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## OPERATIONAL REPORT

### KNOCKHARLEY INTEGRATED WASTE MANAGEMENT INSTALLATION

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**Prepared For: -**

Knockharley Landfill Ltd  
Knockharley  
County Meath

**Prepared By: -**

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Cork.

**September 2019**

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- APPENDIX 3** - Emergency Response Procedure

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**LIST OF DRAWINGS:**

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Drawing LW 14-821-01-P-0050-005	Proposed Site Layout with Infrastructure Locations
Drawing LW 14-821-01-P-0050-006	Proposed IBA Facility Building Location
Drawing LW 14-821-01-P-1700-023	Proposed IBA Facility Building Cross Section & Elevation
Drawing LW 14-821-01-P-1700-001	Site Layout Plan of Proposed Bio Treatment Plant
Drawing LW 14-821-01-P-1700-000	Overview of Bio Treatment & IBA Facilities
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Drawing LW 14-821-01-P-0050-010	Proposed Cell Filling
Drawing LW 14-821-01-P-0050-001	Existing Monitoring Points
Drawing LW 14-821-01-P-0050-002	Proposed Monitoring Locations

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## 1. INTRODUCTION

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Knockharley Landfill Ltd (KLL) operates the its non-hazardous residual waste landfill at Knockharley under an Industrial Emissions (IE) Licence (W0146-02) issued by the Environmental Protection Agency (Agency) that authorises the acceptance for disposal of 175,000 tonnes of non-hazardous waste, including residual household, commercial and industrial, construction/demolition wastes and incinerator bottom ash (IBA).

KLL proposes to increase the annual waste disposal rate to 440,000 tonnes, which will require raising the final profile from 74 m Ordnance Datum (OD) to 85 m OD; accept stable non-reactive hazardous waste (SNRHW); construct and operate a biological treatment plant for non-stabilised organic fines; provide an IBA storage facility where recovery trials will be carried out, install a leachate treatment plant and facilitate future contingency storage for residual municipal solid waste (MSW) and baled recyclables.

This requires a review of the current IE Licence and this Operational Report was prepared for submission with the review application.

### 1.1 Scope

This Operational Report describes the design criteria and method of operation of the installation. It is based on the conditions in the current licence, the operational procedures prepared by KLL and the information in the Environmental Impact Assessment Report (EIAR) that accompanies the review application. Following the grant of the revised licence this report will be amended to bring it into alignment with the conditions of the revised licence.

### 1.2 Annual Review

This Operational Report is subject to an annual review throughout the operational life of the installation to take account of operational experience, the progressive development of the facility, changes in regulatory requirements and developments in landfill and waste processing technology and methodologies.

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## 2. SITE DESCRIPTION & ENVIRONMENTAL SETTING

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### 2.1 Site Location

The site is in a rural area, approximately 1.5 km north of the village of Kentstown and 7 km south of Slane. The surrounding land use is predominantly agricultural, comprising a mix of tillage and pasture, with farmhouses and detached residential single-family dwellings.

### 2.2 Site Layout & Phasing

The licensed area encompasses 135.2 ha. The landfill footprint, where residual waste is currently deposited in engineered landfill cells, is in the centre of the site. A buffer of at least 100 m is maintained between this area and the site boundary, as required by Condition 3.13. 1 (W0146-02).

The layout when the site is fully developed is shown on Drawing LW14-821-01-P-0000-003. The initial phase, which was completed in 2004, involved the construction of four engineered landfill cells and an access road from the N2, the provision of the supporting infrastructure including the waste reception area, leachate holding lagoon and site offices, groundwater and surface water control measures, forestry planting and initial landscape works.

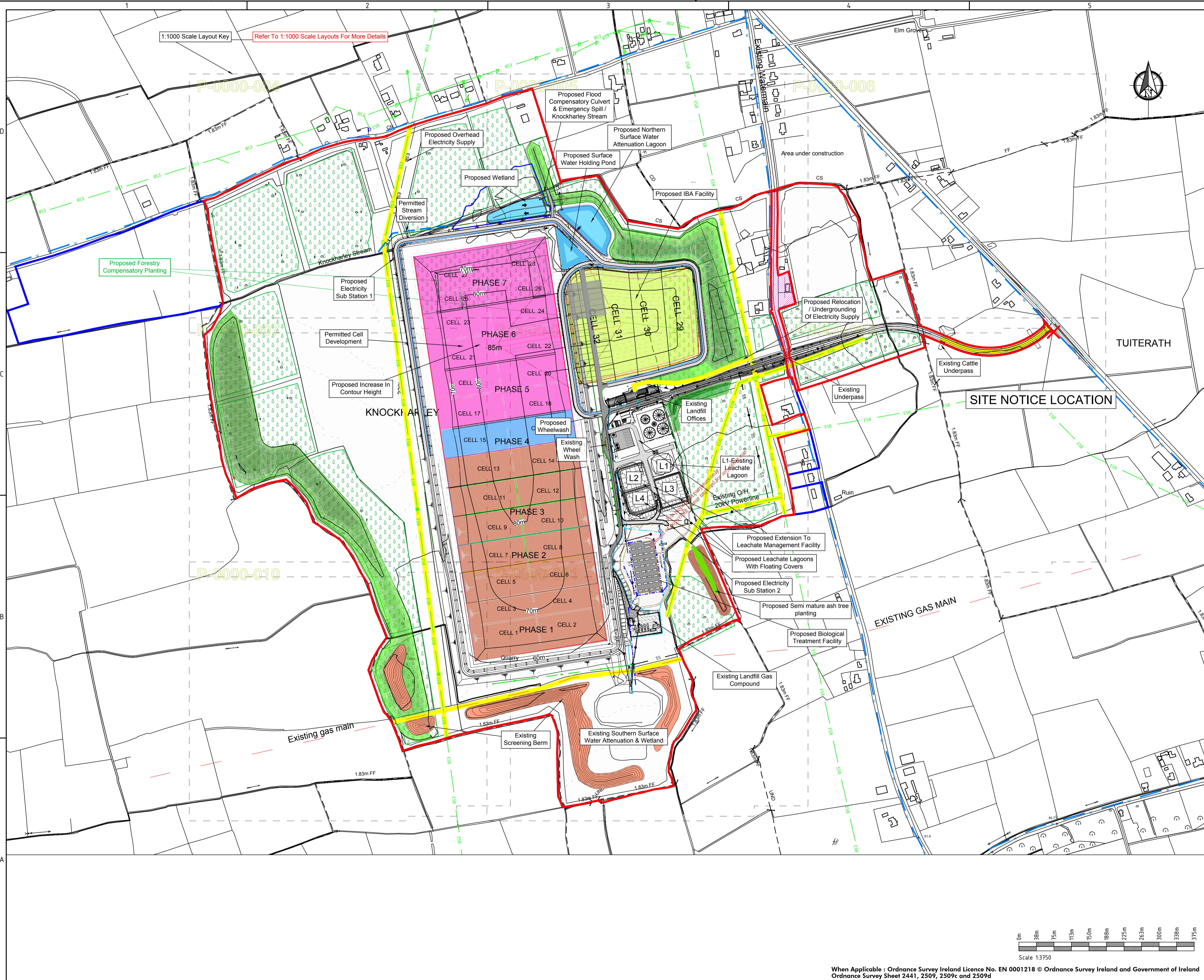
Subsequent phases involved the construction of additional engineered cells, provision and progressive expansion of the active gas management and flaring system, landscape works and the capping and restoration of the completed landfill cells.

The proposed development, which is the subject of the licence review application, forms the final development phase and involves:

- The construction of an IBA 'Weathering Area' and five dedicated storage cells;
- The construction of a biological treatment plant for the treatment of organic fines recovered from residual solid wastes;
- The expansion of the leachate management system to accommodate additional leachate volumes and future on-site treatment, and
- The provision of additional surface water controls.

### 2.3 Geology and Hydrogeology

The subsoil consists of a locally thick and continuous glacial till (10 >20 m thick). The till comprises boulder clay made up of bedrock debris set in a silty clay matrix, with minor sand content. The permeability ranges from  $1 \times 10^{-9}$  m/s to  $4.9 \times 10^{-11}$  m/s, which places it at the lower range of permeability values for Irish tills.



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**LEGEND**

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary
- Refer to dwg P-0000-BDY For Clarity
- Existing Wayleave
- Ground Contours
- Existing Watercourse
- Landfill Cells currently being filled (2017/18)
- Constructed Landfill Cells
- Final Forested Areas
- Permitted Landfill Cells, To Be Constructed
- Proposed IBA Facility
- IBA
- IBA, Cell 33 (Outline Only Shown For Clarity)
- Proposed Screening Berms with New Replanting
- Proposed Stream Diversion
- Existing Berm

**EXISTING SERVICES LEGEND**

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

**PROPOSED SERVICES LEGEND**

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer

Rev.	Drawn	SK	CHKD	CIC	App'd	Rev Origin	Rev Date	Description
A						Cork	10.07.18	Issue For Planning Application

**Name of Client**  
**KNOCKHARLEY LANDFILL LTD.**

**Name of Job**  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

**Title of Drawing**  
**PROPOSED SITE LAYOUT PLAN**

**Scales Used**  
**1:3750**

**Dwg. No.**  
**LW14-821-01-P-0000-003**

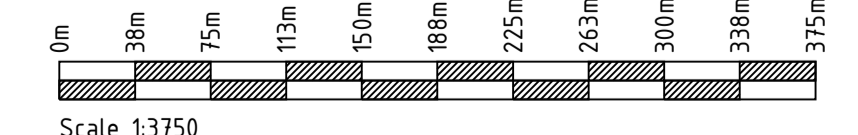
**Rev.**  
**A**

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The underlying bedrock comprises a fine grained light coloured sandstone (65%) and a darker coloured siltstone/mudstone (35%). The top of the rock is weathered to 0.3 to 0.5 m and the shallow fractures are clay filled to a depth of 1 m

Although poorly permeable the till is water bearing. The water table is generally within 1.5 m of the ground surface, which is consistent with the poor permeability and the poor drainage conditions. In-situ permeability measurements, in conjunction with the groundwater gradient across the site, indicates a groundwater flow rate of <1 m/year.

The bedrock has a relatively poor permeability, is classified as a Poor Aquifer and the yield is less than 10 m<sup>3</sup>/day. The direction of groundwater flow is to the south-east. The thick layer of low permeability till acts as a confining layer for the bedrock aquifer and also protects it from contamination. The vulnerability of the aquifer to pollution is Low.

## 2.4 Hydrology

The site is the Nanny River catchment, close to the divide with the River Boyne catchment. The Nanny catchment is characterised by sudden high flows coinciding with high rainfall periods, with particularly low flows in the drier summer months.

There is a surface water divide running east to west roughly through the centre of the site. Drainage from the area north of the divide (63.3 ha) is towards the Knockharley (or Flemingstown) Stream, while drainage south of the divide (73.7 ha) is towards the Kentstown Stream, which joins the Knockharley Stream.

Baseline surface water quality monitoring in the Kentstown and Knockharley Streams completed before the construction of the landfill began identified elevated naturally occurring hardness and iron levels. Superimposed on these were the effects of agricultural practices and the use of septic tanks, reflected in elevated and variable Biochemical Oxygen Demand, Chemical Oxygen Demand, nitrate, and nitrite levels.

## 2.5 Meteorology

The annual average rainfall is of the order of 835 mm, with average monthly rainfall ranging from 56 mm in the drier months to 85 mm in the wetter winter months. The estimated annual evapotranspiration is approximately 560 mm. The mean daily temperature in the winter months is 4.5°C, while the average temperature in the summer months is 15.5°C. The prevailing wind is from the west-southwest, with the average wind speed varying from 8 to 10 knots from summer to winter.

## 2.6 Designated Sites

The KLL landholding is not located in an area designated for environmental conservation. The following Special Area of Conservation (SAC) and Special Protection Areas (SPA) are within 5 km of the site:

- River Boyne and River Blackwater (Site Code 002299 SAC)
- River Boyne and River Blackwater SPA (Site Code 004232 SPA)



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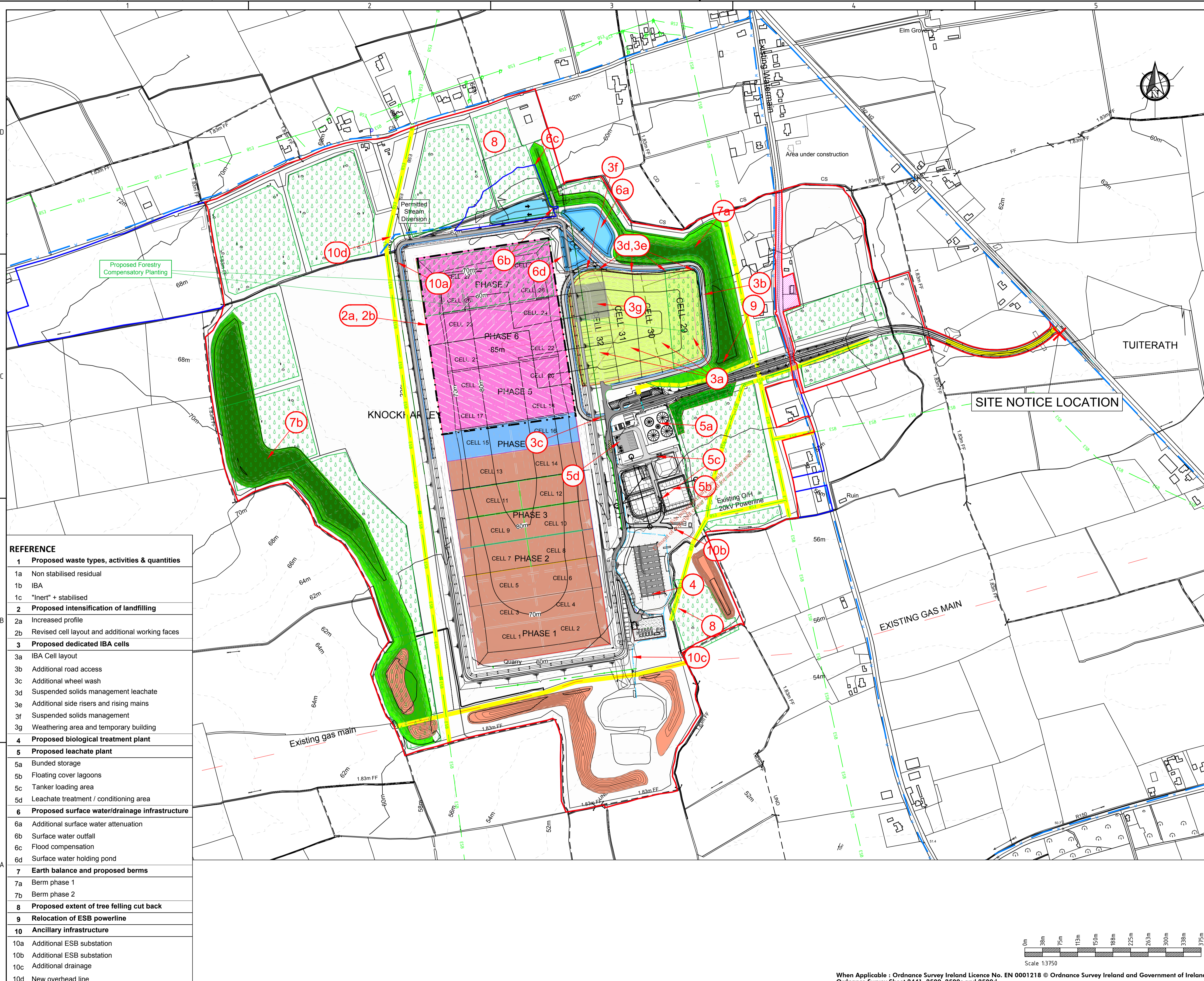
### 3. SITE DESIGN

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#### 3.1 Infrastructure

The infrastructure when the development is complete is shown on Drawing LW14-821-01-P-0050-005 and the main elements will include:

- Administration Block (offices, stores, canteen, toilets and showers) and car park;
- Maintenance Garage and Plant Sheds;
- Weighbridges (2 No.);
- Wheel Shake Out and Wheel Washes;
- Waste Quarantine & Inspection Areas;
- Residual Waste Landfill Cells (Cells 1-28);
- IBA Temporary Storage Cells (29-33) and Weathering Area;
- Biological Treatment Building with Odour Control System and electrical substation;
- Landfill Gas Utilisation Compound (four gas engines, two active flares, a contingency flare, an odour control flare and an electrical substation);
- Electrical substation for leachate pumps;
- Raw Leachate Storage Lagoons (4 No.);
- Leachate Management Facility (raw leachate holding tanks (3 No); modular treatment units (6No.); treated leachate holding tanks (3.No.));
- Surface Water Attenuation Lagoon and Constructed Wetlands (Southern Area);
- Surface Water Holding Pond and Attenuation Lagoon (Northern Area), and
- Diesel Storage Tank (6,000 litres).



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- Proposed Stream Diversion
- Existing Berm

REFERENCE	
<b>1</b>	<b>Proposed waste types, activities &amp; quantities</b>
1a	Non stabilised residual
1b	IBA
1c	"Inert" + stabilised
<b>2</b>	<b>Proposed intensification of landfilling</b>
2a	Increased profile
2b	Revised cell layout and additional working faces
<b>3</b>	<b>Proposed dedicated IBA cells</b>
3a	IBA Cell layout
3b	Additional road access
3c	Additional wheel wash
3d	Suspended solids management leachate
3e	Additional side risers and rising mains
3f	Suspended solids management
3g	Weathering area and temporary building
<b>4</b>	<b>Proposed biological treatment plant</b>
<b>5</b>	<b>Proposed leachate plant</b>
5a	Bunded storage
5b	Floating cover lagoons
5c	Tanker loading area
5d	Leachate treatment / conditioning area
<b>6</b>	<b>Proposed surface water/drainage infrastructure</b>
6a	Additional surface water attenuation
6b	Surface water outfall
6c	Flood compensation
6d	Surface water holding pond
<b>7</b>	<b>Earth balance and proposed berms</b>
7a	Berm phase 1
7b	Berm phase 2
<b>8</b>	<b>Proposed extent of tree felling cut back</b>
<b>9</b>	<b>Relocation of ESB powerline</b>
<b>10</b>	<b>Ancillary infrastructure</b>
10a	Additional ESB substation
10b	Additional ESB substation
10c	Additional drainage
10d	New overhead line

Rev.	Drawn	Checked	App'd	Rev Origin	Date	Description
A	SK	CIC	BC	Cork	10.07.18	Issue For Planning Application

Name of Client  
**KNOCKHARLEY LANDFILL LTD.**

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Title of Drawing  
**PROPOSED SITE LAYOUT PLAN WITH INFRASTRUCTURE LOCATIONS**

Scales Used  
**1:3750**

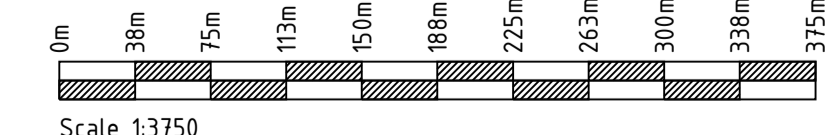
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### **3.2 Engineering Details**

The design of the landfill and IBA cell lining and capping systems meets the specifications set in the EU Directive of Landfill of Waste, the EPA's Manual on Landfill Site Design and the EPA's draft Final Guidance on BAT for Landfill (2011). The design and proposed method of operation of the biological treatment plant complies with the relevant BAT conclusions in the BREF on Waste Treatment (2018).

### **3.3 Services**

There is a 380 volt three phase electricity supply, a mains water supply, and a phone line. Sanitary wastewater from the offices and canteen discharges to an on-site wastewater treatment plant which is located to the east of the weighbridge. Sanitary wastewater from the welfare facilities in the Biological Treatment Plant will discharge to a new proprietary treatment system located adjacent to the building and the treated effluent will be pumped to the leachate management plant. There is one fire hydrant that is connected to the mains supply.

### **3.4 Facility Roads, Access Roads & Hardstanding**

The facility is accessed from the N2 via the main internal roadway leading to the Administration Area. The internal access roads and hardstanding are provided in accordance with Condition 3.5 of the licence.

### **3.5 Site Buildings**

The design of all of the buildings took into consideration the guidance given in the DOE publication "Protection of New Buildings and Occupants from Landfill Gas, as specified in Condition 3.15.6 (W0146-02).

### **3.6 Waste Inspection and Quarantine Areas**

The waste inspection and quarantine areas required under Condition 3.7.1 (W0146-02) are adjacent to the site offices. The areas are bounded on three sides by a 2 m high reinforced concrete wall with a central 2 m high dividing wall. Both areas are provided with falls to allow run-off to drain directly to the original leachate lagoon.

### **3.7 Wheel Cleaning**

A dry wheel shake and mains supplied wheel wash is provided in accordance with Condition 3.9.1 (W0146-02) for all waste transport vehicles that access the landfill operational area. Both are provided with sealed sumps and liquid accumulating in the sumps is transferred to the existing leachate storage lagoon.

Wheel cleaning facilities will be provided inside and outside the Biological Treatment Plant and all vehicles leaving the building will be obliged to use the external unit. The wash water will be collected in the process wastewater holding tank serving the building.

## 3.8 Landfill

### 3.8.1 Layout

The residual waste and stabilised and inert landfill will, when fully developed, comprise 28 Cells, as shown on Drawing LW14-821-01-P-0000-003. To date residual waste Cells 1-12 (approximately 96,000 m<sup>2</sup>) have been permanently capped. There is an intermediate cap on Cells 13 and 14. Landfilling is on-going in Cells 15, 16, 17 and 18. Cells 19 and 20 are being constructed

### 3.8.2 Lining System

The landfill is designed as a containment facility where wastes are deposited in engineered landfill cells provided with the lining system specified in Condition 3.12 (W0146-02). The lining system design comprises: -

- A composite liner consisting of a 1 m layer of compacted soil, or equivalent (bentonite enhanced sand) with a hydraulic conductivity of less than or equal to  $1 \times 10^{-9}$  m/s overlain by a 2 mm thick high density polyethylene (HDPE) layer;
- A geotextile protection layer placed over the HDPE layer;
- A 500 mm thick drainage layer placed over the geotextile layer with a minimum hydraulic conductivity of  $1 \times 10^{-3}$  m/s;
- The side walls are designed and constructed to achieve an equivalent protection.

A comprehensive independent construction quality assurance report is prepared for each phase of cell construction and is submitted to the Agency for approval prior to waste acceptance.

### 3.8.3 Landfill Cell Capping System

The final profile will be a maximum of 85 m Ordnance Datum (OD) and be a domed shape. When the final fill level is reached in each cell it is temporarily capped for 12 months to allow settlement pending the installation of the final cap.

The final cap design, which has been agreed with the Agency in accordance with Condition 4.3.1 (W0146-02) comprises an under liner geocomposite for the management of gas and / or leachate, a 1 mm fully welded low density polyethylene liner (LDPE liner), sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers is 1 m.

### 3.8.4 Leachate Management

The landfill is designed to minimise leachate generation. Surface water run-off and groundwater flow is directed away from the fill area by means of interceptor drains installed outside the landfill cells. The cells are designed as fully contained areas.

The leachate collection system comprises a granular collection layer incorporating 160 mm and 200 mm leachate collection pipework laid at gradients of 1:150 and 1:100. The system drains by gravity to leachate collection sumps connected to the main (200 mm) drainage pipe, in each of the landfill cells. It is pumped from the sump via a sloping shaft side riser to the leachate storage lagoon.

The leachate lagoon is sized to provide a 72-hour storage capacity (2,500m<sup>3</sup>) based on water balance calculations completed in accordance with the guidance presented in the EPA Landfill Manual on Landfill Site Design and are fitted with floating covers.

Annual water balance calculations are completed during the preparation of the Annual Environmental Report (AER) and are based on recorded rainfall data and the volumes of leachate removed from the site. The calculations form the basis for the assessment of the suitability of the current leachate management capacity.

The leachate lagoons are provided with the lining system specified in Condition 3.12.2 (W0146-02), which requires: -

- a composite liner consisting of at a minimum a basal soil clay layer of at least 1 m in thickness with a permeability of less than  $1 \times 10^{-9}$  m/s overlain by a 2 mm thick HDPE liner, unless otherwise agreed with the Agency.

A concrete spill pad is provided at the lagoon loading bays. The road tankers used to remove the leachate are parked in the bay while leachate is pumped from the lagoon. The pad is graded to direct any spills that might occur during the removal operations to flow back to the lagoon.

All on-site leachate management structures are inspected and certified fit for use on an annual basis by an independent and appropriately qualified chartered engineer, as specified in Condition 3.14.5 (W0146-02).

### 3.8.5 Landfill Gas

#### Non-Stabilised Cells

During the initial phases of filling the non-stabilised landfill cells the gas is passively vented. Subsequently, and based on the levels of methane and gas flow rates, the passive vents are converted to active abstraction wells and connected to the gas engines. The design of the abstraction and utilisation system complies with the guidance in the EPA Manuals on Landfill Site Design and Landfill Operational Practices and operational experience and comprises:

- Horizontal gas extraction pipework in each cell.
- A network of vertical landfill gas extraction wells progressively installed on an approximately 50 metre grid, with addition wells installed based on the findings of fugitive gas surveys at the top of the capped areas.
- The vertical gas wells are sealed at surface with bentonite as required in order to minimise the ingress of oxygen and the potential for migration of landfill gas.)
- The connection of the extraction wells to a collection network that comprises a perimeter 355 mm ring main around the landfill that is connected to by 180 mm pipes laid across the landfill surface. The wells and ring main connection points are fitted with shut-off valves to enable flow restriction or isolation.
- The provision of 'knock out pots' that remove condensate from the collection network to avoid gas flow restrictions. The condensate is pumped to the leachate riser pipes.
- A landfill gas utilisation plant comprising gas engines and flares. There are four gas engines, two of which run continuously each with a capacity of 1,000 m<sup>3</sup>/hr, and two back-up engines, each 800 m<sup>3</sup>/hr. There are two enclosed duty flares (1,500 m<sup>3</sup>/hr and 1,500 m<sup>3</sup>/hr) and an enclosed back-up flare (2,500 m<sup>3</sup>/hr). The 2,500m<sup>3</sup> flare is connected to the booster station that provides the primary back up to the two duty engines. A fourth open flare (500 m<sup>3</sup>/hr) is provided, but only used for odour control measures as required.

## Stabilised & Inert Cells

The stabilised and inert waste and SNRHW will not be sources of landfill gas generation and therefore an active abstraction and utilisation/flaring system is not required. As a precautionary measure passive vents will be installed in the cells.

### 3.8.6 *Odour Controls*

The following odour controls will be implemented;

- The daily working face in the landfill is limited in size and the working area covered at the end of the working day;
- The provision of a progressively installed landfill gas collection system that connects to gas utilisation engines and flares in the non-stabilised residual waste landfill cells;
- The placement of a synthetic intermediate cap pending the placement of the permanent cap;
- The installation of additional gas abstraction wells if required based on the findings of fugitive gas surveys carried out on the top of the cells, and
- The fitting of carbon filters to the passive vents in the inert and stabilised waste cells if considered necessary to prevent off-site odour nuisance.

## **3.9 IBA Area**

### 3.9.1 *Layout*

The layout of IBA area is shown on Drawing LW 14-821-01-P-0050-006. It will encompass Cells 29 to 33. Cells 29 and 32 (57,829 m<sup>2</sup>) will be constructed together. The drawing does not show Cell 33 (23,170 m<sup>2</sup>), which will be the final cell and will be constructed between in the inert and the IBA cells to tie into the overall final landfill. The total design capacity is 1,424,709 tonnes.

### 3.9.2 *Cell Design*

The storage cells' design and method of construction will be the same as the landfill cells (Section 3.8.2) and a similar independent construction quality assurance report will be prepared for each phase of cell construction and submitted to the Agency for approval prior to IBA storage.

### 3.9.3 *Weathering Area*

To maximise the recovery of metals from the IBA and the production of aggregate, the IBA must be matured or 'weathered'. A temporary single span roofed building with a concrete slab floor - 'Weathering Area' - (5,776 m<sup>2</sup>) will be constructed in Cell 32. Cross sections of the building are shown on Drawing LW 14-821-01-P-1700-023. A concrete access road will be constructed on the surface of the cell to facilitate HGV movements. The building is sized to accommodate two stockpiles, each approximately 37,500 tonnes.

During the early stages exothermic reactions may cause elevated temperatures and hydrogen gas is released. Peak gas production will occur within 3 to 4 months following receipt of IBA on-site and rapidly decline over the following 12 months.



