

APPENDIX 4

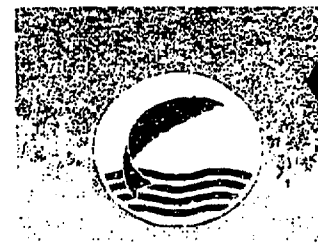
Sewer Pipeline Discharges

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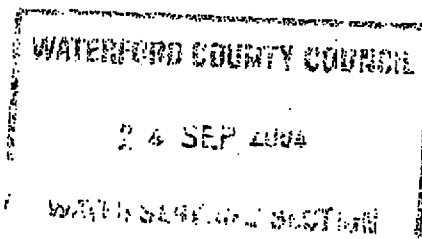


Fisheries Ireland

Our Natural Heritage

21 September, 2004

Mr. Colum Flynn,
Executive Engineer,
Water Services Section,
Waterford County Council,
Civic Offices,
Dungarvan,
Co. Waterford.



Application for Licence to Discharge Trade Effluent to Waters made by Bedminster International (Ireland) Limited

Dear Mr Flynn,

I refer to your letter dated 8th inst., and attached proposed draft licence.

While the Board very much appreciates your Council's co-operation in forwarding licence applications and draft proposed licences to us, I very much regret to have to state that in the case of this proposed licence, a number of the conditions therein are considered to be highly unsatisfactory, giving unnecessary and undue leeway to the applicant. I am further to state that in the event of the licence being granted in its current form, it will be necessary for this Board to appeal any such decision to An Bord Pleanála.

Condition 2.5

In limiting the detailed analysis required to 5 parameters, a comprehensive characterisation of the waste in question may not be obtained. For example, it is not uncommon in certain so called organic sludges to have contamination due to the presence of heavy metal compounds. It is recommended this condition be reworded so as to provide for in addition to the specified analysis, analysis for such other parameters as Waterford County Council may require from time to time.

The Southern Regional
Fisheries Board

Angloesha Street

Cork

Co. Tipperary

Tel: 051 80011

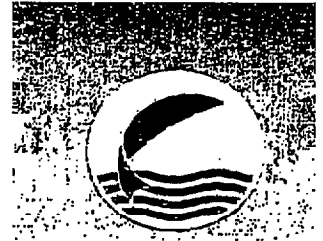
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Condition 3.1

Reference is made in this condition, and elsewhere within the licence, to *the site's previous IPC Licence designated location*. Respectfully, references to a previous licence and separate legislation has the potential to cause confusion from a legal standpoint, and it is recommended same be deleted from the licence. We make this recommendation so as to avoid the need for complex proofs in the event, for example, of a prosecution, and a dispute over the location or specification of a particular item of sampling/measuring/monitoring equipment. Under the condition as presently drafted, if a dispute arises, it will be necessary to call a witness or witnesses from the EPA, and to require production of the original IPC application made to the EPA. This could be cumbersome costly and possibly confusing. It is recommended that the relevant sentence read: "Details of the design and location of this chamber shall be agreed with the Licensing Authority within 2 months of the date of issue of this licence....."

Condition No. 3.2

The range of pH values proposed is unacceptable. A storm water pH value of 9.0 units would indicate very significant hydroxyl contamination. Your Council is urged to reduce this range to between 6.0 and 8.0 units.

In the case of conductivity, again bearing in mind one is referring to a trigger to distinguish between essentially clean rainwater discharging from clean yards and buildings, the upper limit of 2,000 $\mu\text{S}/\text{cm}$. is considered to be too high, and is recommended same be reduced to 1,000 $\mu\text{S}/\text{cm}$.

Condition 3.3

Following from the recommendations above for 3.2, the emission limit values should be altered to read in the case of pH: 6.0 - 8.0; and in the case of conductivity 1,000 $\mu\text{S}/\text{cm}$.

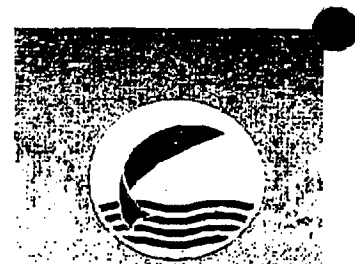
In the specific case of BOD, the proposed limit of 100 mg/l is wholly unacceptable. This is typically between 4 and 5 times less onerous than the standard normally required to be provided in conventional secondary treatment systems. A storm water BOD value of 100 mg/l is indicative of gross pollution. Recognising that storm water typically is discharged to rivers and streams, the BOD of storm water so discharged should be similar to that normally encountered in clean freshwater. A maximum BOD value of 5 mg/l is most strongly recommended.

Similarly, in the case of oils, fats and greases, the emission limit value of 15 mg/l is excessive, given that the condition is specifically addressing storm water. Oils fats and



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grease should not be present in storm water, and therefore the maximum admissible value permitted should be reduced to 5 mg/l.

Condition 4.3

It is recommended based on the numeric standards proposed by your Council, that the time of emission be specified within this condition as follows *"Effluent shall only be discharged during 4 hours of ebbing tides, commencing half an hour after the ebb tide begins and terminating one and half hours before the ebb tide ceases."*

In the event of your Council adopting and imposing the numeric standards as recommended by this Board, the discharges made be made over 24 hrs/day.

Condition 4.4

Respectfully, the proposed emission standards as set out in the Table are unduly lenient, and the following changes are most strongly recommended.

In the case of temperature, and bearing in mind that the discharge is being made to salmonid waters, the maximum temperature should not exceed 25°C.

The pH range should be reduced to be in the range 6.0 - 8.0 units.

In the case of BOD, a value of 100 mg/l is much too lenient. By way of illustration, the entirety of discharges from the city of Waterford and environs, including a multiplicity of industrial discharges will soon receive full treatment in the new local authority plant to be installed. The final discharge standard for BOD to be achieved therefrom is 25 mg/l. In this case, a maximum of 25 mg/l is recommended.

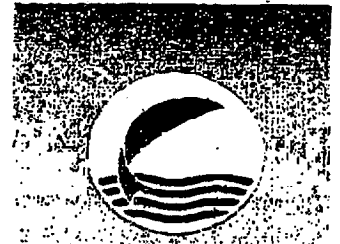
In the case of COD, while the relationship between COD and BOD varies depending on the nature and origin of the waste concerned, a ratio of 15:1 COD:BOD as proposed is excessively high, and we make this comment based on not inconsiderable experience. A maximum ratio of 10:1 COD:BOD is considered reasonable, and accordingly a maximum COD of 250 mg/l is recommended.

In the case of suspended solids, the proposed limit is unduly lenient, and a maximum value of 35 milligrams is urged, in accordance with the available technology and good international practice.



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The level of ammonia is unacceptable, and typifies a plant where no nitrification whatsoever is taking place. In accordance with the available treatment facilities, a maximum value of 5 milligrams per litre expressed as N is recommended.

Similarly, the proposed level of nitrate is excessively high, and a maximum value of 10 mg/l expressed as N is recommended.

In the case of phosphorous, the proposed total value of 3 is not demanding enough, and it is recommended a maximum value of 2 mg/l as P be imposed, with a maximum of 1 mg/l in the case of orthophosphorous expressed as P being set.

In the case of chlorides, the level is unduly lenient, and should be reduced to 100 mg/l.

There is no good reason, given the proposed processes to be carried out, why such a high level of phenol is proposed. A level of 0.1 mg/l maximum is recommended.

In the case of detergents, these simply should not be present, and a maximum of 5 milligrams per litre is proposed.

Similarly, fats oils and grease should largely be removed in the treatment process, and a maximum value of 10 mg/l is recommended.

In the case of toxicity, the level proposed is totally unacceptable. A series of recommendations on the maximum levels of toxicity to be permitted in effluents discharging to surface waters was prepared by the predecessors of the now Enterprise Ireland. Subject to available dilution and the application of a safety factor, 10 toxic units were proposed to be allowed in discharges from metal extraction, plating and finishing industries, based on the treatment technology available at that time. In the case of agricultural and food industries, and untreated municipal sewage, the maximum proposed number of toxic units to be permitted was 1.4 units, again subject to available dilution. And in the case of treated municipal sewage from a secondary treatment plant such as exists at the applicant's premises, a maximum of 1 TU is the recommended toxic limit. Having regard to same, and advances in treatment technology down through the years, a maximum permissible toxicity of 1 unit is recommended in the case of the proposed discharge.

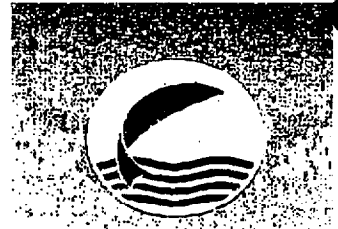
Condition 5.1(d)

In accordance with earlier recommendations above, the alarm settings should read 8.0 high and 6.0 low.



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Condition 6.1

This condition refers in the first sentence to the monitoring of effluent prior to entry to "the public sewer". Appropriate amendment is required.

Condition 6.1 (c)

It should be a requirement that the 24 hour sample on which independent analysis is carried out, is a split sample of the composite sample referred to in condition 6.1 (b), so as to allow for a meaningful comparison and checking of results.

As set out in previous correspondence, the quality of the Suir/Suir Estuary in the reach to which the proposed discharge is to be made is less than satisfactory. The EPA in their report entitled "*An Assessment of Trophic Status of Estuaries and Bays in Ireland*" have assessed the upper Suir Estuary between Coolnamuck Weir and Mount Congreve as being eutrophic, based primarily on the level of nitrate nitrogen therein. Against this background, and noting the importance of the river Suir as a salmonid fishery, and recognising also the extent of commercial fishing throughout the Suir Estuary, it is absolutely essential that in any licence granted, there be adequate safeguards to ensure the well being of the fishery, and the protection and improvement of water quality. Accordingly, the Board asks your Council to amend the licence as set out above.

I trust these observations will be of assistance. Kindly forward to the Board, marked for the attention of undersigned, a copy of the licence in its final granted form.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Patrick Kilfeather'.

Patrick Kilfeather,
Senior Fisheries Environmental Officer.

EMISSIONS TO WATER

Flow Limit - Total Daily Flow 700m³/day. Emission Point Reference EW1
Results in accordance with Schedule 2(ii) of IPC Licence Reg. No. 238.

Date Sep-03	Total daily flow m ³ /day	Maximum Daily Discharge Temperature Degree C.
1	650	24.0
2	650	23.0
3	650	23.0
4	650	24.0
5	650	24.0
6	650	23.0
7	650	23.0
8	650	23.0
9	650	23.0
10	650	23.0
11	650	23.0
12	650	23.0
13	650	23.0
14	650	23.0
15	650	23.0
16	650	23.0
17	650	23.0
18	650	23.0
19	650	23.0
20	650	23.0
21	650	23.0
22	650	23.0
23	650	22.0
24	650	22.0
25	650	22.0
26	650	22.0
27	650	23.0
28	650	23.0
29	650	23.0
30	650	22.0

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APPENDIX 5

Landscape and Visual Impact Assessment Report

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DOCUMENT CONTROL SHEET

Client	Bedminster Ireland Ltd					
Project Title	AES Waste Management Facility - Reply to planning request for further information – 04/1831					
Document Title	Landscape and Visual Assessment					
Document No.	MDR0341LA0001A02					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	12	3	1	0

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Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A01	Draft for Approval	Jill Westra	Áine Ryan	Larry O'Toole	CORK	14/7/05
A02	Approved Draft	Jill Westra	Áine Ryan	Larry O'Toole	CORK	21/7/05

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1 INTRODUCTION

The existing Michell Ireland tannery factory in Portlaw, Co. Waterford, located on the R680 Waterford-Clonmel Road at Killowen is currently the subject of a planning application for a proposed waste management facility consisting of a composting plant and wastewater treatment plant to treat wastewater. The previous tannery made use of an existing factory building and wastewater treatment plant.

As the nature of the proposal requires an Environmental Impact Assessment to be carried out, a landscape and visual assessment was undertaken in June 2005. This component of the EIS is intended to assess the existing environment, examine and evaluate the implications of the proposed scheme in terms of subsequent landscape character and visual alterations to the local environs. For the purposes of the landscape and visual impact assessment the study area is confined to the visual envelope for the proposed scheme.

1.1 LANDSCAPE AND VISUAL ASSESSMENT METHODOLOGY

The landscape assessment follows the methods described in *Guidelines for Landscape and Visual Impact Assessment 2nd Ed.* (LI, 2002), EPA Guidelines on Environmental Impact Assessment (EPA 1995; 2002) and the Department of Environment, Heritage, and Local Government (DoEHLG) "*Landscape and Landscape Assessment Draft Guidelines*" June 2000. The objective is to undertake sufficient assessment to identify the landscape and visual factors and the likely effects upon them, which are taken into consideration in developing and refining the proposed layout and construction of the facility. The surrounding landscape has been appraised to allow it to be described and classified into landscape character types, which enables the categorisation of landscape quality. The final landscape and visual impact assessment consists of:

- a) a written statement on the impact of the proposal on the landscape character and values of the area.
- b) an illustrated description of the visual impact of the proposal on properties and public areas.

The landscape context, classification and quality are described in Section 1.2. below, assessment was undertaken through analysis of up to date maps and site photography, in conjunction with detailed plans and sections of the existing and proposed site buildings. A site visit was carried out in summer when, due to leaf cover being at a maximum, any potential visual implications or alterations would be highly screened and therefore assessed on a "best case scenario" basis.

1.2 EXISTING ENVIRONMENT, LOCAL LAND USE

The proposed waste management facility is approximately 3.2 ha in size, within a site measuring approximately 30 ha in the low-lying river valley of the Suir. The townland of Killowen is located in the predominately flat lowlands west of the Suir, which rise to the steeply sloping contours of lands to the west at Clashroe. Tower Hill is the most elevated point in the area, at 232m OD, west of Clashroe and Killowen, and north of the Clodiagh River, a tributary of the Suir passing through Portlaw. The proposed development site rises from 3 metres to 17 metres above low river level, over a distance of 450 metres, on an east-west axis.

The Killowen area is largely agricultural, with large parcels of pine plantation and mixed woodland established in the elevated regions of Tower Hill and Clashroe, northwest of the site. The River Suir is approximately 200-300 metres wide at Killowen and makes up an integral landscape feature of the area. Woodlock Nursing Home and a local GAA facility make up the non-agricultural land uses within

the Killowen area. A local farm immediately south of the site was once an orchard, and continues to be the only small-scale commercial element within the immediate vicinity of the site, vending produce and apple juice, open 4 days per week. Currently what was orchard land in the past, is used for growing daffodils, but is likely to return to a land use of apple orchard in the next 2 years, as advised by the proprietor. Other existing agricultural land uses in the study area include potato fields and silage pasture west of the R680 from the site, and mainly grazing pasture to the north and west.

Post and wire fencing along hedgerows mainly consisting of *Crataegus monogyna* (hawthorn), *Fraxinus excelsior* (ash), *Viburnum opulus* (guelder rose), *Ilex aquifolium* (holly), *Ulex europaeus* (gorse), *Salix cinerea* (willow), *Sambucus nigra* (elder), and *Corylus avellana* (hazel) make up field boundaries within the study area. Overgrown sod and stone ditches are also common, specifically along the local rural roads. Mature, established trees randomly interspersed amongst hedgerows, and found within local blocks of woodland nearby include *Quercus spp.* (oak), *Acer pseudoplatanus* (sycamore), *Pinus sylvestris* (Scot's pine), *Alnus glutinosa* (alder), and *Acer campestre* (field maple).

The development site includes lands not directly affected by the development of the proposed facility. A small proportion of land within the site has been previously developed by Michell Ireland, and includes the main factory, existing offices, wastewater treatment plant, and a gas substation. The entirety of the site comprises further undeveloped lands, which extend significantly farther north, south, and east of the developed portion, as well as west of the existing development into unused pasture land, across the R680 (refer to Figure 2.1 MDC0182Fig2-1.dwg). The undeveloped portions of land surrounding the existing factory, yet still within site boundaries, comprise dense woodland south and east of the factory, grazing pasture to the north and west, and silage fields to the west, across the R680, from the factory.

The majority of the lands surrounding the existing factory and wastewater treatment plant, within the site boundaries, have been landscaped utilising a variety of native, naturalised, and exotic vegetation. Non-native tree species such as *Liriodendron tulipifera*, *Eucalyptis spp.*, and several exotic evergreen shrub varieties are present within the site boundaries as a result of the previous landscape design around the Michell facility.

1.2.1 Landscape Character

Landscape character types are distinct areas of landscape that are relatively homogenous in character. Each character type represents its own landscape values and sensitivities, as described in the subsequent sections. The character type specified for a study area is generally a descriptive term made up of the prominent landform and landcover observed in the area. While there is also a small, rural residential component in the area, the primary landscape character covering the study area at Killowen can be described as *lowland agricultural landscape*. This is a landscape type often comprising the following key characteristics:

- Open views of patchwork fields and undeveloped lands
- Rural farmhouses, free-standing bungalows, or cottages
- Hedgerows forming boundaries of patchwork fields
- Small country roads

The secondary landscape character type of the study area is that of *River Suir valley*. The wide tidal river dominates the centre of the visual envelope (considered to be the study area), as shown in Figure 1. The river follows a sinuous easterly course through agricultural lowland and a series of marshy inlets. The lowland section of the River Suir exhibits distinct landscape characteristics on either side. Fertile soils on both banks of the Suir are used for agricultural purposes and therefore the entire study area is characterised by farms and fields, in addition to the river itself.

Overall, conclusions drawn from the landscape character assessment illustrate that the landform within the study area is predominately low-lying river flats, which give rise to steep upland areas to the west, outside the study area. Land cover within the study area is mixed, comprising permanent grazing pasture and arable crops, with blocks of woodland and hedgerows contributing to a mature landscape character. There are also extensive areas of unimproved grassland and marshland towards the more lowland areas adjacent to the River Suir.

The character of the existing Michell Ireland facility, when viewed from off-site, appears to be of an agricultural, or industrial nature, dependant on the viewpoint location and nature or scale of lands between the viewpoint and any visible aspect of the facility. The external treatment of the factory building itself is similar to that of many agricultural complexes typical of this particular landscape type. However, when viewed from across the Suir, east of the site, as well as northwest of the site, along the R680, the wastewater treatment plant is partially visible and exhibits a relatively industrial character within an agricultural landscape.

1.2.2 Landscape Values

Assessment of the landscape value of the study area considers the landscape in relation to its location, rarity and particular attributes identified on site. The study area may contain areas of common values such as significant aesthetic, ecological, historical, socio-cultural, religious or mythological importance, which are of relevance in identifying the value of individual landscape types. In general, the higher the quality or value of landscape, the more sensitive it will be to change.

