.

5.4.2 Product Quality

The quality of the product will be checked on a monthly basis. Samples will be taken during the screening of the mature compost using a standard procedure.

The samples will be sent to an accredited laboratory for analysis on the following parameters:-

(a) Physical properties: moisture, organic content, bulk density etc.

(b) Salmonella & faecal coliforms.

(c) Priority trace metals: As, Cu, Cd, Cr, Hg, Pb, Ni & Zn.

(d) Plant nutrients.

(e) Maturity.

(f) Physical contaminants (plastic metal, glass and stones).

Additional samples will be taken as required, to monitor the composition of input material and process performance. These samples will be analysed on basic parameters (dry solids, volatile solids, Carbon/Nitrogn ratio). It is envisaged that at differetn stages the treatment system will generate the three different classes of product permitted in the current waste licece (Reg. No. 53-2). The product applications will be in line with those prescribed by the draft document on biowaste.

5.5 Hours of Acceptance/ Hours of Operation

At present the facility only operates during the hours of 7:30 – 21:00 Monday to Saturday inclusive and waste is only accepted and transferred from the facility between the hours of 7:30 – 19:00 Monday to Saturday inclusive. Waste is not accepted at the facility on Bank Holidays.

greenstar's commercial customers are increasingly requesting early morning/late evening collection of wastes to avoid business disruptions. Traffic restrictions in urban areas also require early morning/late evening collections. Therefore, it is proposed to amend the current licence to allow for the hours of operation/acceptance to be extended subject to the Agency's approval.

5.6 Site Access

Access to the site is controlled by means of a traffic barrier at the weighbridge shown on Drawing No. B7498-C012-C. The main route to the facility is a link road from the nearby motorway M11. This road is currently being upgraded to allow for further developments south of the *greenstar* facility. Part of the upgrade includes the construction of a roundabout at the existing site entrance. This will require the relocation of the site entrance and the removal of the redundant weighbridge.

The location of the proposed roundabout and the new site entrance is shown on Drawing No. B8575-C003-A.

5.7 Waste Types and Volumes

It is not proposed to change the types of waste accepted from those currently licensed. The existing and proposed waste volumes that will be accepted at the facility for processing and onward transfer are presented in Table 5.1.

Table 5.1 Total Permitted and Proposed Waste Inputs

Waste Type	Existing	Proposed*
Household	25,000	38,600
Commercial	69,500	107,358
Construction & Demolition	35,000	54,040
Hazardous	2	2
Total	**129,502**	**200,000**

*** Note 1:** The quantities of the different categories referred to in this table may be amended with the agreement of the Agency provided that the total quantity of waste specified is not exceeded.

The biowaste will initially comprise green waste, food waste and other wastes capable of being biologically treated. These wastes are listed in the draft document on Biowaste. It is a policy objective of *greenstar* to encourage its customers to introduce waste segregation at source. It is envisaged that over time the percentage of mixed waste will reduce significantly and that the bulk of biowaste treatable material will be source separated. The facility is sized to be capable of meeting Wicklow County Council requirements to treat source separated waste from households.

5.8 Waste Acceptance Procedures

All wastes accepted at the facility are subject to waste acceptance measures that have been approved by the Agency. It is not proposed to change these approved acceptance procedures. *greenstar* requires new customers to characterise the waste prior to delivery to the facility. The producer/holder/collector of the waste must, if requested, provide documentation that the waste meets the *greenstar* specification. Waste not conforming to the specification is not accepted.

Any waste delivered to the facility that does not have the appropriate documentation or which, upon inspection at the weighbridge, is deemed not to be suitable is not accepted. In such event the weighbridge operator records the name of the waste delivery contractor, the registration number of the vehicle and the nature and origin of the waste. The operator instructs the vehicle driver to return the waste to the producer. Records of any such incidents are maintained on site and reported to the EPA.