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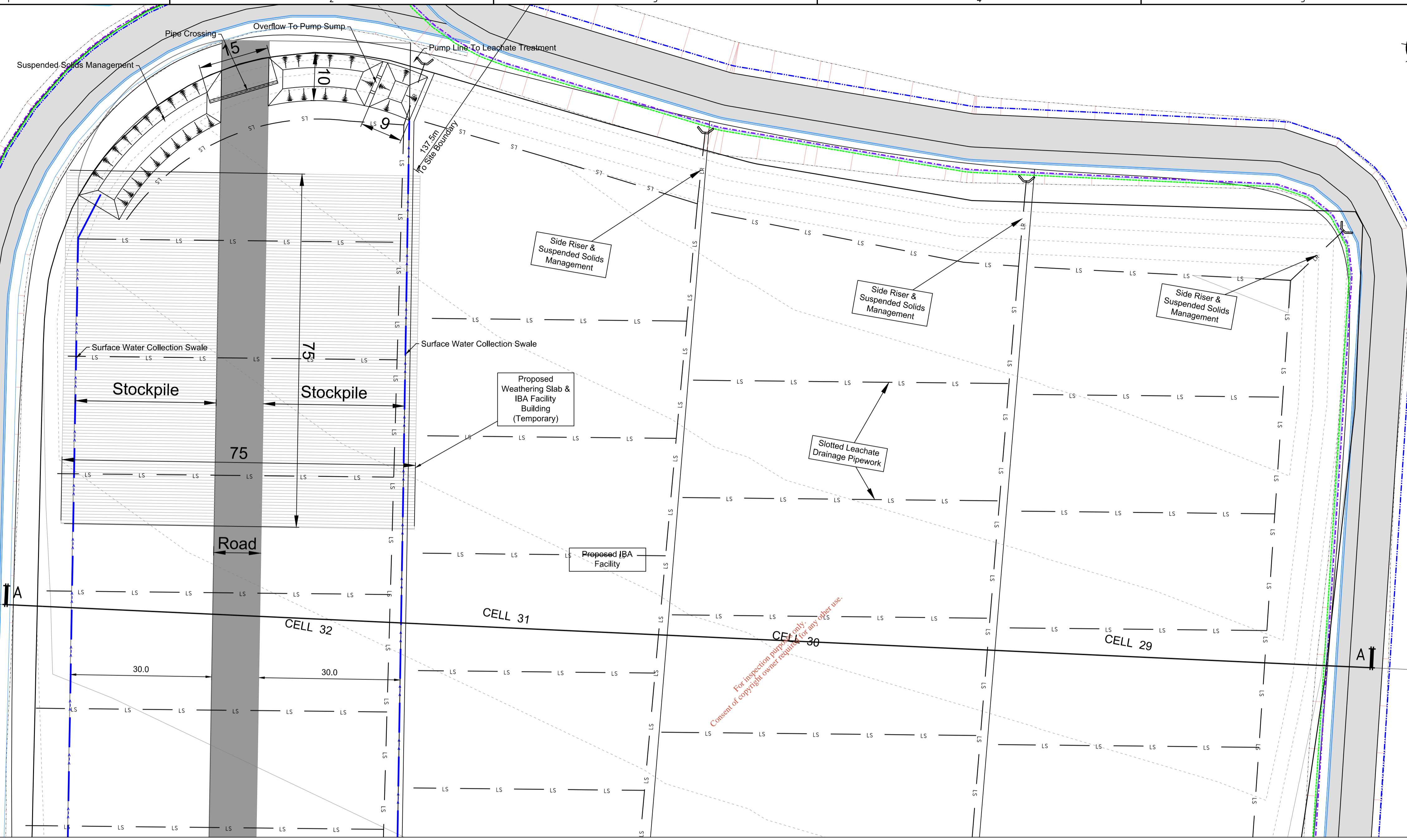
**Legend**

Leachate Side Riser & Suspended Solids Management

LR LR LR LR

Leachate Pipework

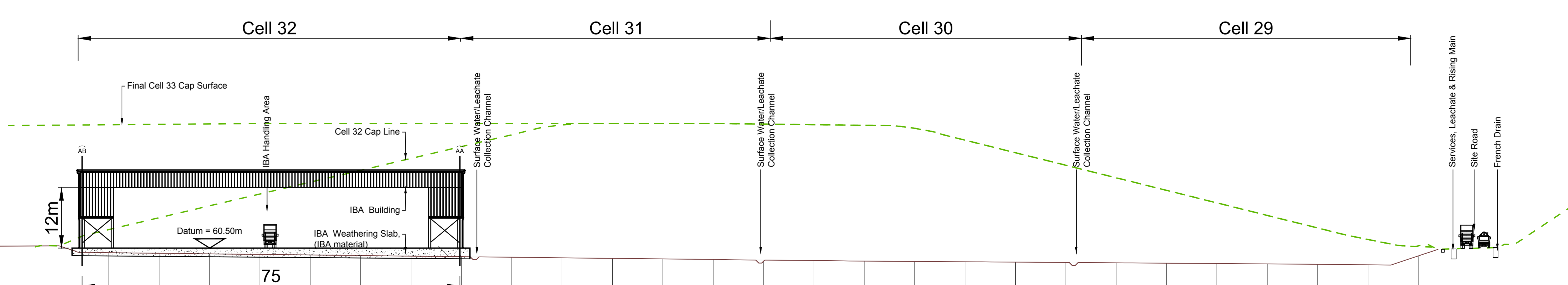
LS LS LS LS



SCALE - VERTICAL

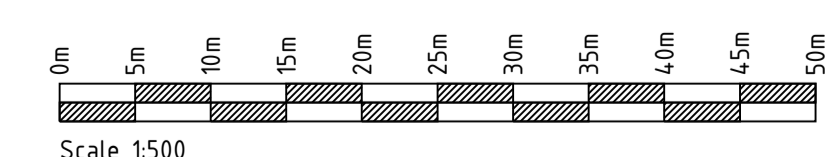


A



Chainage	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000
IBA Cell Floor	84.895	84.897	84.898	84.897	84.895	84.892	84.888	84.883	84.878	84.872	84.865	84.857	84.848	84.838	84.827	84.815	84.802	84.788	84.773	84.757	84.740	84.722	84.703	84.683	84.662	84.640	84.617	84.593	84.568	84.542	84.515	84.487
Proposed Final Profile	84.895	84.897	84.898	84.897	84.895	84.892	84.888	84.883	84.878	84.872	84.865	84.857	84.848	84.838	84.827	84.815	84.802	84.788	84.773	84.757	84.740	84.722	84.703	84.683	84.662	84.640	84.617	84.593	84.568	84.542	84.515	84.487

IBA SECTION A



Rev. A	Drawn	CHKD	C/C	BC	Cork	10.07.18	Issue For Planning Application
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Rev.	Drawn	CHKD	C/C	BC	Rev Origin	Date	Description
Revision History A							EAIR

Name of Client  
**KNOCKHARLEY LANDFILL LTD.**

Name of Job  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

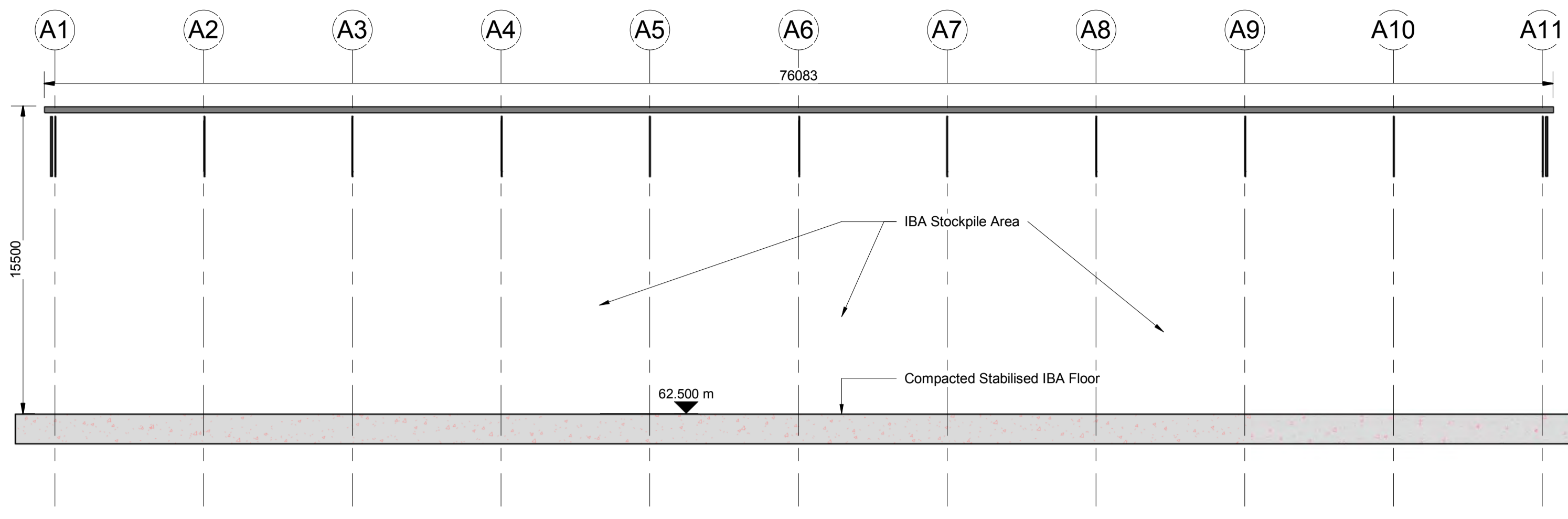
Title of Drawing  
**PROPOSED IBA FACILITY BUILDING LOCATION AND CROSS SECTION**

Scales Used  
**1:500**

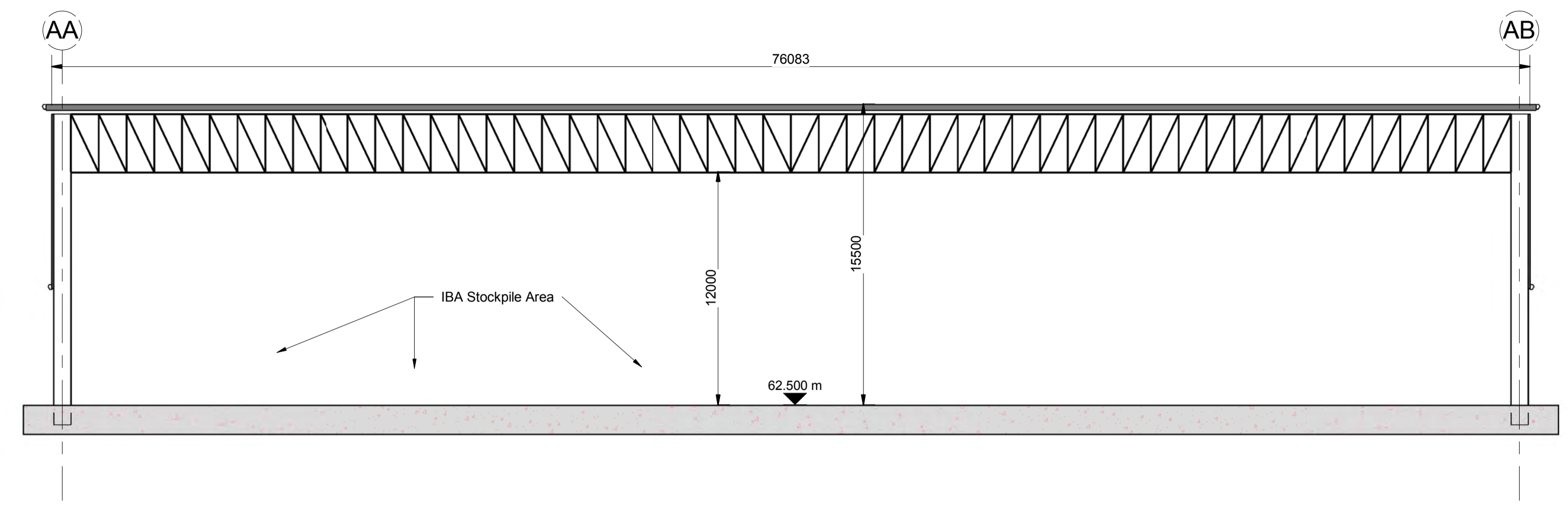
Dwg. No.  
**LW14-821-01-P-0050-006**

This Drawing was printed to A1.

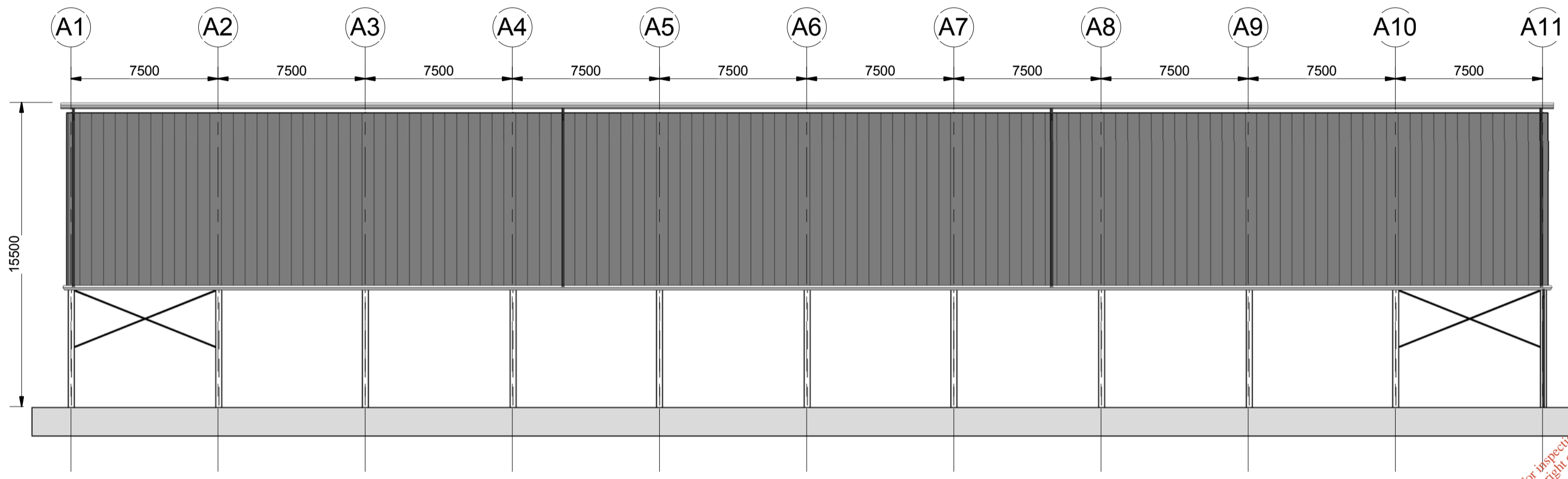
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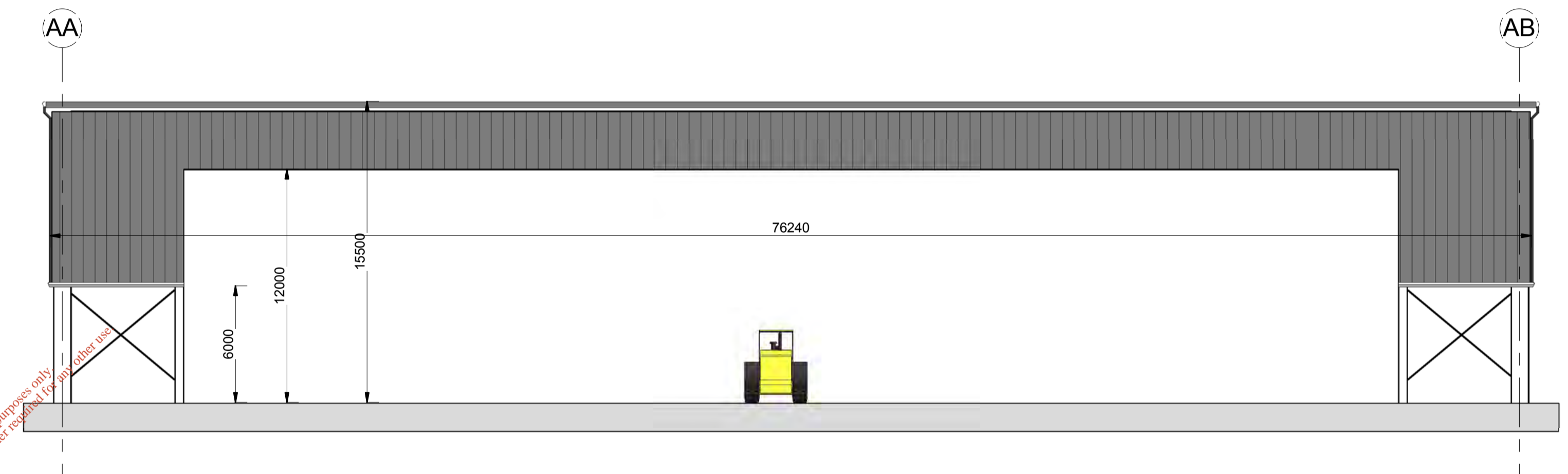
**X1 SECTION A-A THROUGH IBA BUILDING**  
(1 : 200)



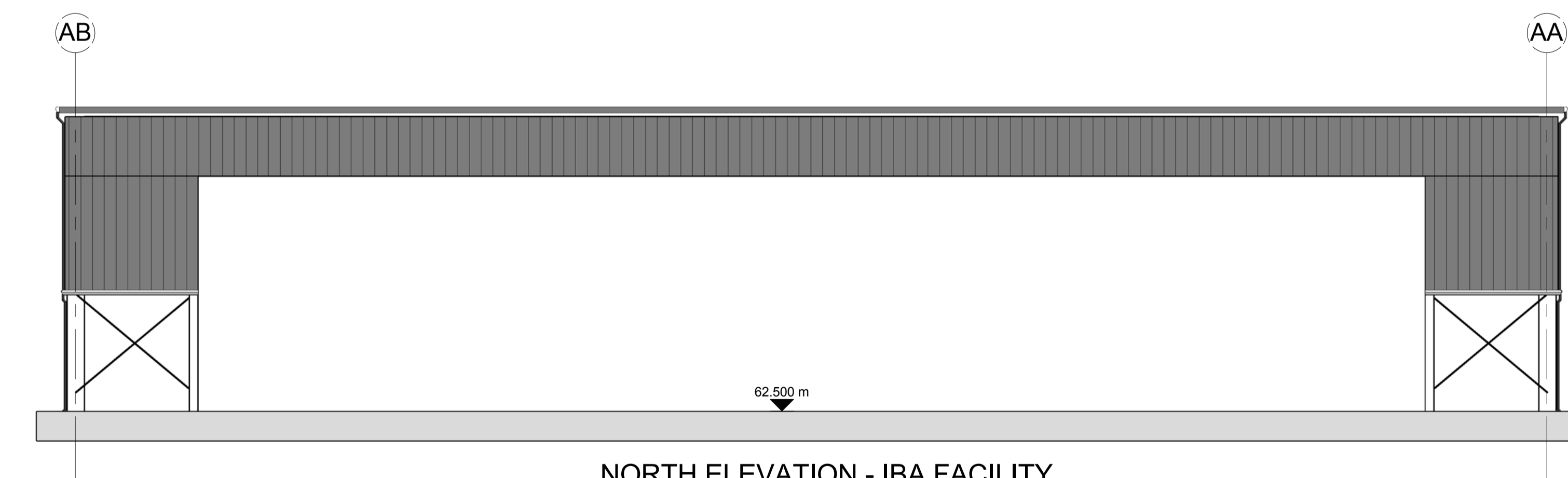
**X2 SECTION B-B THROUGH IBA BUILDING**  
(1 : 200)



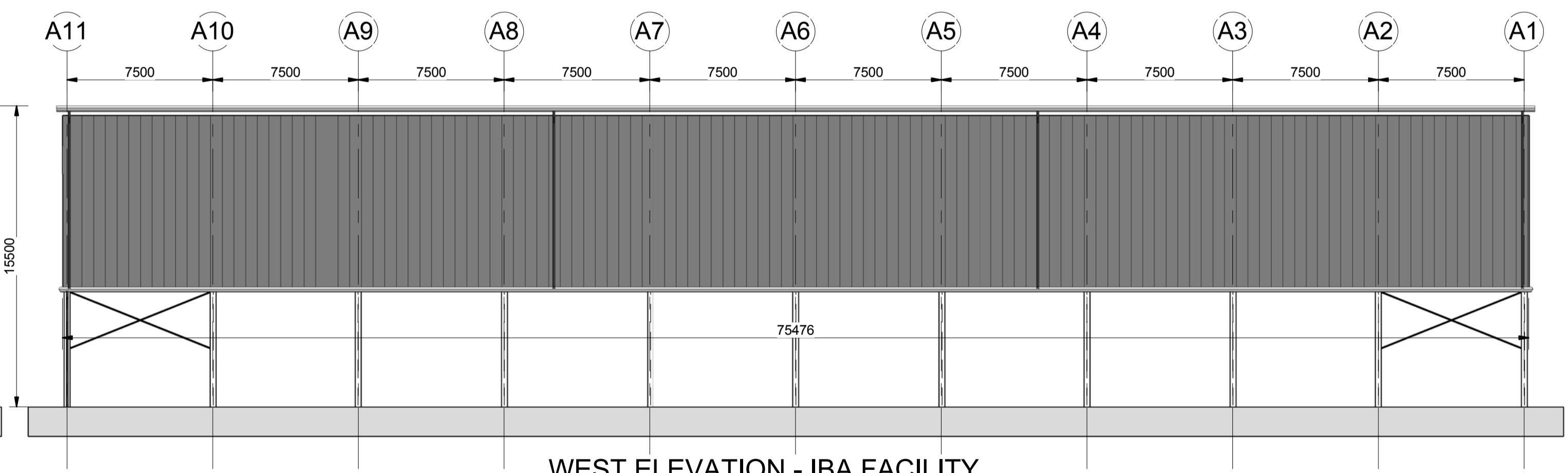
**EAST ELEVATION - IBA FACILITY**  
(Scale 1 : 200)



**SOUTH ELEVATION - IBA FACILITY**  
(Scale 1 : 200)

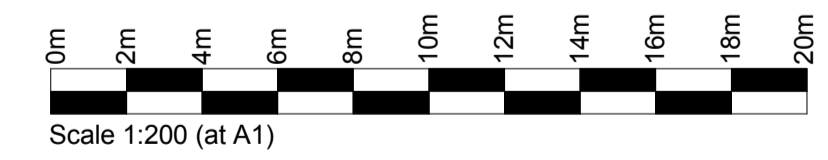


**NORTH ELEVATION - IBA FACILITY**  
(Scale 1 : 200)



**WEST ELEVATION - IBA FACILITY**  
(Scale 1 : 200)

- EXTERNAL FINISH**
1. WALLS - VERTICAL PROFILED INSULATED METAL CLADDING
  2. ROOF - PROFILED INSULATED METAL ROOF PANEL SYSTEM
  3. MUSHROOM COLOUR (RAL 1006020)



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Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

**PROJECT**

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

**SHEET**

PROPOSED IBA FACILITY BUILDING SECTION AND ELEVATIONS

**CLIENT**

KNOCKHARLEY LANDFILL Ltd.

Date	02/26/18	Project number	LW14-821-01	Scale (@ A1)	1 : 200
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-023	Rev	A
Checked by	CC				

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Drawing printed: 09/07/2018 10:24:34



The high temperatures have the potential to damage the HDPE basal liner while hydrogen is potentially explosive between 4% and 75% by volume of air. A thermal barrier will be installed under the slab to protect the basal HDPE liner. To prevent the risk of explosive conditions occurring the building will have no gables, it will have perforated side cladding that will terminate 6 m above ground level and the roof will have vents.

Weathering may also be carried out in the open in Cells 29/31 and to facilitate this a minimum 1 m layer of weathered IBA will be placed on top of the leachate collection layer to act as a thermal barrier for the basal HDPE liner.

The cells may also be used to carry out recovery trials, which may include metal recovery, crushing, screening, and washing.

#### *3.9.4 Leachate Management*

The 'Weathering Area' will be roofed to minimise leachate during the weathering process. The storage cells will be provided with the same leachate collection system as the landfill cells.

#### *3.9.5 Hydrogen Gas Management*

The 'Weathering Area' will be constructed to allow the free venting of hydrogen gas to atmosphere. While hydrogen gas production will reduce to negligible levels as the IBA weathers, as a precaution gas collection pipes and passive gas vents will be progressively installed in the cells.

#### *3.9.6 Recovery Trials & Processing*

The recovery of IBA is well developed in the European Union where the recovery of the metal content and the production of aggregate for use in construction projects is quite commonplace. The process requires screening to remove metals, followed by crushing to the required aggregate size and washing. The washing plant will be a 'closed loop' system with the washwater recycled.

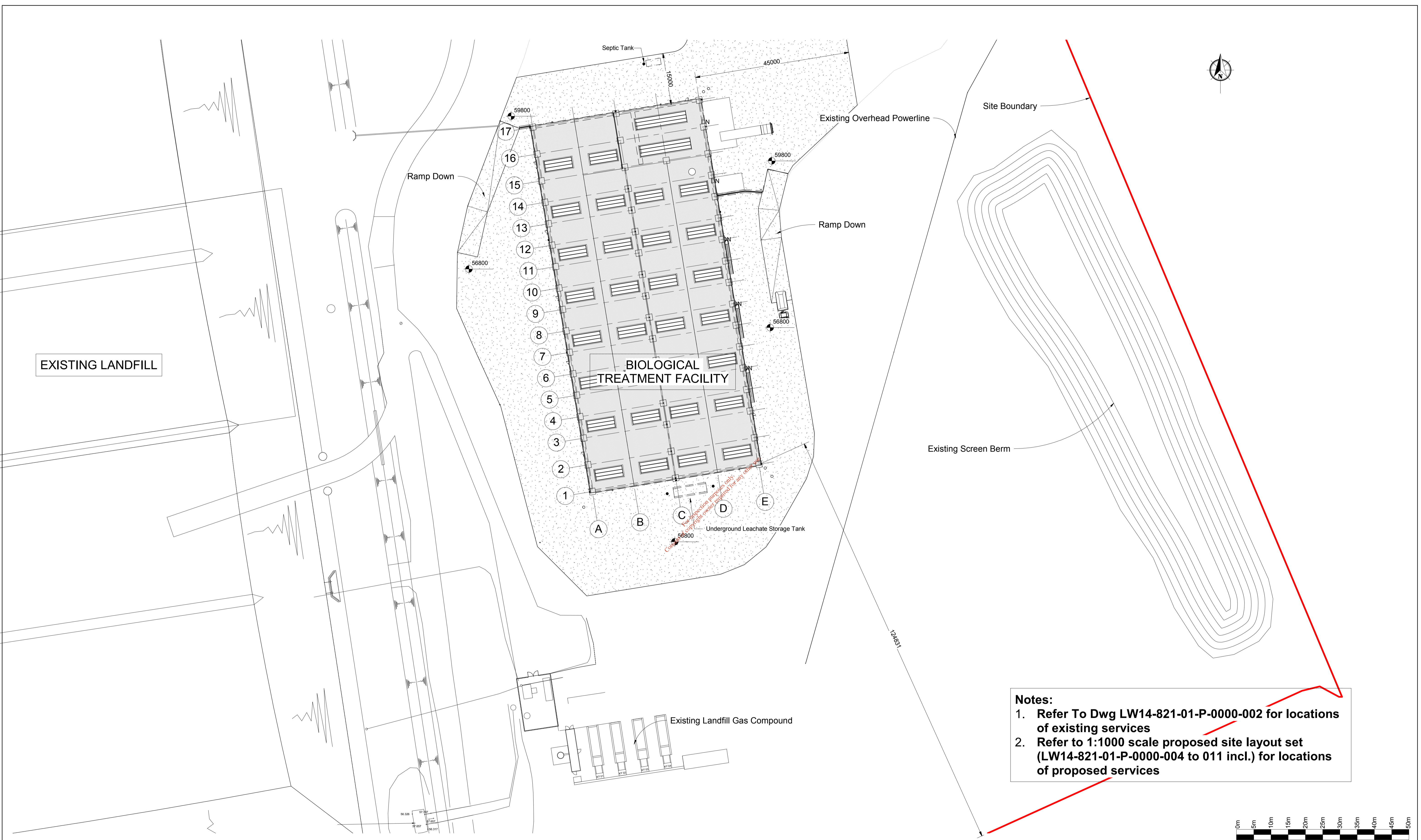
#### *3.9.7 Capping*

Temporary covers (e.g. HDPE sheeting) and or sprays that will bond surface fines into a cohesive layer will be used to control dusts. If the recovery trials do not prove successful and/or sustainable outlets for the processed IBA cannot be found a permanent cap will be installed over Cells 28 to 32 to the same specification as that applied at the non-stabilised cells (Section 3.8.3).

### **3.10 Biological Treatment Plant**

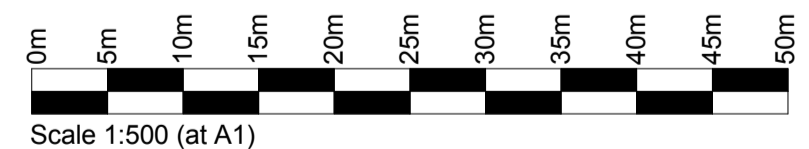
The biological treatment building (5,400 m<sup>2</sup>), will be a 17 m high portal frame structure, with reinforced concrete 'push walls' walls and steel cladding and surrounded by a paved marshalling yard as shown on Drawing LW 14-821-01-P-1700-01.

Drawing LW 14-821-01-P-1700-000 is an overview of the building, the internal layout of the ground floor is shown on LW 14-821-01-P-1700-02, with elevations and cross sections on LW 14-821-01-P-1700-005 and LW 14-821-01-P-1700-006 respectively.