A judgement must be made on the value or importance of the affected landscape, to those directly impacted by it. This includes establishment of the level of importance at a local, regional, or national level. This includes examining planning documentation or council zoning of lands for particular uses or protection in the future. The proposed facility is located within lands that are not zoned as sensitive by the Waterford County Council's Draft Development Plan (2005). No scenic routes pass the site, nor are any listed buildings within the site boundaries, or nearby. Several local landscape sensitivities and designations identified by the County Development Plan are not within close proximity of the proposed development site, for example, the Portlaw Woods located several kilometres south of the study area, or the candidate Special Area of Conservation (cSAC) proposed by Duchas along the Clodigh at Coolfin, south of Portlaw. This area is a habitat for wintering grey-legged geese and has therefore been declared a natural heritage protection area. (NHA). Likewise, the visually vulnerable ridgeline at Clashroe, is located several kilometres west of the site, and although visible from the study area, due to scale and distance, is not considered a constraint on the landscape of the proposed development area.

The aesthetic values of a landscape are often the most obviously impacted, due to development and the subsequent shift in character of the developed area. The proposed development site is generally level and is effectively screened from many local views by young, recently planted woodland. Therefore, the aesthetic value of the site in its current state mainly lies in the value of the landscape planting surrounding the site. The woodland which has been planted to the south and east of the Michell Ireland facility will eventually mature into a mixed woodland of predominately native species, which will not only provide visual screening of the facility, but will increase the ecological value, visual amenity from offsite, and overall aesthetic value of the area.

1.2.3 Landscape Sensitivity

The sensitivity of a landscape to development (and therefore to change) will vary according to its character type, as well as the importance attached to any single value or combination of values which are attributed to that landscape. The sensitivity of a landscape is therefore defined by the DoEHLG Landscape Guidelines (2000) as "the measure of its ability to accommodate change or intervention without suffering unacceptable effects to its character and values".

The *Suir River valley* landscape type consists of a relatively visually enclosed landscape. Due to the low-lying nature of the land surrounding the river, any occurrences of woodland, mature hedgerows, farm complexes, or other visual intrusion within the landscape are likely to truncate any lines of sight within the river valley. Therefore, there are rarely any long-range views afforded from viewpoints within this landscape character area, with the exception of views upstream and downstream, which are not intruded upon by three-dimensional features. However, as the river is an important landscape feature in the environment, as well as being of high ecological and aesthetical value, it carries a degree of sensitivity to development, which may compromise the highly distinctive character and sense of place associated with such a feature.

Overall, the *Suir River valley* landscape is partially enclosed, and therefore capable of absorbing a large degree of visual impacts. Subsequently, the River Suir valley landscape character portions of the study area are in general **moderately sensitive** to change.

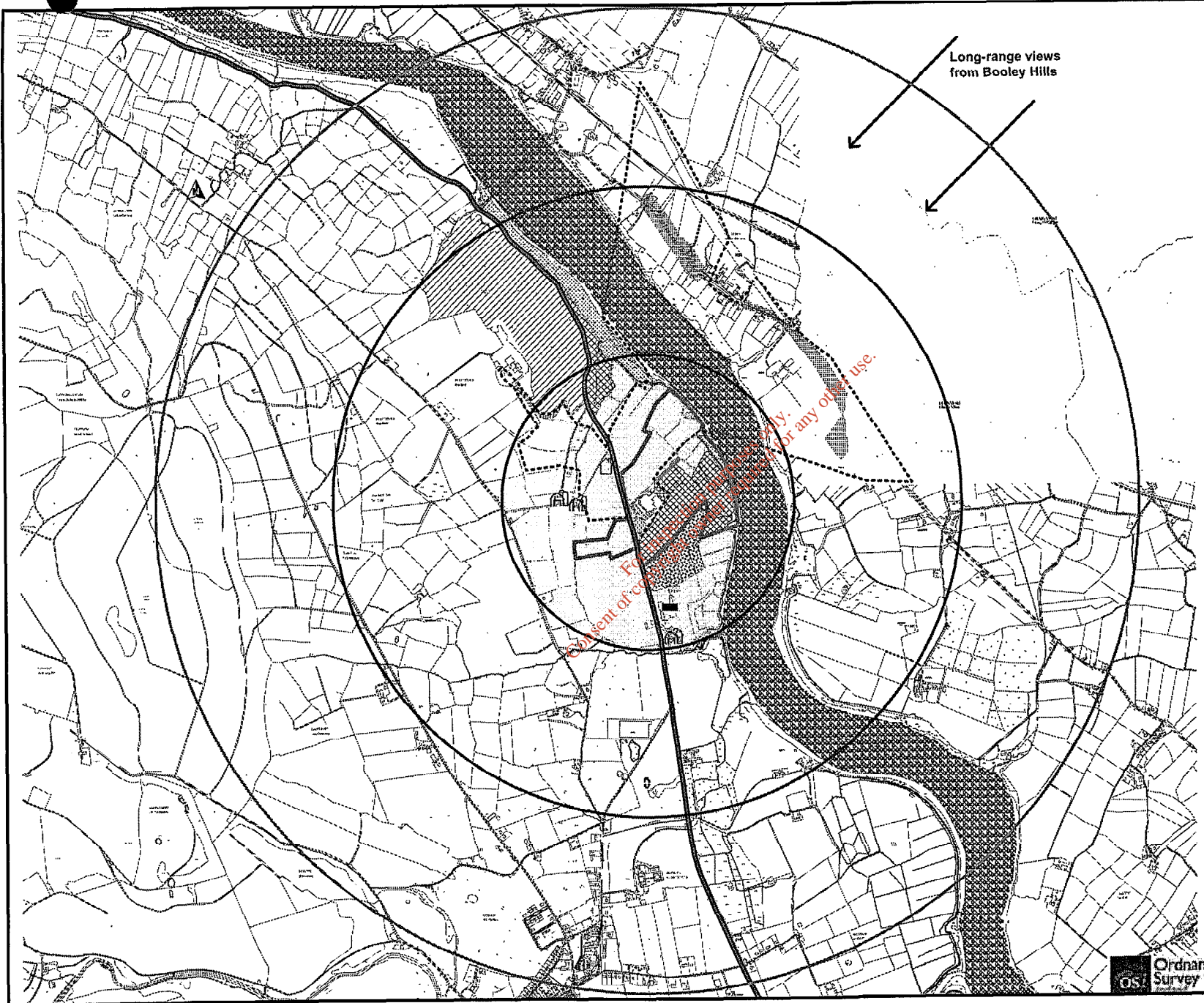
The overall local *agricultural landscape* is described in the Waterford County Development Plan (1999) as being "normal" in terms of visual vulnerability. The sometimes-undulating topography, dense hedgerows and belts of woodland help prevent distant views across the countryside, restricting the extent of visual impact. However, within the current study area, the agricultural landscape is of relatively flat, *lowland* landform, at the base of steeply rising contours to the west/northwest of the study area. This yields a number of long-range views into the lowlands of the study area, from the high ridgeline, whereby such lands are potentially **moderately sensitive** to development that may appear out of character with the surrounding agricultural environs.

1.2.4 Visual Envelope

The existing steep contours to the west of Killowen, in conjunction with the existing robust vegetation within the area, provide a significantly visually enclosed environment, within which to locate an industrial facility such as the proposed facility. The rising ground to the west, northwest, and southwest of the existing factory ensures that long-range views to the site from several kilometres away (in a westerly direction) are truncated, while the existing woodland to the south and east provides a significant degree of visual screening from both directions. Along the northern site boundary is an established hedgerow, densely planted with a mixture of ash, sycamore, pine, and alder, which parallels the length of the existing factory building and wastewater treatment plant. The hedgerow, while effectively screening views to the factory from the R680, becomes less effective as a visual screening element as it extends eastward past the wastewater treatment plant. In the easternmost extents of the hedgerow, the high-canopy tree species give way to low growing gorse and scrub. This results in views to the eastern portions of the site, from the R680 and Clashroe hills.

The majority of off-site views to the existing Michell Ireland site are afforded from the northwest, north, and east directions. Due to the rising contours to the northwest of the site, a small number of short-to-medium range views to the roof of the factory, and the existing wastewater treatment plant are afforded within the visual envelope. From the north and east, specifically across the Suir, within the Booley Hills range (the mountainous region east/northeast of the Suir) and along the N24 at Fiddown, a glimpse of the existing factory roof can be seen over the tops of existing woodland and hedgerows. This particular view generally pertains to traffic moving at high speeds along the national road, and is at a relatively long-to-medium range, dependant on the precise location of the viewer on the road at a given time. Finally, medium range views from the east, at Riverquarter and Turkstown can be seen by motorists on the Turkstown road, as well as some Turkstown/Riverquarter residents occupying dwellings along the eastern banks of the River Suir.

There are few short-range views to the site, due to earth mounding and site landscaping, with the exception of from immediately in front of the entrance to the facility, along the R680, and a nearby residence along the R680, opposite the site. Any remaining short-range views are limited to passing traffic along the R680, which would typically involve vehicles moving at high speeds, and are therefore not typically considered to be highly sensitive visual receptors. Further explanation of visual terminology and individual receptors are further explored in *Section 1.4.3, Visual Impacts*.



Legend

Study Area Features

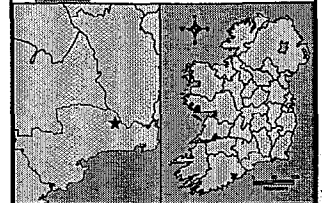
- Site Boundaries
- Proposed high-canopy hedgerow R880
- Formal Landscaped area within site
- River Star

Land Uses within 0.5km of site

- Farm Complex
- Residence not indicated on OS map
- Commercial
- Mixed woodland
- Commercial farm/orchard
- Mixed woodland/river flats
- Agricultural fields/grassland
- Coniferous woodland

Sensitive Visual Receptors

- Visual Envelope Boundary
- Short-range zone (<0.75km)
- Sensitive Residential Zone: Individual newly-built houses not indicated on OS mapping
- Medium-range zone (0.75-1.6km)
- Long-range zone (up to 2.5km)



RPS mcOS

Project **Bedminster Composting Facility EIS at Killowen, Portlaoighaire, Co. Wick**

Title **VISUAL ENVELOPE MAP**

Figure 1

RPS Group
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1.3 CHARACTERISTICS OF THE PROPOSAL

The proposed Facility involves the use of Bedminster technology for composting waste and the use of the existing wastewater treatment plant to treat wastewaters, and includes very few alterations to the existing Michell Ireland facility. The facility is adequately described in detail elsewhere and only those features with relevance to landscape and visual aspects are described in the following sections.

Proposed entities to be constructed on the site include the following:

- Weighbridge/kiosk/wheelwash
- Extension of factory building
- Digester
- Bio-filter area

External treatments will include cladding for roofs of the factory extension and weighbridge kiosk in Moorland Green, to match the existing buildings on site. The weighbridge kiosk will be rendered in a smooth plaster finish, doors and windows that match the existing factory office building will be used. Elevations of the proposed weighbridge/kiosk/wheelwash, bio-filter area, and digester will be lower than the existing structures on site, and therefore will not create any new visual intrusions on the viewshed from off-site viewpoints.

Changes to the existing facility that will be visible from off-site locations are limited to the slight increase in elevation of the 1780 m² extension, from the existing factory. The existing factory structure has a finished floor level (FFL) of 10,200 and a roofline level of 22,100, while the extension will increase the roofline by approximately 1 metre, to 23,100. This will allow for the safe clearance of tipping trucks within the facility.

Other amendments to the existing site layout include the partial demolition of an existing shed to the rear of the factory building, and the removal of rooftop vents along the top of the existing factory building. The removal operations will yield no change on the current landscape character or visual characteristics of the site. Boundary vegetation will be retained as will the surrounding woodland and internal planting, except where construction of the proposed structures warrants a minimal amount of internal landscaping to be removed. This includes a non-native, overgrown evergreen hedge to the east of the existing office, which is of little landscape value or aesthetic quality.

1.3.1 Associated Site Developments

Access to the site will not deviate from existing road infrastructure at the Michell Ireland facility. No new entrance or entrance road will be created. During the construction and operational phases, traffic will increase from levels that exist at the currently non-operational/disused facility, however, based on traffic data supplied by Bedminster Ireland Ltd., traffic levels will not increase from those recorded at the previous operational tannery. No new pumping stations, service connections, fencing, or lighting are to be installed due to the proposed extension of the scheme.

The existing landscape strategy includes an established, dense block of mixed woodland planting around the facility, as described in previous sections and illustrated in corresponding Figure 1. The woodland strategy has utilised trees that are high-canopy in nature, and will continue to grow to a maximum height of up to 15 – 30 metres, dependant on individual species. Eventually the majority of the factory building will be screened from northern and eastern views by dense woodland canopy, specifically within summer months when trees are in full leaf cover. Throughout winter months, the density of the woodlands combined with the presence of interspersed coniferous species, will also ensure significant screening views to the site structures, even when lacking in deciduous leaf cover.

1.4 SUMMARY OF LIKELY IMPACTS

1.4.1 Terminology

The significance of impacts on the landscape and visual environment are described using the following scales:

- **Imperceptible/No Impact** – arises where the development proposal is either distant or adequately screened by existing landform, vegetation or built environment.
- **Slight Impact** – arises where views affected by the proposal form only a small element in the overall panorama, or where there is a small change in the character of the area.
- **Moderate Impact** – arises where an appreciable segment of the panorama is affected, where there is an intrusion in the foreground or where there is a noticeable change in the character of the area.
- **Significant Impact** – arises where the views are affected, obstructed or dominated to such a degree that the proposal becomes the focus of the viewer's attention. A significant impact on character arises where there is a substantial alteration in the character of an area but the essential experience of the original character remains.
- **Profound Impact** – arises where a significant view is completely obscured or altered or where the character of an area has been completely changed.

Table 1.1 Duration of Impact¹

IMPACT DURATION	LENGTH OF IMPACT
TEMPORARY IMPACT	Lasting one year or less
SHORT TERM IMPACT	Lasting 1 - 7 years
MEDIUM TERM IMPACT	Lasting 7 - 15 years
LONG TERM IMPACT	Lasting 15 - 60 years
PERMANENT IMPACT	Lasting > 60 years

¹ Taken from EPA Guidelines on information to be contained in EIS, Glossary of Impacts (2002)

Table 1.2 Scale of Change²

SCALE OF CHANGE	DESCRIPTION OF SCALE
ADVERSE	A change that reduces the quality of the visual environment or adversely affects the character of the landscape.
NEUTRAL	A change, which does not affect the quality of the landscape.
POSITIVE	A change, which improves the quality of the environment.

1.4.2 Landscape Impacts

No new landscape impacts will be experienced due to the proposed expansion of the existing facility. There will be no removal of significant vegetation, and the character of the existing site will not be altered in a way that creates a new landscape character, or alters an existing landscape character in an adverse way. Additionally, the existing landscape character types, low-lying agricultural landscape and river valley landscape, are moderately sensitive to change, and have the ability to accommodate many kinds of development.

The existing site scale and massing in relation to neighbouring development is in keeping with the current landscape character within the immediate study area. The horizontal configurations of the buildings mimic the landscape character of broad horizons, enabling it to fit into the receiving environment with minimal visual impact. Overall, the approximate 1 metre increase in height of the existing facility roofline will be the only noticeable change to the existing facility, from offsite locations. This will be an *imperceptible impact* upon the local landscape character, most likely long term to permanent in duration, and *neutral in* reference to landscape quality, as it will not affect the local character as perceived from short, medium, or long-range views.

1.4.3 Visual Impacts

Visibility mapping is an integral part of landscape and visual assessment, as it can indicate the visibility of the site or the proposed development within it, from surrounding lands. However, the production of a Visual Envelope Map is only indicative and its application can be limited, particularly in a flat landscape where visibility is not determined by topographic features, rather by land use (including intervening features such as fences, hedges, woodland, or passing traffic). By determining the visual envelope or zone of visual influence, the potential extent of visibility is isolated and potential views that may be affected are itemised. However, it should be appreciated that a VEM is not an accurate indicator of the level of significance of the visual impact, but merely a statement of the fact of inter-visibility. Terminology used in descriptions of views is found in Table 1.3 below.

All visual impacts are presumed to be permanent in duration, with the exception of lines of sight to specific visual intrusions that will eventually be entirely screened over time, due to eventual maturation of vegetation.

² Taken from EPA Guidelines on information to be contained in EIS, Glossary of Impacts (2002)

Table 1.3: Zone of Visual Influence Terminology³

View Description	Length of Range	Visual Zone
Short Range View	< 0.75km	Local Zone
Medium Range View	< 1.6km	Intermediate Zone
Long Range View	Up to 2.5km	Distant Zone

The extent and visual importance of existing tree and shrub vegetation on the site is significant, as it comprises diverse boundary planting around the entirety of the site, and dense woodland blocks within the site boundaries to the south and east. All vegetation will be retained and therefore the visual impact of both the existing and proposed structures will be lessened over time, as the vegetation continues to mature and eventually reflect the scale of the highest structure levels within the site.

Specific viewpoints considered to be sensitive include:

- Views from residences
- Views from roads
- Views from river
- Views from other properties

Views from residences

Existing residential property around the site is sparse and limited to rural residences along the R680, along the Clashroe ridgeline (west of Killowen), and along the Turkstown/Riverquarter road, along the opposite banks of the River Suir.

The site assessment included a visual survey of all existing structures from the local residential areas, and concluded that the most visually exposed components of the site are limited to the wastewater treatment tanks and the existing factory building. The tanks are dark in colour and therefore appear visible more from medium-range viewpoints than long-range. However, the light colour of the existing factory building is highly visible in contrast to the dark foliage of the surrounding woodland and the wastewater tanks immediately adjacent to it.

Partial short-range views to the existing Michell Ireland facility are limited to one recently built residence along the R680, opposite the existing factory, and slightly north (refer to Figure 1). Upon completion of the composting facility extension, the short-range visual receptor at the R680 residence will experience no change in visual impact, as the only visible alteration to the facility will be the roofline elevation, increased by 1 metre. The most visible component of the facility from this particular residence is the wastewater treatment plant, which will not undergo any changes due to the proposal. Although the 1 metre increase in height of the proposed extension will be an additional visual intrusion within the landscape, it does not change the character of the viewshed. Furthermore, due to the scale of distance and intervening vegetation between the viewpoint and proposal, the alteration to the roof of the existing facility will not reduce the quality of the visual environment. Moreover, as the intervening vegetation surrounding the facility matures, less of the existing and proposed facility will be visible, over time. As shown on Figure 1, two farm complexes are also present within the short-range visual zone, (<0.75km) however due to intervening hedgerows and dense vegetation surrounding the complexes, no lines of sight to the facility are afforded from beyond the aforementioned residence.

