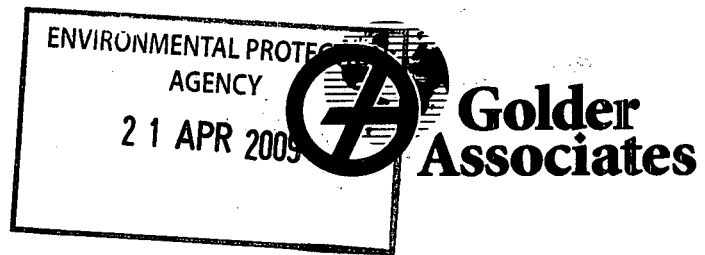


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17 April 2009
08 5071 90234.L01/V.1

BALLYNAGRAN RESIDUAL LANDFILL SITE, CO. WICKLOW REQUEST FOR TECHNICAL AMENDMENT OF WASTE LICENCE W0165-01

Dear Mr. Meaney,

1. INTRODUCTION

Greenstar Limited has retained Golder Associates Ireland Limited (Golder), to provide engineering advice and design services in relation to its licensed non-hazardous waste landfill facility at Ballynagran, Coolbeg and Kilcandra, County Wicklow. This submission presents a request to the Environmental Protection Agency (EPA) to make a Technical Amendment to three conditions of the Waste Licence for the facility.

2. BACKGROUND

Greenstar Recycling Holdings Limited (Greenstar), was granted a waste licence for a Non-Hazardous Waste Landfill on the 5th of September 2003 (Register Number W0165-01). The licence is subject to 12 Conditions and seven schedules (Schedules A to G). The development, operation, management and monitoring are covered amongst other items in the licence conditions. Of particular interest to Greenstar, at this point in regard to the development and operation of the facility is **Condition 3 - Facility Infrastructure**. This condition refers to certain drawings that were included in an Environmental Impact Statement (EIS), which was submitted with the application for the waste licence in September 2001. The EIS included the necessary Text, Figures, Tables, Appendices and Drawings to address the statutory requirements of an EIS. The Drawings are of particular relevance to the design and construction of the Specified Engineering Works (SEW) that are listed in Schedule B of the Waste Licence. To date, seven (7 No.) cells (which include the original Cells 1 to 8 shown on Drawing No. 2001-144-02-02 Rev. A that accompanied the EIS) of the landfill, have been developed for receipt of wastes. The development of the cells have been the subject of SEW proposals pursuant to Condition 3.2.1 of the Waste Licence. The Agency has agreed to the SEW proposals and cell development has taken place in 2006 (Cells 1, 3 and 4), 2007 (Cells 2 and 5) and 2008 (Cells 6 and 7).

In accordance with the section 42B of the Waste Management Act, 1996 (inserted by Section 38 of the Protection of the Environment Act, 2003) the Agency may amend a waste licence for the purposes of:

- a) *Correcting any clerical error therein;*
- b) *Facilitating the doing of anything pursuant to a condition attached to the licence where the doing of that thing may reasonably be regarded as having been contemplated by the terms of the condition or the terms of the licence taken as a whole but which was not expressly provided for in the condition; or*
- c) *Otherwise facilitating the operation of the licence and the making of the amendment does not result in the relevant requirements of section 40(4) ceasing to be satisfied.*

Upon review of some of the conditions of the waste licence, Greenstar requests an amendment of certain conditions of the licence as described below.

3. PROPOSED TECHNICAL AMENDMENTS AND GROUNDS FOR SAME

Greenstar proposes that three Conditions of the Licence be amended. Amendment of these conditions will fulfil two purposes, namely i) facilitating the "doing" of the works and the resulting environment protection that was contemplated by the conditions requiring the works to be carried out and ii) facilitating the operation of the licence. We respectfully submit, for the Agency to decide, that the making of the amendments as proposed will not result in the relevant requirements of section 40(4) of the WMA, 1996 ceasing to be satisfied.

The proposed amendments to conditions 3.12.1 c), 3.12.1 d) and 3.12.5 and the ground for the amendments are presented below:

3.1 Condition 3.12.1 c)

3.1.1 Current Wording

The current wording of this condition is:

3.12.1 The landfill liner shall comprise:

3.12.1 c) a 500mm thick drainage layer placed over the geotextile layer with a minimum hydraulic conductivity of 1×10^{-3} m/s, of pre-washed, uncrushed, granular, rounded stone (16-32mm grain size) incorporating leachate collection drains.