**Notes:**

1. Refer To Dwg LW14-821-01-P-0000-002 for locations of existing services
2. Refer to 1:1000 scale proposed site layout set (LW14-821-01-P-0000-004 to 011 incl.) for locations of proposed services



When Applicable : Ordnance Survey Ireland Licence No. EN 0001217 © Ordnance Survey Ireland and Government of Ireland. Ordnance Survey Sheet 2441, 2509, 2509c and 2509d **SITE PLAN BIOLOGICAL TREATMENT FACILITY**  
(Scale 1 : 500)

Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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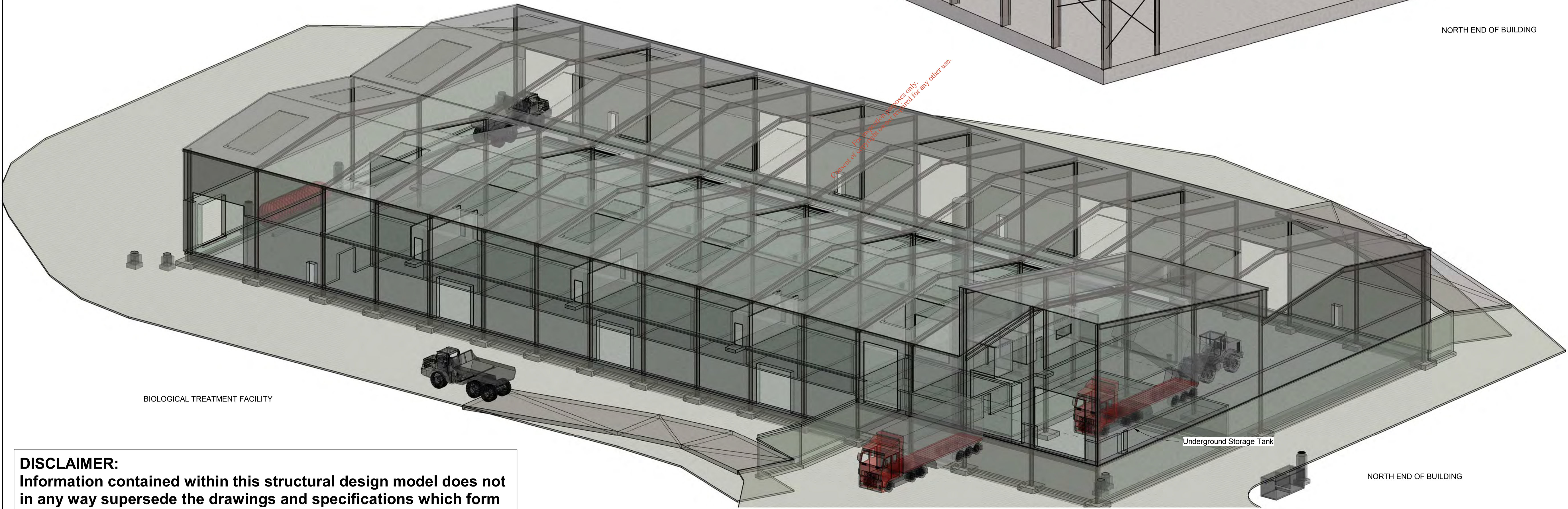
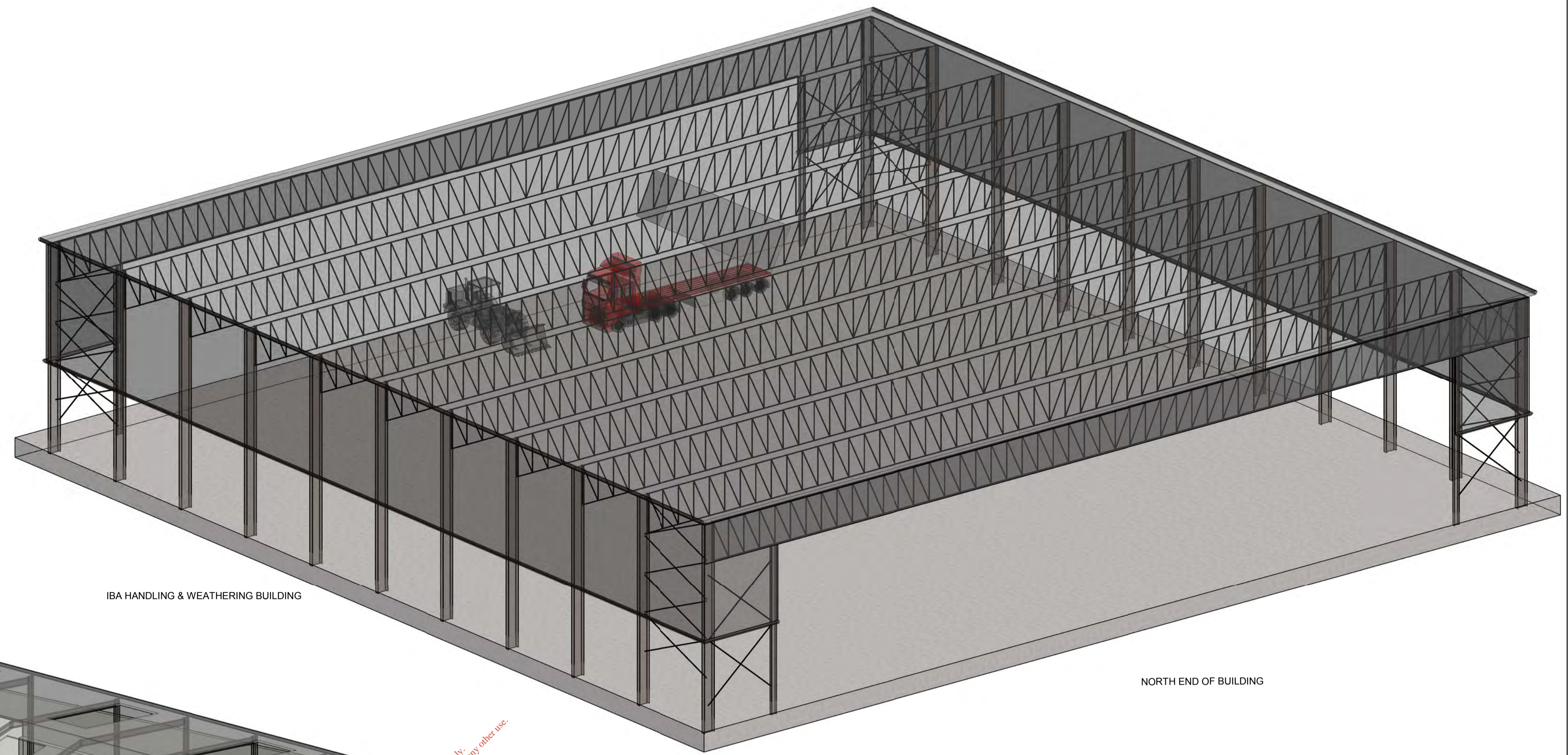
CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

PROJECT	PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL
SHEET	SITE LAYOUT PLAN OF PROPOSED BIOLOGICAL TREATMENT FACILITY

CLIENT			KNOCKHARLEY LANDFILL Ltd.		
Date	04/04/17	Project number	LW14-821-01	Scale (@ A1)	As indicated
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-001	Rev	A
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Sheet List				
Zone	Level	Sheet Number	Sheet Name	Revision
P	1700	000	OVERVIEW OF BIOLOGICAL TREATMENT FACILITY AND IBA FACILITY BUILDING	A
P	1700	001	SITE LAYOUT PLAN OF PROPOSED BIOLOGICAL TREATMENT FACILITY	A
P	1700	002	PROPOSED BIOLOGICAL TREATMENT FACILITY GROUND FLOOR PLAN	A
P	1700	003	PROPOSED BIOLOGICAL TREATMENT FACILITY FIRST FLOOR PLAN	A
P	1700	004	PROPOSED BIOLOGICAL TREATMENT FACILITY ROOF PLAN	A
P	1700	005	PROPOSED BIOLOGICAL TREATMENT FACILITY CROSS SECTIONS	A
P	1700	006	PROPOSED BIOLOGICAL TREATMENT FACILITY ELEVATIONS	A
P	1700	007	DETAILS OF FULL RETENTION OIL INTERCEPTOR	A
P	1700	008	PROPOSED BIOLOGICAL TREATMENT FACILITY LEACHATE & SEPTIC TANK DETAILS	A
P	1700	010	ESB MV SUBSTATION DETAILS	A
P	1700	021	PROPOSED IBA FACILITY BUILDING FLOOR PLAN	A
P	1700	022	PROPOSED IBA FACILITY BUILDING ROOF PLAN	A
P	1700	023	PROPOSED IBA FACILITY BUILDING SECTION AND ELEVATIONS	A



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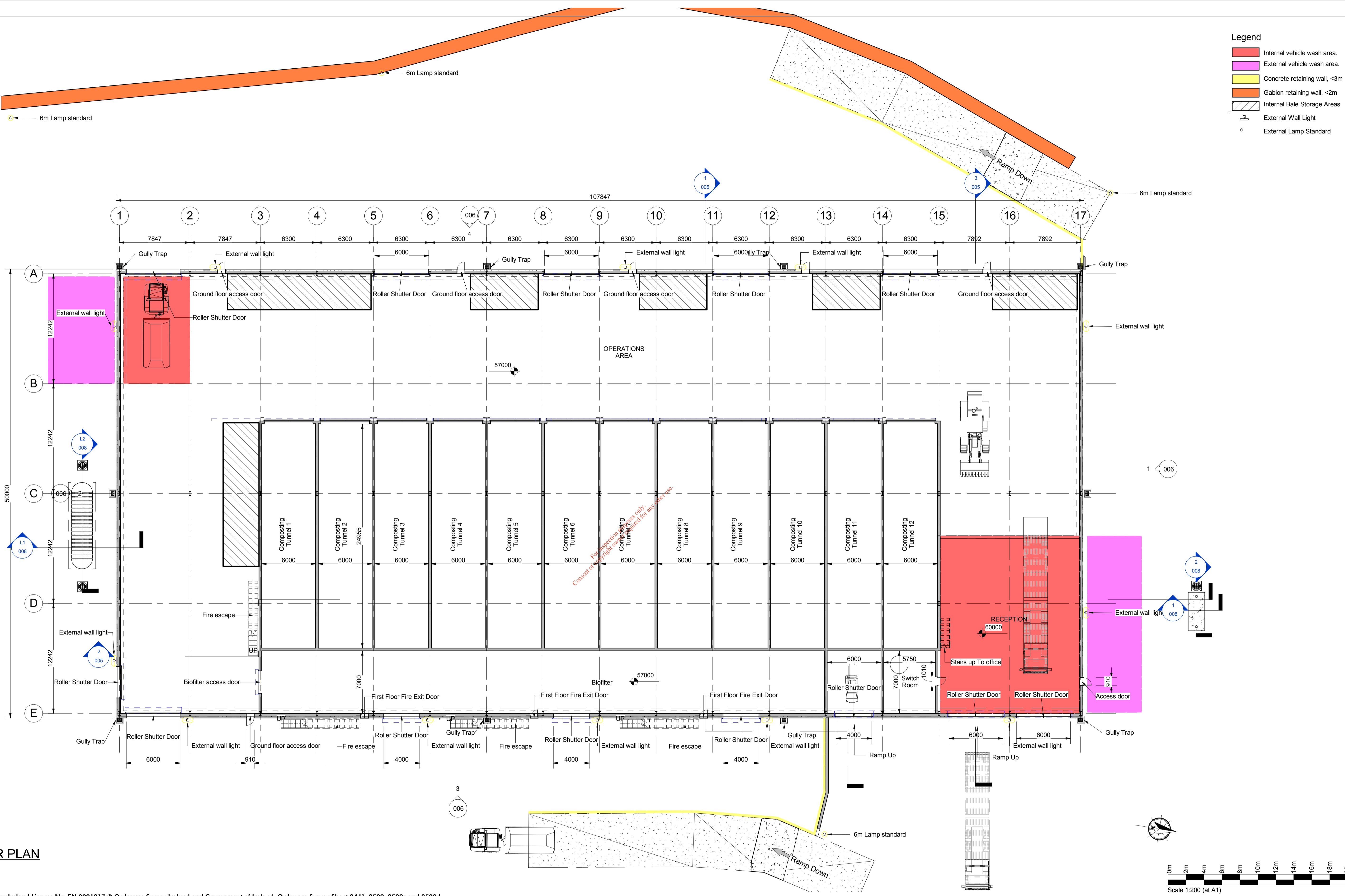
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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
-	-	-	EIAR

PROJECT	PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL
SHEET	OVERVIEW OF BIOLOGICAL TREATMENT FACILITY AND IBA FACILITY BUILDING

CLIENT				KNOCKHARLEY LANDFILL Ltd.	
Date	10.07.18	Project number	LW14-821-01	Scale (@ A1)	N/A
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-000	Rev	A
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**GROUND FLOOR PLAN**  
(Scale 1:200)

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PROJECT  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

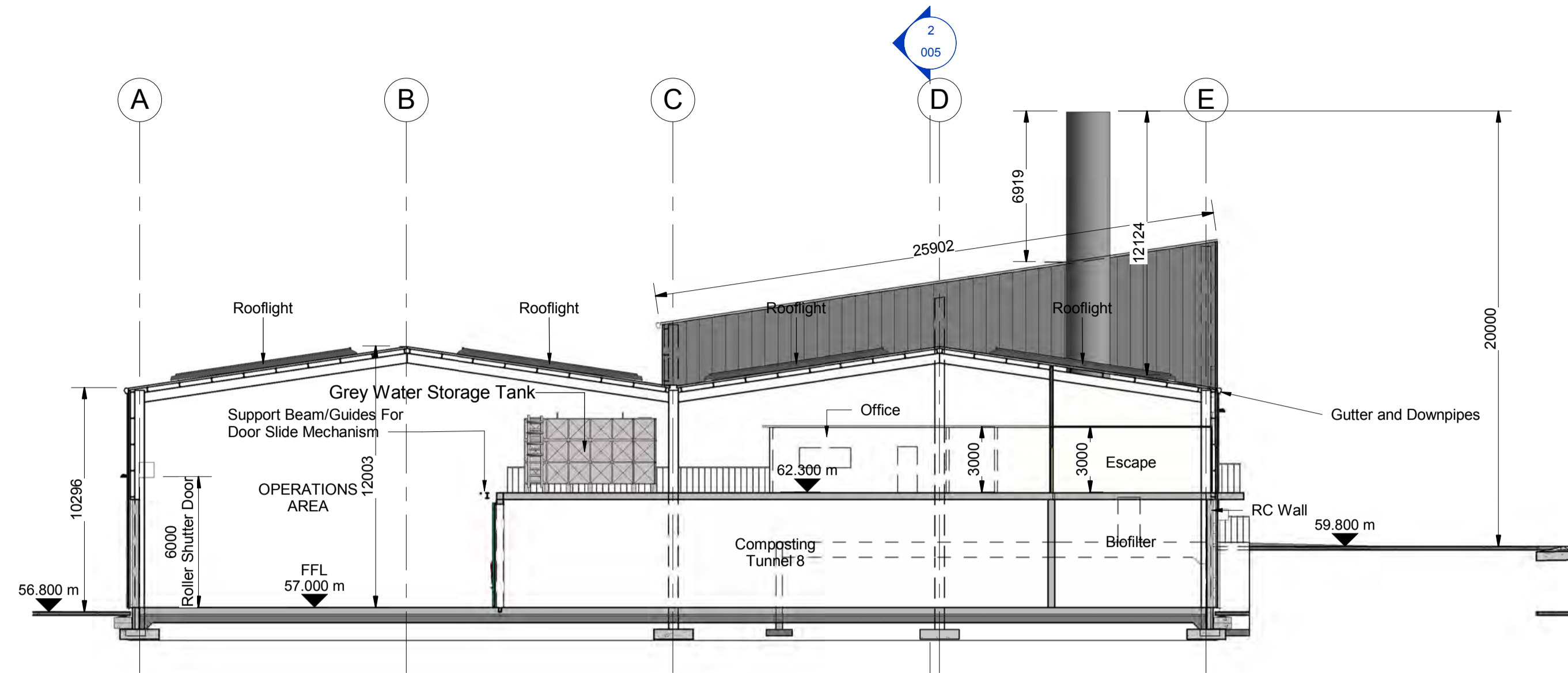
SHEET  
**PROPOSED BIOLOGICAL TREATMENT FACILITY GROUND FLOOR PLAN**

CLIENT  
**KNOCKHARLEY LANDFILL Ltd.**

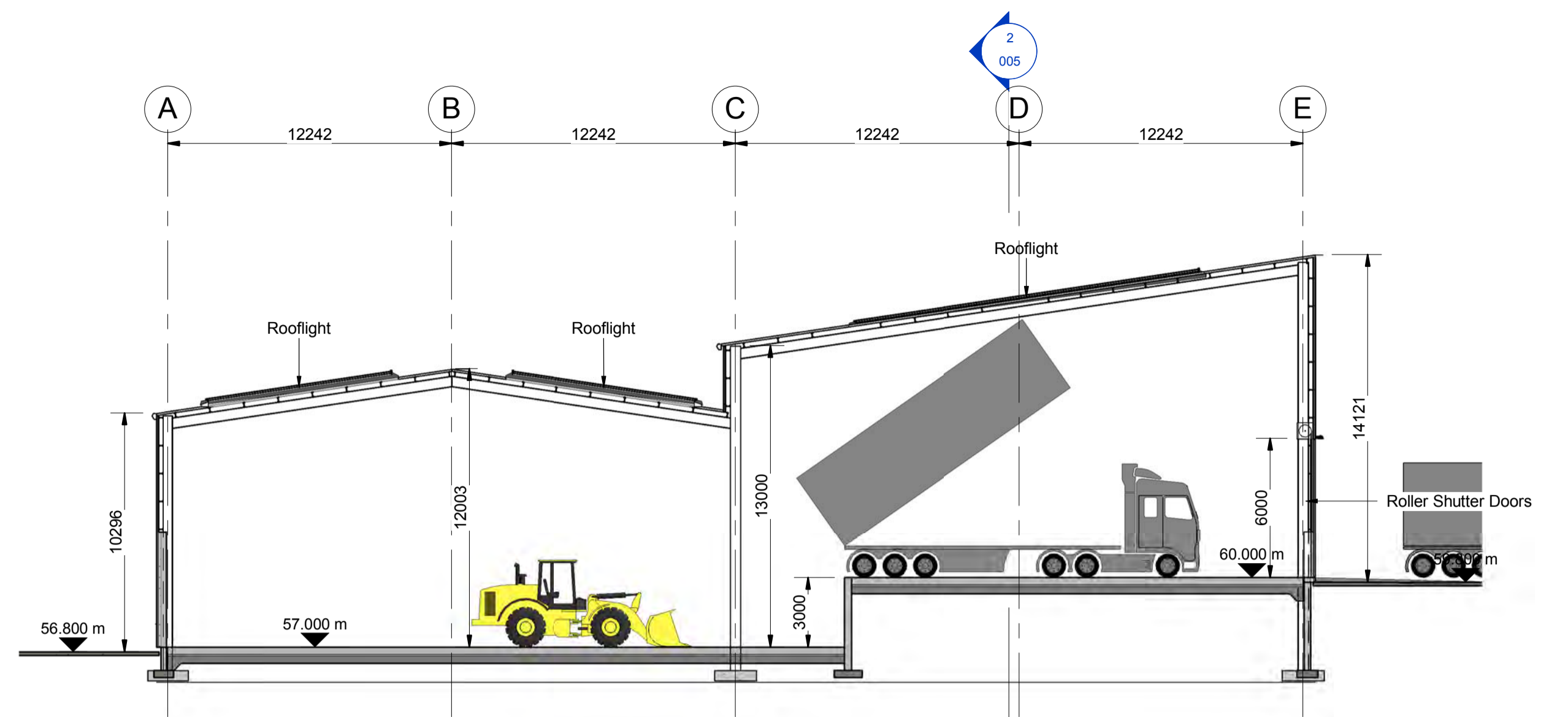
Date	09/27/17	Project number	LW14-821-01	Scale (@ A1)	1:200
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-002	Rev	A
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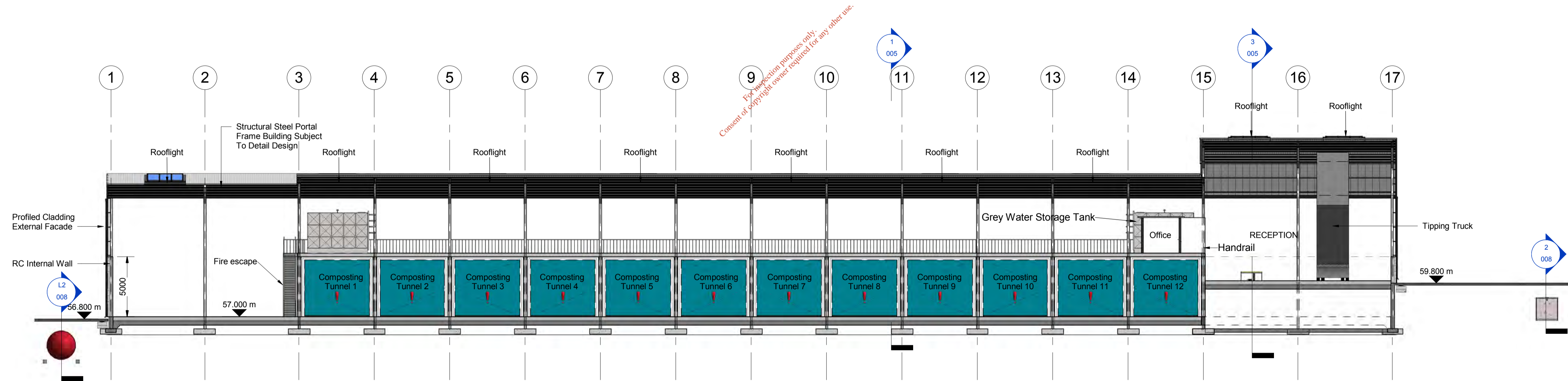
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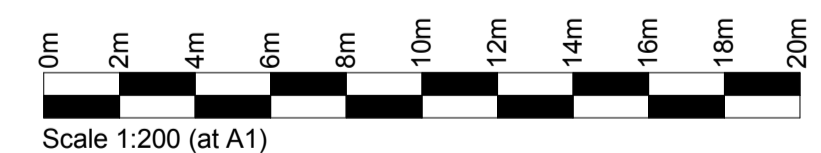
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(Scale 1:200)



**Section 3**  
(Scale 1:200)



**Section 2**  
(Scale 1:200)



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**PROJECT**

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

**SHEET**

PROPOSED BIOLOGICAL TREATMENT FACILITY CROSS SECTIONS

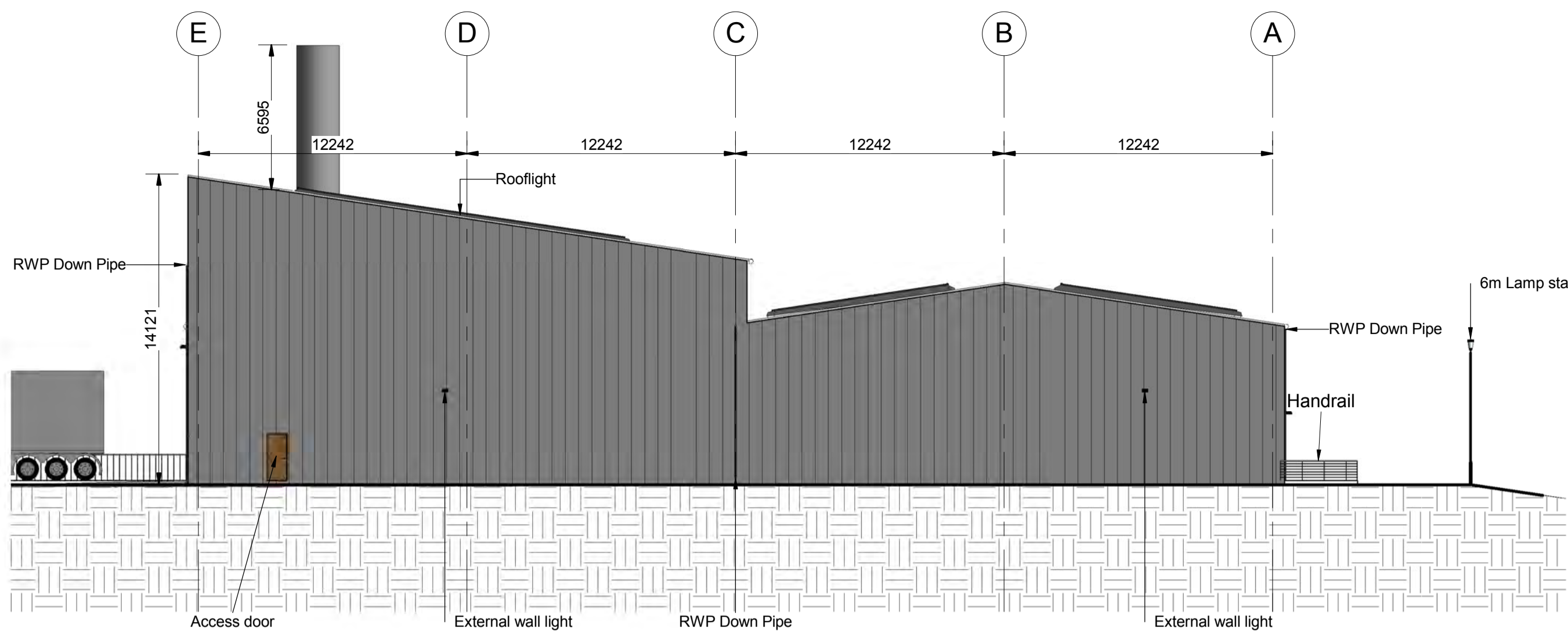
**CLIENT**

KNOCKHARLEY LANDFILL Ltd.

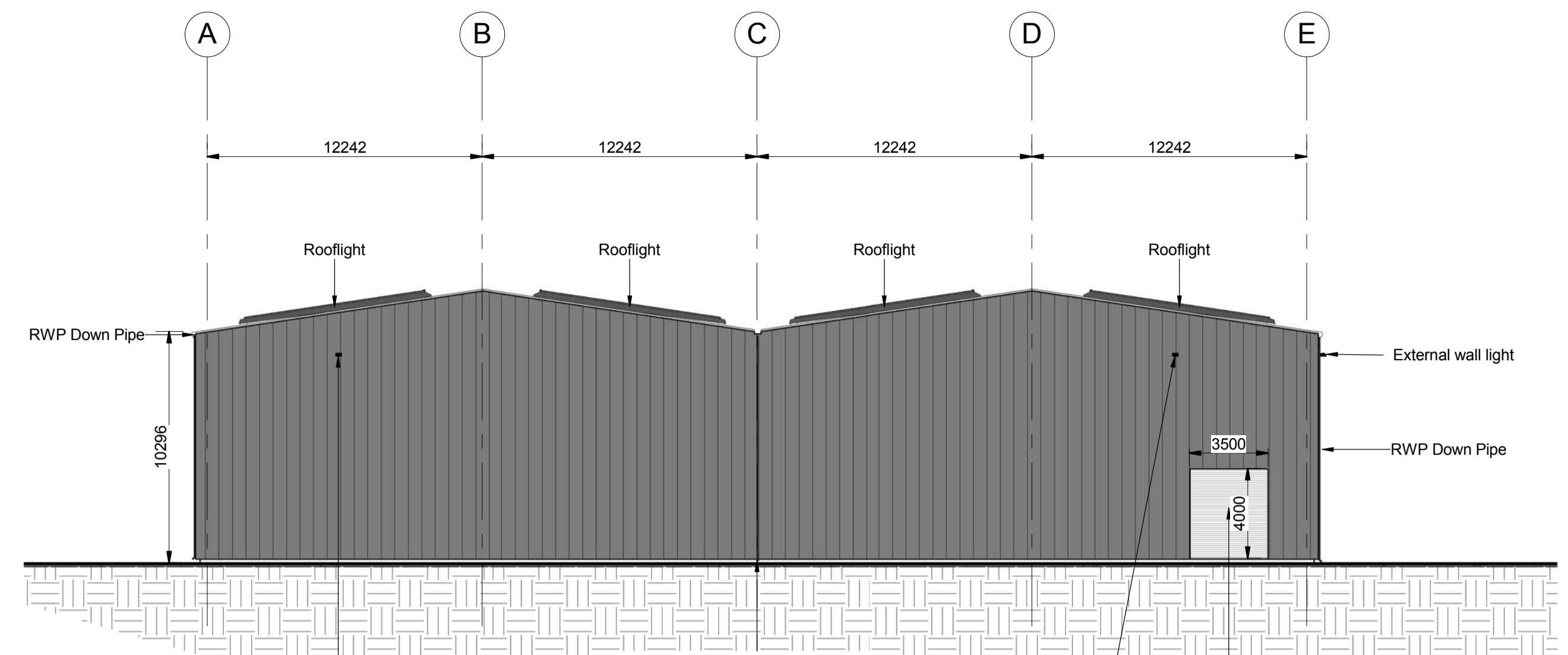
Date	09/27/17	Project number	LW14-821-01	Scale (@ A1)	1:200
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-005	Rev	A
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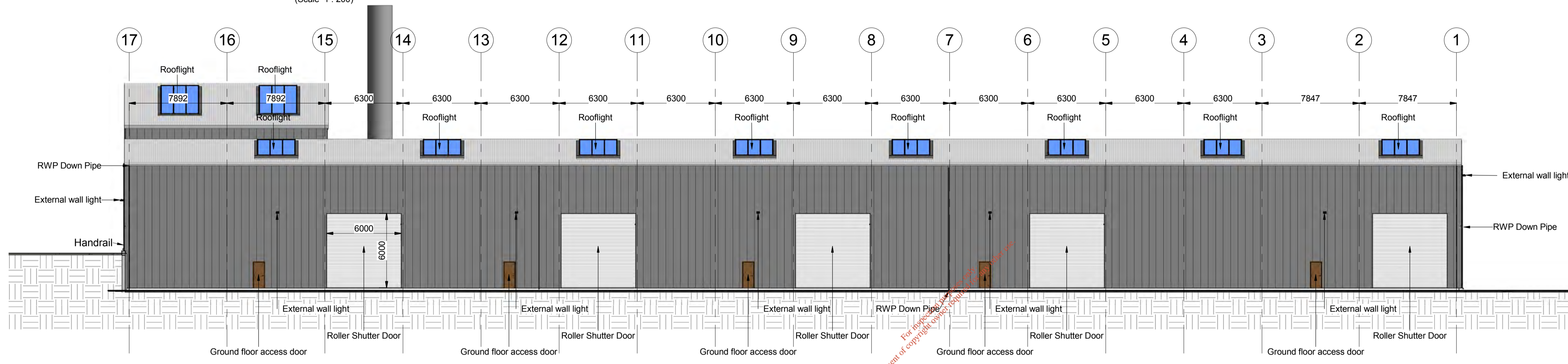
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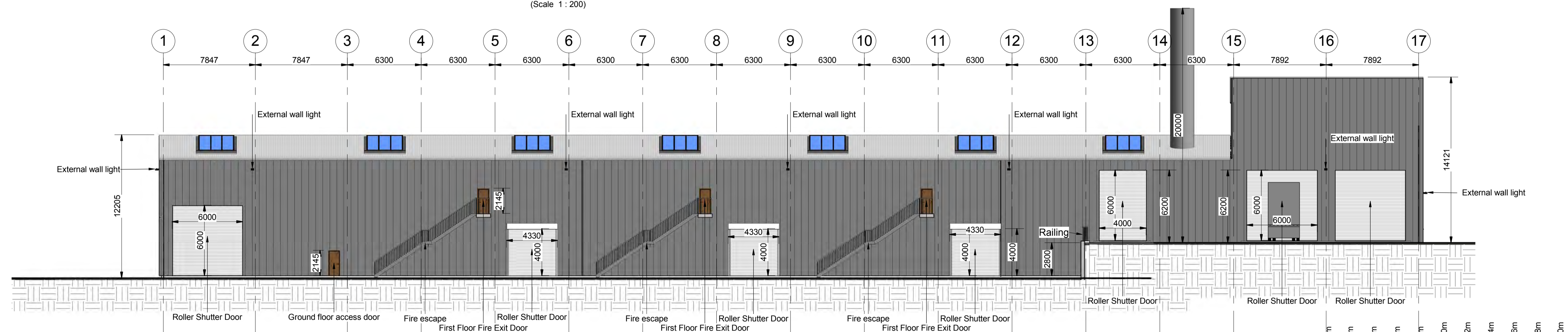
**NORTH ELEVATION**  
(Scale 1 : 200)



**SOUTH ELEVATION**  
(Scale 1 : 200)



**WEST ELEVATION**  
(Scale 1 : 200)



**EAST ELEVATION**  
(Scale 1 : 200)

- EXTERNAL FINISH**
1. WALLS - VERTICAL PROFILED INSULATED METAL CLADDING
  2. ROOF - PROFILED INSULATED METAL ROOF PANEL SYSTEM
  3. MUSHROOM COLOUR (RAL 1006020)

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Rev.	Description	App By	Date
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			EIAR

**PROJECT**

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

**SHEET**

PROPOSED BIOLOGICAL TREATMENT FACILITY ELEVATIONS

**CLIENT**

KNOCKHARLEY LANDFILL Ltd.

Date	09/27/17	Project number	LW14-821-01	Scale (@ A1)	1 : 200
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-006	Rev	A
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The building will be fitted with fast acting vehicle roller shutter doors. There will be an internal waste reception bay; twelve aerated composting tunnels (each 6 m wide, 25 m long and 5 m high) and a stabilised waste storage area. An odour control system comprising an air extraction, scrubbing and an odour control unit (biofilters) will be located inside the building, with the treated air venting via a 20 m high stack.

Two 40 m<sup>3</sup> rain water harvesting tanks (80 m<sup>3</sup> combined capacity) will be provided to collect rainwater from the roof for re-use as 'grey water' in the process. An underground holding tank will be provided for the process wastewater. The tank will be located in a concrete surround, fitted with an LLDPE liner, as shown on Drawing LW14-821-01-P-1700-008 and will have level indicators and high-level alarms.

The building will also house staff welfare facilities and a proprietary wastewater treatment system will be installed to treated sanitary wastewater. In addition, the building will have the capacity to provide contingency storage for baled recyclables and/or baled MSW on the ground floor and above the compost tunnels.

The plant is designed to treat the non-stabilised organic fines accepted at the installation to achieve an AT 4 of <7 mgO<sub>2</sub>/g DM and has a processing capacity of 25,000 tonnes/year. It will require approval by the Department of Agriculture, Food and the Marine (DAFM) to operate in accordance with the "Conditions for Approval and Operation of a 'Type 8' Composting/Biogas plant transforming Category 3 catering waste".