³ From LI *Guidelines for Landscape and Visual Impact Assessment*, (2002)

Medium range views include one residence to the northeast of the facility, across the R680 from site, and immediately adjacent to the north easternmost extents of the visual envelope. Partial views from this property are confined to views in winter months, when intervening vegetation at the residence is no longer in full leaf cover, and partial views to the factory roof and wastewater treatment plant are afforded from the farm buildings and driveway of the property. As previously mentioned, although the 1 metre increase in height of the proposed extension will be an additional visual intrusion within the landscape, it does not change the character of the viewshed. In addition, as a result of the distance and intervening vegetation between the viewpoint and proposal, the modification to the roof of the existing facility will not decrease the value of the visual environment. Furthermore, as the intervening vegetation surrounding the facility matures, over time this will reduce the visibility of the proposed facility.

Remaining medium-range views are confined to those opposite the River Suir from the site, within the townlands of Turkstown and Riverquarter. Eight no. residences in Turkstown have views facing the factory roof and wastewater treatment tanks, while 5 no. residences have rear views to the same. Two rear views to the facility and wastewater treatment tanks are afforded from residences alongside the N24 between Turkstown and Riverquarter, while 3 no. residences in Riverquarter have front or side views to the site, as do 5 no. residences at the Clonmore Cross Roads. In total, 23 no. residences east of the proposed development were assessed to have medium-range views to a portion of the site, in summer when leaf cover is at 100%. Due to scale and intervening distance, vegetation, and the low lying contours of the river valley, the most noticeable change to the existing site will be the removal of 6 white ventilation tubes on the roof of the existing factory. Upon completion of the extension, no change in visual amenity or landscape character will be yielded by the structural additions on the visual receptors indicated.

The *distant* zone of visual influence surrounding the site is limited to long-range lines of sight from the east and northeast of the N24 in County Kilkenny. Rural agricultural lands define the steeply rising contours of Graigavine and Clonmore, with few residences scattered amongst patchwork fields separated by hedgerows. The higher elevations, The Booley Hills, are void of residences and are covered in woodland, which stretch as far as 10km away from the site. These hills comprise part of the South Leinster Way, and span northwest into the Slievenamon range. While a small number of individual residential views to the site are afforded from the lower agricultural hillsides (approximately 5-8km away), due to scale and intervening distance between the site and the lands that make up this range of hills, no distant-zone (or beyond), views to the site are isolated in visual impact analysis of the study area.

Views from roads

Views to the site from roadways are limited to a small (less than 1 km) section of the R680, and the N24 in Co. Kilkenny. As established by residential assessment, a neutral visual impact will occur, due to imperceptible change in visual character from both roads. This is due to road design, the topography of the land and the degree and nature of vegetation, in both the roadside hedgerows and ditches, and the adjoining lands. This, in conjunction with the nature of the N24 in particular, which is a national primary road with a speed limit of 100kph and the current structures on site, which are buildings with a large footprint and relatively small vertical height, make the nature of existing development on the proposed site inconspicuous.

Overall, the alterations of the existing Michell Ireland facility will include structural changes, which are predominately screened from view by boundary vegetation, woodland within the site extents, and existing intervening topography. Those views to the roof of the site and existing wastewater treatment plant are limited to short and medium range views, mainly from Co. Kilkenny. The visual impact of the proposal will be permanent and neutral, causing no change/imperceptible change to the existing visual amenity and visible landscape character within the visual envelope.

Views from river

Views to the site from the River Suir are likely to remain unchanged, due to the low lying nature of the river, and mature, established riverside vegetation. As the river is significantly lower in elevation than the surrounding trees, woodlands and hedgerows that intrude upon views to the site from the river, it is

likely that no change to the site will be perceived from the Suir. Therefore a neutral visual impact will be yielded upon visual receptors utilising the river, including anglers or recreational and commercial boat traffic.

Views from non-residential properties

Views to the site from properties other than private residences include the local GAA grounds, the Killowen Orchard, and Woodlock Nursing Home, all in the townland of Killowen. No existing views to the site are afforded from such locations, due to intervening woodland vegetation. Subsequently, upon completion of the scheme, no change will be visible from these locations, resulting in a neutral visual impact.

1.4.3.1 Visual Impact: Construction Phase

The proposal would have a *negative* visual impact on the receiving environment (particularly views from residences, roads, river, and other properties) in the *short to medium term* during the envisaged construction phase. This is due to the processes involved in the construction of any development of this scale; construction traffic related to materials delivery and removal, the clearing of what is currently grass and tarmac to make way for the bio-filter area, digester, and proposed extension to the factory, of which the construction processes itself will be highly evident.

Additionally, if a tree protection plan is not implemented and the screening ability of existing trees along all boundaries are compromised to a large extent then the visual impact upon the receiving environment throughout construction and operational phases, would be *negative*, and *short to medium term*, due to the timeframe involved in the reinstatement of the lost vegetation.

If the timeframe of phasing of the development is grossly exceeded, then a greatly extended construction phase will also have *negative* impact upon the study area in the short term.

1.4.4 Do-nothing Impact

This scenario would result in a neutral to negative impact in the medium to long term. The proposed development is on a vacant factory site, which has a series of structures including a wastewater treatment plant, factory, office and shed. These structures are currently serviceable, and if a 'do nothing' regime is followed then these structures will be open to degradation through vandalism, weather and animal infestation. As well as the degradation of the existing structures, the site could also be subject to illegal dumping.

The reverting of previously maintained open areas to scrub, meadow, and woodland is also likely. This in itself would be a positive impact, as it is a scenario that would see the industrial nature of the site revert to a landscape character similar to that of surrounding lands in the area. However, the existence of structures on site and the possible negative impacts associated with their deterioration process, would make any such positive impacts void. As the land is zoned for employment uses, it is likely to be developed in the future.

1.5 PROPOSED MITIGATION

As the proposed development includes only minor additions to a facility which is already established and adequately landscaped, the following are measures are primarily proposed to reduce visual intrusiveness of the construction phase of the development. Moreover, the mitigation measures target the upkeep and propagation of a quality landscape maintenance strategy as currently in place at the

facility. The following strategies are based upon the analysis of the site in its current state and the proposed site layout. These measures include:

- Appropriate tree and shrub planting throughout the site to ensure the integrity of the proposed structures on site and to facilitate inclusion in the overall character of the receiving environment.
- Implementation of high-canopy hedgerow using native species, along entire northern site boundary, where currently gorse and low-growing scrub exist.
- Use of dark-coloured external treatment of facility roof and siding, close to that of the wastewater treatment tanks, which are significantly less visible from off-site views than existing colour.

The aim of these proposed mitigation measures is to ensure the development of a safe, progressive and useable working environment which has a high degree of visual integration into the existing fabric of the receiving environment.

During the construction phase of the development a tree protection program should be implemented to assist in ensuring retention of existing hedgerows and woodland, which is integral in the effective screening of the facility and construction activities. The proposed landscaping of the northern boundary (east of the wastewater treatment plant) should be implemented in the growing season immediately following the earliest construction phase of the development.

1.6 PREDICTED IMPACT OF PROPOSAL WITH MITIGATION MEASURES

The predicted impacts the proposal will have on the receiving environment once landscape mitigation techniques are in place, is based on information supplied by the client, the initial desk study and analysis of information collected on site.

1.6.1 Construction Phase

The proposal will have a *negative to neutral impact* in the temporary to *short term*. As with any construction of this scale there will be a degree of high visibility due to the processes involved in construction. These include arrival and departures of occasional construction vehicles, the clearing of tarmac to make way for new structures and carparking. Such actions will be highly evident in the short term from a variety of locations, especially from the northwest, due to the elevation of surrounding lands and along the R680.

1.6.2 Operational Phase

The proposal will have a *neutral to positive impact* in the *long term*. After construction and establishment of the proposed development, the development will be partially visible from the previously listed visual receptors within the short and medium range. Due to the maturation of existing woodland, and design of the new structures, this visibility will have a *neutral* impact upon the visual fabric of the receiving environment, with mitigation measures successfully implemented. Likewise, the continuously maturing woodland and landscape planting will yield a *positive landscape impact* on the surrounding environs, increasing the ecological and aesthetic value of the existing site.

APPENDIX 6

Traffic Impact Assessment Report

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**FORMER MICHELL SITE,
PORTLAW, CO. WATERFORD**

Transport Assessment

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July 2005

02692/TJ/JK

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APPENDICES

Appendix A – Network Traffic Flow Diagrams

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1 INTRODUCTION

1.1 Background

1.1.1 Trafficwise Ltd. has been retained to advise on the traffic and transportation issues relating to the proposed development of a brown-field site adjacent to R680, in the town lands of Portlaw, Co. Waterford.

1.1.2 The development site of some 30Ha is brown-field site and the previous use of the lands included for an industrial based facility comprising premises of approximately 5,000m². The lands are currently zoned for industrial uses.

1.1.3 The applicant proposes to use the existing premises whilst under the current application a modest increase is sought in the floor area of the existing industrial premises in the order of 1,200m². Accordingly the total floor area will increase from the current 5,000m² to a total of 6,200m². In addition it is proposed to provide ancillary site facilities together with associated car parking, service areas and service road. A more comprehensive description of the detailed composition of the site is provided in the application documentation.

1.1.4 It is proposed that the development will be served by one vehicle access to the R680 which will provide access for both employee and works or operational vehicles.

1.1.5 It is proposed that the site will be accessed from the existing site access point. Landscaping works are proposed under the current application and the Application will ensure that hedge/verge maintenance works are carried out at the existing access to ensure satisfactory visibility sightlines are provided for its future safe use.

1.2 Study Scope

1.2.1 In this report, we identify the existing traffic conditions and assess the relative level of impact the proposed development is likely to have on the capacity and operation of the road network in the vicinity of the development.

1.2.2 The report identifies how the traffic associated with, or generated by the proposed development can be accommodated on the existing and emerging future local roads network. Where appropriate, measures to address the management of both base network traffic flows and development traffic on the local road network are discussed.

1.2.3 Further to examining the specific elements of the proposed development and assemblage thereof, we will review the current roads network serving the site in relation to the long term strategic development of the area in accordance with the current development plan.

1.3 **Study Methodology**

1.3.1 It is normal that the Local Authority would expect that the Traffic Impact Assessment be prepared in accordance with the Traffic Management Guidelines. Accordingly this report, which addresses the likely traffic impact of the proposed development and provides a description of the physical characteristics and land-use requirements in relation to the transport requirements of the proposed development, is structured in accordance with the general advice provided in the Institution of Highways & Transportation document 'Guidelines for Traffic Impact Assessment' (September 1994).

1.3.2 The above document is recognised by Transportation Planners to represent a structured approach to the preparation of Transport Assessments (formerly Traffic Impact Assessments).

1.3.3 The current Traffic Management Guidelines provide a brief overview of the methodology outlined in the Institution of Highways and Transportation guidelines and references the use of same in the preparation of Traffic Impact Assessments. The Institution of Highways & Transportation guidelines provide suggested headings based on current best practice and it is these headings (where relevant) under which the report is written.

2 PROPOSED DEVELOPMENT

2.1 Proposed Development Land Uses

2.1.1 It is proposed to construct a waste treatment facility together with ancillary parking and service area facilities. The proposed facility will be housed in the existing 5,000m² premises on the site, which it is proposed will be extended by some 1,200m². The resulting Gross Floor Areas (GFA) of the facility will clearly be 6,200m² and will be located upon lands zoned for 'Industrial' land uses.

2.2 General Characteristics of Site

2.2.1 The proposed development is located adjacent to the R680 and comprises a land holding of some 30Ha. The site is situated approximately midway between the towns of Portlaw, Co Waterford and Piltown Co. Kilkenny. Located on the southern banks of the River Suir the entire site comes under the administrative jurisdiction of Waterford County Council.

2.2.2 Located within the town boundary of Portlaw, the site is zoned for Industrial Uses within the Portlaw Local Area Plan 2002-2008.

2.2.3 The River Suir is the natural boundary of the site to the north whilst the R680 forms the southern boundary. Lands to the east and west of the 30Ha land holding accommodate agrarian uses.

2.2.4 The proposed development aims to maximise the potential utilisation of the existing brown-field site, which previously accommodated the Michell facility and associated operations. The proposed development is considered to accord with the principles of sustainable development and the hierarchy of development lands.

2.2.5 The Michell facility clearly generated traffic on the local roads network when it was operational. It follows therefore that if the site were still operational then there would be an 'existing' level of traffic generation associated with the site.

2.2.6 By a similar rationale the site is currently zoned for Industrial Uses and it is therefore not unreasonable to assume that some level of traffic generation will also be associated with any future use of the site. It is assumed that such fundamental factors would have been considered when the site was zoned.

2.3 Historic and Zoned Site Traffic Characteristics

2.3.1 Considering the previous and indeed recent uses of the site, the application could be considered essentially a change of use. In the case of examining a change of use at an existing site it is normally accepted practice to examine only the impact of any incremental increases in traffic resulting directly from the proposal. Clearly this methodology provides a measure of the real impact of the site on the 'existing' receiving environment. In the case of a change of use, clearly traffic impact will be less than at a equivalent green-field site.

2.3.2 Notwithstanding the fact that the above is further discussed, and indeed some assessment of the above phenomenon is provided herein, in the interest of a robust or worst case assessment we have also provided an assessment of the site as a green-field development where all traffic generated by the proposal is considered totally new to the area with no account being taken of the existing permitted or zoned uses.

2.3.3 In addition, factors such as providing local employment for both site workers and lorry drivers may indeed bring about minor improvements to traffic on the local roads network. Such minor benefits include the shorten of existing journeys to work for such employees who may currently travel to work outside the area.

2.3.4 Robust assessments are recommended by the Institution of Highways and Transportation. Rather than an assessment of the average influences of the site, robust or 'worst case' assessments are normally carried out.

2.3.5 The assessments herein are carried out under the above robust criteria where the site is essentially considered green-field. It follows that in terms of traffic generation and network performance, the assessments herein constitute a worst case, or extreme scenario of traffic generation on the local road network.

2.4 Proposed Access

2.4.1 As discussed, it is proposed that the site will be accessed from the existing site access point which is a simple priority arrangement serving the site from the R680. The existing access has historically served the Michell operations and is considered satisfactory in serving the proposed development. The existing access will be improved through landscaping works, and the Application will ensure that hedge/verge maintenance works are carried out at the existing access to ensure satisfactory visibility sightlines are provided and maintained for its future safe use.

2.5 Parking Provision and Servicing

2.5.1 Parking facilities for employee vehicles together with operational and service vehicles are proposed on site. These facilities are considered satisfactory to serve the site and thus ensure no overspill or parked vehicles onto the public highway. The site is considered capable of accommodating further parking if this was deemed necessary or appropriate by the Local Authority in determining the application.

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3 EXISTING CONDITIONS

3.1 The Local Road Network

3.1.1 An audit of the local road network has been undertaken during the peak and inter-peak periods on Tuesday 5th July 2005. The objective of the audit was to establish the existing transport conditions and vehicle movement patterns on the receiving roads environment or local roads network in the vicinity of the proposed development.

3.1.2 In addition to the R680 alignment from which the site enjoys direct vehicular access, the audits focused upon three existing junctions considered key, in the vicinity of the proposed development. These junctions are as follows;

- The existing site access,
- R680 T-junction immediately to the south of Fiddown Bridge, and
- T-junction immediately to the north of Fiddown Bridge.

3.1.3 Whilst a narrow footpath is provided adjacent to the eastern parapet of Fiddown bridge, there are no formal pedestrian or cycle facilities provided at the above three junctions. In addition there are no cycle or pedestrian facilities provided on the local road network in the vicinity of the proposed development. The audits established that the R680 varies in width. A minimum road width of approximately 5.5 metres was measured on the section of the R680 between the existing site access and Fiddown Bridge.

3.1.4 Bus services in the local area are provided by two different operators. Suirway operate a service between Portlaw and Waterford via Kilmeaden, with a frequency of 4 trips each way (three on a Wednesday and Thursday) every day excluding Sunday. Bus Eireann operate Expressway services between Waterford and Limerick along the N25 corridor. These services call at Piltown in addition to all other intermediate stops with a frequency of 7 services each way on an average weekday.

3.2 Existing Site Access

3.2.1 The proposed development site currently benefits from having a vehicle access point onto the local road network. The access is a simple priority configuration connecting the site as the 'minor' road to the R680, or the 'major' road. The existing access measures approximately 6.0 metres. The R680 is governed by an 80kph speed regulation along the frontage of the proposed development site. Whilst the R680 is relatively straight in the vicinity of the existing site access, visibility envelopes for vehicles exiting the site are currently impeded by the growth of the hedgerow, however this can be easily addressed by maintenance work to the existing verge and hedgerow either side of the access. In the interest of traffic safety it is the Applicants intention that this work will be carried out during the initial setting up of site for construction work.

3.3 Quantification of Current Traffic Flows on Links and Junctions

3.3.1 In establishing the scope of a traffic impact assessment the Institution of Highways and Transportation advises as follows;

"Although most TIAs relate to large or extensive developments it should be recognised that the movement of two milk tankers to a remote farm down a country lane may, in certain circumstances, be deemed to be unacceptable by the planning authority. In contrast, some city centre developments may attract a large proportion of their trips by public transport. This is often ignored because, whilst car trips form a much lower relative trip proportion, their impact often requires more detailed analysis."

"It is, therefore, not possible to provide any hard and fast rules as to what constitutes a significant traffic impact and hence one for which a full traffic impact assessment should be undertaken. The Guidelines therefore recommend that a TIA should normally be produced where one or other of the following thresholds are exceeded:

- *Traffic to and from the development exceeds 10% of the two-way traffic flow on the **adjoining highway***
- *Traffic to and from the development exceeds 5% of the two-way traffic flow on the **adjoining highway**, where traffic congestion exists or will exist within the assessment period or in other sensitive locations*

These thresholds should be applied in the absence of alternative guidelines from the highway (roads) authority in the form of approved or adopted policy."

"It is recommended that the threshold approach should also be used to establish the area of influence of the development. Hence the study should include all links and associated junctions where traffic from the development will exceed 10% of the existing traffic (5% in congested or other sensitive locations) or such other threshold as may have been adopted by the highway (roads) or planning authority."

3.3.2 In accordance with the above advice we have included in our assessment locations on the local roads network considered to have a potential increase in traffic flow of 10% on the adjoining highways as a direct result of traffic generated by the proposed development.

3.3.3 To establish current traffic conditions on the receiving roads environment **Trafficwise** Ltd. has undertaken short term manual traffic turning count surveys at the at the following two junctions.

- R680 T-Junction immediately to the south of Fiddown Bridge, and
- T-Junction immediately to the north of Fiddown Bridge Junction

3.3.4 The above traffic surveys were carried out on Tuesday 5th July 2005 over the morning and evening peak traffic periods. An analysis of the recorded traffic data established that the networks peak hours occur between 07:45 and 08:45hrs in the morning and 16:45 and 17:45hrs in the evening. The peak hour results of the traffic surveys are provided in Figures 1 and 2 of Appendix A.

3.4 Planning and Development Context

3.4.1 Portlaw Local Area Plan 2002-2008

3.3.1.1 In brief the Portlaw Local Area Plan was formulated as framework for the planned, co-ordinated and sustainable development of the county and for the conservation and enhancement of its natural and built environment. The Plan sets out the objectives and polices of Waterford County Council (WCC) in respect of physical planning as well as co-ordinating the activities of the Council.