Any waste identified as not suitable following off loading is immediately removed to the relevant waste quarantine areas. The waste is stored in the quarantine area pending its removal off site by either the waste producer or the waste contractor who delivered the waste.

In the event of the producer or contractor refusing to remove the waste *greenstar* ensures that it is removed off site and disposed of at an appropriate facility as soon as possible. *greenstar* maintain records of the waste type, quantity, and ultimate disposal/treatment facility. It is not proposed to alter waste acceptance procedures for the facility.

5.9 Waste Handling

All wastes accepted at the facility are subject to waste handling procedures that have been approved by the Agency. The increase in the volumes of waste materials will not alter the materials recovery and transfer handling operations currently successfully employed at the facility. The only new waste handling operations proposed relate to the proposed extension to the biowaste treatment process.

5.9.1 Non Biodegradable Household and Commercial Waste

Non putrescible household wastes, arising from the kerbside collection, and non putrescible commercial/industrial waste is deposited onto the floor of the transfer building and inspected for disposable and/or recoverable fractions. Non-recyclable/recoverable waste is stored within the building before transfer for disposal to an off-site landfill, as agreed with the Agency.

5.9.2 C & D Waste

All C&D waste is inspected to determine if it is suitable for transfer and/or recovery. Wood and metal are separated using a mechanical grab and subsequently removed off-site to approved recovery/recycling facilities. The residual material is passed through a trommel to remove the fine fraction containing subsoil and topsoil. This material is either used on-site for restoration purposes, or sold for agricultural and/or horticultural purposes. The heavy fraction from the trommel containing concrete, brick etc is then passed through the crusher to produce a crushed inert aggregate.

5.9.3 Wood, Timber and Green Waste

Wood and timber delivered to and recovered on-site is shredded and removed off-site for disposal. Green waste delivered to the facility is stored pending transfer to an off-site composting facility.

5.9.4 Biowaste

Biowaste will be unloaded in the reception building for initial inspection and removal of bulk contaminants. Once inspected and confirmed as suitable, the material will be transferred to a mixer for blending inside the building. In the event that material arrives late in the day, it will be held for a maximum of 24 hours inside the building prior to introduction into the biowaste treatment process.

The blended biowaste will then be transferred to in-vessel tunnels by loading shovel. Once full, the doors on the tunnels will be closed. The pasteurised material will be removed from the tunnels at the end of a 14 day cycle and transferred to the ASP. After approximately 8-10 weeks the finished product will be screened following which the product will be stored in designated areas prior to removal off-site.

5.9.5 Civic Amenity Facilities

There are two Ro-Ro containers located opposite the front of the waste transfer building, which are provided for use by the general public for deposition of household waste. There are a number of receptacles for the recyclable materials located beside the Ro-ros including glass, metals and textiles. The materials collected in these are removed off-site for recovery/recycling.

5.10 Facility Managements

The facility is operated by trained staff that includes a Location Manager, Site Foreman, Weighbridge Clerk, Machine Operators, Drivers and General Operatives. The Location Manager is responsible for day-to-day operations at the site. Staff are be present at all times during the operational hours to supervise waste acceptance, segregation, transfer and to deal with any emergency that may arise. *greenstar* also maintains a 24-hour security presence at the facility.

5.11 Equipment

Daily operations involves the use of front loading shovels, conveyors, trommels, mechanical grab(s), trommel Screen(s), crusher, forklift(s), tractor units and trailer etc. The proposed biowaste treatment system will involve the use of new plant /equipment similar to those already in use at the site. A list of fixed and mobile plant and equipment is shown in Table 5.2. The table also provides details of the handling/processing capacity of the equipment and the type of waste material it processes on site.

A minimum of 100% duty and standby capacity is provided on essential items of waste handling plant, including the loading shovels, grabs and the tractors and trailers for road haulage. The provision of this standby capacity ensures the site remains operational at all times while repairs are carried out on duty plant.