3.1.2 Proposed Amended Wording

The proposed amended wording of this condition is as follows:

3.12.1 c) a 500mm thick drainage layer placed over the geotextile layer with a minimum hydraulic conductivity of 1×10^{-3} m/s, of pre-washed, uncrushed, granular, rounded stone incorporating leachate collection drains.

3.1.3 Grounds for Amendment

The size range of the stone is not required because the intent of the condition is to have a layer that is 0.5 m thick with a hydraulic conductivity of less than 1×10^{-3} m/sec. The size range is redundant, as the material is sufficiently specified by the thickness and hydraulic conductivity.

3.2 Condition 3.12.1 d)

3.2.1 Current Wording

The current wording of this condition is:

3.12.1 The landfill liner shall comprise:

3.12.1 d) the side walls shall be designed and constructed to achieve an equivalent protection

3.2.2 Proposed Amended Wording

The suggested amended wording of this condition is as follows:

3.12.1 d) the side walls shall be designed and constructed to achieve an equivalent protection which may include a geosynthetic clay liner on a 1 metre thickness of mineral soil.

3.2.3 Grounds for Amendment

The side wall protection should allow a layer of Geosynthetic Clay Liner (GCL) with a 1 metre layer of soil underlying it.

3.3 Condition 3.12.5

3.3.1 Current Wording

The current wording of this condition is:

3.12.5 Formation levels of the cells shall be as shown on Drawing No. 2001-144-02-02 (Rev. A) of the EIS.

3.3.2 Proposed Amended Wording

3.12.5 Formation levels of the cells shall be as agreed by the Agency based on SEW Proposals submitted pursuant to Condition 3.2.1.

Or

3.12.5 Formation levels of the cells shall be as shown on Drawing No. 2001-144-02-02 (Rev. A) of the EIS or as otherwise agreed with the Agency.

3.3.3 Grounds for Amendment

It is considered that the reference to the drawing is overly prescriptive and restrictive in terms of the development of the landfill for the reasons outlined hereunder.

Variable rockhead surface topography

The condition refers to Drawing No. 2001-144-02-02 which accompanied the EIS. The drawing shows a layout of cells and preliminary design formation levels for the landfill base and side slopes. This design information was based on ground investigations carried out at the time of the original EIS produced by Wicklow County Council in 1996. Since that time there has been considerable additional ground investigation and full scale cell development that have revealed the nature of the ground conditions in detail.

The rockhead topography is described in this section to indicate and emphasise its variability which in turn infers a complexity in the subsoil geology that recent investigations and excavations have revealed. Notwithstanding this it is not envisaged that the variable rockhead topography will lower the floor levels.

Geological mapping (GSI, 1995) and ground investigations carried out as part of the EIA process (1996) show that the Site at Ballynagran is underlain by laminated green, green-grey, grey slaty mudstones, and green or pale grey siltstones (with occasional greywacke and andesitic volcanics) of the Ballylane Formation and dark grey mudstones, with occasional pale grey sandstones (often deeply weathered) of the younger Kilmacrea Formation. The presence of purple, thinly laminated siltstones indicate that the Site may also be underlain by lithologies from the Oaklands Formation.

From the literature and mapping, the variation in rock-type comprising these Formations are reported to have a high degree of foliation (planar arrangement of textural and/or structural features within a rock) and as such might infer a variable sub-surface topographical expression. Recent excavations undertaken as part of the development of the Site have confirmed the presence of a bedrock surface which shows greater variability than expected from the information gained during ground investigations carried out during the EIA process.

The variable rock head topography may need to be taken into account in the design of the formation levels of the cells and the levels presented in the EIS drawing do not allow for this.

Overburden Variability and Workability

Initial ground investigations as part of the EIA process encountered an overburden consisting of mainly glacial till with some fluvio-glacial sands and gravels ranging in thickness from c.2m to c.25m. Similar variations in overburden thickness are being encountered as the Site is being developed.

Additional detailed ground investigations carried out in 2007/2008 in relation to the proposed engineering design layout for the cells and the excavation of borrow areas for a number of the cells themselves encountered a variety of lithological units during the course of the landfill development, indicating a greater localised variability in the quantity and quality of glacial deposits encountered and localised variation in rock-head topography than was initially envisaged from the ground investigations carried out as part of the EIA process.