In the future the plant may, subject to market demands, be reconfigured to process source segregated organic fraction of municipal solid waste i.e. "brown bin" material. Any such reconfiguration will require prior Agency approval.

### 3.10.1 Odour Control

Given the nature of the inputs and the process the biological treatment plant will be a source of significant odours. To mitigate these an odour control system comprising air extraction and an odour treatment unit will be installed.

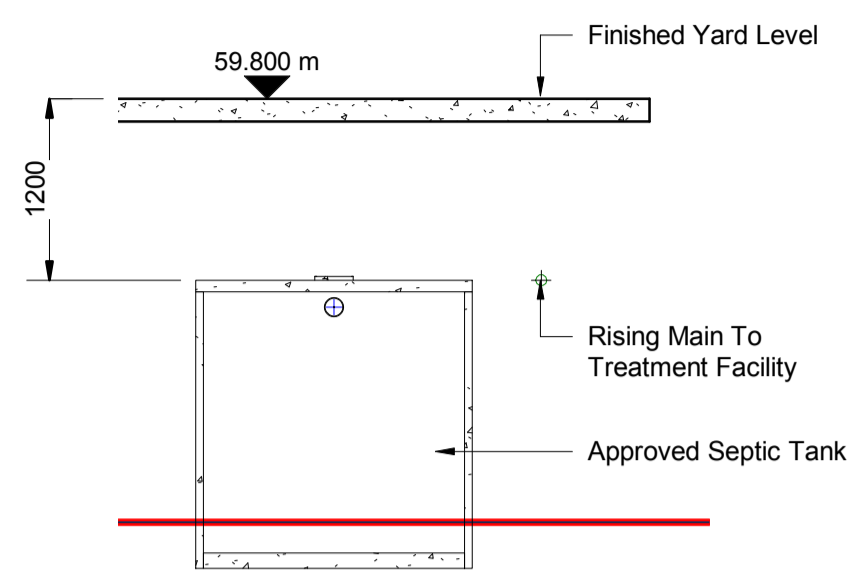
The purpose of the system is to ensure that Best Available Technique emission limit values are achieved and that ambient air quality standards are not contravened. The detailed design of the system will be a Specified Engineering Works and will be submitted to the Agency for its prior approval before the system is installed and commissioned. An outline design is provided below.

#### Air Extraction

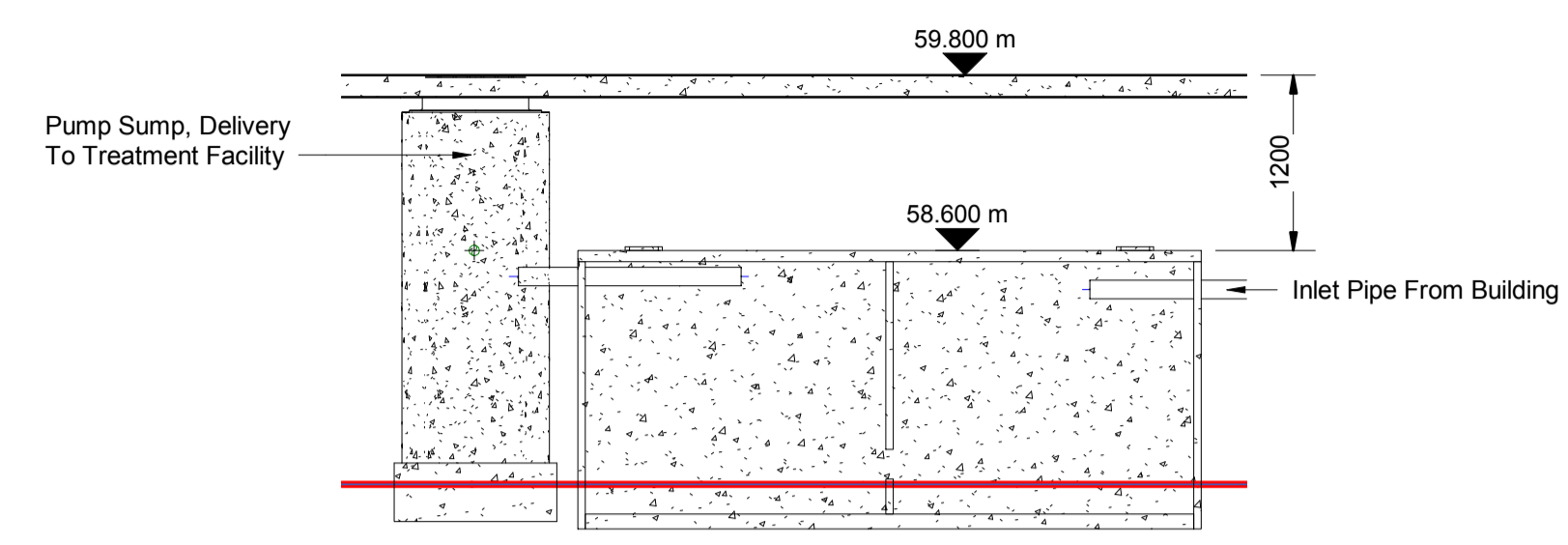
Air extraction fans will be installed that will have the capacity to effect 3 air changes inside the building every hour (240,000m<sup>3</sup>/hr). This, in conjunction with the intact building fabric and fast acting doors, will ensure negative air pressure is maintained and minimise the risk of fugitive odour emissions.

#### Odour Treatment

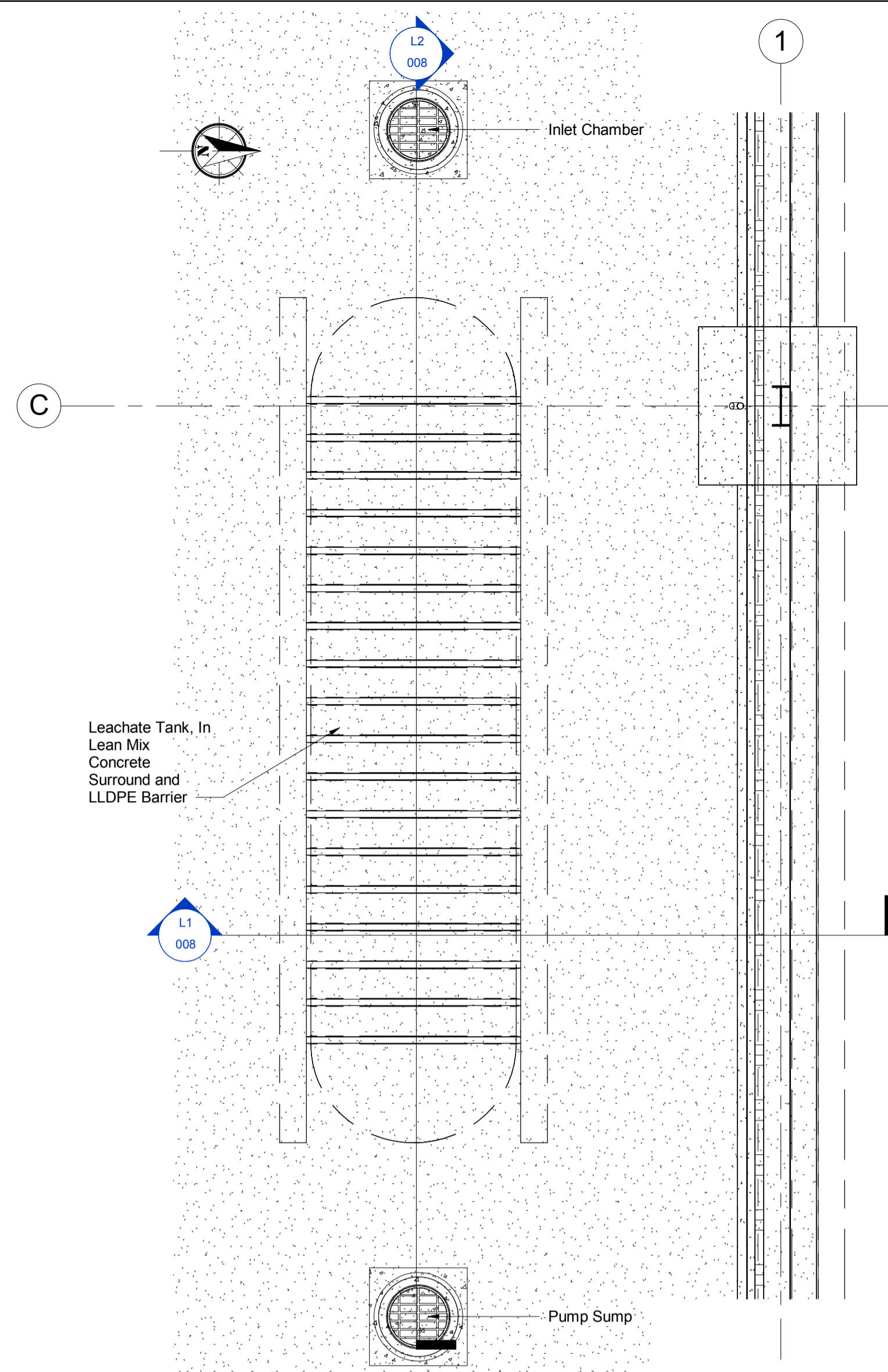
Roof mounted ducting in the building and in the individual compost tunnels will draw the air from the biological treatment plant to the odour treatment unit. The air extracted from the tunnels will be pre-treated in an acid scrubber to remove ammonia and amines. The removal of ammonia is particularly important as its oxidation in biofilters can give rise to elevated levels of nitrous oxide, a strong greenhouse gas.



**SECTION 1**  
(Scale 1 : 50)



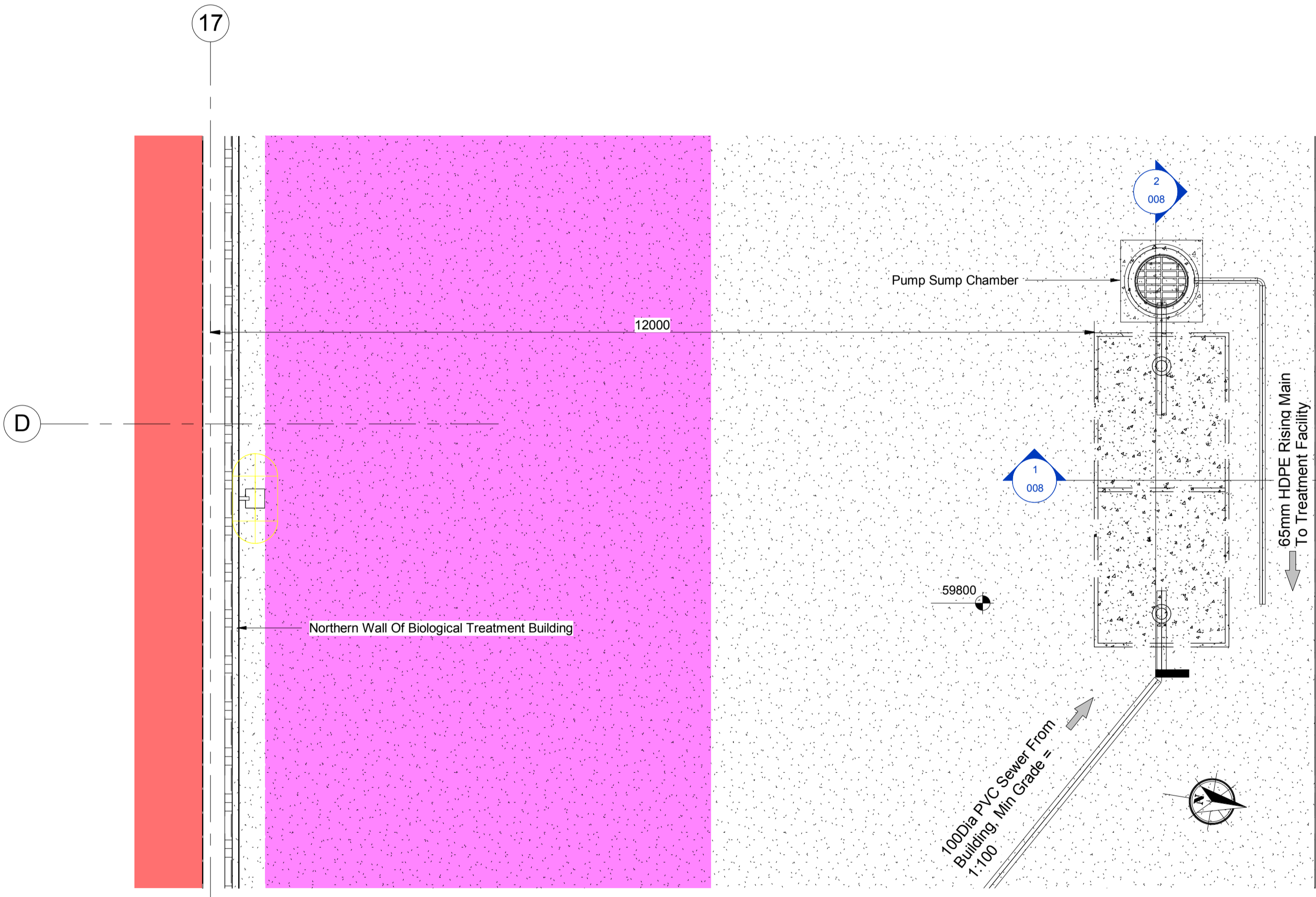
**SECTION 2**  
(Scale 1 : 50)



**PLAN OF LEACHATE TANK**  
(Scale 1 : 50)

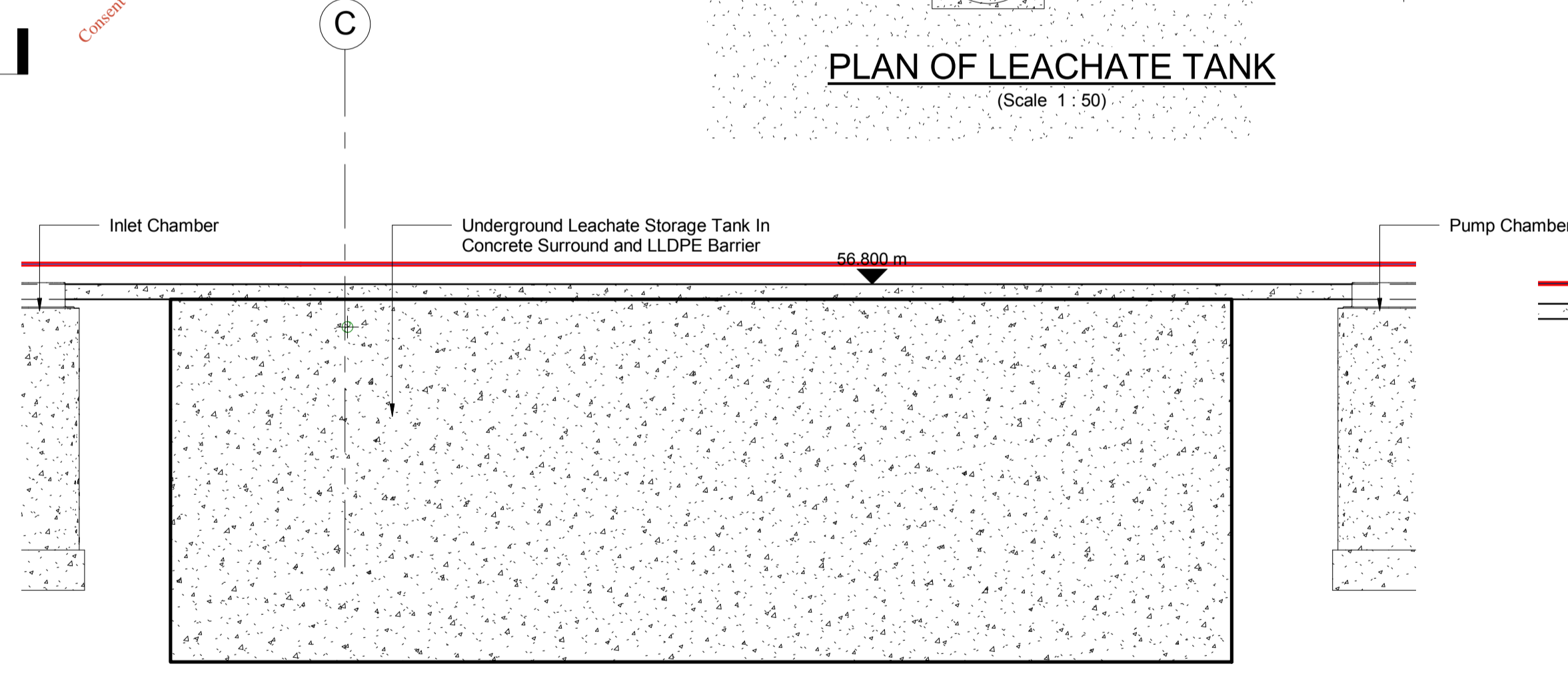
**Legend**

- Internal vehicle wash area.
- External vehicle wash area.

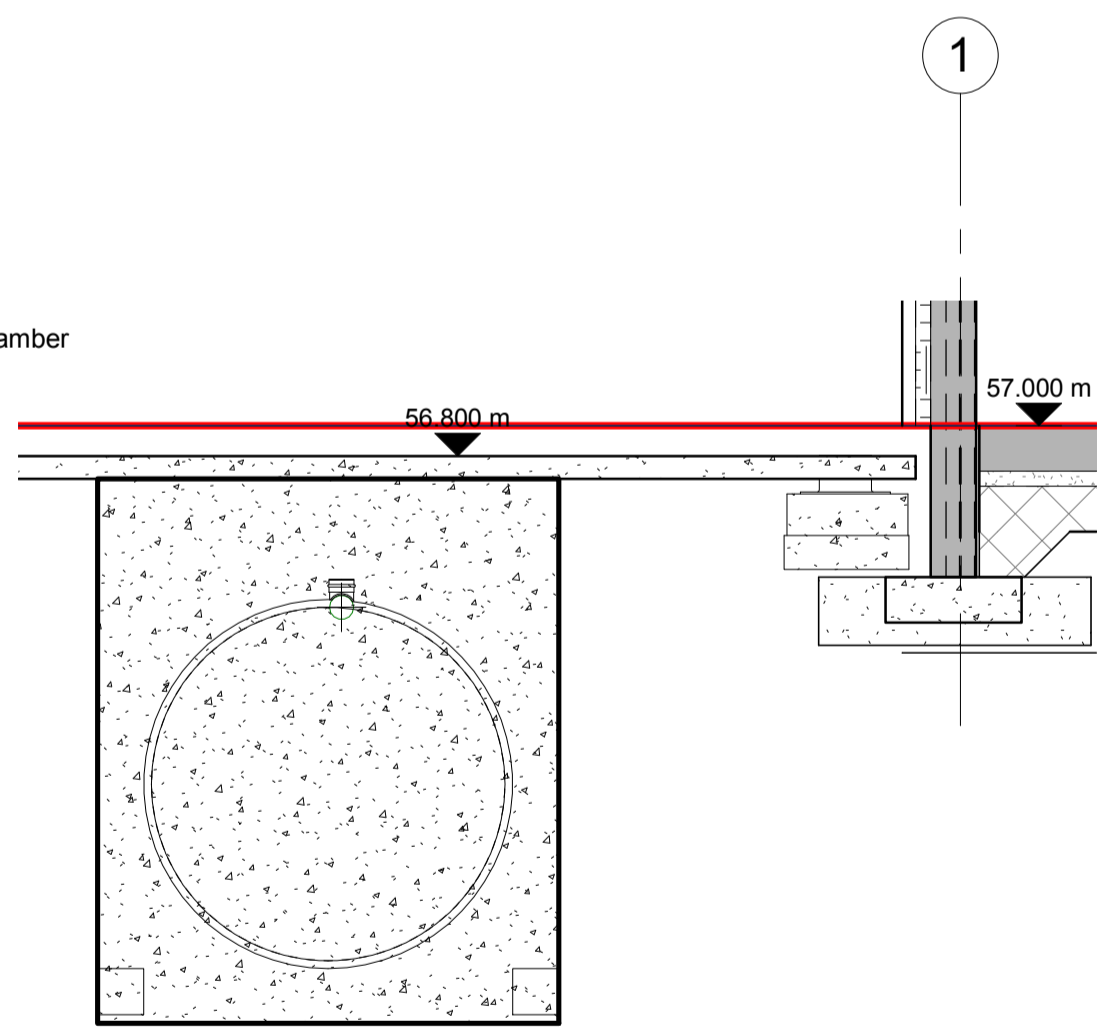


**PLAN OF SEPTIC TANK**  
(Scale 1 : 50)

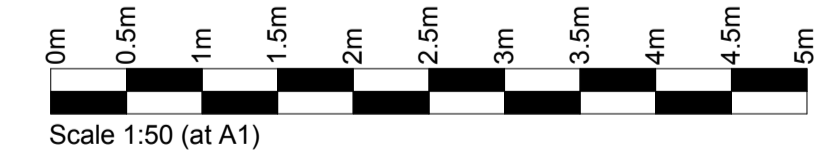
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**SECTION L2 - LEACHATE TANK**  
(Scale 1 : 50)



**SECTION L1 - LEACHATE TANK**  
(Scale 1 : 50)



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Rev.	Description	App By	Date
A	Issue For Planning Application	BG	10.07.18

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CODE	STATUS	SUITABILITY DESCRIPTION	PURPOSE OF ISSUE
			EIAR

<b>PROJECT</b>	PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL
<b>SHEET</b>	PROPOSED BIOLOGICAL TREATMENT FACILITY LEACHATE & SEPTIC TANK DETAILS

<b>CLIENT</b>				<b>KNOCKHARLEY LANDFILL Ltd.</b>			
Date	02/15/18	Project number	LW14-821-01	Scale (@ A1)	As indicated		Rev
Drawn by	SK	Drawing Number	LW14-821-01-P-1700-008				
Checked by	CC					A	

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Drawing printed: 09/07/2018 10:24:11



The scrubber exhaust and the air drawing from inside the building will be mixed and directed to a biofilter located at the western side of the building. The biofilter will be designed to achieve an emission limit of 1,200 odour units (ouE)/m<sup>3</sup>. The bed will comprise either a proprietary high surface-area inorganic media such as clay, activated carbon or organic media such as woodchip, peat, bark or combinations of same. The floor and side walls of the unit will be made of concrete and it will be covered with an air tight fabric.

The bed will be designed to allow an empty bed retention time (EBRT) of between 40 and 60 seconds and will take into consideration the need for contingency media change-out and preventative maintenance to ensure optimal performance. A basal inlet air distribution system will provide homogenous airflow throughout the media, thereby eliminating short-circuiting and poor treatment.

The biofilter will operate in a bio-trickling mode with the recirculation of the liquid through the media. The presence of a continuous moving liquid film will minimise the build-up of contaminants within the media and allow for the addition of nutrients and minerals and pH adjustment to maintain optimum performance conditions. This will be monitored by a supervisory control and data acquisition SCADA system.

The treated air will vent to atmosphere via a 2.4m diameter and 20 m high stack, with an efflux rate of 15m/s to ensure good dispersion of the residual odour plume so as to effectively mitigate odour nuisance.

### 3.11 Leachate Treatment Plant

The facility layout is shown on Drawing LW 14-821-01-P-0600-01. Elevations and Tank Farm Treatment & Equipment details are shown on Drawings LW 14-821-01-P-0600-02 and LW 14-821-01-P-0600-03 respectively. It will be adjacent to the existing leachate storage lagoon (3,000 m<sup>2</sup>) used for residual non-stabilised leachate (L1) and comprise

#### *Raw Leachate Storage*

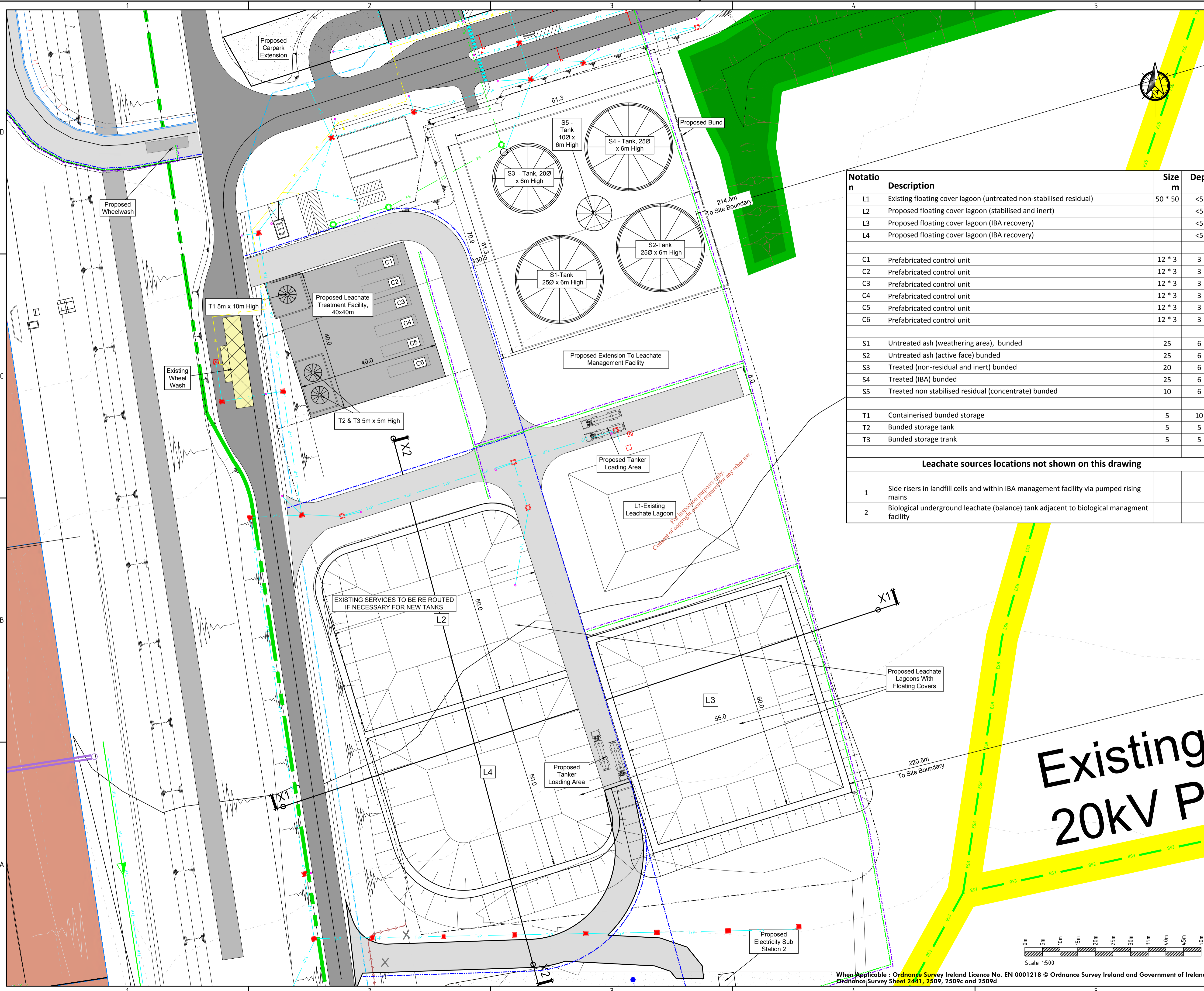
3 No. additional floating cover raw leachate storage lagoons, each 3,000 m<sup>2</sup>

- L2 Stabilised & Inert raw leachate
- L3 IBA recovery raw leachate
- L4 IBA contaminated rain water run-off

2 No. bunded above ground tanks for raw leachate from IBA Weathering Area (S1) and the IBA Cells and (S2) approximately 25 m diameter 6.0 m high.

#### *Leachate Treatment*

Treatment plant comprising 6 No. modular treatment units (C 1 to C6) located on 1,600 m<sup>2</sup> concrete slab and 1 No. elevated tank (T1) - 5 m diameter 10 m high and 2No. (T2 and T3) low level (<5.0 m high) bunded storage tanks for treatment chemicals e.g. pH adjustment (caustic soda and sulphuric acid).