Table 5.2 Plant and Equipment

No	Description	Waste Type	Average Throughput (t/day)	Duty Capacity (t/day)	Standby Capacity (t/day)
1	Waste Transfer Building	Household	82	150	0
1	Can Compactor (SFL Sorting System (2))	Household	5	50	0
1	Plastic sorting/picking line (SFL Engineering Sorting System)	Household	5	50	0
2	Fork lifts	Household	82	100	0
1	Cardboard Baler	Household	2	5	0
1	Large Compactor (municipal waste)	Household	70	150	150
1	Extec Shredder	C&I	116	500	0
1	Powerscreen Trommel	C&D waste	116	500	0
1	Powerscreen Trommel	C&I Waste			0
1	Liebherr grabs	C&D/C&I	172.5	400	400
2	FUCHs grabs	C&D/C&I	172.5 (Based on one unit, one unit standby)	400	0
1	Liebherr loading Shovel	C&D/C&I	345	500	500
1	JCB Loading Shovel (Standby)	C&I/C&D	0	500	0
1	JCB bucket	C&D/C&I	345	500	0
1	Wood Shredder	C&D	23.2	100	0
1	Wood Granulator	C&D	23.2	100	0
4	Tractor Units	C&D/C&I	345	690 (based on 3 units)	230
5	Trailer Units	C&D/C&I	345	690 (based on 4 units)	172.5 (Based on 1 unit)

greenstar carries out a preventative maintenance programme for site machinery, pumps, compressors and other electrical and mechanical equipment to ensure safe site operation. Records of the preventative maintenance programme are maintained by the Location Manager.

5.12 Safety and Hazard Control

All site personnel and visitors to the site including the waste contractors and general public are obliged to comply with *greenstar's* safety guidelines. The guidelines regulate access to and from the site and traffic movement on the site. All site personnel are provided with and obliged to wear the requisite personal protective equipment (PPE). PPE will include face masks, gloves, safety glasses, steel-toed footwear, overalls, reflective jackets and helmets.

5.13 Oil Storage

There is a bunded oil storage area west of the existing transfer building. It is not proposed to provide additional oil storage areas.

5.14 Water Supply

Water for wash down and potable use is obtained from the mains supply provided by Wicklow County Council.

5.15 Surface Water Management

Surface water from the hard standing and roofed areas collects in drains and is piped (gravity feed) to soakaways. It is not proposed to alter the existing surface water management infrastructure in the materials recovery area. Runoff from the screening and compost storage area will be directed to a holding tank for reuse and surplus runoff will be directed to soakways via an interceptor. Run-off from the roof of the biowaste reception building and non process areas will be collected and directed to the existing surface water drainage system as shown on Drawing No. B8575-C005-A.

5.16 Wastewater

5.16.1 Current System

Process wastewater currently generated at the facility comprises washwater from the vehicle cleaning and washing of the floors in the transfer station buildings and in the compactor and loading area. The wash water from the vehicle wash drains into a sump, which is pumped out, to a balancing tank which controls flows through to the on-site septic tank (constructed and installed in compliance with the requirements of S.R. 6 1991) and then to a Puraflow biofiltration system.

Waste water from the facility toilets is directed to the on-site septic tank where it receives primary treatment. The partially treated effluent from the tank is pumped by a float control pump onto a 4 modular Puraflo ™ biofiltration system for secondary treatment. Final effluent subsequently receives tertiary polishing in a percolation area.

5.16.2 Proposed System

It is proposed to discharge the existing process and sanitary wastewater generated at the site to a new foul sewer being installed on lands adjacent to the facility as part of commercial development. The connection to the new proposed foul sewer is shown on Drawing No. B8575-C003-A. The process wastewater will discharge via a petrol/oil interceptor to the new sewer which in turn connects to the municipal sewer that outfalls to the municipal wastewater treatment plant in Bray. The sanitary waste water will discharge directly to the foul sewer.

Process wastewater generated by the biowaste treatment plant will include two types: -

1. *Pre-sanitisation*; run-off from in-vessel biowaste treatment floor wash downs, blending operations in the reception building and leachate from the in-vessel units, and

2. *Post-sanitisation;* run-off from the ASPs.