3.3.1.2 Section 3.3 of the Local Area Plan specifically considers the Transport policies and objectives of the County Council. The Plan states the following policies.

- *To ensure accessibility to Portlaw is maintained and improved as need arises in their programme for road improvements;*
- *To facilitate and promote enhancement measures (visual and physical) to all approach roads to the town, to render a sense of anticipation and arrival.*

3.3.1.3 Stated objectives of the Local Area Plan include the following.

- *To preserve from development the proposed road reservations as shown on the Land-use Zoning Map*
- *To improve the safety and appearance of access routes to the town;*
- *To seek visual improvements as part of new developments adjacent to all approach roads to the town;*
- *To consider alternative strategies for access provision and routes, in order to cater for additional residential requirements, and enhancement and vitality of the town centre*

3.3.1.4 Section 3.6 of the plan addresses the interrelated topics of Industry, Commerce and Enterprise. In paragraph 3.6.2 the plan states that "*Michell Ireland Ltd remains a successful employer in the area*".

3.3.1.5 Land-use zoning is considered in Section 4.1 of the Local Area Plan. The purpose of land use zoning as we understand from the document is to provide an indication to property owners, developers and the general public, of the types of developments which are considered most appropriate in each zone. In this context, the zoning objectives allow the developer to plan development proposals and business plans with some degree of certainty. In the control of development, the objective of zoning seeks to delimit competing and incompatible uses so as to promote greater environmental quality and thereby rationalise the land use patterns. The existing development site is zoned in the Local Area Plan for Industrial Uses, with provision also made in the Plan for Open Space/Amenity lands buffering the lands to the east and west of the Industrial site.

3.4.2 Waterford County Council Request for Further Information

3.3.2.1 The scope of our assessment has considered the comments raised in Waterford County Councils Request for Information which sought clarification and further detail regarding the following points.

- .An up-to-date traffic impact assessment should be undertaken to assess traffic movements along the R680. The survey should determine the impact proposed by vehicles entering and leaving the facility on traffic movements in relation to the bridge crossings in Carrick-on-Suir, Fiddown and Waterford City.
- It should also attempt to proportion the directional flow of vehicles to and from the facility i.e. either via Waterford City and Carrick-On-Suir.
- The survey should also determine the impact of all construction related vehicles.
- The revised traffic impact assessment should take account of the traffic movements during the operational stage of the proposed facility, which was grossly underestimated in the original EIS. All methodologies and assumptions made should be clearly documented.

4 MODAL CHOICE/TRIP ATTRACTION

4.1 Forecast Traffic Generation of Development Site

4.1.1 With the objective of providing a robust and comprehensive assessment of the traffic arising from the proposed development we have undertaken a comparative analysis of the potential of the existing zoned facility and the current proposed waste treatment facility.

4.1.2 The existing development has until recent times been operational and could (albeit for a different specific Industrial use) reasonably be re-commissioned for a similar industrial use which would subsequently give rise to vehicle movements. Given that the existing facility is closed these vehicle movements would be over and above those currently using the local road network in 2005 and enumerated in the traffic surveys. As discussed earlier the assessments herein take no account of the traffic generated by the existing use nor is a specific allowance made in the assessments for the levels of traffic which the Michell site historically generated.

4.1.3 Clearly zoned for industrial uses, the existing site has a potential to generate traffic, irrespective of the type of the Industrial development eventually realised on the site. In the interests of providing an overall traffic picture of the site, in order to determine the traffic generation potential of the site we have used the TRICS Database. Recognised by Local Authority and approved by the Institution of Highways and Transportation for the use in estimating traffic generation of planned developments the TRICS v2005a database (Trip Rate Information Computer System) contains over 1,200 development sites and 3,000 survey days, within 81 separate land uses across the development spectrum. The flexibility of the system allows the user to calculate trip rates from individual, or a group of selected development sites, which can be selected by the user imposing a wide range of database field criteria (such as Site Area, Gross Floor Area, Retail Floor Area, number of employees etc.).

4.1.4 Under the TRICS category 'Employment' a total of three different industrial based land uses can be identified. The trip rates are based generic industrial development types whilst site selection criteria is aimed at survey data in the database for development sites of a relatively similar nature, contextually.

Industrial Land-use Classifications	Forecast Trip Rate					
	AM Peak Hour			PM Peak Hour		
	In	Out	TW	In	Out	TW
Industrial Units	0.55	0.085	0.625	0.075	0.55	0.625
Industrial Warehousing	0.155	0.08	0.235	0.095	0.16	0.225
Industrial Estate	0.680	0.215	0.895	0.175	0.61	0.785
Average	0.462	0.127	0.589	0.115	0.44	0.555

Table 4.1 Summary of Peak Hour Trip Rates – Existing Site

4.1.5 Provided in Table 4.1 are the TRICS trip rates for a selection of Industrial development types. Based upon the trip rates presented in Table 4.1 above and the existing building on site which comprises 5,000m² (GFA) the following Table 4.2 shows the estimated number of vehicle trips could reasonably be expected to each Industrial development type. The figures in Table 4.2 represent the 'potential' traffic generation of the site as zoned.

Industrial Land-use Classifications	Forecast Vehicle Trips					
	AM Peak Hour			PM Peak Hour		
	In	Out	TW	In	Out	TW
Industrial Units	28	4	32	4	28	32
Industrial Warehousing	8	4	12	5	8	13
Industrial Estate	34	11	45	9	31	40
Average	23	6	29	6	22	28

Table 4.2 Summary of Peak Hour Vehicle Trips – Existing Site

4.1.6 The vehicle flows presented in Table 4.2 show that the 'existing' facility located on site has the potential to generate a range of vehicle flows subject to the specific industrial operation.

4.1.7 During the AM peak hour the potential two way flows range from 12 to 45 vehicle movements, whilst in the PM peak hour the potential two way flows range from 13 to 40 vehicle movements.

- 4.1.8 Given the location of the existing site it is expected from our review of the TRICS data that vehicle flows would be likely to be at the lower end of these ranges, nonetheless, with the objective of providing a robust assessment we have adopted the average flows presented above as representing the volume of traffic that could reasonably be expected to be generated by the existing site as zoned.
- 4.1.9 There is no similar 'donor' sites for comparison and there are no equivalent waste treatment facilities in the TRICS database, accordingly, in estimating the likely level of traffic generation to the 'proposed' development we have worked the figures from 'first principles'.
- 4.1.10 The derivation of traffic generation numbers to the proposed development has been sub-divided into employee trips and works or operational trips.
- 4.1.11 Employee trips is composed of light vehicles and it is anticipated that between 12 to 25 employees will be based on site. Considering the sites location it can be argued that there is a potential for each employee to drive to work thereby generating a lower bound of 12 vehicle movements to the site in the morning and from in the evening. The upper bound is clearly 25 employee vehicles.
- 4.1.12 The scheduled hours of employment are between 07:00 and 20:00hrs. It can be appreciated therefore that it is unlikely that employees will travel to or from the proposed development site during the local roads networks peak hours as identified from the surveys.
- 4.1.13 Operational trips will be composed of movements to and from the site by HCV's. The type of HCV will vary depending on the type of material being transported.
- 4.1.14 Whilst operations on site are programmed to take place between 0700 and 2000 on weekdays, and 0800 and 1800 on Saturdays, it is proposed that waste transfer operations both to and from the site will occur between 0800 and 1900 Mondays through to Fridays (11 hours a day), and 0800 and 1730 on Saturdays (9.5 hours a day).

4.1.15 In estimating the potential number of HCV trips that could be generated by the proposed development we have made the following assumptions;

- a) Each HCV can transfer 20 tonnes of material (HCV's regularly transfer up to 24 tonnes of material depending upon axle configuration and carrying capacity) ,
- b) The proposed facility remains operational throughout the year, the only exception being bank holidays in addition to the week between Christmas Day and New Years Day.
- c) There are 11 bank holidays per annum during which the proposed facility will be closed,
- d) HCV's are not parked on-site over night.
- e) It is assumed that there is no back-haul of materials and the vehicles used for the importing of waste material onto site are not used for the exporting of compost material. Importing HCV enter full and leave empty, whilst exporting HGV enter empty and go out full.
- f) The activities and operations of the site are not seriously influenced by seasonal fluctuations.
- g) We have assumed that there would be one additional HGV trip per day to site to allow for maintenance, servicing and the like.

4.1.16 Based upon the above assumptions and the volumes of waste it is proposed to treat at the facility in the following we provide calculations of the likely traffic generation of the proposed development when fully operational. Two separate assessment scenarios are outlined below.

Assessment Scenario 1 - Carrying Capacity Fully Utilised

- 52 weeks or 364 days per year,
- 6 working days per week equates to 312 working days a year,
- 11 Bank Holidays reduces this to 301 working days a year,
- Christmas Week reduces this again to 293 working days a year,
- At 40,000 tpa of inbound solid waste this equates to 136.5 tonnes per day
 - Given 20 tonne payloads this equates to 6.825 one-way HCV trips per day (0.591 HCV per hour)
- At 60,000 tpa of inbound liquid waste this equates to 204.8 tonnes per day
 - With 25 tonnes of material per HCV this equates to 8.2 one-way HCV trips per day (0.7092 HCV per hour)
- At 20,000 tpa of outbound compost this equates to 68.26 tonnes per day (5.91 tonnes per hour),
 - With 20 tonnes of material per HCV this equates to 3.4 one-way HCV trips per day (0.3 HCV per hour)
- In turn this amounts to the following daily weekday trips;
 - 14 (13.65) two-way *Inbound Solid waste* HCV trips per day
 - 17 (16.4) two-way *Inbound Liquid waste* HCV trips per day
 - 7 (6.8) two-way *Outbound Solid Compost* HCV trips per day
- Allowing for an ancillary HCV vehicle trip we predict the following vehicle movements between the site and the local road network;

A total of 39 two-way HCV trips on a normal weekday.

4.1.17 Clearly it is in the commercial interest of the site that the full potential of all vehicles will be realised. Nevertheless in the interest of providing a robust assessment we have undertaken a sensitivity analysis of the above HCV trip generation. The sensitivity analysis is based upon the assumption that on average each and every HCV will carry only 75% of full capacity.

Assessment Scenario 2 - Carrying Capacity 75% Utilised

- 293 working days a year (as above),
- At 40,000 tpa of inbound solid waste this equates to 136.5 tonnes per day (11.82 tonnes per hour),
 - With 15 (opposed to 20) tonnes of material per HCV this equates to 9.1 one-way HCV trips per day (0.788 HCV per hour)
- At 60,000 tpa of inbound liquid waste this equates to 204.8 tonnes per day (17.73 tonnes per hour),
 - With 19 (opposed to 25) tonnes of material per HCV this equates to 10.8 one-way HCV trips per day (0.933 HCV per hour)
- At 20,000 tpa of outbound compost this equates to 68.26 tonnes per day (5.91 tonnes per hour),
 - With 15 (opposed to 20) tonnes of material per HCV this equates to 4.55 one-way HCV trips per day (0.394 HCV's per hour)
- In turn this amounts to the following daily weekday trips;
 - 19 (18.2) two-way Inbound Solid waste HCV trips per day
 - 22 (21.6) two-way Inbound Liquid waste HCV trips per day
 - 10 (9.1) two-way Outbound Solid Compost HCV trips per day
- Allowing for an ancillary HCV vehicle trip we predict the following vehicle movements between the site and the local road network;

A total of 52 two-way HCV trips on a normal weekday

4.1.18 The results of the proposed development trip generation analysis as detailed above is summarised below in Table 4.3 and shows that the proposed development is likely to generate approximately 39 HCV's per day. Under the sensitivity assessment the development is shown to have the potential to generate 52 HGV per day, however it should be noted that this is under unlikely vehicle load conditions.

Operational Traffic Generators	Scenario 1 Full Utilisation	Scenario 2 75% Utilisation
	Two-Way HCV Trips Per Day	Two-Way HCV Trips Per Day
Solid Waste Traffic	14 (13.65)	19 (18.20)
Liquid Waste Traffic	17 (16.40)	22 (21.60)
Compost Traffic	7 (6.80)	10 (9.10)
Ancillary	1	1
Total	39	52

Table 4.3 Summary of Daily HCV Generation; Proposed Development

4.1.19 The results presented above provide an average trip generation over the entire working day. The proposed facilities operational programme promotes an 11 hour window when materials will be imported and exported. Assuming an average hourly rate over this period, approximately 3.54 two-way trips can be expected for the *Full Utilisation* assessment and 4.73 for the *Sensitivity Analysis* scenarios respectively. This equates to 9.1 percent of the total daily HCV generation every hour for both scenarios. From our experience in the development of similar waste recovery facilities a figure of approximately 9% is considered representative of likely hourly traffic flows.

4.1.20 With the objective of providing a robust assessment we have adopted a worst case scenario and assumed that the import/export profile of HCV's will experience a peak during the local road networks AM and PM peak hours. We have assumed that during the AM and PM peak hours the import/export profile of HCV's is double that of the average arrival rate. This represents an increase of 100% above the average rate and would consequentially result in a lowering of the inter-peak traffic generation profile. As a result it can be assumed for the purposes of assessment that the proposed development will generate approximately 8 (rounded up from 7.08) two-way trips during the AM and PM peak hours, for the *Full Utilisation* scenario, and 10 (rounded up from 9.46) in the *Sensitivity Analysis* scenario.

4.1.21 These figures represent approximately 18% of daily traffic flows to and from the site. From our experience with weighbridge data from similar site and from working on similar projects it can normally be expected that there would be a minor peak in the morning. This morning peak typically equates to about 14% of daily traffic generation. Accordingly, from our previous experience we consider the above 'assessment' traffic flows to be indeed robust.

- It should be noted however that the above figures do not represent the levels of traffic expected at the facility each and every hour, as outlined earlier in the document and as recommended by the Institution of Highways and Transportation the above figures are 'assessment' figures aimed at a robust assessment and clearly represent a theoretical and extreme worst case scenario in terms of traffic generation.

4.2 Distribution of Development Generated Traffic

4.2.1 It stands to reason that the greater the distance from the development the more diluted the impact of development related traffic on the capacity and operation of the receiving roads environment. This is due to the opportunity afforded drivers to use a greater number of roads and alternative routes within a larger catchment area.

4.2.2 Two separate distribution exercises have been undertaken. In the first distribution assessment the potential traffic generation of the existing (disused) 'industrial' development is estimated. This assessment has been undertaken to enable a comparison to be made between the potential re-commissioning of the existing facility and the impacts of the proposed development. The second distribution exercise has also been carried out and the traffic generated by the proposed development is distributed to the receiving roads environment.

4.2.3 As is typical, the traffic generated by the existing facility, as presented in Table 4.2, has been assigned across the local road network based upon the existing traffic patterns established from the site surveys undertaken in July 2005.

4.2.4 In response to the specific operational characteristics of the proposed development a different approach has been adopted to assign proposed development traffic to the network. The raw product and Market for the proposed by-product is governed by the geographical location of the urban areas within the catchment of the proposed development. The facility is being promoted to provide a unique service across the south east and as such will generate operational traffic to and from the key urban centres across this area. Accordingly a regional gravity model has been compiled and is based upon the 2002 Census data.

- Table 4.4 below details the key urban areas within the estimated 'operational' catchment area and apportions traffic volumes based upon the total population of all of these centres. For simplicity we have not included the smaller towns and villages nor the rural area within the catchment. As part of this exercise we have assumed that 70% of Waterford generated traffic will travel via Kilmeaden, whilst the remaining 30% will travel via Mooncoin.

Urban Centre within 'Operational' Catchment Area	Population	Proportion of Total	Operations Traffic Generated	
			Inbound	Outbound
Kilkenny City & Environs	28,000	22.6%	6	6
Callan, Co Kilkenny	1,325	1.1%	0	0
Thomastown, Co Kilkenny	1,600	1.3%	0	0
Clonmel & Environs	16,910	13.7%	4	4
Carrick On Suir & Environs	5,586	4.5%	1	1
New Ross & Environs	4,800	3.9%	1	1
Waterford & Environs	46,742	37.8%	10	10
Dunmore, Co Waterford	1,750	1.4%	0	0
Tramore, Co Waterford	8,305	6.7%	2	2
Dungravan, Co Waterford	7,452	6.0%	2	2
Portlaw, Co Waterford	1,183	1.0%	0	0
Total	123,653	100%	26	26

Table 4.4 Distribution of Operational Traffic

4.2.5 The above distribution proportions represent the adopted distribution matrix for the proposed developments 'operational' generated traffic (Sensitivity Analysis traffic flows e.g. 75% HCV capacity utilisation).

4.3 Construction Related Traffic Attraction

4.3.1 The construction phases of the project will generate traffic on the local road network. We consider that the primary generators of traffic will be deliveries of construction materials and construction staff. Bearing in mind the above estimates of traffic attraction to the proposed development site, from our experience in the implementation of similar projects it is not expected that the traffic generation associated with construction will outnumber those generated by the development upon opening.

4.3.2 Accordingly, traffic generation and therefore impact on capacity during the construction period is likely to be considerably lower than forecast above. Considering the lower levels of traffic attraction during the construction period we do not believe it necessary to carry out an assessment of the 'short term' impact on the capacity or load carrying capacity of the local roads network in the vicinity of the development during construction.

4.3.3 Insofar as construction traffic impact on the network is concerned, clearly, given the geometry of the local road network, deliveries in large vehicles may cause some minor and infrequent disruption locally. The impact of such delivery vehicles will be very controllable and is not likely to significantly impact on the operation of the local road network. Although thought normal or standard practice, the arrival and departure of delivery vehicles can be formally programmed to occur outside the peak hour periods if so desired by the Local Authority.

4.3.4 As we understand it is the intention of the developer to comply with the Local Authority policy on maintaining the roads serving the site clean of dirt and debris associated with the development of the site. If further detail regarding the control of the construction project and specifically the control of construction traffic is required by the Local Authority we respectfully suggest that a brief Construction Traffic Management Plan can be prepared under condition of planning.

5 ASSESSMENT YEAR (S) AND ESTIMATION OF TRAFFIC GROWTH

5.1 Estimation of Network Traffic Growth

5.1.1 While traffic on the road network will increase as a result of the development described in this report, it will also increase over time due to background growth in car travel in addition to the traffic movements associated with emerging developments across the greater southeast area. In order to establish future growth rates reference has been made to the NRA document "*Future Traffic Forecasts 2002-2040*" (August 2003).