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**LEGEND**

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary
- Refer to dwg P-0000-BDY For Clarity
- Existing Wayleave
- Ground Contours
- Existing Watercourse
- Landfill Cells currently being filled (2017/18)
- Constructed Landfill Cells
- Existing Forested Areas
- Permitted Landfill Cells, To Be Constructed
- Proposed IBA Facility
- IBA
- IBA, Cell 33 (Outline Only Shown For Clarity)
- Proposed Screening Berms with Compensatory Replanting
- Proposed Stream Diversion
- Existing Berm

Notation	Description	Size m	Depth m
L1	Existing floating cover lagoon (untreated non-stabilised residual)	50 * 50	<5
L2	Proposed floating cover lagoon (stabilised and inert)		<5
L3	Proposed floating cover lagoon (IBA recovery)		<5
L4	Proposed floating cover lagoon (IBA recovery)		<5
C1	Prefabricated control unit	12 * 3	3
C2	Prefabricated control unit	12 * 3	3
C3	Prefabricated control unit	12 * 3	3
C4	Prefabricated control unit	12 * 3	3
C5	Prefabricated control unit	12 * 3	3
C6	Prefabricated control unit	12 * 3	3
S1	Untreated ash (weathering area), banded	25	6
S2	Untreated ash (active face) banded	25	6
S3	Treated (non-residual and inert) banded	20	6
S4	Treated (IBA) banded	25	6
S5	Treated non stabilised residual (concentrate) banded	10	6
T1	Containerised banded storage	5	10
T2	Banded storage tank	5	5
T3	Banded storage tank	5	5

**Leachate sources locations not shown on this drawing**

1	Side risers in landfill cells and within IBA management facility via pumped rising mains
2	Biological underground leachate (balance) tank adjacent to biological management facility

**EXISTING SERVICES LEGEND**

- ESB Power lines
- Water Supply Pipes
- Storm Sewer
- Telemetry & Power
- Leachate Rising Main
- Groundwater Drainage
- Leachate Collection

**PROPOSED SERVICES LEGEND**

- Power, Telemetry & Gas
- Leachate Collection
- Surface Water Drain
- Water Supply
- Foul Sewer

Drawn	SK	Cork	10.07.18	Issue For Planning Application
Checked	CG	Rev Origin		Description
App'd		Date		
Revision History A				
Name of Client				
KNOCKHARLEY LANDFILL LTD.				
Name of Job				
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL				
Title of Drawing				
PROPOSED LEACHATE MANAGEMENT FACILITY				
Scale Used	This Drawing was printed to A1.			
1:500				
Dwg. No.	LW14-821-01-P-0600-001			Rev. No.
				A

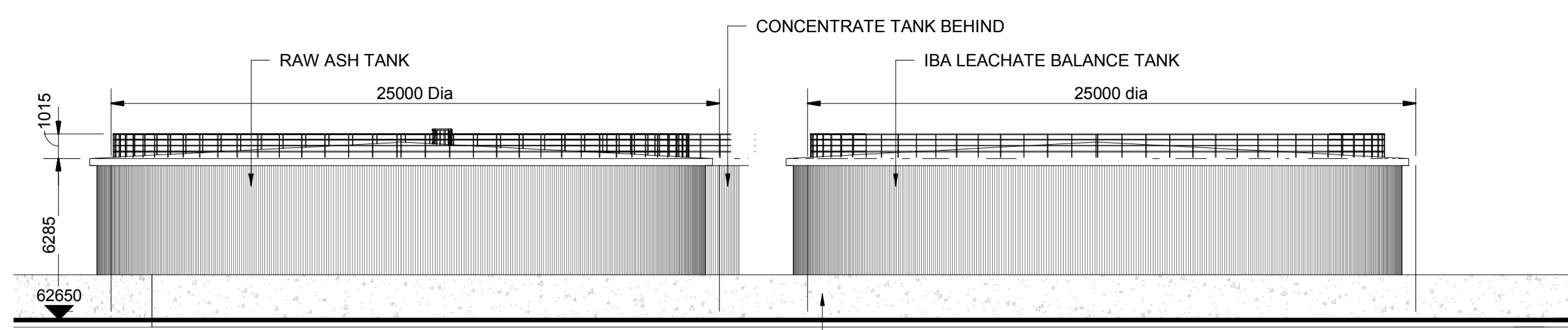
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**FEIHLY TIMONEY & COMPANY**

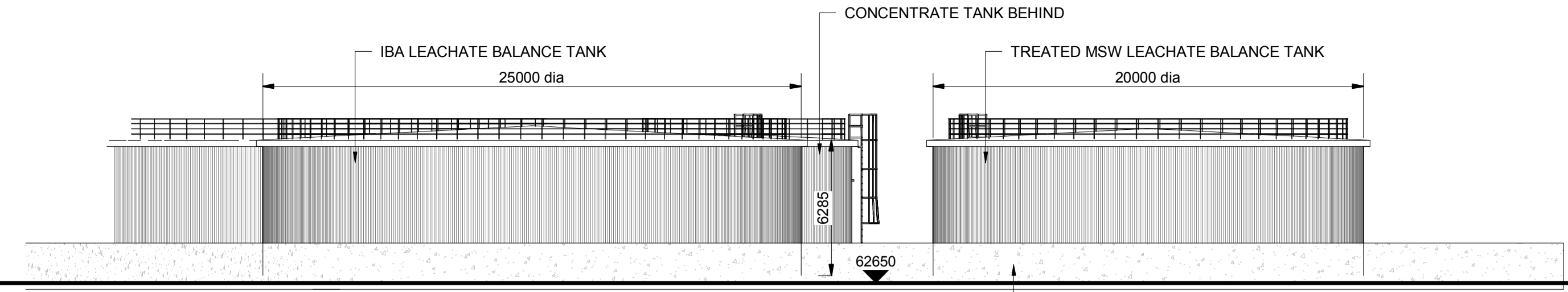
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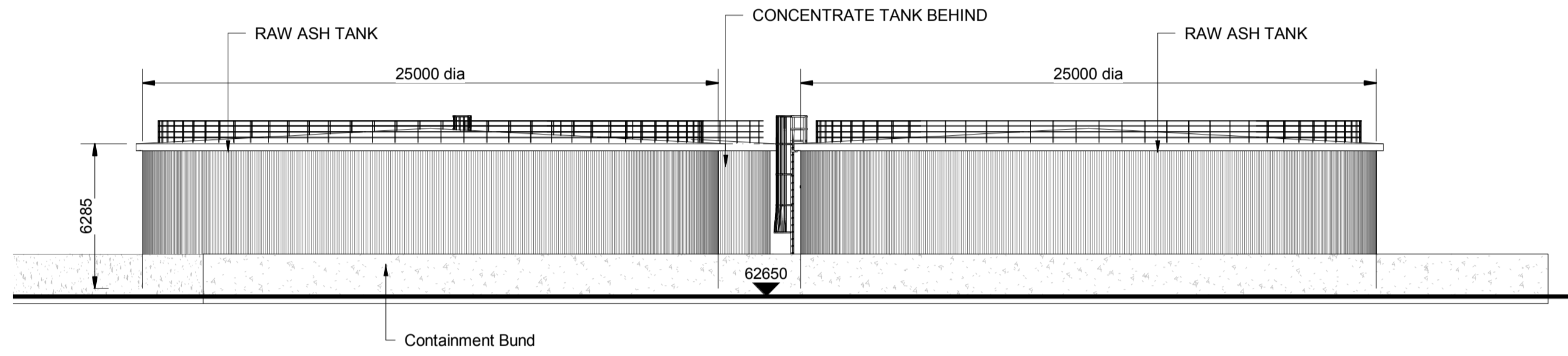
J5 Plaza, North Park Business Park, North Road, Dublin 11, Ireland  
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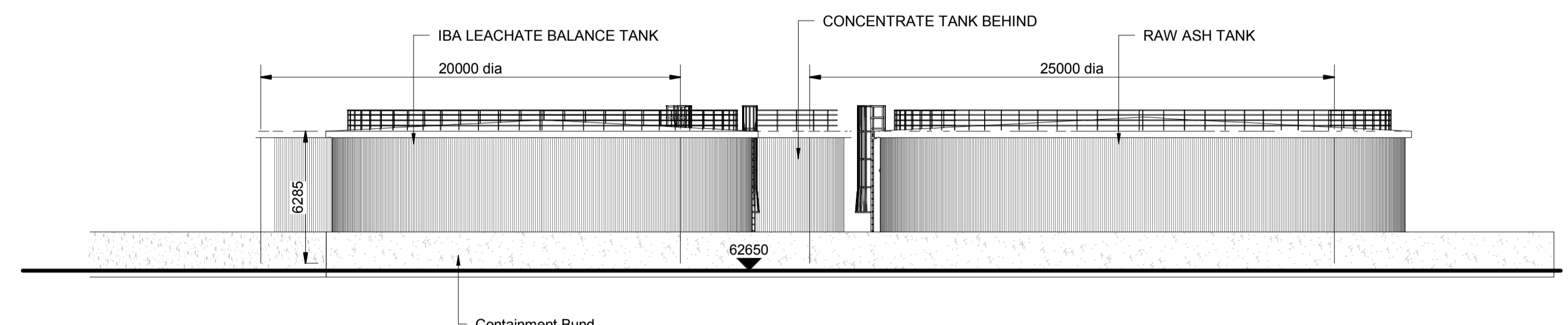
**Tank Farm Elevation East**  
(Scale 1 : 200)



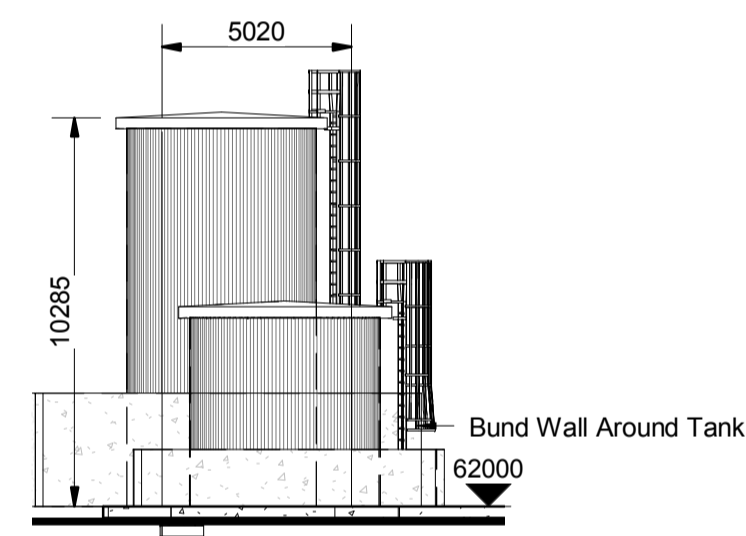
**Tank Farm Elevation North**  
(Scale 1 : 200)



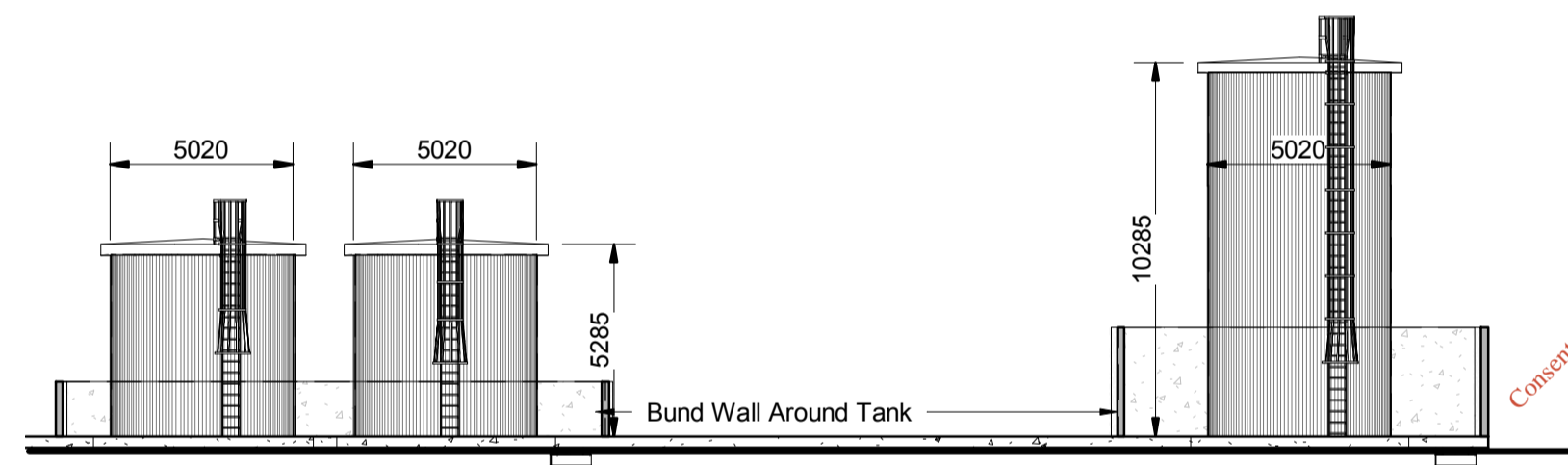
**Tank Farm Elevation South**  
(Scale 1 : 200)



**Tank Farm Elevation West**  
(Scale 1 : 200)

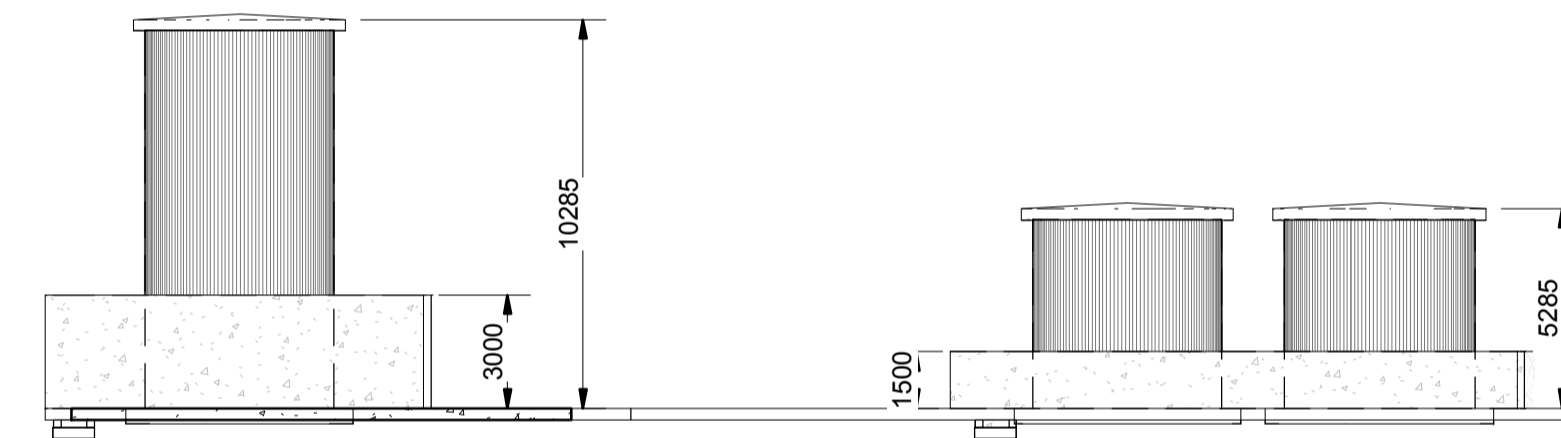


**Leachate Tank Elevation - South**  
(Scale 1 : 200)

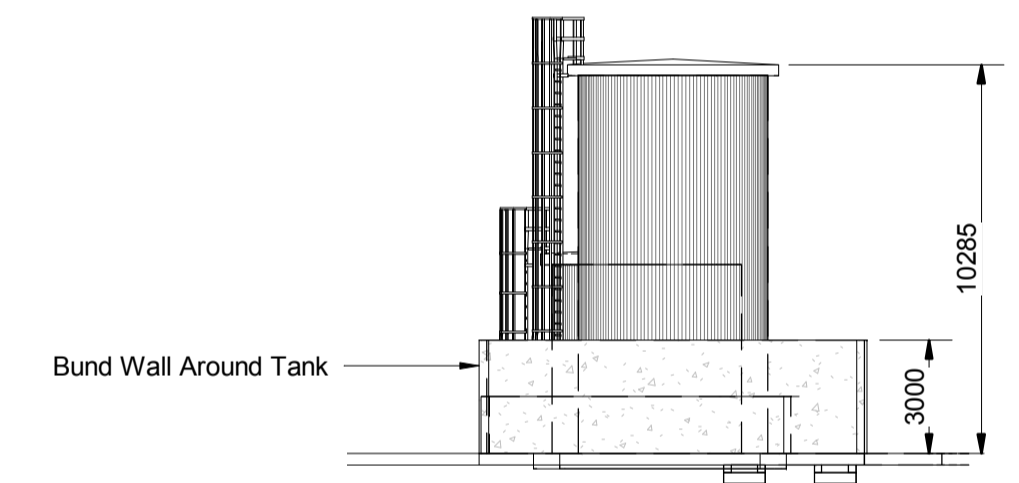


**Leachate Tank Elevation- East**  
(Scale 1 : 200)

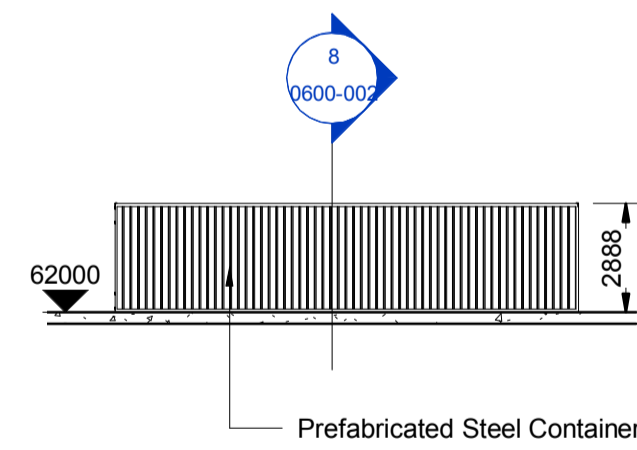
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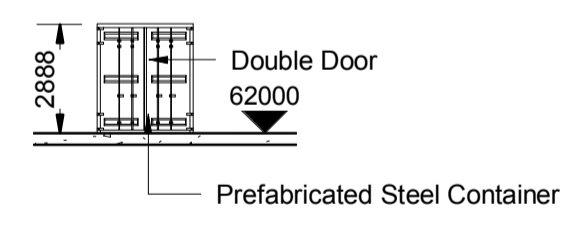
**Leachate Tank Elevation- West**  
(Scale 1 : 200)



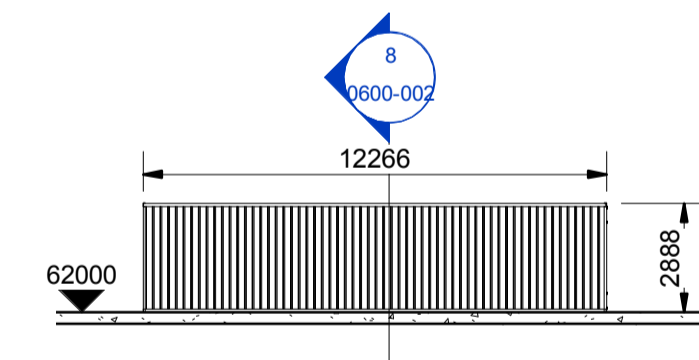
**Leachate Tank Elevation - North**  
(Scale 1 : 200)



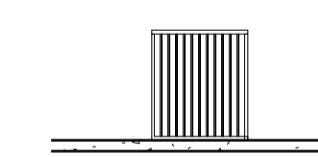
**Prefabricated Control Unit Elevation -South**  
(Scale 1 : 200)



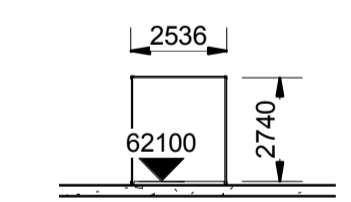
**Prefabricated Control Unit Elevation - West**  
(Scale 1 : 200)



**Prefabricated Control Unit Elevation -North**  
(Scale 1 : 200)

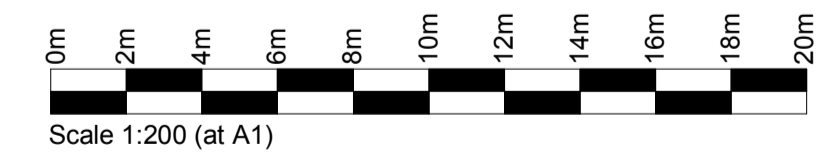


**Prefabricated Control Unit Elevation - East**  
(Scale 1 : 200)



**Leachate Yard Unit - Section**  
(Scale 1 : 200)

REFER TO P0600-003 FOR PLANS



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A	ISSUE FOR PLANNING APPLICATION	BG	10.07.18

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CODE 0600	STATUS	SUITABILITY DESCRIPTION PLANNING	PURPOSE OF ISSUE EIAR
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**PROJECT**  
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

**SHEET**  
TANK FARM And LEACHATE TREATMENT EQUIPMENT ELEVATIONS

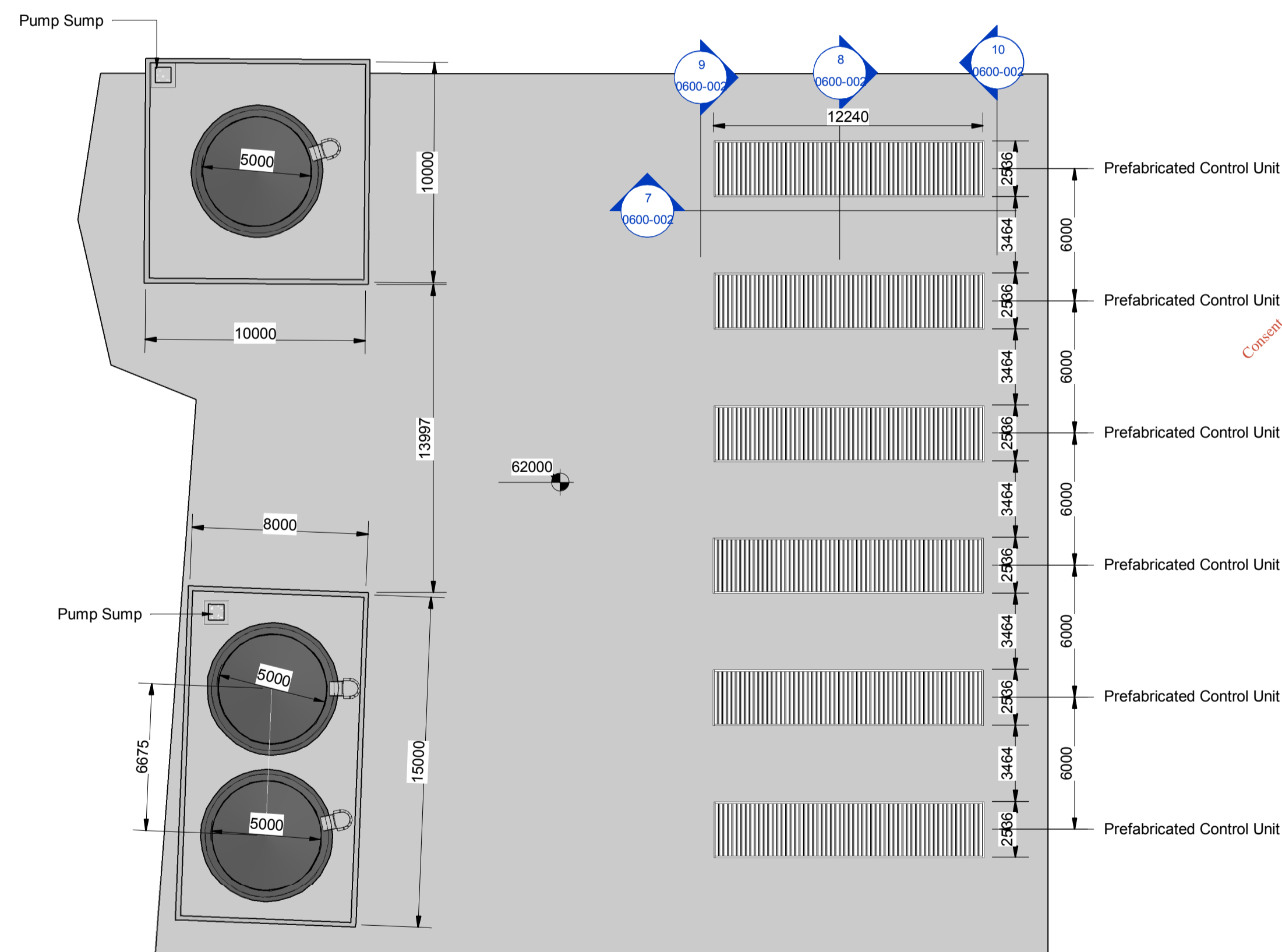
**CLIENT**  
KNOCKHARLEY LANDFILL Ltd.

Date 01/18/18	Project number LW14-821-01	Scale (@ A1) 1 : 200
Drawn by SK	Drawing Number LW14-821-01-P-0600-002	Rev A
Checked by CJC		

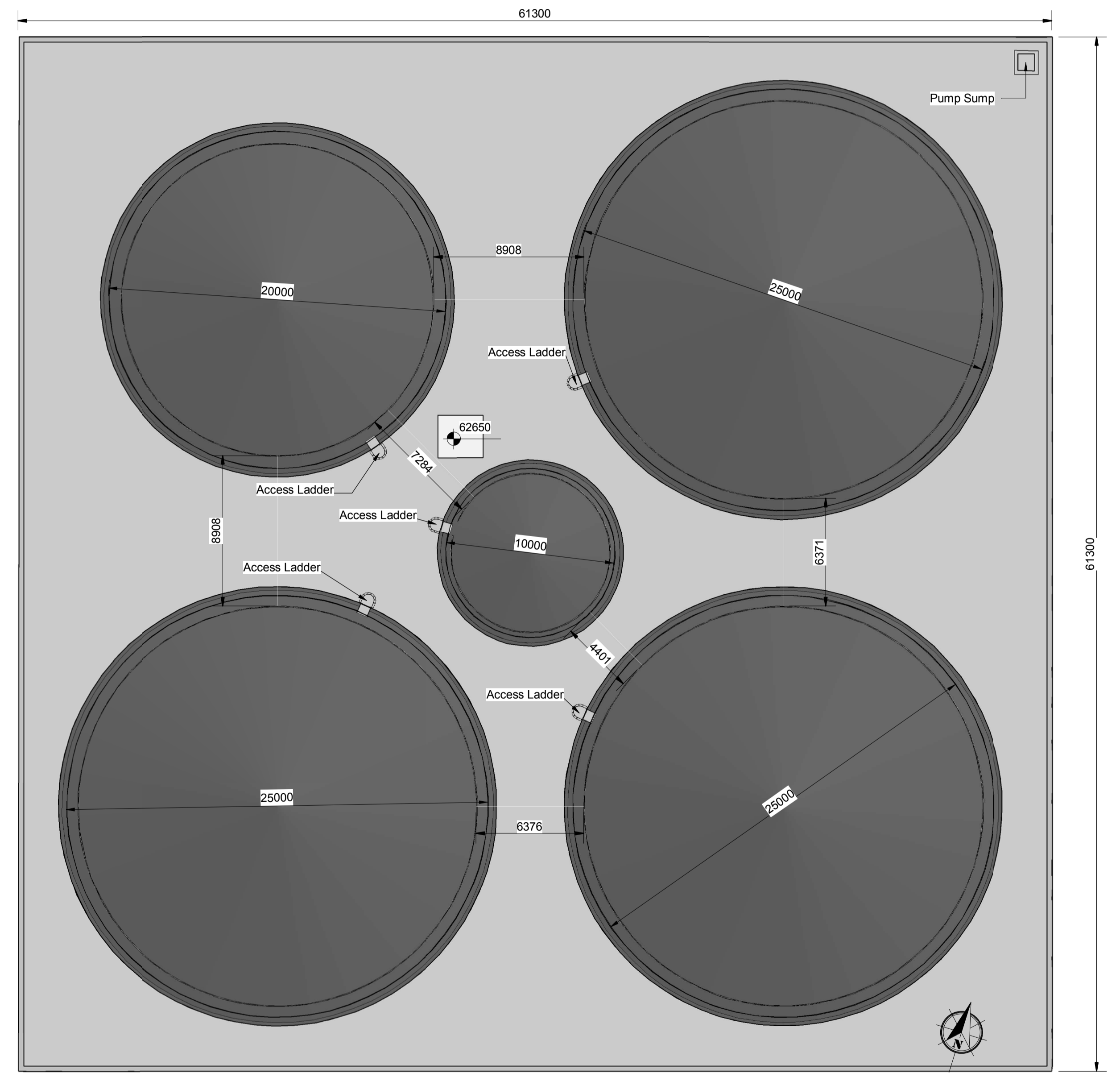
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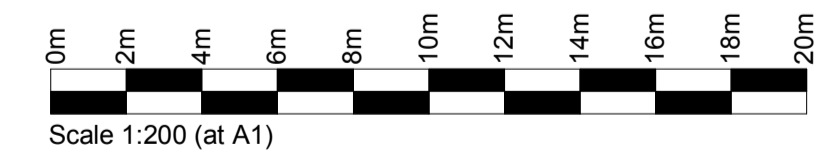
**Notes:**  
 1. Refer to 1:1000 series drawings (LW14-821-01-P-0000-004 To 011) layout of existing and proposed services.



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**LEACHATE YARD**  
 (Scale 1 : 200)



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CODE 0600	STATUS	SUITABILITY DESCRIPTION PLANNING	PURPOSE OF ISSUE EIAR
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PROJECT	PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL
SHEET	TANK FARM And LEACHATE TREATMENT EQUIPMENT PLAN

<b>CUSTOMER</b>			
<b>KNOCKHARLEY LANDFILL Ltd.</b>			
Date	02/12/18	Project number	LW14-821-01
Drawn by	SK	Drawing Number	LW14-821-01-P-0600-003
Checked by	CJC	Scale (@ A1)	As indicated
			Rev <b>A</b>

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The detailed design of the leachate treatment system will be a Specified Engineering Works (SEW), which will be submitted to the Agency for prior approval before the facility is commissioned. The facility will be designed to pre-treat leachate from the residual non-stabilised cells, the inert and stabilised cells and the IBA cells and the process wastewater from the biological treatment plant before they are sent of off-site treatments plants for final disposal.

#### *Treated Leachate Storage*

3 No. bunded above ground treated leachate storage tanks:

- 1 No. (S3) for landfill leachate approximately 20 m diameter 6.0 m high.
- 1 No. (S4) for IIBA leachate approximately 25 m diameter 6.0 m high, and
- 1 No. (S5) for leachate concentrate 10 m diameter by 6.0 m high).

The storage lagoons will have a composite lining system comprising 2 mm HDPE overlying 1 m clay barrier with a permeability  $< 1 \times 10^{-9}$  m/s. The above ground raw leachate storage tanks (S1 and S2), leachate treatment tanks (T1, T2 and T3) and the treated leachate storage tanks (S3, S4 and S5) will be glass lined prefabricated steel tanks founded on a reinforced concrete foundation, with reinforced concrete bund walls, as required by Conditions 3.11.3 and 3.11.6 (W0146-02).

The raw leachate storage capacity, which is based on water balance calculations, will accommodate one month's storage. The treated leachate storage capacity will accommodate 7 days storage.

#### *Tanker Loading Area*

Paved loading areas that can accommodate 4 No. 25 tonne articulated tankers and which are provided with a spill collection drainage system (HDPE pipes) that connects to the storage lagoon.

### **3.12 Surface Water Controls**

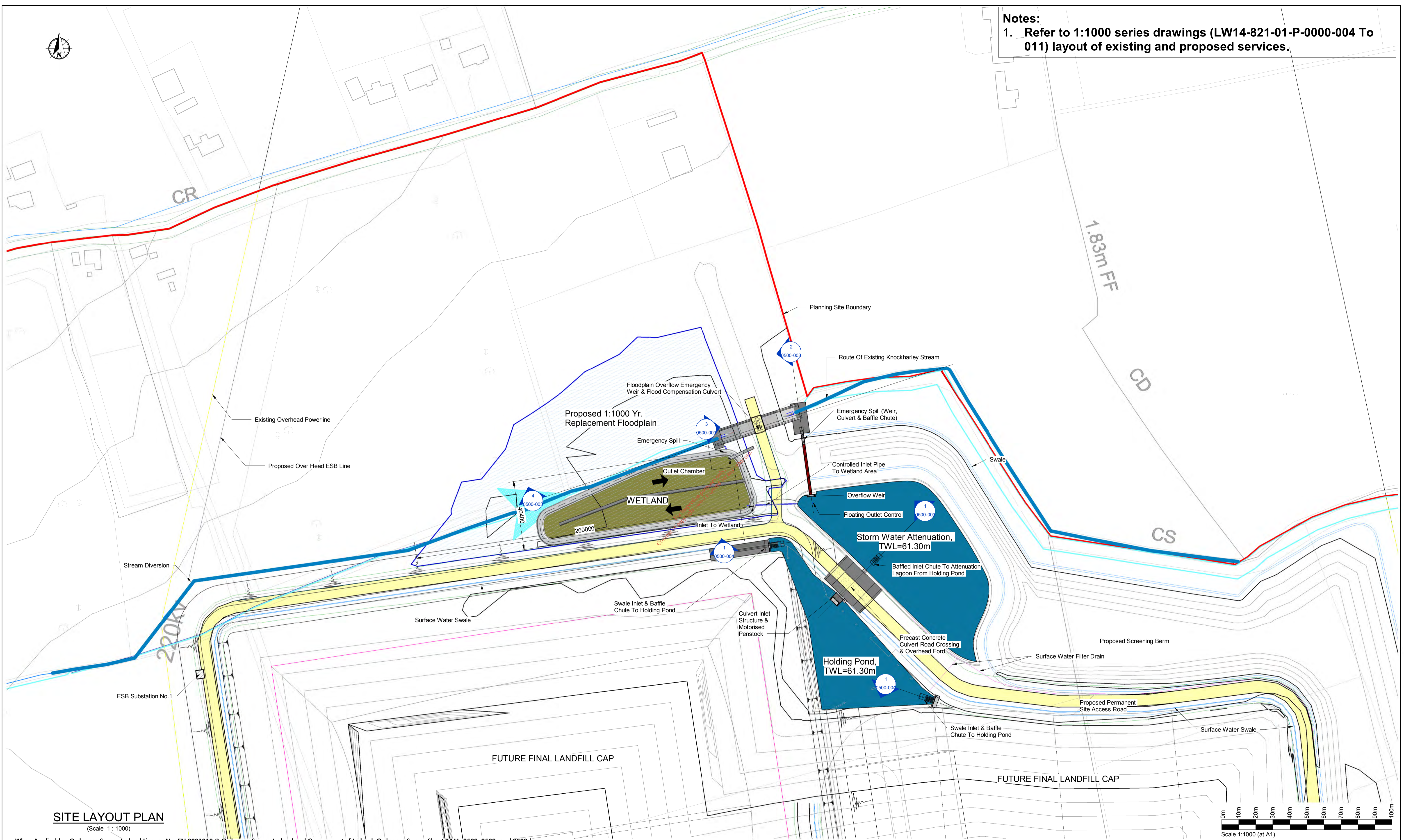
There is a watershed running approximately east to west through the site. Rainwater run-off from all roads, hardstanding areas south of the divide discharges to the southern attenuation lagoon via a trunk surface water sewer that runs from north to south adjacent to the landfill access road. The run-off from the restored landfill cells is collected in a swale on the embankments surrounding the landfill that connects directly to the lagoon.