It is proposed to direct wastewater generated in the reception building and the in-vessel units to a holding tank for recirculation at the blending stage. Run-off from the ASPs will be directed to a holding tank for settling and subsequent re-circulation to the ASPs. Surplus run-off from the ASPs will be directed from this holding tank to a surplus storage tank from where it will discharge to the foul sewer.

During normal operations all leachate generated in the reception building and in-vessel units will be re-used in the biowaste treatment process. On occasions, surplus leachate may be generated and in this event it will be directed to the surplus storage tank. The contents of this storage tank will discharge via a petrol/oil interceptor to the new foul sewer. The revised drainage layout for the biowaste treatment area is shown on Drawing No. B8575-C005-A.

5.16.3 Volume and Quality

As the biowaste treatment system is typically a net water user the majority of the wastewater will be floor wash down from the transfer buildings and the biowaste reception building. It is estimated that approximately up to 2 m^3 of process wastewater will discharge to the sewer on a daily basis.

The floor of the buildings will be swept before washing to remove large items. The floor drains will be provided with grids to prevent entry of large items into the drains. All oils and other chemicals will be stored in dedicated bunded storage areas, which will reduce the potential for accidental releases of oils or chemicals to foul sewers. Facility personnel will be trained in spill response actions and adequate spill containment and clean up equipment will be maintained on-site.

Storm water from the site will not be discharged to the foul drainage system. Automatic cut off valves will be installed on the foul sewer drainage system before the connection to the municipal sewer to prevent the direct discharge of firewater run-off in the event of a fire on the site.

Table 5.3 indicates the likely quality of the process wastewater that will be discharged to sewer.

Table 5.3 Wastewater Quality

Parameter	Concentration
Temperature	42 °C
BOD	10 000 mg/l
COD	30 000 mg/l
pH	5 – 10
Ammoniacal Nitrogen	100 mg/l
Suspended Solids	2000 mg/l
Sulphates (as SO_4)	1000 mg/l
Detergents (as MBAS)	100 mg/l
Fats, Oils, Grease	100 mg/l

5.17 Waste Generation

The facility generates small volumes of office type wastes and. *greenstar* operates a source segregation policy to maximise the recovery of potential recyclable materials. All recovered materials are transferred off-site to recovery/recycling facilities.

Unsuitable materials, e.g. batteries, gas cylinders etc. removed from the material delivered to the site and which cannot be removed by the delivery vehicle are stored on-site pending removal off-site for disposal at appropriately licensed recycling or treatment facilities.

On-site maintenance of plant and vehicles takes place in the maintenance workshop located behind the transfer building. Waste oils and batteries generated during maintenance are removed off-site for disposal/recovery at licensed treatment/recovery facilities.

5.18 Air Management

Materials recovery and transfer and biowaste treatment activities have the potential to generate air emissions including dusts and odours. In addition biowaste treatment processes are a potential source of bioaerosols. Details on the control and mitigation measures to minimise air emission impacts are presented in Section 10.

5.19 Nuisance Control

5.19.1 Litter

The current waste activities do not generate litter. All waste delivered to and transferred off the facility are in fully enclosed or covered vehicles. All current and proposed waste handling operations including waste loading and off-loading, and processing will only be carried out inside the buildings with the exception of C&D wastes, which do not contain significant amounts of material that can cause litter. Wastes, apart from C&D, will not be off-loaded in open areas and recovered materials will not be stored outside the buildings. In the event of an incident, which results in windblown litter, facility personnel will ensure its immediate collection.

5.19.2 Birds

The current waste handling practices minimise the potential attractiveness of the site for birds and birds are not a nuisance. All organic or biodegradable waste (food source) arriving on-site goes directly to Transfer Building and is not left in the open for any period before off-site removal. The waste used in the reclamation and restoration of the facility comprises solely inert material, which is not attractive to birds.