The lithologies encountered during excavation of the cells and the recent ground investigations consist of a varied range of materials and strata including silt, sand, gravel, a variety of clay strata, weathered bedrock and 'fresh' bedrock. Generally, the bedrock topography dips from northeast to southwest across the Site, with a higher degree of weathering occurring towards the south. Recent investigations and excavations indicate that the basal grey clay encountered towards the centre of the Site is overlain by a sand dominant unit, which in turn is overlain by a brown clay. The brown clay gradually replaces the sandy unit and the grey clay to become the dominant superficial material in the northern part of the Site. Where the sand unit does not exist, the brown clay sits directly on the grey clay. Gravel lenses occur throughout the Site both within the sand and clay units. It is the localised presence and depth of this sand unit as well as the variable rock-head topography that will inform and influence the future development of the landfill.

The investigations, on site borrow pit excavations and construction activities have found that the silt/sand deposits are moisture susceptible and thus excavation to hard boulder clays and the use of hard boulder clays is preferred to handling and using silt/sand material. The hard grey boulder clays lie in some limited areas below the formation levels shown on the EIS drawings.

In these areas, the operator believes it is reasonable to remove the deposits that overlie the grey boulder clay and provide a landfill base formation on clay rather than silt/sand.

Use of Overburden for the Compacted Clay Liner

The investigations and on site borrow pit excavations have found that in some areas there are suitable clay materials at depth below the proposed formation on the EIS drawing and that these materials could be used if the formation levels were lower.

In the event that the restrictive reference to the EIS drawing remains it is conceivable that the operator would need to employ alternative materials to form the mineral liner if the boulder clays currently sub formation cannot excavated. Such alternative liner materials would inevitably be sourced off-site and incur the generation of additional traffic to the landfill relating to importation of bentonite and suitable host materials for example.

Cell Layout requires Optimising to facilitate employment of BAT

The cell layout shown on the EIS Drawing No. 2001-144-02-02 needs to be optimised to facilitate access and management of leachate. BAT would dictate that the cells be sized to minimise leachate generation during the operating phase of the cell. The number and layout of cell needs to be optimised to minimise the amount of pumping and closure and aftercare management costs.

3.3.4 Summary Comments on the Proposed Amendment of Condition 3.1.2.5

It is Greenstar's view that the more detailed information collected on the variability of the near-surface lithological units from the recent ground investigations and ongoing development works compared to the initial information provided by the EIA process for the Facility points to the need to allow flexibility for the designers to make beneficial adjustments to the formation/clay liner levels and the layout of the proposed cells that are shown on Drawing No. 2001-144-02-02 of the EIS. The amended wording indicated above will allow the Agency to assess any proposed revised levels and cell layouts in the context of the ground conditions known at the time and documented within the SEW proposal submissions. In allowing a variation in the design of the cells, which design is informed by ground condition data and the corresponding SEW proposal sanctioned by the Agency, the operation of the licence will be facilitated and enhanced with regard to:

- Ensuring environmental protection of groundwater by excavating and removing where ever possible and practicable, sandy units to leave boulder clays as the underlying formation stratum;
- Reuse of soils on site that may be won below the proposed EIS formation levels for use in the construction of lining systems; and
- Minimise the final closure, after care and management requirements and costs of the facility in regard to reducing the number of pumped leachate sumps by optimising the layout and number of cells.

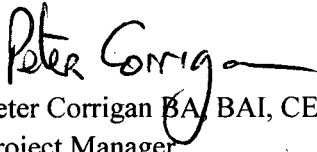
4. CLOSURE COMMENTS

A favourable decision in relation to the request for the TA would not imply a pre-judgement of any future specified engineering works (SEW) proposals made by Greenstar. It would, however, facilitate the consideration of alternative approaches to the development of the landfill which would be proposed by Greenstar through the mandatory and binding SEW process.

In summary, we believe that there are sound technical and operational reasons for submitting this request. We trust the Agency will look favourably upon this request for amendment of Waste Licence W0165-01 and will exercise its powers under section 42B of the WMA 1996-2008. Should require any further information please do not hesitate to contact either of the undersigned or the Facility Manager, Mr John Jones.

Yours sincerely,

GOLDER ASSOCIATES IRELAND LTD.



Peter Corrigan BA, BAI, CEng, MIEI
Project Manager



Geoff Parker PEng, MEng, MIEI
Project Director

cc: Donal Monahan, Greenstar Limited

GFP/PC/lc

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