The inlet to the lagoon is fitted with a Class 1 Full Oil interceptor, as specified in Condition 3.16.6 (W0146-02). The lagoon connects to a constructed wetland that outfalls to the Knockharley Stream. The outfall is controlled by an actuated penstock that can be closed to retain water in the lagoon in the event of an incident that could result in surface water contamination.

Drainage from the area north of the watershed will discharge to a new holding pond and attenuation lagoon to north of the landfill cells, as shown on Drawing LW14-821-01-P-0500-0001. The lagoon will connect to a constructed wetland, which will outfall to the Knockharley Stream.

The pond is designed to treat a suspended solid loading of 2,500 mg/l and deliver an outflow containing less than 25 mg/l (current licence emission limit values require  $< 35$  mg/l). The wetland will provide additional polishing.

**Notes:**  
 1. Refer to 1:1000 series drawings (LW14-821-01-P-0000-004 To 011) layout of existing and proposed services.



**SITE LAYOUT PLAN**  
 (Scale 1 : 1000)

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Rev.	Description	App By	Date
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CODE 0500	STATUS PLANNING	SUITABILITY DESCRIPTION PLANNING	PURPOSE OF ISSUE EIAR
--------------	--------------------	-------------------------------------	--------------------------

**PROJECT**  
 PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL

**SHEET**  
 PROPOSED LAYOUT PLAN OF SURFACE WATER MANAGEMENT INFRASTRUCTURE

**CLIENT**  
 KNOCKHARLEY LANDFILL Ltd.

Date 09/11/17	Project number LW14-821-01	Scale (@ A1) As indicated
Drawn by SK	Drawing Number LW14-821-01-P-0500-001	Rev A
Checked by CJC		

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Continuous total organic carbon (TOC) and electrical conductivity monitors will be installed in the holding pond and trigger levels, which will be agreed with the Agency, will be set. If the trigger levels are exceeded the automated motorised penstock at the outlet from the pond will close to prevent flow to the wetland.

The two attenuation lagoons are sized to accommodate run-off from 1:100 year storm events. Provision has been made for emergency overflows from the northern pond to the lagoon in exceptional rainfall events and these include flood compensation storage for 1:1000 return events

The design of the holding pond and attenuation lagoons meets the requirements of Condition 3.16.5 of the licence (W0146-02). They are lined with a composite barrier, comprising a HDPE membrane and a 1 m clay basal layer with a permeability of  $1 \times 10^{-9}$  m/s, which is the same specification as the landfill cell lining system. The constructed wetlands are shallow clay-lined ponds both naturally colonised and planted with appropriate species.

### **3.13 Groundwater Controls**

To eliminate the potential for groundwater to adversely impact the integrity of the landfill cells, basal drains comprising 1 m deep trenches in which 150 mm diameter open jointed concrete and/or slotted drainage pipes surrounded by a stone filter and wrapped in geotextile are placed are installed beneath the cells. The groundwater intercepted in the drains flows to sumps, from where it is pumped to the attenuation lagoons.

### **3.14 Site Security**

Anti-intruder fencing is provided along the western side of the county road that passes through the eastern part of the landholding and an anti-intruder gate is on the eastern side of the underpass, beneath the county road. There is a chain link fence inside the site boundary and a post and rail fence is provided along the access road from the N2. A closed circuit television (CCTV) system is in place.






### **3.15 Traffic Management**

The traffic management system for the landfill is shown on Figure 001. The proposed traffic management system in the IBA Area is shown on Drawing LW14-821-01-P-0050-007. Traffic associated with leachate management facility will use the existing site roads and the proposed traffic movements are shown Drawing LW14-821-01-P-0050-009. Access to the biological treatment plant will be by the existing entrance road and weighbridge, followed by a left turn in a southerly direction along the existing internal road. A new access road to the plant will be constructed off the internal road as shown on Drawing LW14-821-01-P-0050-008.

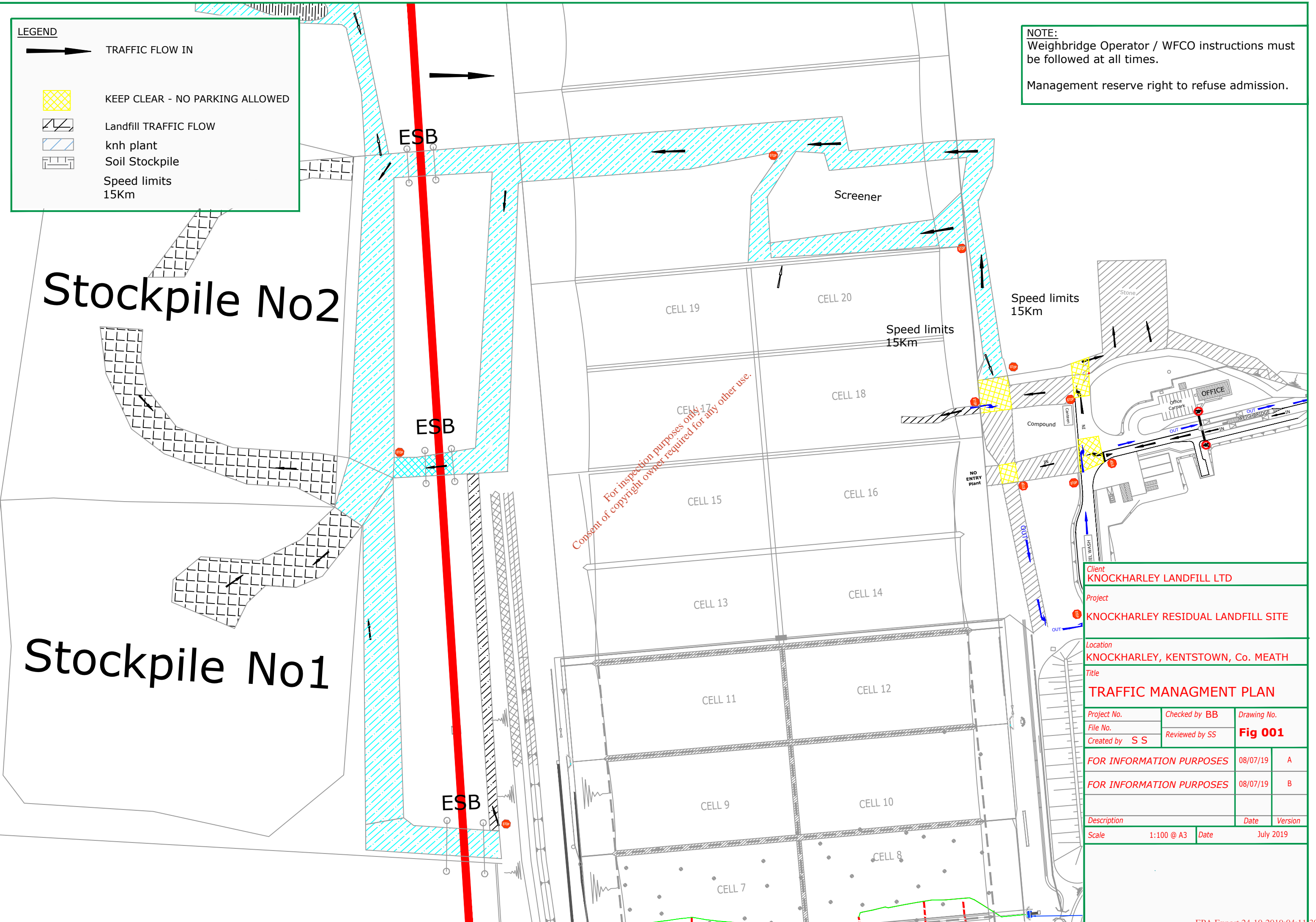
### **3.16 Monitoring Infrastructure**

Safe access is provided to all monitoring points and any monitoring infrastructure that is damaged or proves to be unfit for its purpose is replaced within three (3) months, as specified in Condition 3.20.4 (W0146-01).

**LEGEND**

-  TRAFFIC FLOW IN
-  KEEP CLEAR - NO PARKING ALLOWED
-  Landfill TRAFFIC FLOW
-  knh plant
-  Soil Stockpile
- Speed limits 15Km

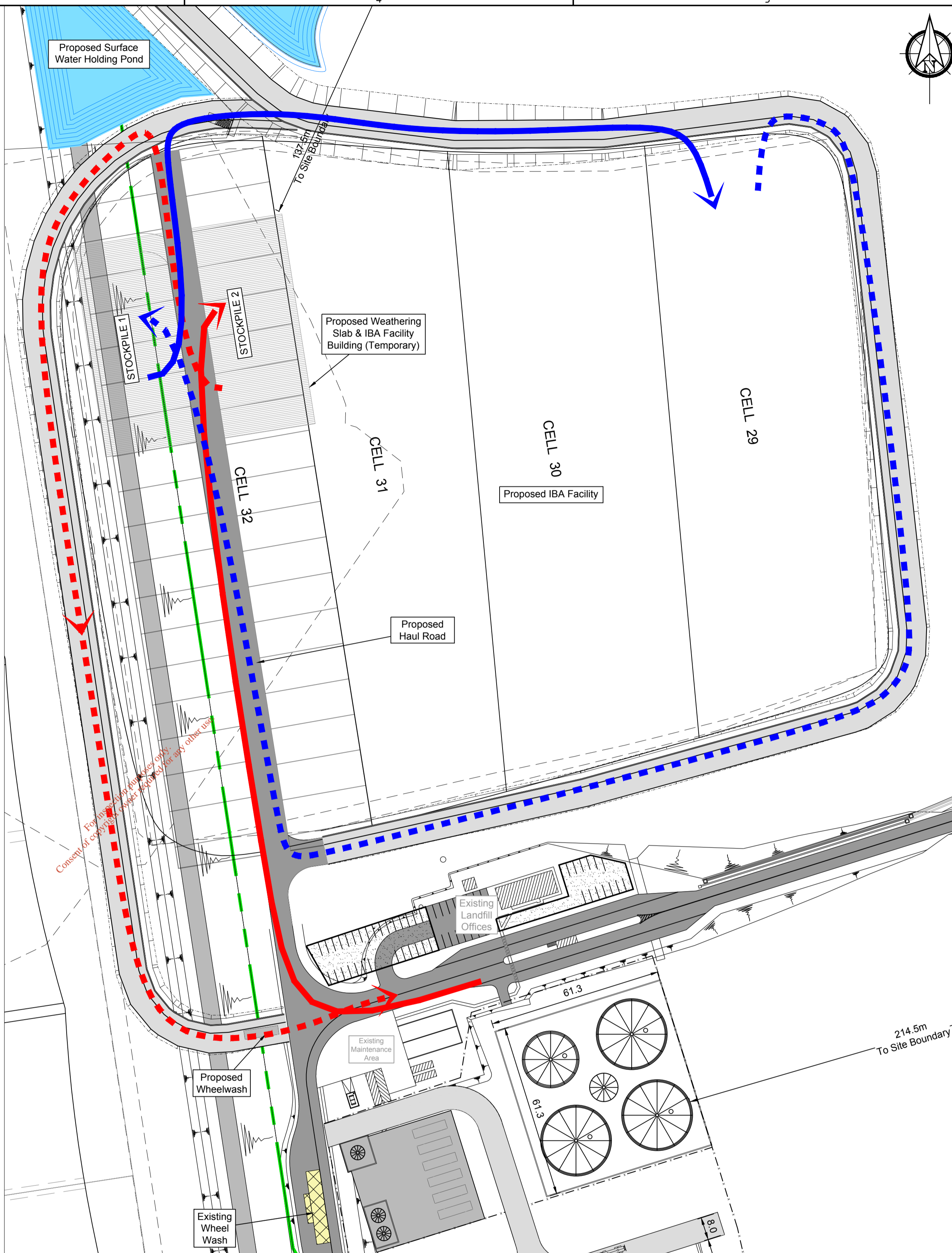
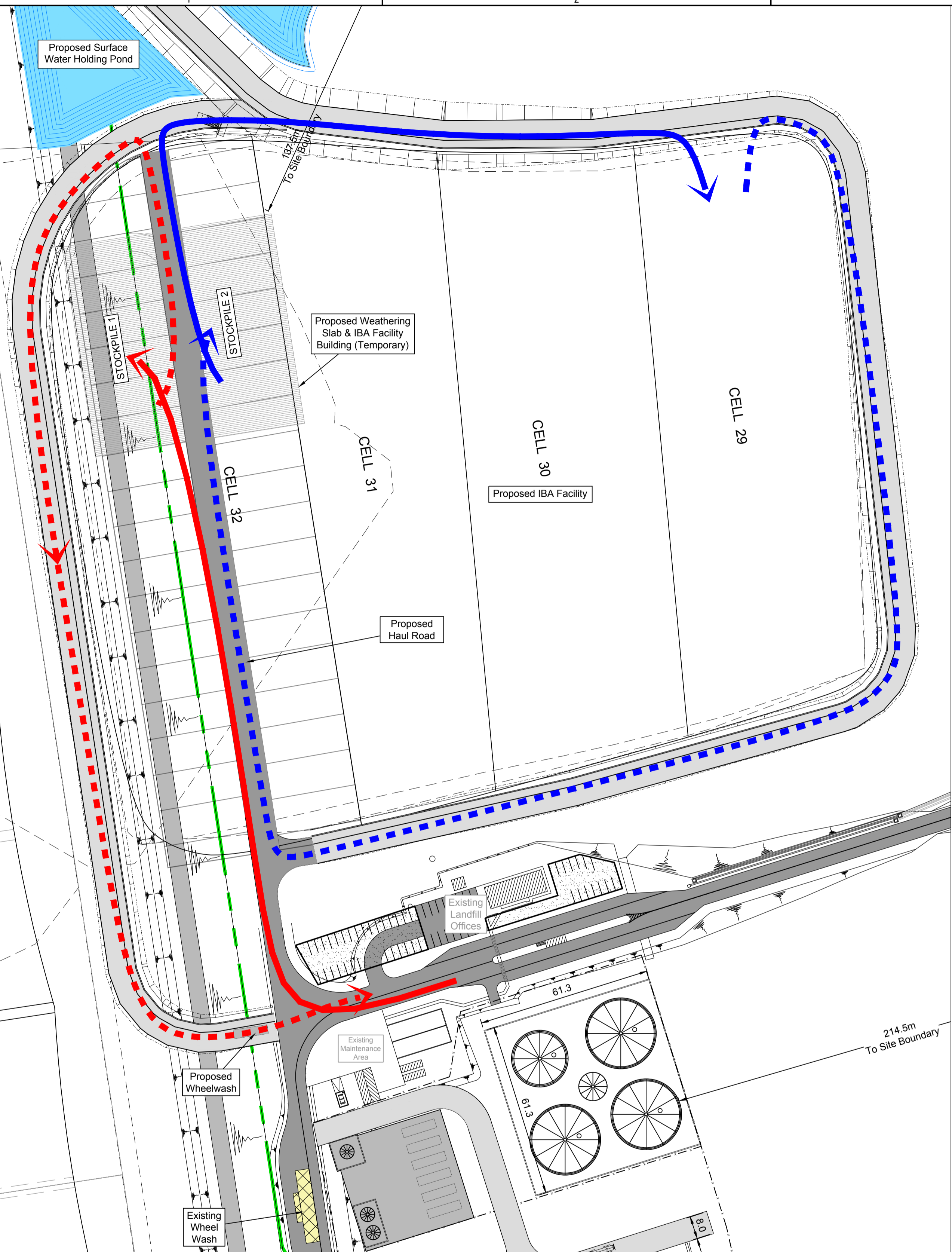
**NOTE:**  
 Weighbridge Operator / WFCO instructions must be followed at all times.  
 Management reserve right to refuse admission.



Client <b>KNOCKHARLEY LANDFILL LTD</b>		
Project <b>KNOCKHARLEY RESIDUAL LANDFILL SITE</b>		
Location <b>KNOCKHARLEY, KENTSTOWN, Co. MEATH</b>		
Title <b>TRAFFIC MANAGMENT PLAN</b>		
Project No.	Checked by BB	Drawing No.
File No.	Reviewed by SS	<b>Fig 001</b>
Created by S S		
<b>FOR INFORMATION PURPOSES</b>	08/07/19	A
<b>FOR INFORMATION PURPOSES</b>	08/07/19	B
Description	Date	Version
Scale 1:100 @ A3	Date	July 2019

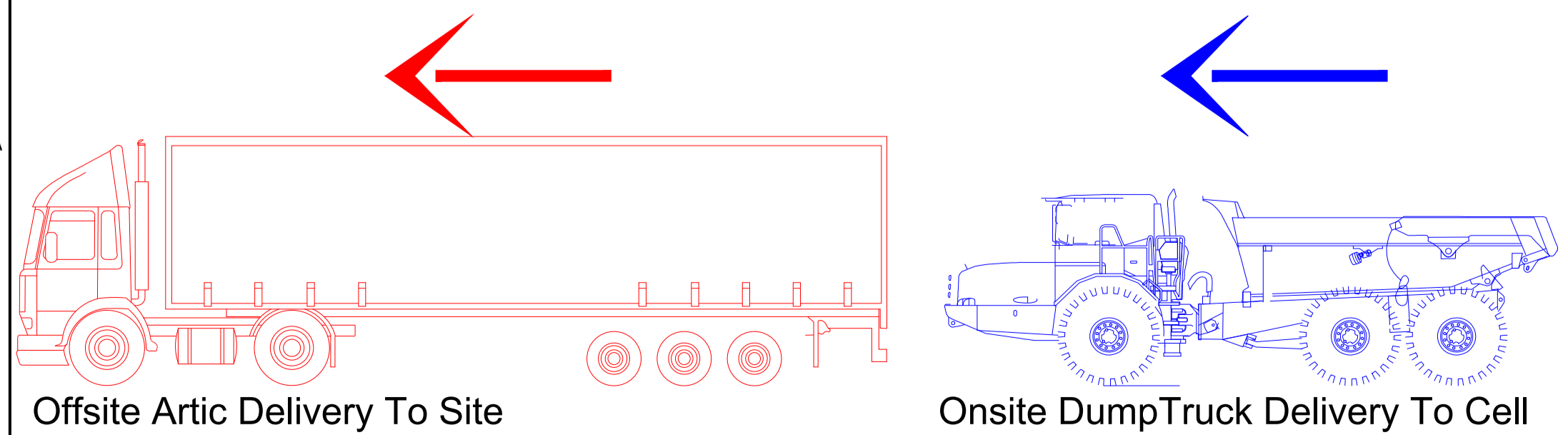


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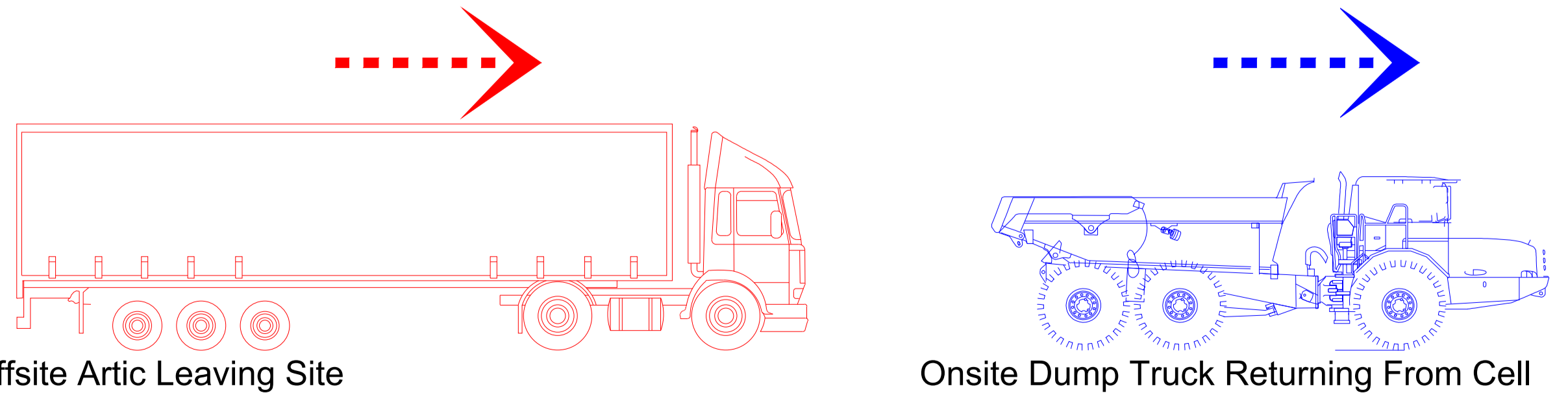
STOCKPILE 1 - RECEIVING, STOCKPILE 2 - TO CELL

STOCKPILE 2 - RECEIVING, STOCKPILE 1 - TO CELL



Offsite Artics Delivery To Site

Onsite Dump Truck Delivery To Cell



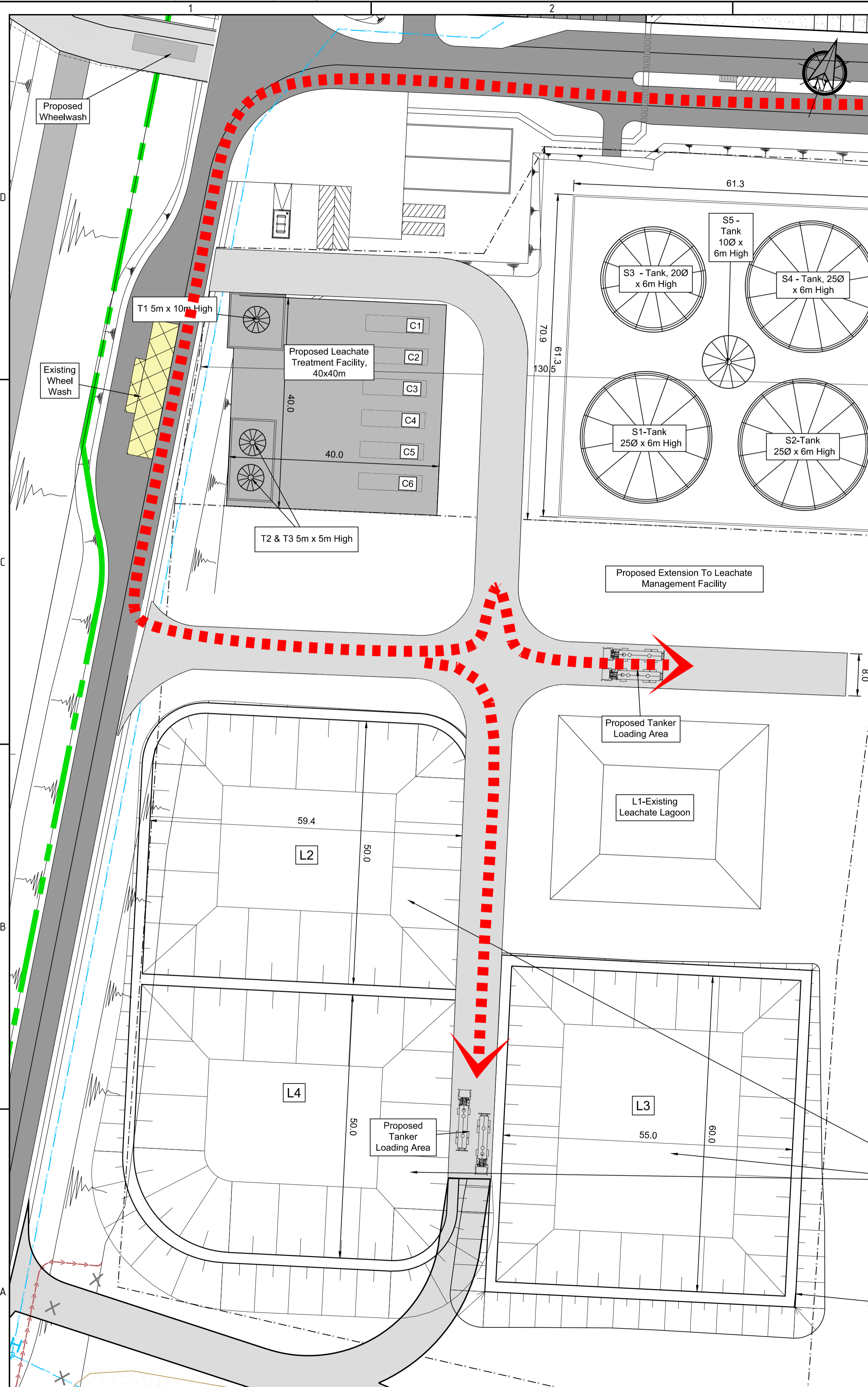
Offsite Artics Leaving Site

Onsite Dump Truck Returning From Cell

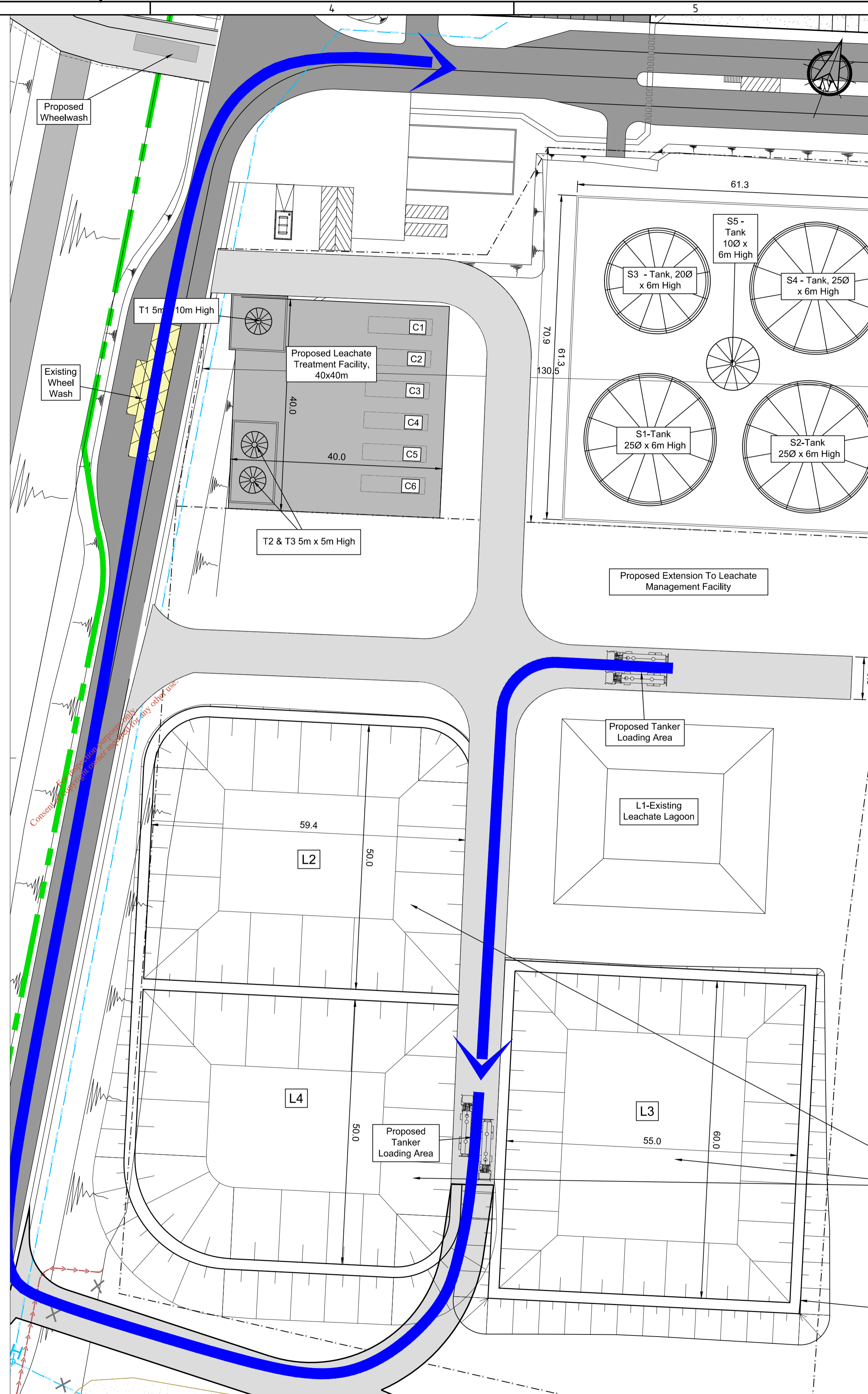
Rev.	Drawn	CHK'd	App'd	Rev Origin	Date	Description
A	CJC	BC	Cork	10.07.18	Issue For Planning Application	
Revision History						
Name of Client						
KNOCKHARLEY LANDFILL LTD.						
Name of Job						
PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL						
Title of Drawing						
TRAFFIC MANAGEMENT IBA FACILITY						
Scales Used				This Drawing was printed to		
1:1000				A1-		
Dwg. No.						Rev.
LW14-821-01-P-0050-007						A

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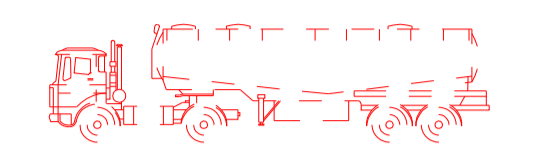
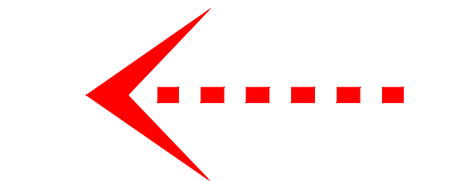