5.2 Assessment Years

5.2.1 Regarding the choice of appropriate assessment years the Institution of Highways & Transportation guidelines advise as follows;

"Various principles have been suggested when considering post-development impact with a view to ameliorating any adverse effects. These principles include:

- *restoring the flow/capacity ratio to the level prior to the development*
- *providing for 5 years growth*
- *maintaining 10% reserve capacity at the design year*
- *allow for some off-setting public transport mode shift."* (para 3.7.4)

5.2.2 Considering the scale of the proposed development and the lead time required to commission such a scheme we have adopted 2006 as our Opening Year assessment period. In accordance with Institute of Highways and Transportation TIA guidelines, 2016 some five years after opening has been selected as future Design Year for the purposes of the assessments.

5.2.3 NRA document "*Future Traffic Forecasts 2002-2040*" (August 2003) indicates that for non national roads a growth rate of 1.87 percent for the period 2005 to 2006. For the 2016 future year assessment the a growth rate of 14.67% is forecast by the NRA.

5.2.4 In the capacity assessments we will examine the following future year assessment scenarios based on an assumed year of opening in 2006.

- a) 2006 Year of Opening – Post Development Scenario
- b) 2016 Future Design Year – Post Development Scenario

5.3 Assessment Traffic Flows

5.3.1 Provided in the attached figures are the future year assessment flows used in the compilation of this report. In the interest of a comprehensive overview of the traffic implications of the proposed development we have also provided existing survey data and forecasts of likely traffic generation on separate network flow diagrams. The following network flow diagrams are provided in Appendix A.

- **Figure 1:** AM Peak Hour Flows – Traffic Survey
- **Figure 2:** PM Peak Hour Flows – Traffic Survey
- **Figure 3:** Peak Hour Flows – Forecast Traffic Generation
- **Figure 4:** AM Peak Hour Flows - Post Development Scenario (2006 & 2016)
- **Figure 5:** PM Peak Hour Flows - Post Development Scenario (2006 & 2016)

5.4 Network Traffic Growth, Robustness of Forecast

5.4.1 Since traffic growth on the local roads network is for a large part attributable to development in the area, it could be assumed that a portion of the forecast or assumed network growth would account for the traffic generated by the proposed development. However, in the interests of preparing a robust analysis of the traffic situation we have discounted this consideration.

5.4.2 Based on the above, in the assessments of the local road network to follow in this report we have not accounted for this element of 'double counting' and have simply compounded the traffic growth on the local road network by adding the traffic generated by the proposed development directly to the growth-factored network traffic flows.

5.4.3 It must be appreciated that in our analysis of the roads network we have applied the above traffic growth rates to the peak hour period. However these growth rates are not always applicable to the peak hour period and it is generally accepted by traffic engineers that the peak hour, instead of increasing or intensifying, tends to spread over a longer period. Therefore in light of the above considerations we believe that it can be assumed that the figures used in the peak hour analysis are robust in terms of the likely levels of peak hour traffic on the local roads network in the vicinity of the proposed development.

5.4.4 The 2006 Opening Years 'base' network traffic flows have been quantified, therefore it is possible to establish the potential traffic impact specific to the proposed development. In the interest of a comparative assessment we have also undertaken this exercise for the scenario which considers only the potential traffic implications of re-commissioning of the existing industrial facilities located on site. Table 4.5 below shows the forecast potential impact of the current and proposed developments on the link capacity of the surrounding roads network.

Location	Existing Facilities		Proposed Development	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
R680 Site Access	6.8%	4.2%	2.4%	1.5%
T-Junction South of Fiddown Bridge	3.4%	2.4%	2.6%	1.7%
Fiddown Bridge	3.0%	2.2%	3.0%	2.0%
T-Junction North of Fiddown Bridge	3.0%	2.0%	3.0%	1.9%

Table 4.5 Year of Opening 2006 Forecast Network Impact on Links

5.4.5 The network impacts are presented as a percentage increase over those traffic flows recorded in the surveys (and estimated for 2006 and 2016). The figures presented in Table 4.5 demonstrate the marginal increases in traffic resulting from development at the site. The largest impact is forecast under the assessment traffic flows to be approximately 3.0% which is significantly less than the Institution of Highways and Transportation recommended threshold.

5.4.6 It can be seen from the above that the Proposed Development and the hypothetical existing industrial facilities are comparable in terms of predicted traffic generation. Both development types have a very small level of impact on the local roads network, indeed considering that traffic volumes are accepted to fluctuate by a typical $\pm 10\%$ on a daily basis a 3% increase is clearly likely to have an insignificant impact on the capacity of the receiving roads environment. It should also be borne in mind that this 3% is derived from robust calculations which discount for the most part any potential traffic benefits the site may have to offer. In general in the preparation of the assessments any traffic reductive element of the proposal or traffic benefit is ignored.

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6 ASSESSMENT OF FUTURE YEAR ROAD NETWORK OPERATION

6.1 Computer-modelling Programs used in Capacity Assessments

6.1.1 As recommended by the NRA: Design Manual for Roads and Bridges (DMRB) and the Institution of Highways & Transportation, the Transport Research Laboratory (TRL) computer modelling program PICADY (Priority Intersection Capacity and Delay) has been used for the assessment of major/minor priority junctions on the local road network. In general terms these programs operate on the gap acceptance theory. The output of PICADY provides information for roads designers and planners with regards to capacity, queuing and delay. The program is intended primarily as a means of assessing junction performance and can also be used as an aid in junction design. Generally a level of saturation of 85-90% corresponding to a Ratio of Flow to Capacity (RFC) of 0.850-0.900 is accepted at priority junctions, however as with the other programs this figure should not be considered in isolation during the peak hour period and should be viewed together with queuing and delay information. The PICADY sister program for the assessment of traffic signal controlled junctions is OSCADY.

6.2 Assessment Scenarios and Presentation of Results

6.2.1 The capacity of any system of roads is dictated by the operation of the road junctions within that system. It is the junctions in the vicinity of the proposed development that must be assessed in terms of operation in order to establish the traffic conditions that are likely to prevail on the local road network in the forthcoming years. It is not expected that the impact of the traffic generated by the proposed development would have any detectable influence on the operation of the local road network beyond the immediate environs. As a result the scope of future year assessments is limited to the local road network most heavily trafficked period (PM Peak Hour) and the following scenarios;

- Year of Opening 2006 – Post Development Scenario; PM Peak Hour
- Future Design Year 2016 – Post Development Scenario; PM Peak Hour

6.2.2 A copy of the full PICADY results for each of the assessments carried out on the local road network can be provided if required.

6.3 Capacity Assessments Site Access Junction

6.3.1 The operational performance of the existing access has been investigated for the PM peak hour when network flows are considerably higher than the AM. It therefore follows that impact on the operation of junctions is likely to be greater in the PM period. The results of the assessments are detailed in Table 6.1 below.

Scenario/Junction Arm		RFC	Delay	Queue
2006 PM	R680 West	0.009	0.1	0.0
	Site Access	0.020	0.3	0.0
	R680 East	0.010	0.2	0.0
2016 PM	R680 West	0.009	0.1	0.0
	Site Access	0.021	0.3	0.0
	R680 East	0.010	0.2	0.0

Table 6.1 Summary of PICADY Output Data – Site Access / R680 Junction.

6.3.2 The junction simulation results demonstrate that the junction will continue to operate with a significant amount of reserve capacity following the commissioning of the proposed development in both the 2006 Opening Year and the 2016 Design Year. As can be seen from the results of the PICADY assessment the RFC is very low indeed indicating that in terms of capacity, the existing site access can accommodate the likely levels of traffic generation whilst maintaining a reserve capacity approaching 100%. The volumes of traffic generation to the site are very low indeed and equate to approximately 10% of that volume which indicate the need for a right turn facility, accordingly the above results are no surprise, and the existing access is expected to perform well within acceptable operational parameters.

6.4 Capacity Assessments R680 T-Junction South of Fiddown Bridge

6.4.1 The operational performance of the existing junction has been investigated for the PM peak hour when network flows are considerably higher than the AM. It therefore follows that impact on the operation of junctions is likely to be greater in the PM period. The results of the assessments are detailed in Table 6.2 below.

Scenario/Junction Arm		RFC	Delay	Queue
2006 PM	R680 Portlaw Rd	0.047	0.7	0.0
	Bridge	0.442	11.6	0.8
	R680 Carrick-On-Suir Rd	0.151	2.7	0.2
2016 PM	R680 Portlaw Rd	0.061	1.0	0.1
	Bridge	0.528	16.3	1.1
	R680 Carrick-On-Suir Rd	0.180	3.4	0.2

Table 6.2 OSCADY Output Data – T-Junction South of Fiddown Bridge.

6.4.2 The junction simulation results demonstrate that the junction will continue to operate well within capacity following the commissioning of the proposed development. This statement applies to both the 2006 Opening Year and the 2016 Design Year assessment results. As can be seen from the figures provided in Table 6.2 the existing junction is likely to function well within capacity for the foreseeable future. The impact of the proposed development on the operation of the existing junction is considered likely to be insignificant if not imperceptible to casual road users.

6.5 Capacity Assessments T-Junction North of Fiddown Bridge

6.5.1 As above the operational performance of the existing junction has been investigated for the PM peak hour when network flows are considerably higher than the AM. It therefore follows that impact on the operation of junctions is likely to be greater in the PM period. The results of the assessments are detailed in Table 6.2 below.

Scenario/Junction Arm		RFC	Delay	Queue
2006 PM	Piltown Rd	0.222	4.0	0.3
	Bridge	0.634	22.5	1.6
	Old Waterford Rd	0.105	1.8	0.1
2016 PM	Piltown Rd	0.327	7.0	0.5
	Bridge	0.747	40.4	2.8
	Old Waterford Rd	0.122	2.1	0.1

Table 6.3 OSCADY Output Data – T-Junction North of Fiddown Bridge.

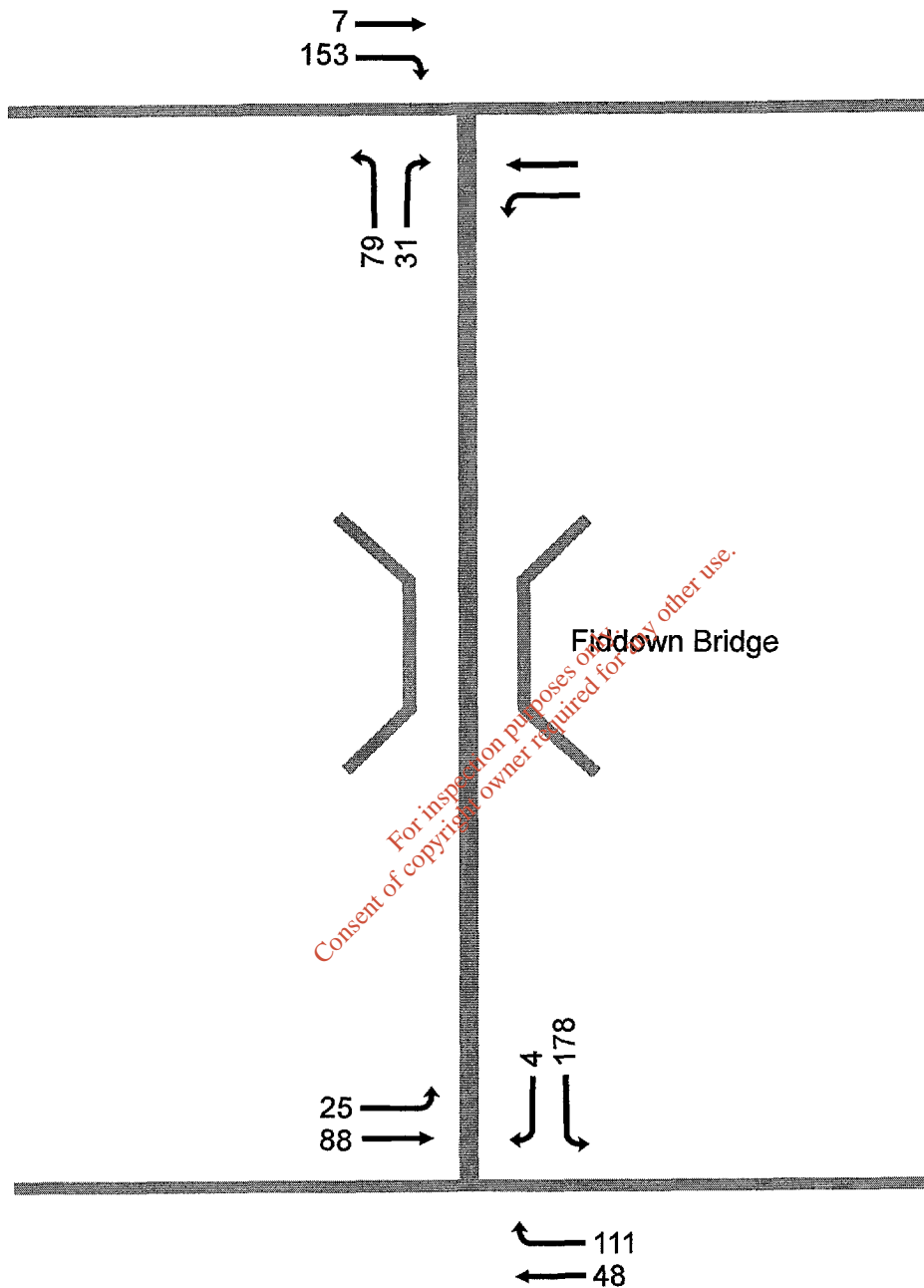
6.5.2 The PICADY output data shows that the junction will continue to operate within capacity following the commissioning of the proposed development, in both the 2006 Opening Year and the 2016 Design Year. The incremental reduction in capacity due to traffic growth on the network can be seen to be insignificant in terms of overall junction performance.

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7 CONCLUSION

7.1.1 We have examined the likely traffic scenario in the vicinity of the development site and the results of the analyses clearly indicate that the local roads network in the vicinity of the proposed development is not likely to experience operational difficulties due to the forecast increases in traffic associated with the development. The forecast increase in traffic resulting from the implementation of the proposed development will not be significant and the resulting impact on the carrying capacity of the receiving roads environment is estimated to be practically negligible.

7.1.2 We have also examined the potential traffic generation of the site based on the size of the existing building and the fact that the site is zoned for Industrial development. The results of this examination show that the proposed development is likely to generation a similar level and mix (HGV and cars) of traffic as a generic Industrial type development, as categorised in the TRICS database of site surveys. This indicates that the proposed development does not generate any more traffic than the industrial zoning would suggest, and therefore, in terms of traffic generation the proposed development is considered to accord with the development strategy envisaged for the site when the decision was taken to zone for Industrial uses.



Trafficwise
traffic & transportation solutions

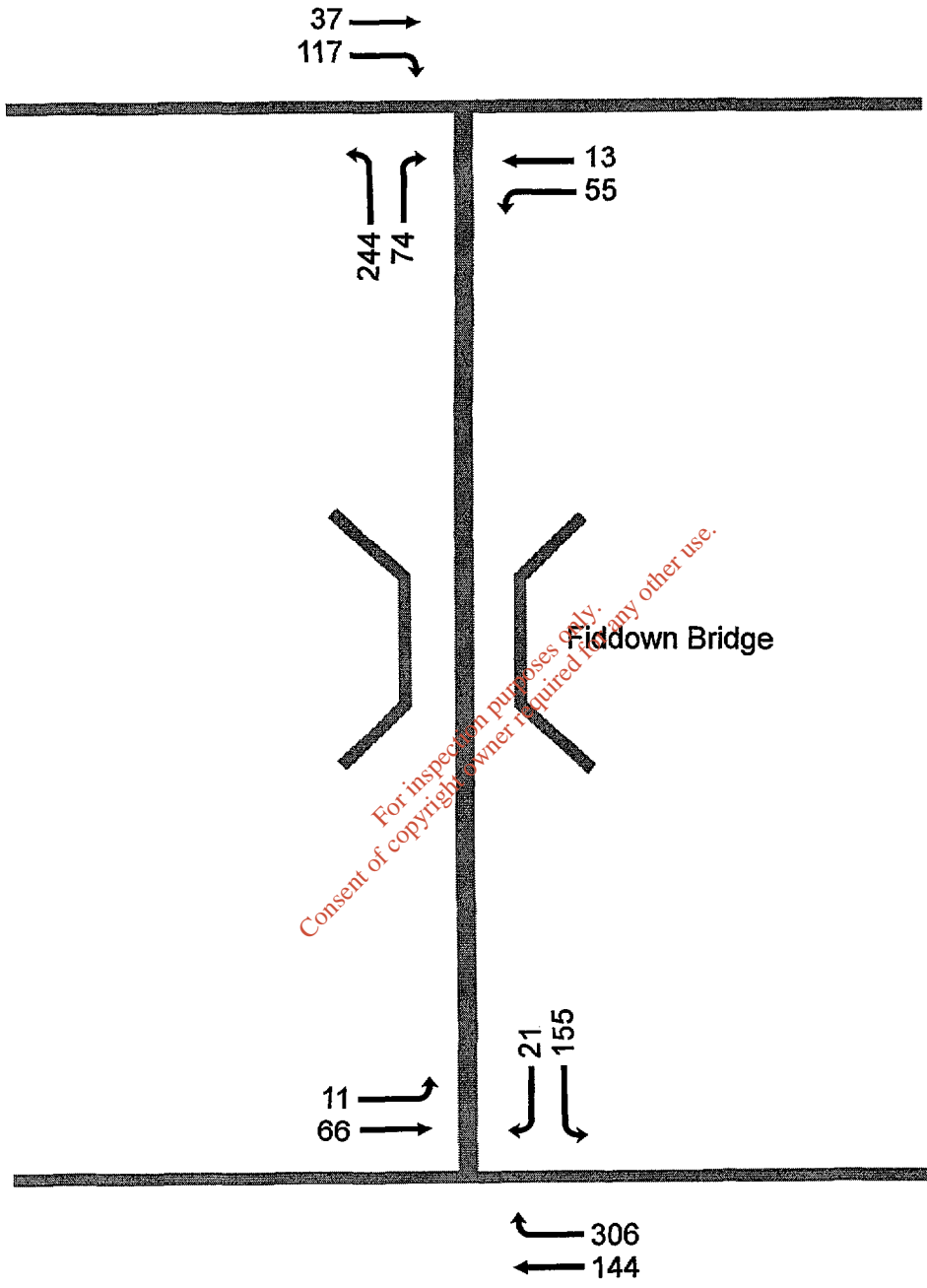
Bracetown Business Park,
Clonsilla,
Dublin.