Wastes delivered to the proposed biowaste treatment plant will only be off-loaded inside the waste reception building. The in-vessel units will eliminate the biowaste materials as a source of bird attraction. At the end of the in-vessel treatment cycle the vast majority of the food value has been removed and this material and the finished product is not attractive to birds.

5.19.3 Pests

Pests are not a problem at the facility. However, vermin and insects can potentially be a problem where organic waste is not handled properly. However, this usually occurs where waste is either being disposed of (landfill) or being stored for long periods of time. There will be no long term storage of organic waste in the biowaste treatment area and the waste reception and initial processing will be completely enclosed. All plant, equipment and loading areas will be cleaned regularly.

As a preventative measure, *greenstar* engages a pest control contractor to implement vermin control measures on a routine basis. The facility will be inspected daily for the presence of insects or vermin and de-infestation measures will be implemented as necessary by the Facility Manager.

5.19.4 Noise

The existing site operations are not a source of noise nuisance and do not impact on any noise sensitive locations. The proposed increase in waste volumes will not result in the use of any different types of plant and machinery types to those currently in operation. The proposed changes to the biowaste treatment plant will result in new sources of noise, but these will not have any adverse impacts on noise sensitive locations outside the facility. A detailed assessment of the impact of the noise from site operations is presented in Section 11.

5.20 Site Security

Entry to the site during opening and operational hours is controlled by the gate operator in the site weighbridge. Outside of opening and operating hours a security guard is present on-site. In addition, CCTVs are strategically located throughout the site to monitor unauthorized entries and any fly tipping that may occur. The access gates are closed and locked outside the opening hours.

5.21 Landscape Measures

Landscaping measures are carried out in compliance with current licence conditions. A Restoration and Aftercare Plan for the facility has been submitted to the Agency. The proposed reclamation and restoration programme will bring the level of the partially filled area of the site up to the formation level of the existing transfer building.

The current licence specifies the final capping for the portion of the site that was previously used to landfill inert waste. The capping system incorporates a top layer of subsoil and topsoil which is to be underlain by a drainage layer, a low permeability ($1x10^{-9}$m/s) later and a landfill gas layer. The capping system is intended to prevent the percolation of incident rainfall through the waste so as to minimise the generation of leachate and to facilitate the collection of landfill gas.

greenstar considers, based on the groundwater, leachate and landfill gas monitoring conducted at the facility in accordance with the licence conditions, that the specified capping is not required to ensure that the former landfill areas do not result in any short or long term environmental impacts.

The on-going environmental monitoring programme has demonstrated that the former landfill areas are not having any perceptible impact on surface water or groundwater quality. The landfill gas monitoring programme has identified that carbon dioxide is being generated at the site in relatively low levels, but that methane is not significant.

As biodegradable wastes are no longer landfilled at the site it is expected that the volumes of carbon dioxide will decrease over time, and this in conjunction with the absence of methane renders the need for a collection system unnecessary.

Following the ending of landfilling at the site temporary capping, consisting of subsoil and stone, was placed on the landfill areas. As a topographic survey was not undertaken prior to its installation, the depth of capping cannot be confirmed at any given location. However, in recent years, excavations for various activities have indicated that the depth of capping varies between 0.5 - 1.5 m across the site.

greenstar proposes the following alternative capping system to that specified in the current licence. When the Phase II development works are completed, which are expected to be by the end of 2004, most of the areas previously landfilled, other than sideslopes, will be covered by impermeable hardstand comprising 1-2 m of subsoil and 0.25-0.5 m stone sub-base and concrete/tarmacadam finish. It is proposed to place 1 - 2 m of subsoils and 0.25 - 0.5 m of topsoil on the unpaved areas and then plant these areas. Both hardstanding and unpaved areas will be profiled in accordance with the restoration plan.