EMPTY TANKER INTO LEACHATE TREATMENT FACILITY

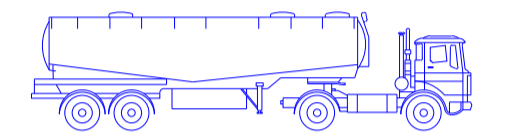
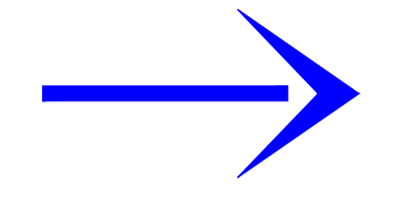


TANKER OUT OF LEACHATE TREATMENT FACILITY

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Offsite Tanker (Empty) To Site



Offsite Tanker Leaving Site

Rev.	Drawn	CHKD	Appd	Rev Origin	Date	Description
A	C/C	BC		Cork	10.07.18	Issue For Planning Application

Revision History		A	EAIR
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Name of Client  
**KNOCKHARLEY LANDFILL LTD.**

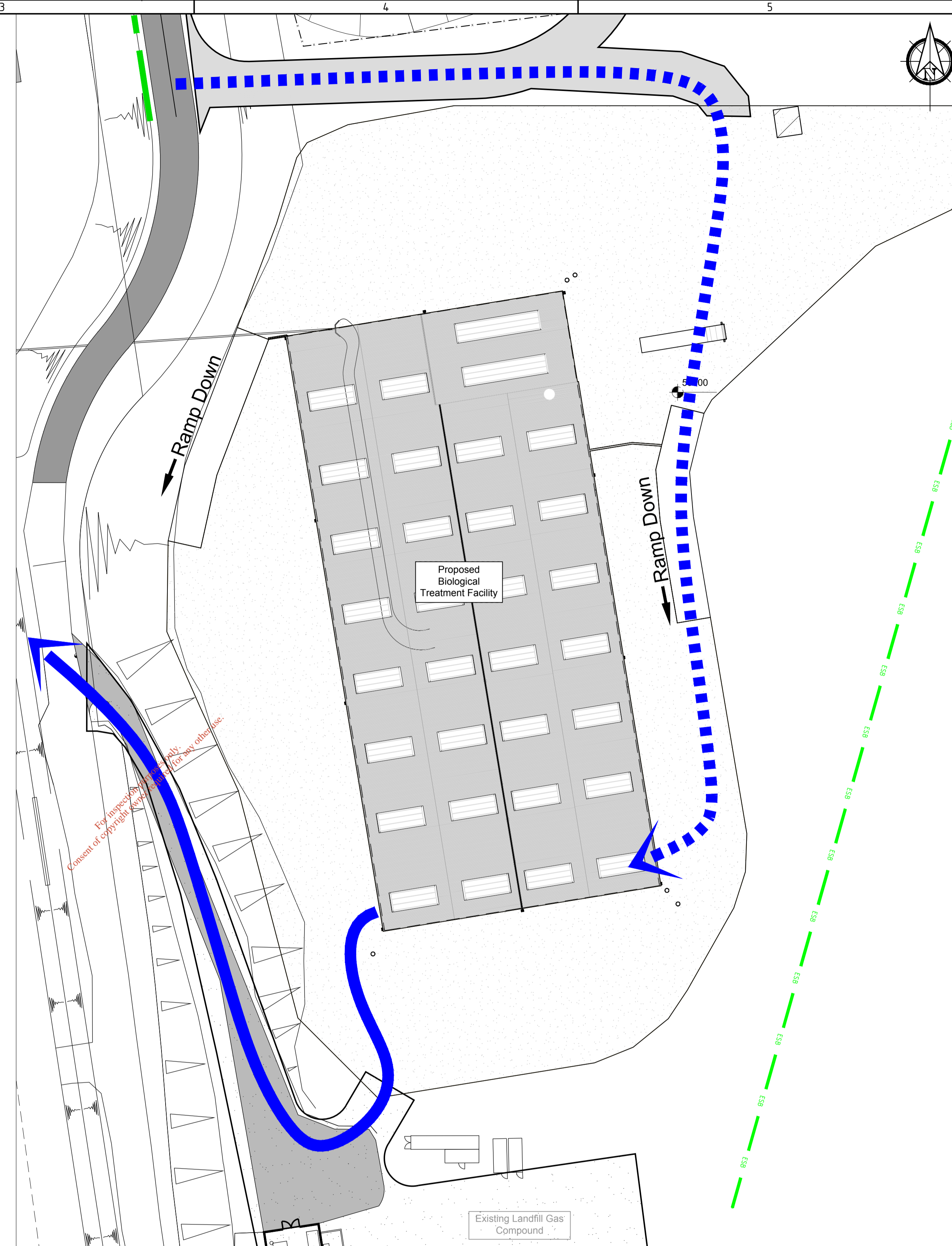
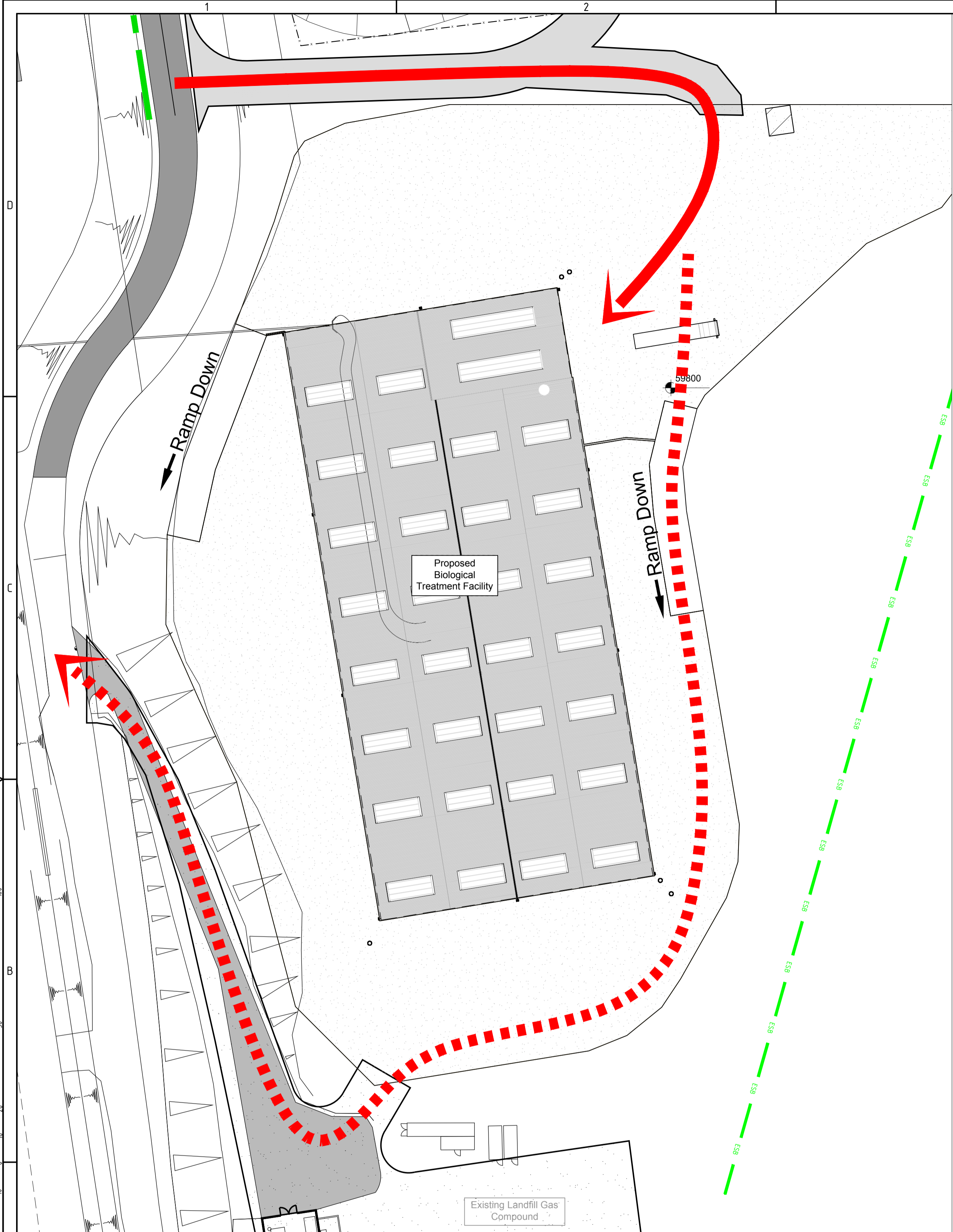
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**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

Title of Drawing  
**TRAFFIC MANAGEMENT LEACHATE MANAGEMENT FACILITY**

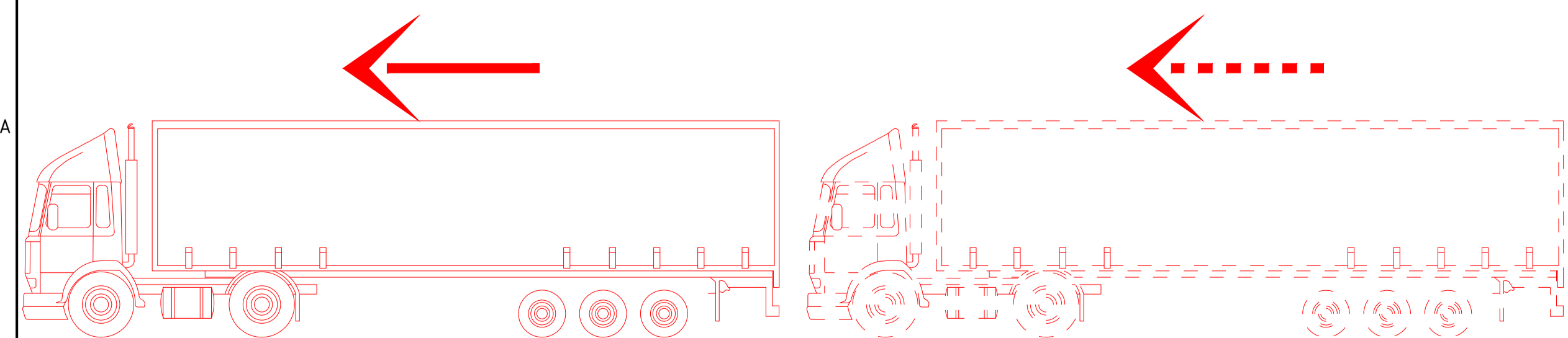
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1:500	A1
Dwg. No.	Rev.
LW14-821-01-P-0050-009	A

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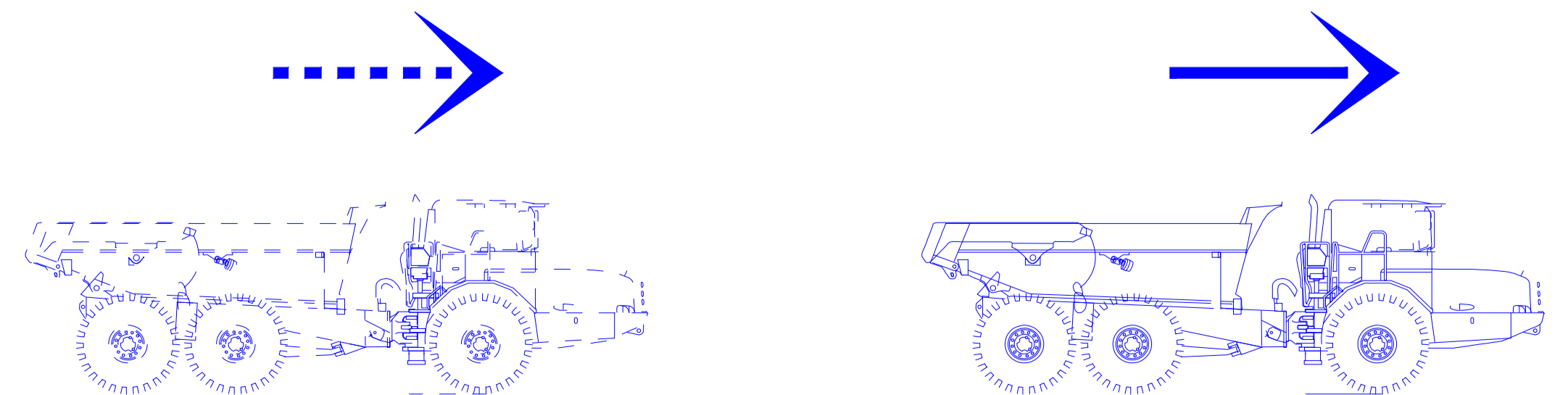
**BIOLOGICAL TREATMENT BUILDING RECEIVING WASTE**



Offsite Artic Delivery To Site

Offsite Artic Leaving To Site

**BIOLOGICAL TREATMENT BUILDING TRANSFERRING TO CELL**



Onsite Dump Truck Returning From Cell Empty

Onsite Dump Truck Returning To Cell Loaded

A	C/C	BC	Cork	10.07.18	Issue For Planning Application
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Rev.	Drawn	CHK'd	App'd	Rev Origin	Date	Description
Revision History A						EAIR

Name of Client  
**KNOCKHARLEY LANDFILL LTD.**

Name of Job  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

Title of Drawing  
**TRAFFIC MANAGEMENT BIOLOGICAL TREATMENT FACILITY**

Scales Used  
**1:500**

Dwg. No.  
**LW14-821-01-P-0050-008**

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### 3.17 Fire Control

A Fire Prevention Management Plan has been prepared and a copy is in Appendix 1. This will be updated to reflect the additional waste activities following the grant of the revised licence and will be submitted to the Agency for approval before the new waste activities begin.

### 3.18 Landscaping

The landfill, IAB Area biological treatment plant and the leachate management facility have been sited to maximise the screening value of the internal and boundary hedgerows. The landscape design guidelines applied are: -

- Significant and progressive planting to screen and integrate the development into the surrounding landscape fabric, to complement views and reduce intrusion,
- Progressive completion and reinstatement of the landfill area for agricultural use,
- Boundary treatment to soften harsh lines,
- Wildlife conservation and the creation of habitats complementary to the surroundings.

The 50 m wide belt of predominantly native mixed woodland on all boundaries of the site significantly filters out views of the facility and accentuates the screening provided by the retained hedgerows.

### 3.19 Fuel & Chemical Storage

Diesel for the mobile plant is stored in a 6,000 litre tank provided with a containment bund. The chemical storage tanks in the leachate treatment facility will also be banded. The bund design meets the specification in Condition 3.11 (W0146-1). Small quantities of lubricating and hydraulic oils used in plant maintenance are stored in a banded pallet inside the plant shed.

### 3.20 Restoration & Aftercare

The landfill area is progressively restored in accordance with a detailed Restoration and Aftercare Management Plan (RAP) prepared in compliance with Condition 4.1 (W0146-02). The RAP will be revised and updated and submitted to the Agency for its approval prior to the commencement of the new waste activities.

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## 4. OPERATIONS

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### 4.1 Overview

The installation is an integrated waste management facility comprising:

- An engineered landfill for the disposal of residual non-hazardous and stable non-reactive hazardous waste;
- A biological treatment plant for MSW organic fines
- An IBA pre-treatment and temporary storage areas, and
- A Leachate treatment plant.

### 4.2 Operating Procedures

KLL has prepared a comprehensive set of Operating Procedures that cover all aspects of the day to day management of the installation and contingency measures. The procedures form part of the installation's Environmental Management System (EMS) which is certified to ISO 14001, and are subject to regular review based on operational experience, legislative changes and improvements in best practice. The current set of procedures are in Appendix 2 and these will be amended to reflect the new waste activities authorised under the revised licence.

### 4.3 Site Management

At a minimum the facility personnel include: -

- Facility Manager,
- Deputy Facility Manager,
- Weighbridge Operator,
- Foreman,
- Mobile plant operators,
- General Operatives,
- Administration.

### 4.4 Operational & Waste Acceptance Hours

Unless otherwise agreed with the Agency the operational hours are 7.30 and 18.30 Monday to Saturday. Wastes are accepted between 8.00 and 18.00, Monday to Saturday.

### 4.5 Access

The only access to the facility is off the N2. The internal traffic control system requires all vehicles entering the facility to pass the weighbridges. The access gates are locked outside of operational

hours. Signage is provided on the northern and southern approaches to the facility entrance identifying the site and the access point.

Directional and speed control signage is provided on the internal roads. Access to the weighbridges is controlled by automated barriers. All visitors must report to the administration building and provide their name, company/organisation, vehicle registration number and purpose of visit.

#### 4.6 Waste Types

When operating at full capacity the installation will accept 440,000 tonnes of waste for disposal/recovery. A breakdown of the individual waste types is in Table 4.1. The actual amount of each waste type may vary, but the total annual limit will not be exceeded.

**Table 4.1: Waste Types & Quantities**

Waste Type	Annual Intake (Tonnes)	
Residual MSW	65,000	Non-stabilised
Fines Materials MSW		
Soil & Stone and other C&D materials	225,000	Inert and Stabilised
Non-recoverable bulky waste individual industrial waste streams & SNRHW		
Fines materials –C&D, C&I, MSW		
Street Sweepings & Cleansing Wastes		
IBA	150,000	No organic fraction
<b>Total</b>	<b>440,000</b>	

The sources of the residual non-stabilised waste will be household, commercial and industrial waste collections for which thermal treatment and/or export capacity may either not be available at certain times, e.g. thermal plant routine shut down or where suitable treatment is not available. It includes repatriated waste or waste from unauthorised and or legacy landfills.

The stabilised waste i.e. waste that is relatively 'non-reactive' nature, in terms of leachate and landfill gas generation includes stabilised fines, bulky waste, street sweepings, (SNRHW) and inert wastes. The stabilised fines include those treated off-site and processed in the on-site in the biological treatment plant. The IBA will be generated at Waste to Energy (WtE) facilities operating in Ireland.

#### 4.7 Waste Acceptance

KLL has prepared waste acceptance procedures (EMS-OP-08; EMS-OP-09 and EMS-10) to ensure that the waste pre-treatment, characterisation and acceptance requirements are achieved.

##### 4.7.1 Pre-Treatment of Waste

With the exception of repatriated and unauthorised landfill waste, which it may not be possible to treat before delivery to the facility, only pre-treated waste is accepted for disposal. The stabilised organic fines must meet the AT4 limit of <7 mg O<sub>2</sub> /g DM.

#### 4.7.2 Waste Collection Permits

Wastes are only accepted from holders of up to date Waste Collection Permits as stipulated in Condition 5.2 (W0146-02).

#### 4.7.3 Waste Characterisation

Where necessary, waste producers are required to characterise the waste, as required by Condition 5.3.1 (W0146-02). The characterisation must meet all KLL's waste acceptance criteria specified in EMS-OP-09.

#### 4.7.4 Waste Inspection

All documentation accompanying waste deliveries records are checked. The wastes are, where practical, visually inspected at the weighbridge. If there are doubts about the nature of the non-stabilised, inert and SNRHW, the delivery vehicle will be directed to the Waste Inspection Area and off-loaded. If the waste is deemed suitable it will be moved to the appropriate handling area.

If the material is not suitable it will, where practical, loaded onto the delivery vehicle and removed off-site. If this is not practical the waste is moved to the Waste Quarantine Area for storage pending removal by the waste producer/waste collector.

All wastes placed in the landfill cells will be inspected at the waste face to confirm that the wastes are suitable. Any unsuitable wastes will be removed to the Waste Quarantine Area, pending removal off-site by the waste producer/waste collector.

The IBA will be off-loaded inside the 'Weathering Area' and inspected. Any unsuitable materials will be removed to the Waste Quarantine Area.

All wastes delivered for treatment in the biological treatment plant will be inspected in the reception area inside the building. Where unsuitable waste is identified this will either be removed from the facility or disposed of in the landfill area.

#### 4.7.5 Waste Records

The following records on each waste load arriving at the site are maintained, as required by Condition 10.2 (W0146-02): -

- a) the date and time;
- b) the name of the carrier (including if appropriate. the waste carrier registration details);
- c) the vehicle registration number;
- d) the trailer, skip or other container unique identification number (where relevant);
- e) the name of the producer(s)/collector(s) of the waste as appropriate;
- f) the name of the waste facility (if appropriate) from which the load originated including the waste licence or waste permit register number;
- g) a description of the waste including the associated EWUHWL codes;
- h) the quantity of the waste - recorded in tonnes;

- i) details of the treatment(s) to which the waste has been subjected;
- j) the classification and coding of the waste, including whether MSW or otherwise;
- k) whether the waste is for disposal or recovery and if recovery - for what purpose;
- l) the name of the person checking the load; and,
- m) where loads or wastes are removed or rejected, details of the date of occurrence, the types of waste and the facility to which they were removed.

## **4.8 Landfill**

### *4.8.1 Landfill Cells*

The residual non-stabilised wastes will be placed in Cells 17, 18, 19, 20, 21 and 22, which will be provided with active landfill gas abstraction and leachate collection systems.

Stabilised and inert wastes that are not suitable for use as daily cover in the non-stabilised cells will be placed in Cells 20, 22, 23, 24, 25, 26, 27 and 28. The stable non-reactive hazardous waste will be placed in dedicated sub cells in Cells 27 and / or 28.

The stabilised and inert wastes do not generate landfill gas and therefore an active gas abstraction system is not required; however if monitoring identifies a need for odour controls a system of passive vents fitted carbon filters will be provided. The cells are provided with leachate collection systems.

### *4.8.2 Filling Sequence*

The proposed filling sequence is shown on Drawing LW14-821-01-P-0050-10. Residual non-stabilised waste will be placed in a south to north direction commencing in cells 17 and 18. To reduce exposure to odour sensitive receptors to the north of the site, residual non-stabilised waste will not be placed north of cells 21/22. The filling sequence for stabilised and inert waste will commence in Cells 27 and 28 and will initially be in a southerly direction

### *4.8.3 Waste Placement*

Filling will typically commence in the low point of cells which will always be adjacent to the perimeter access roads. The residual non-stabilised waste, the inert and stabilised waste and the SNRHW waste will be deposited directly on the surface of the immediately preceding layer close to the advancing tipping face. There will be one working face within each cell.

The waste is typically spread in shallow layers, generally no more than 0.5 m thick, on the inclined surface and compacted using a steel wheeled compactor. All large, hollow objects or other large items are crushed or flattened using the compactor.

The stabilised waste placed in Cells 20, 22 will be isolated from the non-stabilised waste by means of plastic sheeting.



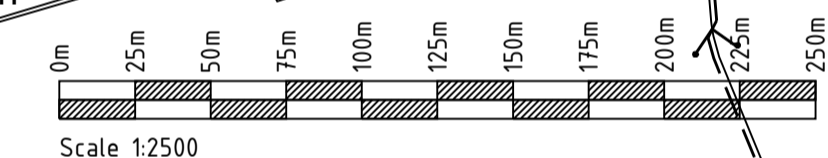


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**LEGEND**

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary
- Refer to dwg P-0000-BDY For Clarity
- Existing Wayleave
- Ground Contours
- Existing Watercourse
- Landfill Cells currently being filled (2017/18)
- Residual Non Stabilised
- Inert Stabilised
- IBA
- Direction Of Waste Placement
- Cell Number



Rev.	Drawn	SK	CHK'd	CJC	App'd	BC	Cork	10.07.18	Issue For Planning Application
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Rev.	App'd	Rev Origin	Description
Revision History A			EIAR

**Name of Client**  
**KNOCKHARLEY LANDFILL LTD.**

**Name of Job**  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

**Title of Drawing**  
**PROPOSED CELL FILLING**

Scales Used	This Drawing was printed to
<b>1:2500</b>	A1.
Dwg. No.	Rev.
<b>LW14-821-01-P-0050-010</b>	<b>A</b>

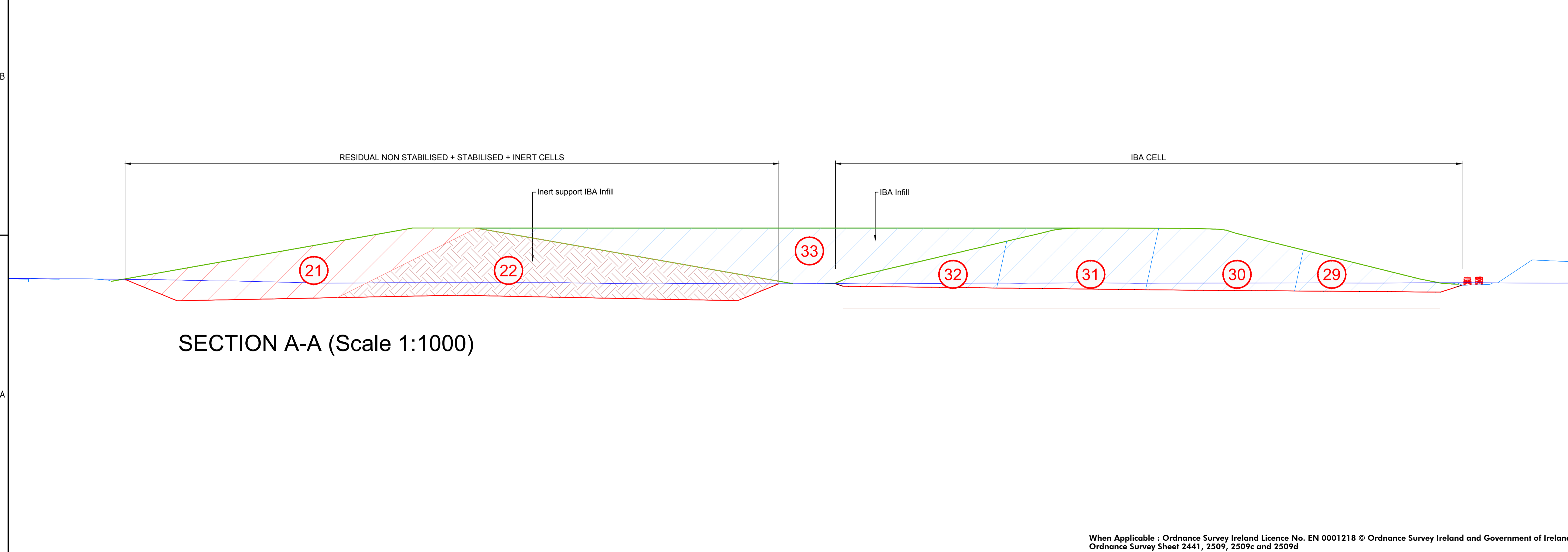
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**SECTION A-A (Scale 1:1000)**

#### 4.8.4 Cover

The working face is covered with 150 mm of suitable material at the end of each working day. Adequate stockpiles of cover are maintained on-site at all times. The active fill area is inspected daily and where it is found that the cover has been eroded, washed off or otherwise removed it is replaced by the end of the working day. The covered wastes are not excavated or disturbed, with the exception of works associated with the installation of the landfill gas collection system.

In the residual non-stabilised cells and the inert stabilised cells the near-horizontal working area is covered with soil and woodchip, while the slope of the working face is covered with synthetic cover sheets at the end of each working day. The soil/woodchip cover is effective in minimising odour nuisance, preventing litter, discouraging scavenging birds and facilitates gas extraction.

When the final fill levels are reached temporary synthetic low-permeability covers (intermediate capping) are installed. The covers are designed to minimise odour emission and leachate generation and to allow differential settlement to occur prior to installing the final landfill cap. The final cap is placed within 12 months of the achievement of the final fill levels.

Due to the nature of the materials daily and intermediate cover are not required for the IBA storage cells; however if the recovery trials do not prove successful and/or sustainable outlets for the processed IBA cannot be found, a permanent cap to the same specification as that installed in the non-stabilised cells will be placed.

#### 4.8.5 Leachate Management

Leachate accumulating in the non-stabilised and stabilised landfill cells will be pumped from collection sumps to the lined leachate storage lagoons. The pumps are controlled by a SCADA system, which continuously monitors the level within each cell to ensure the leachate level does not exceed 1 m above the liner. The SCADA system will also monitor the levels in the leachate lagoons and holding tanks in the leachate treatment facility to ensure that the pumps are only activated when there is sufficient storage capacity.

Currently the raw leachate is tankered off-site for treatment in municipal wastewater treatment plants. When the leachate treatment plant has been installed and commissioned the raw leachate will be pumped from the lagoons and holding tanks to the modular treatment plant. The treated leachate will be pumped to the storage tanks pending removal off-site to municipal wastewater treatment plants.

KLL has prepared written procedures for the proper handling of leachate at the site (EMS-OP-11), as specified in Condition 11.4.1 (W0146-02). KLL maintains an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spill at the installation and site staff are provided with appropriate training to deal with any such incidents.

#### 4.8.6 Landfill Gas Management

The primary gas control measures are the landfill lining system, the passive and active landfill gas collection systems and gas utilisation plant. All gas wells, pipework, valves, pumps, flares and gas engines and other elements of the landfill gas infrastructure are subject to a preventative maintenance programme, as required by Condition 3.15.4 (W0146-02). This is implemented by the operator of the gas utilisation plant to ensure optimum performance conditions are maintained. In the event of any significant downtime of the gas engines and or flares the EPA is notified in accordance with EMS-OP-23.

#### 4.8.7 *Stability and Settlement*

A stability assessment of the landfill is carried out annually in accordance with Condition 8.12.1 of the licence (W0146-02). If settlement is found to be interfering with either the integrity of the cap, or runoff from the landform, measures are taken to either reinforce the cap, or re-profile the landform.

Raising the final levels from that currently authorised (74 mOD) to what is proposed (85 mOD) will be achieved using side slopes not steeper than 1:20. Where the non-stabilised residual waste abuts the inert and stabilised waste differential settlement rates may differ significantly, requiring re-profiling over several years depending on the findings of the annual surveys.

### 4.9 **IBA Area**

#### 4.9.1 *Weathering*

To maximise the recovery of metals and the production of aggregate the IBA must be matured or 'weathered'. Weathering is a process whereby the silica, calcium, aluminium and sulphate minerals along with heavy metals in the IBA undergo carbonation processes.

There are three major stages in weathering based on pH characteristics of the IBA and / or leachate. Stage 1 occurs at the WtE plants where the IBA is produced. When it is removed from the combustion chamber and prior quenching the IBA has a pH>12.

Stage 2 involves the storage of the IBA for up to three months where the exposure to water and carbon dioxide causes carbonation. During this stage exothermic reactions can cause elevated temperatures and hydrogen gas is released.

Stage 3 occurs over a longer period during which the pH of the leachate generated by the IBA leachate will typically stabilise between 8 and 8.5 and nominal volumes of hydrogen are produced.

#### 4.9.2 *Weathering Area*

The IBA will be delivered in enclosed trailers that enter the 'Weathering Area' via a concrete paved road constructed on top of the cell. The IBA will be off-loaded inside the Area where it will be inspected and then moved to the two stockpiles using a front loading shovel. The maximum amount stored in each stockpile will be 37,500 tonnes

#### 4.9.3 *Storage Cells*

The weathered IBA will be placed in Cells 29 to 33, which will be provided with a passive hydrogen gas venting system and leachate collection system. Filling will start in Cell 29 and progress in a westerly direction through Cells 30, 31, 32 and 33. To facilitate placement, the IBA will be dampened. It will be placed in 4m 'lifts' comprising 500 mm layers graded to falls to facilitate surface water management and compacted to 90 % proctor maximum dry density using a smooth vibrating roller.