Telephone: +353 (0)1 8014009
Fax: +353 (0)1 8014035
Website: www.trafficwise.ie
E-mail: info@trafficwise.ie

Project/Job Title **Fiddown, Co Waterford**

Drawing Title **AM Peak Hour Traffic Counts**

Drawn by: David Ashe	Checked by: Thomas Jennings	Approved by: Julian Keenan
Date: July 2005	Date: July 2005	Date: July 2005
Scale: N.T.S	JOB No: 02692	Figure 1
Appendix A		



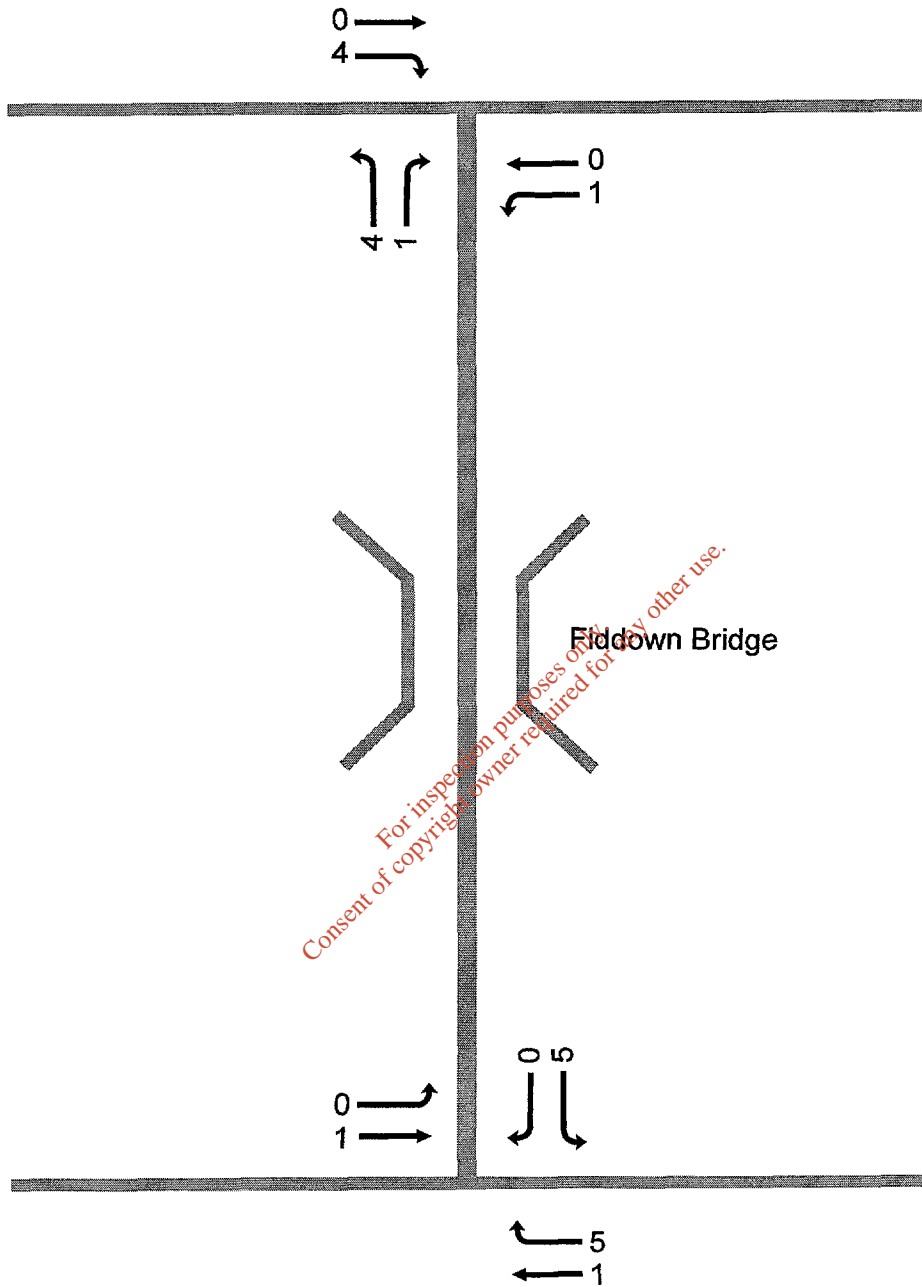
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Project/Job Title	Fiddown, Co Waterford	
Drawing Title	PM Peak Hour Traffic Counts	

Drawn by:	Checked by:	Approved by:
David Ashe	Thomas Jennings	Julian Keenan
Date:	Date:	Date:
July 2005	July 2005	July 2005
Scale:	JOB No:	Figure
N.T.S.	02692	2
Appendix A		



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Project/Job Title	Fiddown, Co Waterford
Drawing Title	Development Traffic Generation

Drawn by:	David Ashe	Checked by:	Thomas Jennings	Approved by:	Julian Keenan
Date:	July 2005	Date:	July 2005	Date:	July 2005
Scale:	N.T.S.	JOB No:	02692	Figure	3
Appendix A					

(9) 7
(180) 157

(95) 83
(37) 32

5 (5)
63 (72)

Fiddown Bridge

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(29) 25
(101) 89

4 (6)
183 (208)

116 (132)
49 (56)



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Project/Job Title	Fiddown, Co Waterford	
Drawing Title	AM Peak Hour Traffic Flows Post Development 2006 (2016)	

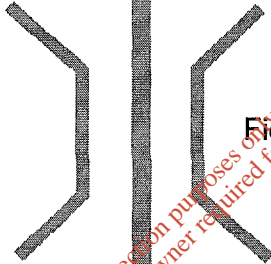
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David Ashe	Thomas Jennings	Julian Keenan
Date:	Date:	Date:
July 2005	July 2005	July 2005
Scale:	JOB No:	Figure
N.T.S	02692	4
Appendix A		

(42) 37 →
(138) 121 ↘



(284) 248 ↗
(86) 75 ↘

← 13 (14)
↙ 56 (64)



Fiddown Bridge

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(13) 11 ↗
(77) 67 ↘



← 21 (18)
↙ 160 (184)

← 311 (355)
← 145 (165)



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Project/Job Title	Fiddown, Co Waterford		
Drawing Title	PM Peak Hour Traffic Flows Post Development 2006 (2016)		

Drawn by:	Checked by:	Approved by:
David Ashe	Thomas Jennings	Julian Keenan
Date:	Date:	Date:
July 2005	July 2005	July 2005
Scale:	JOB No:	Figure
N.T.S.	02692	5
Appendix A		

APPENDIX 7

Soils and Groundwater Investigation and Analysis

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Submission in response to Waterford County Council request for 'Further Information' re the proposed development in Portlaw

Addendum to EIS – Soil, Geology and Groundwater

The EIS should detail the current condition of the soils on site and determine if any contamination has resulted on site as a result of Michell Tannary.

In order to comply with this request, the applicant contracted the independent consultants *Geotechnical and Environmental Services (GES) Limited* to investigate the site in order to sample and analyse soil and groundwater at the facility. This response to Waterford County Council contains the results from these independent investigations at the site. GES undertook two distinct investigative campaigns, Groundwater in late 2004 and Soil in 2005; their reports are appended to this EIS.

- Groundwater Report 3rd December 2004
 - Additional explanatory note from FBA laboratories (on sample from 3/12/04 report)
- Residual Contamination Assessment Report – April 2005

Groundwater Report 3rd December 2004

This original assessment was requested and carried out under the instruction and supervision of the Environmental Protection Agency. The report is appended to this EIS, in summary the conclusions state that *"there is no indication of significant impact on the groundwater environment from previous activities [Tanning] on the site"*

The additional explanatory note from FBA laboratories was forwarded to the EPA following a request from the Agency as to the methodologies employed in the analysis of the groundwater samples in the above report.

Residual Contamination Assessment Report – April 2005

Again this report was requested and carried out under the instruction and supervision of the Environmental Protection Agency. A schedule of works was agreed with the EPA and carried out by GES during March and April 2005. This report which is also appended to this EIS is primarily concerned with an examination of soil samples from potentially vulnerable areas around the Portlaw facility. The salient conclusions from this report state that *"a comprehensive investigation has been undertaken, which demonstrates consistent ground conditions across the area investigated. The results of the analysis do not indicate residual contamination, that may impact the environment or have an affect on structure associated with future development of the site"*

Conclusion

It is therefore evident from the independent reports that the previous activities carried out by Michell Tannery did **not** result in any contamination to the soil or groundwater at the facility.



Geotechnical & Environmental
Services Ltd.,
Campus Innovation Centre
Green Road,
Cariow
Ph: 059 91 30314
Fax: 059 91 40499
E-mail: geoenviron@circom.net

GES Limited
Ground and water environment consultants

Groundwater Assessment

Job No: 04-66

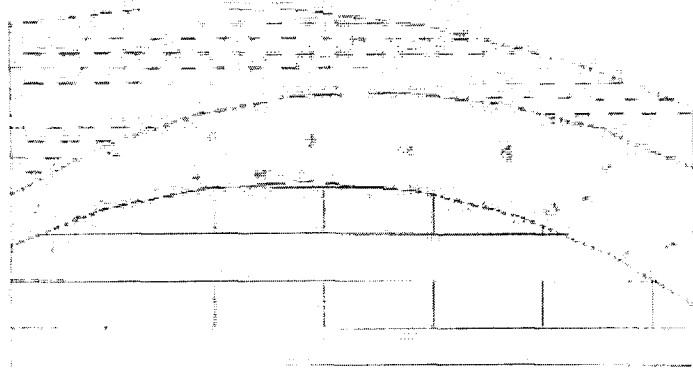
Report No: 04-66-01

Date: 03-Dec-04

Site: Michel Ireland site, Portlaoise,
Co. Waterford

Client: AES Landfeeds Environmental

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Contents

1. Introduction
2. Works undertaken
3. Drilling
4. Pumping and Analysis
5. Conclusions

Appendices

1. Borehole Location Map
2. Borehole Log
3. Groundwater Analysis

Report prepared and checked by:


J. Keohane

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1. INTRODUCTION

Geotechnical and Environmental Services Limited were requested by AES Landfeeds Environmental to co-ordinate an assessment of down gradient groundwater quality on the former Michel Ireland site at Portlawn, Co. Waterford.

The assessment was requested by the Environmental Protection Agency, as part of the return of the licence, covering the previous activities on site (Tannery).

2. WORK UNDERTAKEN

A borehole location was identified on 16 September 2004 and approval sought from the agency for the location and proposed method of drilling. Approval was received with a request to move the location 30m to 40m to the east on 27 September 2004.

The borehole was drilled by Fogarty Drilling of Gowran between 13th and 16th October 2004.

A pump was installed in the well and a sample recovered, which was analysed by FBA Laboratories of Cappoquin, Co. Waterford.

This report has been prepared to summarise and interpret the findings.

3. DRILLING

A log of the borehole is provided in the appendices. The borehole encountered 10.3m of silty CLAY over LIMESTONE Bedrock. The borehole was drilled to 50m total depth. A fissure at 43m yielded approximately 1m³ per hour. The overburden is effectively sealed out, which means that only groundwater from the aquifer is allowed to enter the borehole.

4. PUMPING and ANALYSIS

A pump was fitted to the borehole and the borehole pumped for 5 hours. A sample was recovered and sent to FBA Laboratories for analysis. The results of analysis are provided in the appendices.

The results demonstrate a good quality groundwater, with low concentrations for the main pollution indicators of Chloride, Phosphate, Potassium, Sodium, Ammonia, Nitrite and Nitrate. Very low concentrations of total Chromium were encountered in the sample.

5. CONCLUSIONS

The findings from the borehole indicate **LOW** groundwater vulnerability conditions, with confined conditions, indicating an upward hydraulic pressure.

The works confirm that there is no indication of a significant impact on the groundwater environment from previous activities on the site.

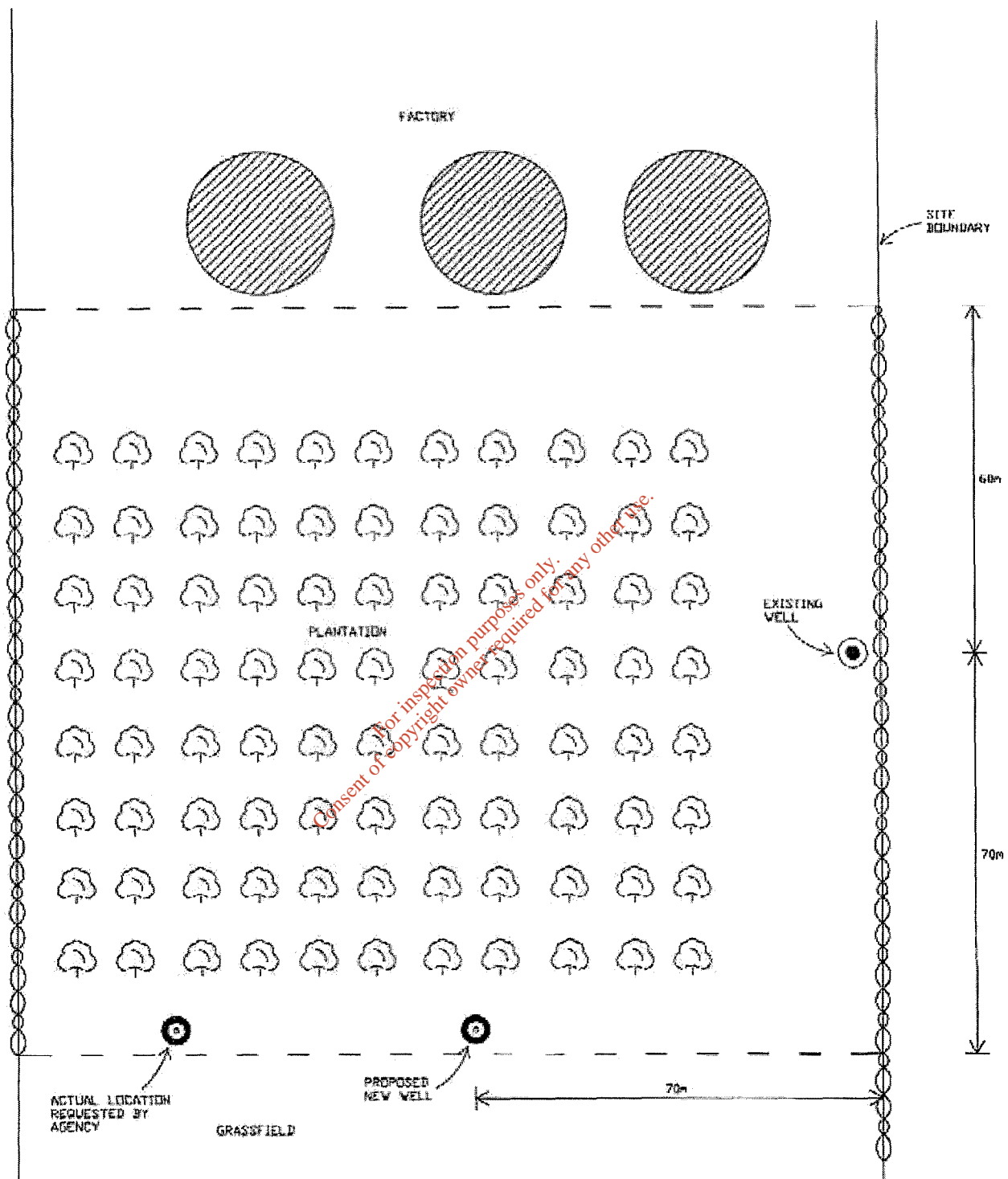
Appendices

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Appendix 1

Borehole Location Map

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Geotechnical & Environmental Services Ltd.		Project Title: Monitoring Borehole @ Michel Site Portlaoigh				
<small>Experts in Geotechnics, Hydrogeology & Environmental Studies</small>		Project Address: Michel Ireland, Killowen, Portlaoigh				
Gas Ltd., Campus Innovation Centre, Green Rd., Carlow.		Client: Landleeds AES				
		Dwg. Title: Location of Proposed Downgradient Borehole				
Ph: 059-9130314 Fax: 059-9140499 E-mail: genoviron@eircom.net		Dwg. Scale: 1/1,000	Date: 17/09/04	Dwg. No.: 04-66-01	Job No.: 04-66	Revision: A
		Drn By: LM				



Appendix 2

Borehole Log

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Geotechnical & Environmental Services

Campus Innovation Centre,
Green Rd.,
Carlow.

Ph: 050-9130314
Fax: 059-9140499

Borehole Log

BH1

Sheet 1 of 1

Method: Rotary Date: 13to16/10/04 Site: Michel Ire Ltd, Portlwg
Dia.mm: 250-160 Coords: G.L.M.O.D. Client: Landfeeds Environmental Ltd.

Water and Progress	Completion	Depth	Description of Strata	Legend
		0.00m		
250mm open hole		-1.50	Dark brown CLAY topsoil and roots	
250mm steel casing to 10.6m		-5.00	Soft red-brown silty CLAY with limestone boulders and sub-angular gravels	
Grout		-10.00		
160mm steel casing to 13.6m		-13.60	Dark shaley - Limestone	
160mm open hole		-15.00	Dark muddy Limestone with dark shale layers. Limestone is dry. Increasing layers of clean Limestone with depth.	
125mm uPVC 13.6m to 49.6m		-20.00		
		-25.00		
		-30.00		
		-35.00		
		-40.00		
		-43.60	Fissure in clean Limestone layer	
		-45.00	Dark shaley Limestone	
		-49.60	End of Borehole	

Remarks:

1. Upon reaching the 49.6m depth the borehole was airlifted for 1 hour until the water ran clear. Output estimated at 1 cubic m/hour.
2. After development 49.6m of 125mm uPVC casing was installed consisting of; 13.6m of casing and 30m of screen to bottom of BH.

Logged by: T.F. Scale: 1/250 End Casing Depth: Job No: 04-66

Appendix 3

Groundwater Analysis

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FBA Laboratories Ltd.

ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Carrigeen
Industrial Estate
Cappoquin,
Co. Waterford.

Tel: 058-52861
Fax: 058-52865
fbalabs@iol.ie

CERTIFICATE OF ANALYSIS

Landfeeds,
Unit 16 Hebron Ind Est.
Co. Kilkenny.

Ground water sample received 03.11.04

Ref: Mitchell Ireland

Lab Ref: WC0165

Parameter	Units of analysis	Result
pH	pH	7.1
Conductivity	$\mu\text{S}/\text{cm}$ @ 25°C	564
Chloride	mg/l Cl	22.5
Phosphate	mg/l P	0.15
Potassium	mg/l K	2.30
Sodium	mg/l Na	10.6
Ammonia	mg/l $\text{NH}_3\text{-N}$	0.04
Total Chromium	$\mu\text{g}/\text{l}$ Cr	< 1.0
Nitrites	$\mu\text{g}/\text{l}$ NO_2	3.0
Nitrates	mg/l $\text{NO}_3\text{-N}$	4.8

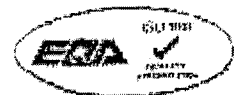
COMMENT: Due to very low level of Total Chromium present it is unfeasible to do further analysis for hexavalent Chromium as detection limits are in the range ppm and Total Chromium was analysed as < 1.0 ppb.

Signed M. Kelly

Date 5/11/04

DIRECTORS: T.M. BUTLER M. Agr. Sc., PhD
C.M. BOYER Dip. Sci.

Co. Reg. No. 250639



FBA Laboratories Ltd.

ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Carrigeen
Industrial Estate,
Cappoquin,
Co. Waterford.