The restoration profile, the extent of hardstand and the planting of top soiled areas will minimise the entry of incident rainfall through the capping to previously landfilled material. This will further reduce the minimal risk of negative impacts on the facility's environs. Following capping it is intended that the restored areas will be landscaped to form park land around the transfer station buildings and biowaste treatment area. The landscaping will include a combination of grassed areas and plantings with shrubs native to the area.

5.22 Environmental Monitoring Programme

greenstar implements a comprehensive environmental monitoring programme to assess the significance of emissions from site activities. The programme includes groundwater, surface water, leachate, landfill gas, biological, noise and dust monitoring in compliance with licence conditions. The revision of the sites boundary to accommodate the construction of the roundabout at the existing site entrance will involve the loss of a groundwater/gas monitoring well (BH-06) which is located up gradient of the site. It is proposed to provide an alternative upgradient monitoring point (BH-06 A) at the location shown on Drawing No. 03072-01.

5.23 Changes to the Project

It is not anticipated that there will be any significant additional infrastructure to that described in this Section required during the operational lifetime of the facility. Additional waste streams may be recovered at some point in the future depending on the development of sustainable outlets, but it is not possible at this time to identify such wastes.

greenstar does not envisage a set lifespan for the facility. In the unlikely event that the facility shuts down, the closure will be carried out in accordance with the conditions set out in the Waste Licence and to the satisfaction of the Agency.

5.24 Associated Developments

The facility is designed to meet national and regional waste management policy objectives on waste recovery and the reduction of the volumes disposed to residual landfill. It is anticipated that the recovered materials will be either transferred off-site to existing and new recycling/recovery operations and/or reused on site for restoration works. Residual waste will be transferred to approved residual landfills.

While *greenstar* will, depending on market conditions, avail of any future waste recovery/recycling facilities developed in the country it is not envisaged that the proposed development will be directly or indirectly responsible for any associated developments.

NOTES

LEGEND: EXISTING MONITORING LOCATIONS

- Denotes monitoring well locations (BH, GAS and LEACHATE) ALL WELLS USED FOR GAS MONITORING
- Denotes surface water monitoring locations
- Denotes noise monitoring point
- Denotes dust monitoring point

#	I.D.	EASTING	NORTHING
1	BH/GS-01	324311.85	218157.81
2	BH/GS-02	324212.67	218255.62
3	BH-5	324308.53	218166.26
4	BH-6	324330.71	217966.07
5	BH-7	324162.96	218313.81
6	GS-05	324331.53	218071.80
7	GS-06	324291.42	218019.91
8	GS-07	324146.36	218021.76
9	GS-08	324118.57	218048.52
10	GS-09	324084.55	218100.07
11	GS-11	324100.93	218272.43
12	L-01	324231.96	218165.23
13	L-02	324108.57	218077.62
14	L-03	324052.44	218035.59
15	SW-1	324132.36	218322.94
16	SW-2	324247.97	218240.39
17	SW-3	324326.38	218166.72
18	SW-4	324309.53	218124.20
19	N1	324310.04	217968.64
20	N2	324313.86	218013.03
21	N3	324325.62	218143.04
22	N4	324209.67	218282.19
23	NSL1	324305.76	217868.30
24	NSL2	324299.30	217846.31
25	DS-01	324122.92	218286.56
26	DS-02	324273.77	218191.72
27	DS-03	324320.24	218037.48
28	DS-04	324161.16	218013.86

Proposed New Monitoring Wells

	EASTING	NORTHING
P – GS-10	324481.01	218135.36
P – BH-6	324346.85	217903.07

NOTE:
P – GS-10 SCHEDULED TO BE INSTALLED AS PART OF WL 53-2

REV	DATE	DESCRIPTION	DRN	CHKD	APP
A	20/08/04	REVIEW	MW	JOC	SM

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CLIENT
GREENSTAR

TITLE
EXISTING & PROPOSED MONITORING LOCATIONS

SCALE	DRAWING No.	REV.
NTS A3	03072–01	A

DOS Filename : DOSFILENAME