Tel: 058-52861
Fax: 058-52865
fbalabs@iol.ie

CERTIFICATE OF ANALYSIS

John Mc Namara,
Landfeeds,
Unit 16 Hebron Ind Est,
Co. Kilkenny.

Ground water sample received 03.11.04

Lab Ref: WC0165

Parameter	Units of analysis	Result
pH	pH	7.1
Conductivity	$\mu\text{S/cm}$ @ 25°C	564
Chloride	mg/l Cl	22.5
Phosphate	mg/l P	0.15
Potassium	mg/l K	2.30
Sodium	mg/l Na	10.6
Ammonia	mg/l NH ₃ -N	0.04
Total Chromium	$\mu\text{g/l}$	< 1.0
Nitrites	$\mu\text{g/l NO}_2$	8.0
Nitrates	mg/l NO ₃ -N	4.8

COMMENT: Due to very low level of Total Chromium present it is unfeasible to do further analysis for hexavalent Chromium as detection limits are in the range ppm and Total Chromium was analysed as < 1.0 ppb.

Signed


Oonagh Mee

Date

14/2/05

DIRECTORS: T.M. BUTLER M.AGR.SC., PHD
C.M. BUTLER DIP SCI.

Co. REG. No: 250639



FBA Laboratories Ltd.

ANALYSTS: Agricultural and Environmental

CONSULTANTS: Agricultural and Nutritional

Carrigeen
Industrial Estate
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Co. Waterford.

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fbalabs@iol.ie

John Mc Namara,
Landfeeds,
Unit 16 Hebron Ind Est,
Co. Kilkenny.

With regard to ground water sample received 03.11.04 ref; Mitchell Ireland, Lab Ref: WC0165 analytical methods used are from the "Standard Methods for the Examination of Water & Wastewater, 20th edition. Individual reference numbers for analysis are listed below. The only exception is Ammonia Nitrogen which is analysed using a Hach DR/2500 with the method adapted from *Clin. Chim. Acta.*, 14, 403 [1966]. We partake in the EPA Intercalibration Scheme which monitors our analysis on all of the parameters you requested except nitrate nitrogen.

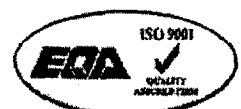
pH	pH	4500-H&B
Conductivity	$\mu\text{S/cm}$ @ 25°C	2510 B
Chloride	mg/l Cl	4500- Cl B
Phosphate	mg/l P	4500- P B&E
Potassium	mg/l K	3120 B ICP-OES
Sodium	mg/l Na	3120 B ICP-OES
Total Chromium	$\mu\text{g/l}$	3120 B ICP-OES
Nitrites	$\mu\text{g/l NO}_2$	4500-NO ₃ -B
Nitrates	mg/l NO ₃ -N	4500-NO ₂ - B
Ammonia	mg/l NH ₃ -N	see above

Signed 
Oonagh Mee

Date 14/2/05

DIRECTORS: T.M. BUTLER M.AGR.SC., PHD
C.M. BUTLER DIP SCI.

Co. REG. No: 250639



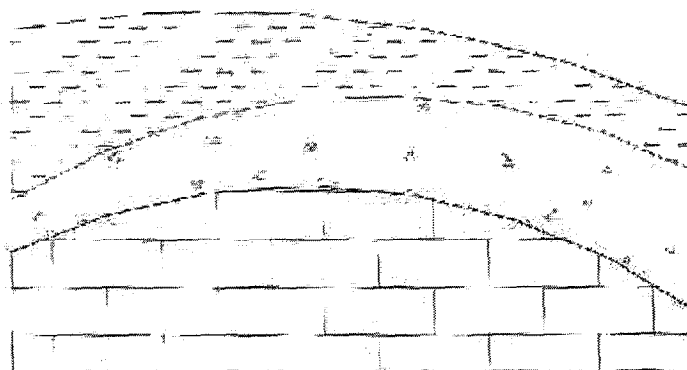


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Campus Innovation Centre
Green Road,
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Ph: 059 91 30314
Fax: 059 91 40499
E-mail: gepenviron@eircom.net

GES Limited
Ground and water environment consultants

Residual Contamination Assessment

Job No: 04-66
Report No: 04-66-02
Date: 29/4/2005
Site: Michel Ireland site, Portlaoise,
Co. Waterford
Client: AES Landfeeds Environmental



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Contents

- 1 Introduction
- 2 Site Works
 - 2.1 Proposed Works
 - 2.2 Actual Works
- 3 Findings
 - 3.1 Drilling
 - 3.2 Sampling
- 4 Conclusions

Appendices

- 1 Figure 1 – Site Map detailing Actual Investigation Points
- 2 Trial Pit and Borehole Logs (TP 1 and 2, BH 1, 3 and 5 and RC 1 and 2)
- 3 Soil Analysis Results
- 4 Plates Trial Pits 1 and 2

Report prepared by:

Jer Keohane

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1. INTRODUCTION

Geotechnical and Environmental Services Limited were requested by AES Limited to coordinate and prepare a report concerning the potential for residual contamination from the previous activities on a site at Killowen Portlaur, Co. Waterford.

The site was previously operated as a tannery by Michel Ireland Limited.

The EPA requested that an investigation be undertaken at agreed locations and that samples of subsoil be analysed for a range of potential contaminants.

This report documents the investigation undertaken and discusses the findings in the context of residual contamination.

2. SITE WORKS

2.1 Proposed Works

A schedule of works was agreed with the EPA as follows:

Further trial hole approximately 5m down gradient of the burial site, logged by a hydrogeologist and including the recovery of samples for analysis principally for total Ammonia, pH, Total Chromium and Chloride. A temporary standpipe will be fitted and any groundwater that accumulates in the standpipe will be recovered and analysed for the above parameters.

A borehole will be drilled on the tarmac area adjacent to the chrome recovery pit to 2m greater than the depth of the pit or to rockhead. Samples of subsoil will be taken for analysis for the parameters detailed above. A standpipe will be installed, and if groundwater is encountered, will be sampled and analysed for the parameters detailed above.

Three shallow boreholes to 3m depth will be drilled inside the original building. These will be equally spaced along on the downgradient side of the building and subsoils encountered will be analysed for the parameters detailed above.

It is proposed to use the shell and auger technique for the drilling.

2.2 Actual works

The actual works comprised 2 No. trial holes, 6 No. shell and Auger Boreholes and 2 No. Rotary boreholes. The boreholes were undertaken by Geotech Limited, of Cork and Jer Keohane of GES Ltd. supervised the excavation of the trial holes, and was in attendance during drilling.

The Shell and Auger holes were excavated on 7 and 8 March 2005. The trial holes excavated on the 7 March and the rotary holes excavated on 01 and 02 April 2005.

Samples were taken and analysed at TES Bretby Laboratories in the U.K.

The locations of the various investigation points are shown on Fig 1, and logs are provided in the appendices. A summary of laboratory results is provided in the appendices as are the original laboratory report sheets.

The following is a summary of works undertaken

PROPOSED POINT	PROGRESS	FOLLOW UP	ACTUAL POINT
TP1	Excavated to 3.2m		TP1
BOREHOLE A	Drilled to 4m		1
B	Low head room	Trial hole	TP2
C	Encountered lower concrete floor, could not excavate	Attempted to break out, but not successful	
Chrome Point	Drilled by Shell and Auger to 4.12m	Rotary Hole to 8.35m	3 and R1
		Drilled additional holes outside of building	5 and R2

The proposed schedule was disrupted because of obstructions encountered during drilling. However alternative locations were provided which maintained the integrity of the investigation.

A series of disturbed samples were taken and analysed for pH, Chloride, Chromium and Total Ammonia.

The results of analysis are provided in the appendices.

3. FINDINGS

3.1 Drilling

The deep rotary boreholes did not encounter bedrock at depths of approximately 8m below ground level.

The rotary holes encountered mainly Clay with cobbles from the top to base of the holes.

Similar material was encountered in the Shell and Auger boreholes, comprising mainly CLAY with localised pockets of gravel or cobbles.

The trial hole to the north of the site, encountered grey brown gravelly CLAY.

No groundwater inflow was encountered in any of the holes, so no groundwater samples were taken.

3.2 Sampling

The results of analyses are provided in the appendices.

The pH appears to be generally high across the site, suggesting a background influence.

Similarly there appears to be variable chloride concentrations with higher values measured at the factory. However the chloride concentrations are not considered likely to affect concrete structures in the ground or to have any adverse environmental effect.

The Total Chromium concentrations are consistently low ranging from 10mg/kg to 20 mg/kg, well below the Dutch intervention concentration

The total ammonia concentration is generally low, only slightly elevated at TP1, which is considered to be related to breakdown of vegetation close to the surface and not related to any influence from the burial pit.

4. CONCLUSIONS

A comprehensive investigation has been undertaken, which demonstrates consistent ground conditions across the area investigated.

The results of analysis do not indicate residual contamination, that may impact the environment or have an affect on structures associated with future development of the site

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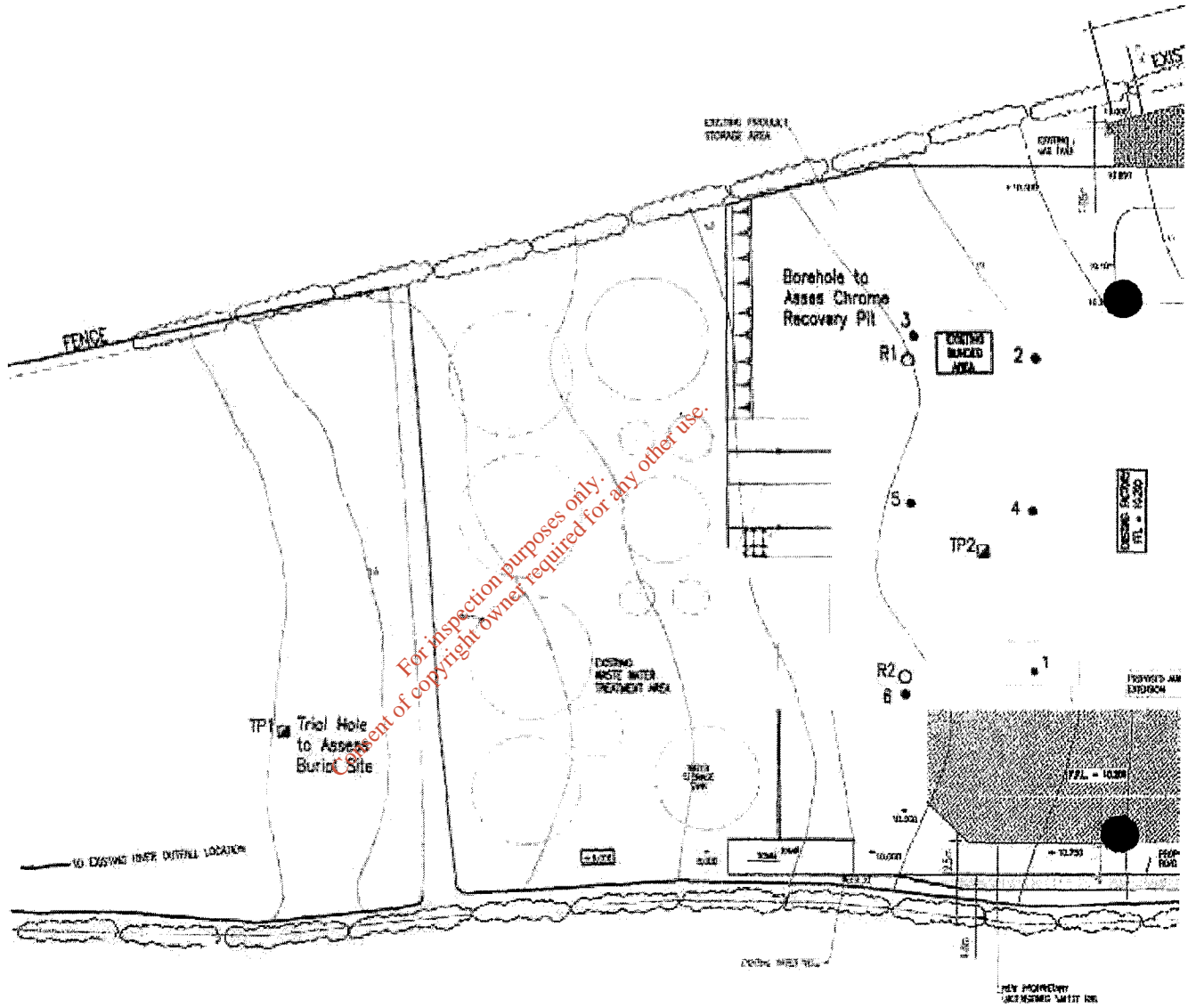
Appendices

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Appendix 1

Site Map detailing Actual Investigation Points

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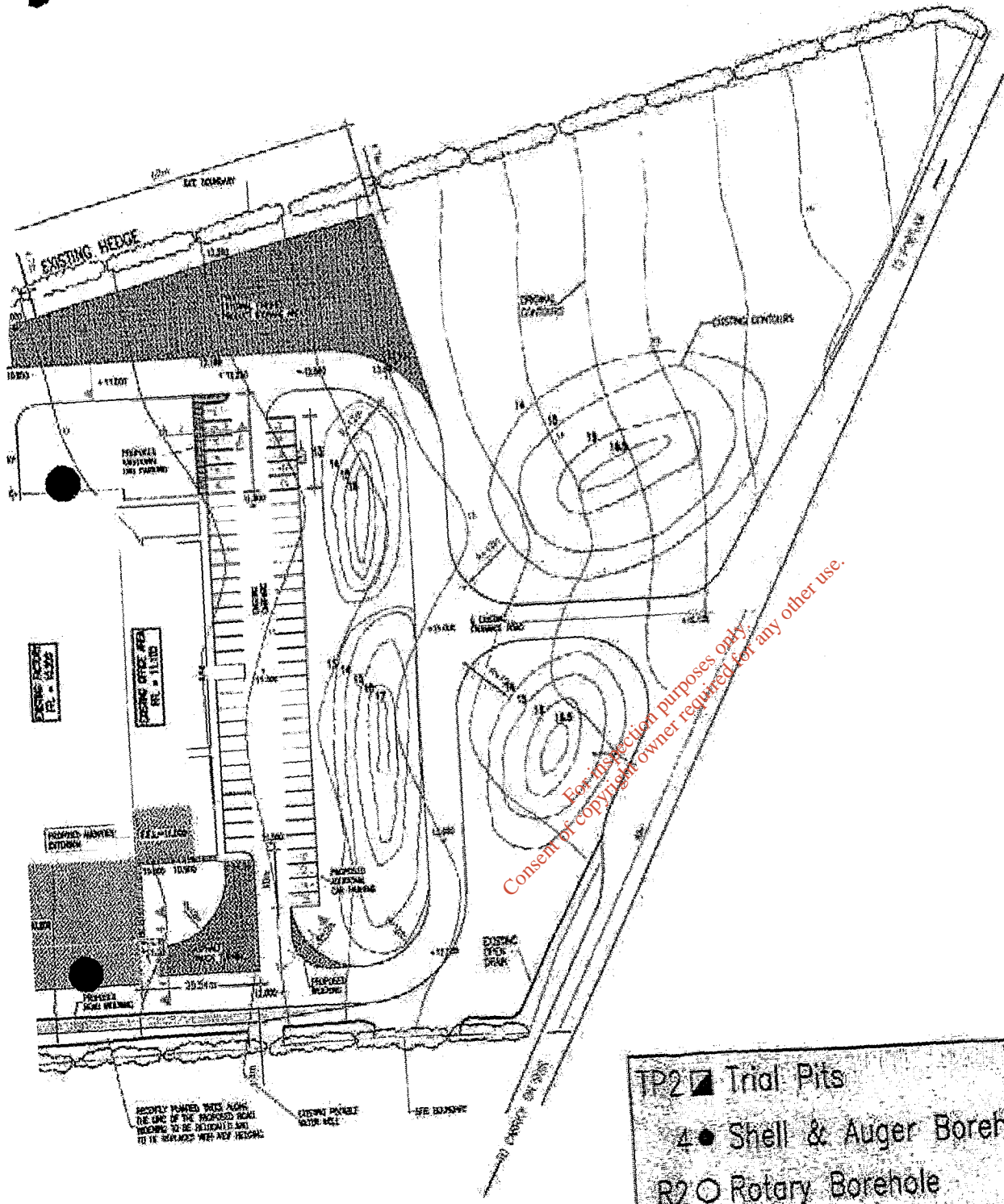


Actual Investigation Points

Geotechnical & Enviro
Experts in Geotechnics, Hydro

Gea Ltd.,
Campus Innovation Centre,
Green Rd,
Carlow.

Ph: 050-91
059-4
E-mail: g@gea.ie



TP2 Trial Pits
 4 Shell & Auger Boreholes
 R2O Rotary Borehole

Environmental Services Ltd.
 soils, hydrogeology & environmental geology



Tel: 01 853 80914
 Fax: 01 853 40499
 e-mail: geo@enviro.com.net

Project Title: Monitorin Borehole @ Michel Site Portlaw	
Project Address: Killawen, Portlaw, Co. Waterford	
Client: Landceda AES	
Dwg. Title: Actual Investigation Points (Fig. 1)	
Dwg. Scale: 1/1000	Date: 24.02.05
Dwg. No.: 04-88-02	Job No.: 04-88
Revisior: A	Dwg. By: LM

Appendix 2

Trial Pit and Borehole Logs

(TP 1 and 2, BH 1, 3, 5 and RC 1 and 2)

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Geotechnical & Environmental Services

Campus Innovation Centre,
Green Rd.,
Carlow.

Ph: 050-9130314
Fax: 059-9140499

Trial Pit

TP 1

Sheet 1 of 1

Method: Excavation		Date: 07/03/05		Site: Portlaoise	
Dia.mm:		Coords:		G.L.mO.D.:	
Client: AES					
Soil Samples		Water & Progress		Depth (m)	
Type test	Depth			Description of Strata	
				Legend	
				-0.00	
				-0.20	
				-0.50	
				-0.00	
Sample taken @1.0m				-1.00	
				-1.50	
				-2.00	
Sample taken @2.5m				-2.50	
				-3.00	
				-3.50	
				-4.00	
				-4.50	
				-5.00	
				-5.50	
				-6.00	
Remarks: 1.Slight wet patches in sandier lenses. 2.No evidence of strong groundwater flow. 3.Samples taken @ 1.0m & 2.5m.				Logged by: JK	
				Scale: 1/50	
				End Casing Depth:	
				Job No: 04-66	

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Trial Pit

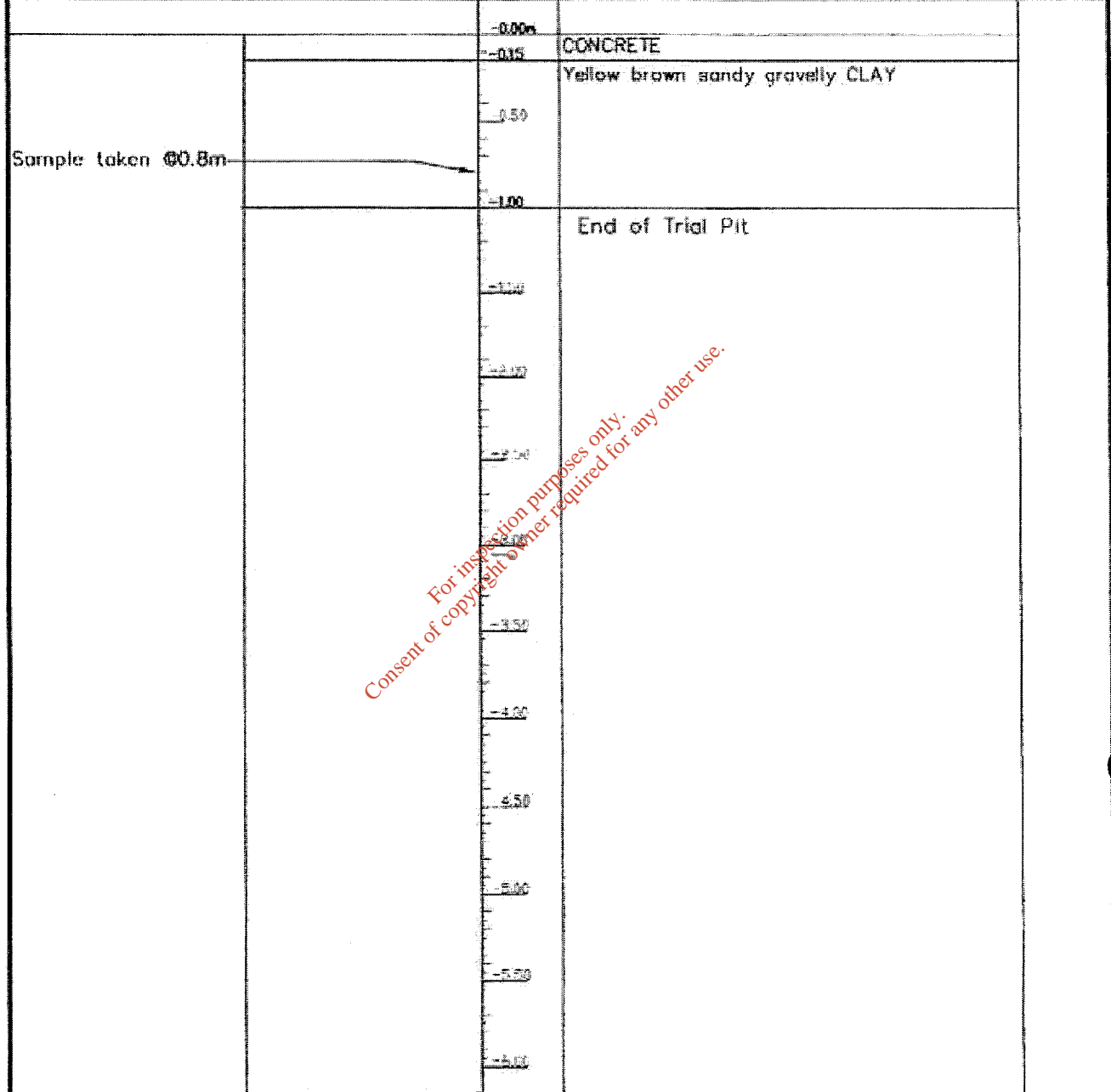
TP 2

Sheet 1 of 1

Method: Excavation Date: 07/03/05 Site: Portlao

Dia.mm: Coords: G.L.mO.D. Client: AES

Soil Samples	Water & Progress	Depth (m)	Description of Strata	Legend
Type test	Depth			



Remarks:
1.No groundwater encountered.
2.Sample taken @ 0.80m.

Logged by: JK	Scale: 1/50	End Closing Depth:	Job No: 04-66
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Borehole Log

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Collar ID Location (checked)		Start 07/05/2008 End 07/05/2008		Equipment, Methods and Remarks Cable percussion 200mm diameter from 300mm x 1.5m		Depth from 2.00m to 4.12m Diameter 200mm Casing depth 1.00m		Ground Level Coordinates National Grid	
Samples and Tests				Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description		Depth (Thickness)	Log	Scale
					MAKE GROUND: Concrete** MAKE GROUND: Hardcore and rubble**		0.00		
					Brown-grey clayey slightly sandy gravelly COBBLES. Grains are irregular to subangular fine to coarse. Cobbles are angular to subangular of moderate.		1.50		
					Brown yellow slightly sandy gravelly CLAY. Grains are subangular to subrounded fine to coarse.		2.00		
					EXPT (GROUTING) NO 1 (L) 2 AT 4.00		4.12		
Test No Type & No		Records	Date Casing	Time Water	Depth sealed (m)		Depth Watered Remarks* From To		
1. Standard Penetration Test (SPT) - Blow count behaviour (m)							Charting Depth (m) Time Test (min) 1.00 - 1.20 30 min 1.00 - 1.50 60 min		
2. Laboratory (see Key Sheet)									
* Make a note of any problems and deviations on key sheet. A dipstick read reduced to 1.5m and 3.0m in thicknesses given in brackets should be used.				Project Project No. NC 15338 Carried out for 622		Borehole BH-3 Sheet 01			

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Borehole Log

Collected JL Logged TP Checked		Start 06/03/2005 End 06/03/2005	Equipment, Methods and Remarks Cable percussion 200mm diameter borehole	Depth from 0.00m	Diameter 225mm	Casing Depth 37.96m	Ground Level Coordinates National Grid	
Samples and Tests				Strata				
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth (Thickness)	Legend	
					MADE GROUND: Concrete**	0.00		
					MADE GROUND: Hardcore**	0.30		
					MADE GROUND: Concrete and SF**	0.50		
1.00	B1				8 mm yellow sandy gravelly CLAY with occasional cobbles. Gravel is subordinate to bulk of soil mass. Cobbles are composed of limestone.	0.50		
1.41	Q2						2.40	
1.82	B3							
2.23	B4							
			06/03/2005	1400				
			13.00		LABORATORY TUBE RECOVERY	3.00		
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Depth	Type & No	Records	Date Casing	Time Water				
Borehole Seepage No seepage. Post strike behaviour (nil) NoPS extra Vsd (see Key Sheet)					Depth Related Remarks: None.		Chiselling Depth (m) Flow Test rate 0.00-0.30 30 mins 0.30-0.08 60 mins	
Make up explanation of symbols and abbreviations used here. All entries and reduced level of 100% Shaker thickness given in frequency of 100%.			Project	Portlow			Borehole BHS Sheet 1 of 1	
Project No. 005075			Project No.	005075				
Carried out by GSS			Carried out by	GSS				

Borehole Log

PRELIMINARY



Start 01/04/2005 End 01/04/2005		Equipment, Methods and Remarks Heavy open hole 147 Jumbo bit 0.50m x 4.00 Rotary 200 75mm diameter hole 4.00m to 6.25m		Depth from 1.00m to 4.00m 8.50m Diameter 150mm Casing Depth 4.00m	Ground Level Coordinates Natural Grid				
Samples and Tests				Strata					
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth Level (Thickness)	Logucal	Remarks	
					Soft CLAY "few cobbles"				
						(1.00)			
					Soft CLAY with occasional cobbles"	1.00			
00-100	50 0 0								
	30 0 0					(4.35)			
BR-138	25 0 0								
					EXPLORATORY HOLE LINDSAY 6.35m	6.35			
Depth	Top of Casing	IT	Records/Samples	Date Casing	Time Water	Depth Related Remarks * From to m	Casing Depth (m)	Time	Tools
Depth	Top of Casing	IT	Records/Samples	Date Casing	Time Water	Depth Related Remarks * From to m	Casing Depth (m)	Time	Tools
Note: To facilitate all enquiries and requirements, see key sheet. All depths are reduced to natural ground. Stratum thickness given in brackets where appropriate.						Borehole RC 1 Sheet 1 of 1			
Project: Portlaw Project No: KC 9038 Carried out for: GEG									

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Borehole Log

PRELIMINARY



ORIGINAL TR L-1444 CHECKED 02/04/2005 END 02/04/2005	Start 02/04/2005 End 02/04/2005	Equipment, Methods and Remarks White open hole 142 diameter from 0.00 to 4.00 77mm diameter from 4.00 to 8.00	Depth from 0.00m 4.00m	to 4.00m 8.00m	Diameter 142mm 77mm	Casing Depth 4.00m	Ground Level Coordinates National Grid
Samples and Tests			Strata			Depth Level (Thickness)	
Depth	Type & No	Records	Date Casing	Time Water	Description	Legend	Scale
					Soft CLAY with occasional cobble**		
					Soft CLAY with occasional cobble**		
4.00-4.15	29 0 0						
4.50-4.57	29 0 0						
4.50-4.65	75 0 0						
4.65-4.80	57 E E						
			02/04/2005 4.15	1900			
					EXPANSION - SOLE END AT 8.00 m		
Depth	100 50 0	#	Records/Samples	Date Casing	Time Water	Depth Related Remarks*	Chiselling Depth (m)
* GROUP OF 100 ENTRIES No. Sample Post strike behaviour BY			Depth sealed (m)			Time	Test Log
Note observed (see Key Sheet)							
* See key indicator of records and observations and key sheet. All depths and remarks are in metres. Strata thickness given in brackets in depth column.			Project Project No Carried out for	Pathway HC 4038 GCS	Borehole RC 2 Sheet 1 of 1		

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Appendix 3

Soil Analysis Results

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**AES Landfills - Portlaw Site
Soil Analysis**

Parameter	Units	Soil Sediment Data List		BHS D-1		BHS D-2		BHS D-3		TPI D-1		TPI D-2		TPI D-3		R1 D-1		R2 D-1	
		Intervention Level	Action Level	Sampled: 1.0m	Sampled: 2.0m	Sampled: 1.0m	Sampled: 1.5m	Sampled: 1.0m	Sampled: 2.0m	Sampled: 1.0m	Sampled: 2.0m	Sampled: 0.0m	Sampled: 0.0m	Bulk Sampled at 0.0m	Bulk Sampled at 0.0m				
pH	pH Units			9.9	7.9	7.9	8.1	8.8	8.6	7.9	8.4	8.1	8.7	8.5					
Chloride	mg/kg Cl			154	517	171	123	878	421	29	24	77	138	299					
Sulfate	mg/kg S	100	280	477	18.8	393	323	102	124	13.5	14.8	14	16.4	16.4					
Total Ammonia	mg/kg NH ₃			0.9	2.8	1.5	1.0	0.7	1.1	0.3	0.7	0.7	0.3	0.6					

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TEST NUMBER	CLIENT SAMPLE DESCRIPTION	THIOPHENOL	PHENOL	2,4-DICHLOROPHENOL	2,4,6-TRICHLOROPHENOL								
		Method Code	Method Code	Method Code	Method Code								
		Method Code	Method Code	Method Code	Method Code								
		Method Code	Method Code	Method Code	Method Code								
		Method Code	Method Code	Method Code	Method Code								
0507015	BT 2 2 1	18	12.5	8.4	15.9								
0507016	BT 2 2 2	2.3	15.5	8.9	6.50								
0507017	BT 2 2 2	1.5	15.1	11.4	12.1								
0507018	BT 2 2 3	1.0	20.0	8.1	12.0								
0507019	BT 2 2 1	2.0	19.2	5.6	8.18								
0507020	BT 2 2 3	1.8	14.6	8.8	4.24								
0507021	BT 2 2 1	8.5	13.4	7.8	4.8								
0507021	BT 2 2 2	2.1	18.8	8.4	7.4								
0507022	BT 2 2 2	1.1	11	8.1	7.2								

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TES Bretby
 Portlaw 100, Bromborough, Wirral, Merseyside, CH52 3LQ
 01492 616111
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Client Name: Geotech Specialists
Contact: Mr. Walters
Portlaw

Soils Sample Analysis

Date Printed	05-Apr-05
Report Number	EPS/051070
Table Number	



	Units Method Code: Method Reporting Limits: USAS Accredited:	mg/kg NANBHS NS	mg/kg NANBHS NS	g/kg NANBHS NS	g/kg NANBHS NS												
TEST ID Ammonia - etc	Chart Sample Description	Ammonia Nitrate	Chromium (MS)	Fe units	Cobalt												
100047	100047	2.3	14.0	8.7	130												
100047	100047	1.4	18.5	8.4	250												
TES Bretby 115001 (01) 0001 0001 0001 115001 (01) 0001 0001 0001 115001 (01) 0001 0001 0001 115001 (01) 0001 0001 0001	Client Name Client Name Contact Contact	Geotech Specialists Geotech Specialists Vt. J. Walsh Portlaw			Soils Sample Analysis Date Printed 29-Apr-05 Report Number EFS/CS1354 Table Number 1												

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Report Notes

Soil/Solid analysis specific:

Results expressed as mg/kg unless stated otherwise
SMA analysis not conducted in accordance with ASTM unless otherwise stated
Water Soluble Sulfate on 2.1 water soluble extract
AS regular analysis conducted on the As Received sample
A corrected with benzene/difuran/hexane
PH corrected with internal 23-dipylene
RTX analysis expressed as ug/kg As Received
Phenol HPLC results expressed as ug/kg As Received

Water analysis specific:

Results expressed as mg/L unless stated otherwise

Oil analysis specific:

Results expressed as mg/kg unless stated otherwise
S.G. corrected as given @ 15°C

Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

VOC analysis specific:

Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:

Results expressed as ug/L unless stated otherwise

Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:

CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibers Observed
T Trace
L Low (<15%)
M Medium (15-50%)
H High (>50%)

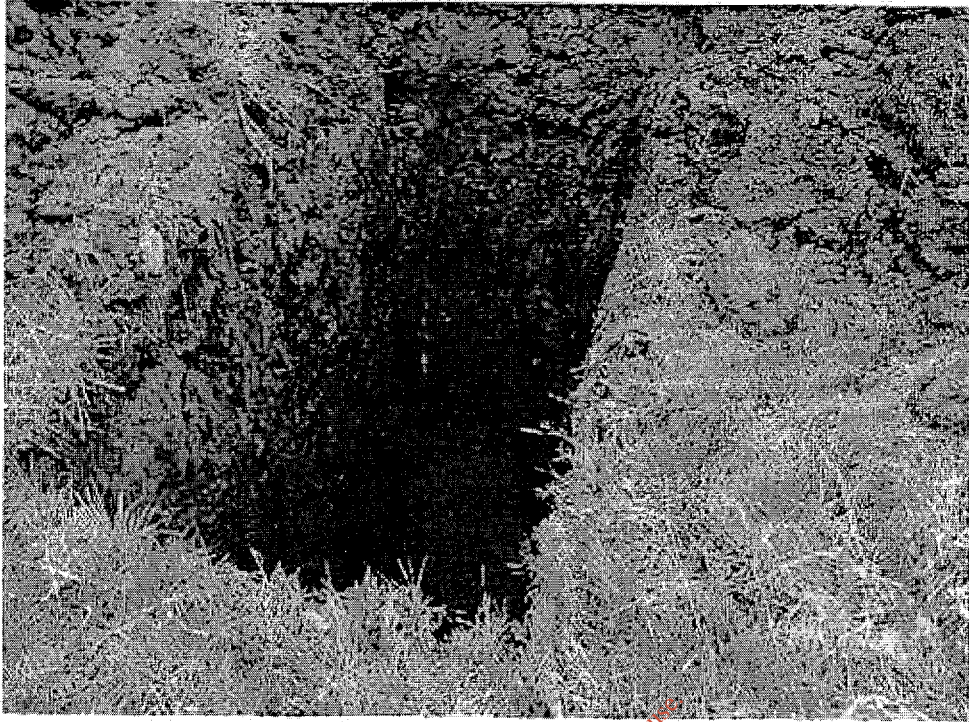
General notes:

A Air analysis was subcontracted to another laboratory
T Within laboratory tolerance
\$S unable to analyze due to nature of sample
* Results for guidance only, possible interferences
& Blank corrected
I.S. insufficient sample for analysis
Intf Unable to analyze due to interference
N.D. Not Determined
N.R. Not recorded
N.Det. Not detected
Red Analysis Re-evaluated see attached sheets for details
* denotes this result not LKAS approved on this sample
h Rather than blank due to nature of sample
? Denotes that an element of the quality control system is currently exhibiting sustained bias from its normal working pattern. The QC has not failed other runs and the cause of this is being investigated and rectified
This does not involve determination of compliance policy specifies that you will be kept informed when this happens

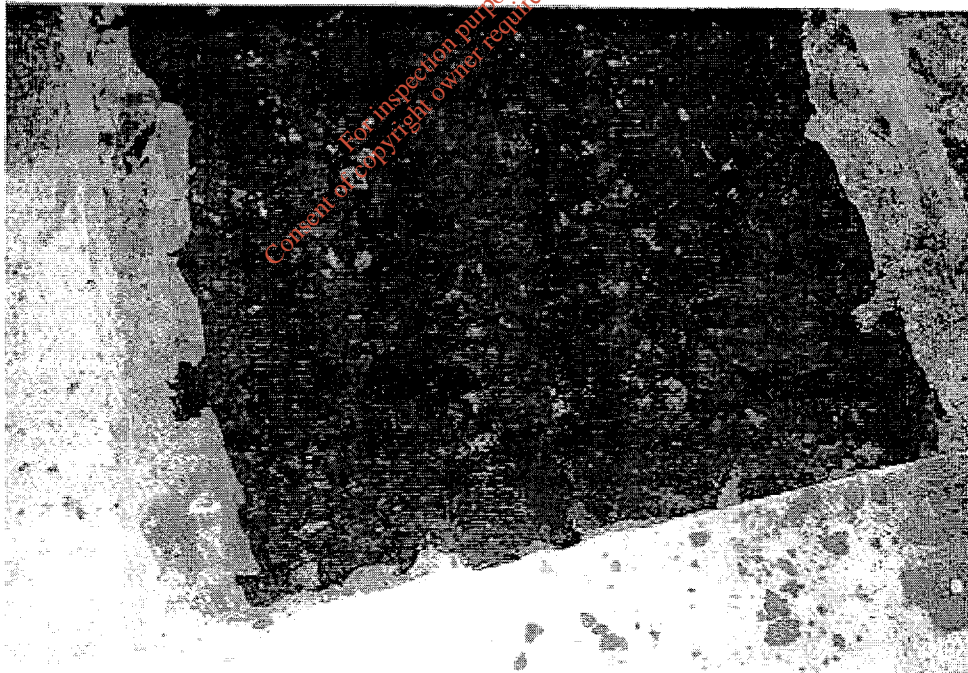
Appendix 4

Plates of Trial Pits 1 and 2

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Trial Pit TP1



Trial Pit TP2