#### 4.9.4 *Hydrogen Gas Management*

Horizontal gas collection pipes that connect to passive vents will be progressively installed in the cells.

#### 4.9.5 *Leachate Management*

Leachate from the 'Weathering Area' where there is the potential for elevated pH, will be collected in basal drainage system and perimeter edge drains and directed to a temporary settlement pond at the

northern boundary of Cell 32, where the solids will settle out. The supernatant will pass over a weir and into a pump sump from where it will be pumped to the dedicated above ground storage tanks. The settlement pond will be cleaned as required and the materials placed in the IBA storage cells.

Leachate generated in the cells outside the 'Weathering Area' will be collected within the cell drainage layer and pumped via a rising main to a small sedimentation tank to remove suspended solids before being pumped to covered attenuation leachate storage tanks. The tanks will have the capacity to store 30 days leachate production.

#### 4.9.6 Dust Controls

The IBA stockpiled in the 'Weathering Area' will be damp on arrival, but will dry out over time and, given the open sides of the building, there is the potential for windblown dust to occur. To mitigate this overhead water sprinklers will be used to dampen the stockpiles.

Dust generation during the placement of the weathered IBA in the storage cells will be negligible, as it will be dampened to facilitate compaction. The primary potential source of dust in the cells post placement are vehicle movements during dry periods. In such conditions dust emissions will be controlled by a combination of sprinklers and vehicle mounted dribble bars. When the intermediate levels have been achieved temporary sheeting and/or dust control sprays will be applied.

#### 4.9.7 Recovery Trials & Processing

Site-based trials will be carried out within the 'Weathering Area' using mobile screening, crushing and washing plant to remove metals and produce aggregates. The scope of the trials will be submitted to the Agency for prior approval. The wash water will be recycled in a closed loop system in the washing plant.

If the recovery trials are successful and sustainable outlets for the processed IBA aggregate are identified, then full scale processing of the IBA will begin. This will comprise an SEW and the details will be submitted to Agency for approval before the processing begins.

#### 4.9.8 Capping

If the recovery trials do not prove successful and/or outlets for the processed IBA cannot be found a permanent cap to the same specification as that applied at the non-stabilised cells will be installed over the storage cells.

### 4.10 Biological Treatment Plant

#### 4.10.1 Waste Reception

The residual organic fines will be suitable for composting without further processing apart from the addition of amending materials. The vehicles will enter the building, the door will be closed and the trailer end tipped in the reception area, which will be at a lower level than the vehicle parking area.

#### 4.10.2 Amendment

The fines will be stockpiled until there is sufficient feedstock (ca 260 m<sup>3</sup>) to begin filling a tunnel. Before loading into the tunnel the fines will be mixed and blended with stabilised material and/or woodchip (or similar) amendment material. The amending material inoculates the fines with micro-organisms and enhances aeration.

#### 4.10.3 Tunnel Filling and Operation

The amended materials will be placed in the tunnels using a front-end loader and each full tunnel will be classified as a 'batch'. Tunnel blowers/fans located in roofs will feed air to sparge pipes in the tunnel floors that will 'force' aerate the stockpiles.

The process temperature will be continuously monitored using probes inserted in the piles and the aeration rate adjusted to maintain the optimum temperature. It will take approximately 10 weeks to stabilise the fines and during this time the stockpile will either be mechanically turned a number of times (2-3 times), or moved from one tunnel to another to prevent compaction and enhance aeration.

#### 4.10.4 Testing and Storage

Upon completion of the stabilisation process, the treated 'batch' will be removed using a dedicated 'clean' vehicle and placed in a dedicated treated material storage area, which will have the capacity to store up to 1.5 weeks output. Different 'batches' will be separated by portable concrete block wall. Each 'batch' will be sampled and tested for AT4 compliance.

#### 4.10.5 Landfill

When results confirm that a 'batch' meets the appropriate AT4 standard, the stabilised materials will be loaded into a trailer and moved to the operational landfill cell. The vehicles must pass through the wheel cleaning unit located outside the building.

#### 4.10.6 Odour Control

An odour control system comprising the active extraction of air from the tunnels and the building and treatment in a biofilters located inside the building will be provided. All vehicle entrances will be fitted with fast acting doors that will only be opened when vehicles enter and leave. The building fabric will be regularly inspected and any damage repaired.

#### 4.10.7 Process Wastewater Management

Operations will generate a range of effluents and the process will be designed to maximise the reuse of these effluents to achieve a balanced process, with a slight 'water demand' possible i.e. all effluent generated within the facility will be re-circulated within the process, with a potential requirement for top up with fresh water.

#### Compost Tunnels

Due to the moisture content in the incoming fines it will not be necessary to add water at the start of the process. During the process material will lose moisture due to the process heat generated and seepage/drainage from the material itself.

The tunnel in-floor aeration system also acts as a liquid collection system. The aeration system will be fitted with a series of valves which will be opened when air is not being delivered to allow the liquid to freely drain to the underground holding tank located outside the southern side of the building.

#### Floor Wash Down

The building floors will all be subject to regular wash-downs and the wash water will drain to the holding tank. The wash down will generate 10-12 m<sup>3</sup> of wastewater/month.

## Odour Abatement Effluents

The odour abatement system will consist of a wet scrubber and biofilter. The biofilter will operate in a bio-trickling mode, with recirculation of the liquid; however excess wastewater will be generated. At full capacity, the scrubbers will generate up to 20 m<sup>3</sup>/month of wastewater with the biofilters generating 25 m<sup>3</sup>/month. The wastewater will be directed to the holding tank.

## Vehicle Wash-Down

There will be internal vehicle wash-down areas at both the northern and southern ends and an external wash down outside the northern side of the building. The latter will be a 200 m<sup>2</sup> concrete paved area graded to fall to a dedicated collection tank. The truck wash down is expected to generate approximately 30 - 50 m<sup>3</sup>/month, including for rainfall which will be captured in the external wash-down area. This wash down will drain to the holding tank.

## Holding Tank

The stabilisation process will generate up to 120 m<sup>3</sup> per month of process wastewater, all of which will be collected and directed to underground holding tank. Although the stabilisation process is designed to re-use all of the effluents generated during the process a pipeline will be installed between the holding tank and the main leachate management plant so that in the unlikely event that excess effluent arises it can be pumped to the main leachate plant.

## **4.11 Leachate Management Facility**

### *4.11.1 Tanker Loading*

Each tank / lagoon will be fitted with a valved discharge pipe connected to a manifold in the tanker loading area. The tanker will enter the loading area and park. A flexible hose will connect the tanker to the manifold and the valve on the discharge pipe will be opened. The transfer of leachate to the tankers will be supervised by trained personnel in accordance with EMS-OP-11.

### *4.11.2 Leachate Treatment*

Prior to the start of leachate treatment KLL will prepare operational procedures that specify the leachate and treatment chemical handling controls, the measures that must be applied to comply with the licence conditions, the performance tolerance limits and the quality standards for the treated leachate.

### *4.11.3 Odour Control*

All the tank vents and the air displacement vents on from vacuum tankers will be fitted with carbon filters.

## **4.12 Off-Site Disposal and Recovery**

Wastes consigned from the facility must be conveyed by waste collectors that have up to date collection permits and are authorised to transport the particular waste. KLL maintains and regularly updates a register of approved waste collectors. All the wastes go to appropriately licensed/permitted/ authorised facilities.

As required by Condition 10.5 written records are kept of each consignment of leachate removed from the facility. The records include:

- a) the name of the carrier;
- b) the date and time of removal of leachate from the facility;
- c) the volume of leachate, in cubic metres, removed from the facility on each occasion;
- d) the name and address of the Waste Water Treatment Plant to which the leachate was transported, and
- e) any incidents or spillages of leachate during its removal or transportation.

#### **4.13 Plant & Equipment**

##### Landfill

Compactors (2 No.)

##### Biological Treatment Plant Facility:

Front end loader (2 No.)

Tractor trailer (1 No.)

##### IBA Area:

30 tonne off road vehicles (2 No.).

Roller (1 No.)

Grader (1 No.)

360° Excavators (2 No.)

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#### **4.14 Health & Safety**

KLL has prepared a Safety & Health Plan and Accident Prevention Plan and an Emergency Response Procedure (ERP), as specified in Condition 9.2 (W0146-02). The ERP is in Appendix 3. The Accident Prevention Plan and ERP will be revised and updated to reflect the new activities.

All staff are trained in the use of and are obliged to wear the appropriate personal protective equipment. KLL reviews health and safety practices annually to ensure that they remain in line with best practice and regular safety audits are carried out on-site to ensure the safety of all personnel working there.

#### 4.15 Emissions

Site activities are sources of noise, dust, odour and storm water (outfalls from the wetlands) and point air emissions (gas engines, gas flares and odour control unit stack). Details of the existing and proposed point emissions sources are in Table 4.3.

**Table 4.2 Point Emission Sources**

Emission Point	Source	Receiving Medium
A2-1	Gas Engine	Air
A2-2	Gas Engine	Air
A2-3	Gas Engine	Air
A2-4	Gas Engine	Air
A2-5	Gas Flare	Air
A2-6	Gas Flare	Air
A2-7	Biofilter stack	Air
A3-1	Gas Flare - contingency	Air
A3-2	Gas Flare – odour control	Air
SW-9	Southern Wetland	Knockharley Stream
SW-10	Northern Wetland	Knockharley Stream

The precise locations of the emission to the Knockharley Stream from the northern wetland and the stack on the biofilter have not been determined, but will be agreed with the Agency post construction and before the emissions commence.

#### 4.16 Emission Controls

##### 4.16.1 Air

The gas engines and flares are subject to regular inspection and preventative maintenance and the emissions from the exhausts are monitored to assess compliance with the emission limit values. The odour control system that will be provided in the biological treatment facility will be subject to inspection and maintenance requirements specified by the supplier and monitoring of the stack emissions.

##### 4.16.2 Noise

Noise emissions are mitigated by the following, which are based on the requirements of Condition 5.13 (W0146-02): -

- Provision of an earthen screening berms,
- Planting a 50 m wide band of wood land plantation inside the entire facility boundary, where it does not interfere with overhead power lines,
- Speed restrictions on all internal site roads, and
- Fitting acoustic panels on the engine bays and exhaust silencers on all heavy machinery used on-site.



#### 4.16.3 Odours

KLL has prepared an Odour Management Plan and regularly assesses the effectiveness of the odour control measures and submit a report to the Agency, as required by Conditions 6.10.3 (W0146-02). Odour emissions are controlled by the following operational procedures and abatement measures: -

- The daily working face in the landfill is limited is size and the working area covered at the end of the working day.
- The provision of a landfill gas collection and utilisation system in the non-stabilised residual waste landfill cells.
- The biological treatment plant will be fitted with an odour control system comprising air extraction and a biofilter.
- The air displacement vents on the leachate storage tanks and the road tankers will connect to carbon filters.
- The passive gas vents in the stabilised and inert landfill cells and in the IBA storage cells will be fitted with carbon filters.

#### 4.16.4 Dust

Dust emissions are minimised by the control measures specified in Conditions 7.4 ad 7.5 (W0146-02) and additional controls for the proposed activities: -

- Paved internal access roads;
- Mandatory use of the wheel wash by all waste vehicles leaving the site;
- Routine road sweeping;
- Daily cover of the deposited waste;
- Vegetation of soil stockpiles;
- Use of water bowser to dampen roads and stockpiles as required, and
- Use of water sprinklers to dampen the IBA stockpiles and cells.

### 4.17 Nuisance Control

#### 4.17.1 Pests

KLL had prepared a procedure (EMS-OP-06) for pest control measures that include birds and vermin. The primary measure for the prevention of birds gathering and feeding at the facility is the appropriate daily covering of the residual non-stabilised and the stabilised and inert waste disposed in the landfill cells. Additional measures include distress calls, balloons, decoys, and shotguns.

KLL has retained the services of a specialist pest control contractor to provide a pest prevention service for the landfill, which includes rats, mice and seasonal treatment for flies, where necessary. The

contractor visits the site approximately 8 times per year to carry out inspections and service poison bait boxes which are installed at strategic locations.

#### 4.17.2 Litter

The litter control measures, which are based on the requirements of Condition 7.3 (W0146-02) include:

- The active tipping area is kept to the minimum area required to efficiently operate.
- The active tipping area is covered daily with soil-like material.
- All waste in non-active areas of the landfill is always covered with soil or an alternative mineral layer.
- Netting systems are employed around active areas of the landfill.
- Mobile litter cages are used as necessary around unloading vehicles
- A minimum buffer of approximately 100 m between the landfill footprint and the site boundary ensures that in the event of a failure in the netting system litter will be confined to the lands owned by KLL and a clean-up can be immediately started.
- All waste is delivered to the site in covered vehicles. Any vehicle delivering uncovered waste is deemed to be in breach of waste acceptance contract conditions and appropriate action is taken by Knockharley Landfill Ltd to prevent recurrence. This action is designed to ensure that this practice does not recur.
- Waste collectors are prohibited from using minor roads on their approach to and departure from the site and all access is directly from the N2.
- Staff at the site patrol the nearby roads regularly to ensure that there is no litter emanating from vehicles using the facility. The nature of the waste to be deposited on the north face will be less prone to litter nuisance.
- The site stops accepting waste during severe wind conditions.

#### 4.18 Site Inspections

KLL carries out regular site inspections in accordance with EMS-OP-17 and EMS-OP-18 to assess the potential for activities to give rise to nuisance or impairment of amenity outside the installation boundaries associated with odours, litter, mud and dust and litter.

#### 4.19 Environmental Monitoring Programme

KLL implements the environmental monitoring programme specified in Conditions 8.1 to 8.14 of the licence (W0146-02). It includes both emission points and ambient monitoring locations. The locations and frequencies are set out in Schedule D of the licence and summarised in Table 4.3.

The Table includes amendments to the frequency, locations, methods and scope of the monitoring agreed with Agency in accordance with Condition 8.2 (W0146-2). Following the grant of the revised licence the monitoring programme will be amended to reflect the additional monitoring requirements.

The existing monitoring locations are shown on Drawing LW 14-821-01-P-0050-001 and the proposed locations associated with the development are shown on Drawing LW 14-821-01-P-0050-002. The actual position of the proposed monitoring points may vary depending on as built conditions. The precise locations will be agreed with the Agency and a composite monitoring point location drawing will be prepared before the new waste activities commence.

KLL maintains records of all the monitoring carried out at the facility. The records include the names and qualifications of all the persons that carry out the sampling, conduct the laboratory analysis and provide the interpretation of the results.

#### 4.20 Meteorological Station

Condition 3.21 and Schedule D.6 of the Licence (W0146-02) specify the meteorological monitoring requirements to be undertaken at the installation and these are listed below.

Parameter	Monitoring Frequency	Analysis Method/Technique
Precipitation Volume	Daily	Standard
Temperature	Daily	Standard
Wind Force and Direction	Daily	Standard
Evaporation	Daily	Standard
Evapotranspiration	Daily	Standard
Humidity	Daily	Standard
Atmospheric Pressure	Daily	Standard

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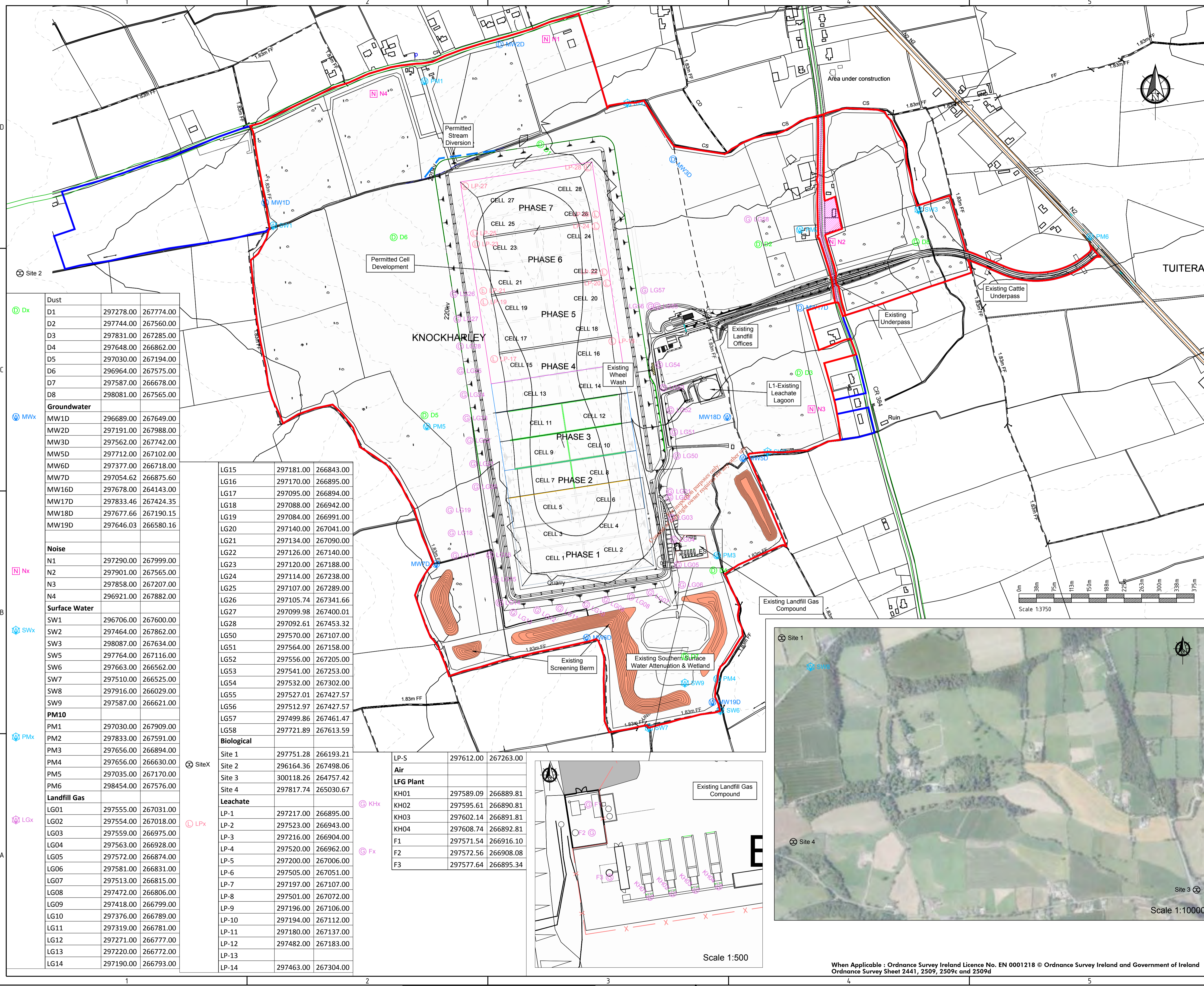
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**LEGEND**

- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary

Note: MW17D, MW18D and MW19D were installed in 2016 for baseline monitoring for proposed development



Area under construction

TUITERAT

Existing Cattle Underpass

Existing Underpass

Existing Landfill Offices

L1-Existing Leachate Lagoon

Ruin

Existing Landfill Gas Compound

Existing Screening Berm

Existing Southern Surface Water Attenuation & Wetland

Existing Landfill Gas Compound

Scale 1:3750

Scale 1:10000

Site 1

Site 4

Site 3

Scale 1:500

Existing Landfill Gas Compound

Scale 1:500

Dust		
D1	297278.00	267774.00
D2	297744.00	267560.00
D3	297831.00	267285.00
D4	297648.00	266862.00
D5	297030.00	267194.00
D6	296964.00	267575.00
D7	297587.00	266678.00
D8	298081.00	267565.00

Groundwater		
MW1D	296689.00	267649.00
MW2D	297191.00	267988.00
MW3D	297562.00	267742.00
MW5D	297712.00	267102.00
MW6D	297377.00	266718.00
MW7D	297054.62	266875.60
MW16D	297678.00	264143.00
MW17D	297833.46	267424.35
MW18D	297677.66	267190.15
MW19D	297646.03	266580.16

Noise		
N1	297290.00	267999.00
N2	297901.00	267565.00
N3	297858.00	267207.00
N4	296921.00	267882.00

Surface Water		
SW1	296706.00	267600.00
SW2	297464.00	267862.00
SW3	298087.00	267634.00
SW5	297764.00	267116.00
SW6	297663.00	266562.00
SW7	297510.00	266525.00
SW8	297916.00	266029.00
SW9	297587.00	266621.00

PM10		
PM1	297030.00	267909.00
PM2	297833.00	267591.00
PM3	297656.00	266894.00
PM4	297656.00	266630.00
PM5	297035.00	267170.00
PM6	298454.00	267576.00

Landfill Gas		
LG01	297555.00	267031.00
LG02	297554.00	267018.00
LG03	297559.00	266975.00
LG04	297563.00	266928.00
LG05	297572.00	266874.00
LG06	297581.00	266831.00
LG07	297513.00	266815.00
LG08	297472.00	266806.00
LG09	297418.00	266799.00
LG10	297376.00	266789.00
LG11	297319.00	266781.00
LG12	297271.00	266777.00
LG13	297220.00	266772.00
LG14	297190.00	266793.00

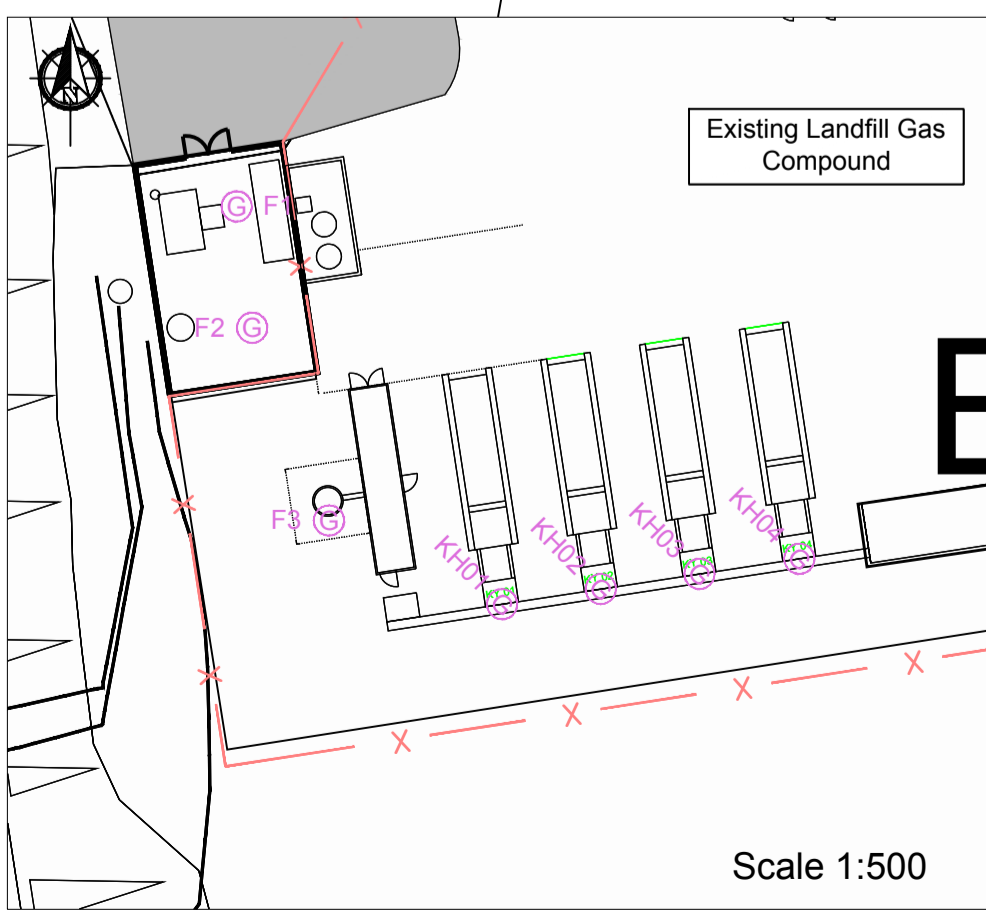
LG15	297181.00	266843.00
LG16	297170.00	266895.00
LG17	297095.00	266894.00
LG18	297088.00	266942.00
LG19	297084.00	266991.00
LG20	297140.00	267041.00
LG21	297134.00	267090.00
LG22	297126.00	267140.00
LG23	297120.00	267188.00
LG24	297114.00	267238.00
LG25	297107.00	267289.00
LG26	297105.74	267341.66
LG27	297099.98	267400.01
LG28	297092.61	267453.32
LG50	297570.00	267107.00
LG51	297564.00	267158.00
LG52	297556.00	267205.00
LG53	297541.00	267253.00
LG54	297532.00	267302.00
LG55	297527.01	267427.57
LG56	297512.97	267427.57
LG57	297499.86	267461.47
LG58	297721.89	267613.59

Biological		
Site 1	297751.28	266193.21
Site 2	296164.36	267498.06
Site 3	300118.26	264757.42
Site 4	297817.74	265030.67

Leachate		
LP-1	297217.00	266895.00
LP-2	297523.00	266943.00
LP-3	297216.00	266904.00
LP-4	297520.00	266962.00
LP-5	297200.00	267006.00
LP-6	297505.00	267051.00
LP-7	297197.00	267107.00
LP-8	297501.00	267072.00
LP-9	297196.00	267106.00
LP-10	297194.00	267112.00
LP-11	297180.00	267137.00
LP-12	297482.00	267183.00
LP-13		
LP-14	297463.00	267304.00

Air		
LP-S	297612.00	267263.00

LFG Plant		
KH01	297589.09	266889.81
KH02	297595.61	266890.81
KH03	297602.14	266891.81
KH04	297608.74	266892.81
F1	297571.54	266916.10
F2	297572.56	266908.08
F3	297577.64	266895.34



Rev.	Drawn	Chkd	Appd	Rev Origin	Date	Description
A				Cork	10.07.18	Issue For Planning Application

Name of Client  
**KNOCKHARLEY LANDFILL LTD.**

Name of Job  
**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

Title of Drawing  
**EXISTING MONITORING POINTS**

Scales Used  
**1:3750**

Dwg. No.  
**LW14-821-01-P-0050-001**

Rev.  
**A**

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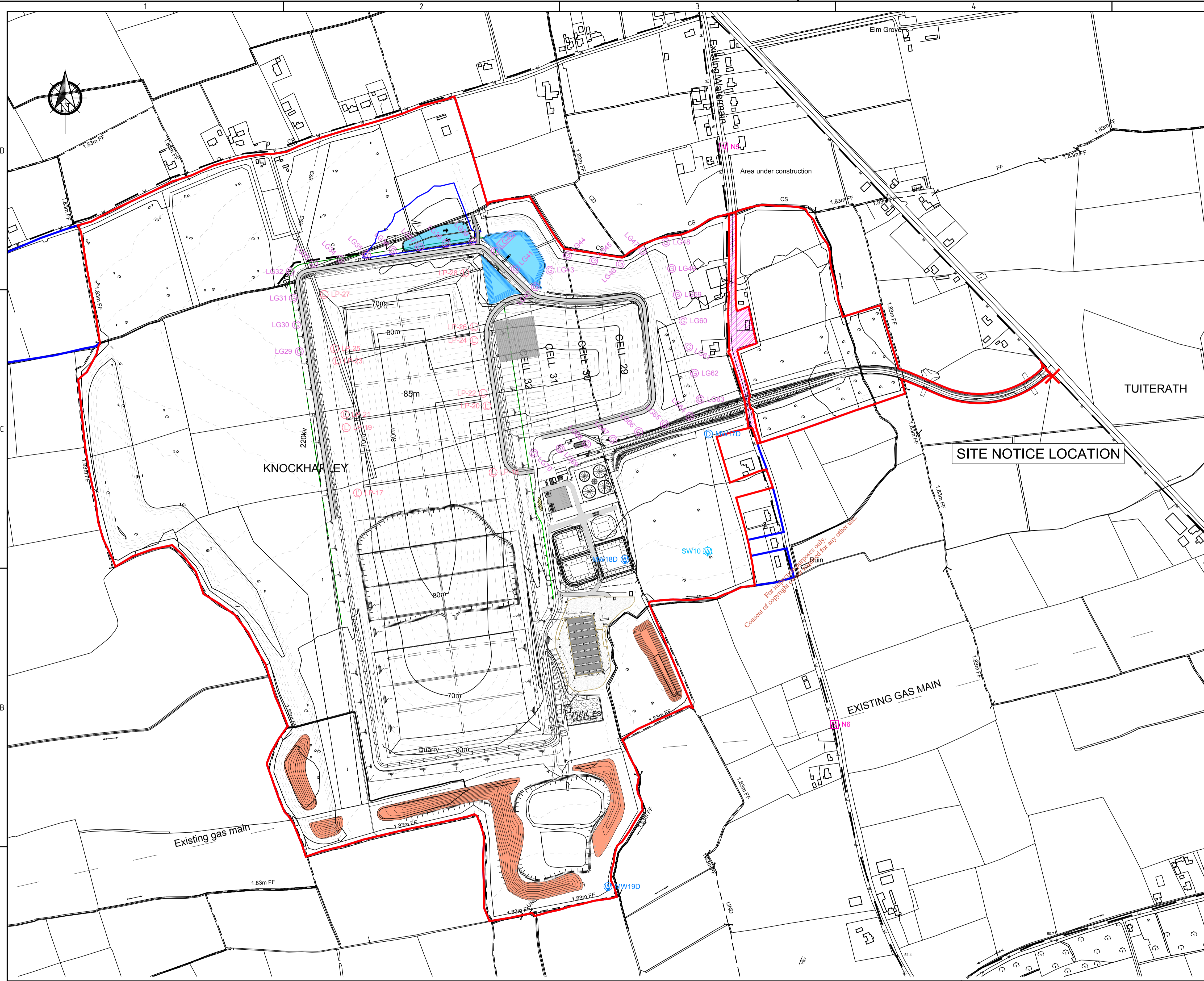
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REF	EASTING	NORTHING
<b>Gas</b>		
LG29	297070	267578
LG30	297065	267628
LG31	297059	267677
LG32	297053	267727
LG33	297097	267741
LG34	297146	267750
LG35	297196	267759
LG36	297245	267766
LG37	297295	267773
LG38	297344	267779
LG39	297394	267785
LG40	297436	267765
LG41	297473	267732
LG42	297511	267699
LG43	297538	267730
LG44	297570	267757
LG45	297619	267747
LG46	297669	267741
LG47	297711	267766
LG48	297754	267782
LG49	297765	267733
LG59	297776	267684
LG60	297786	267635
LG61	297797	267586
LG62	297807	267538
LG63	297818	267489
LG64	297799	267457
LG65	297751	267443
LG66	297703	267429
LG67	297655	267414
LG68	297606	267406
LG69	297557	267397
LG70	297508	267388
<b>Groundwater</b>		
MW17D	297833	267424
MW18D	297678	267190
MW19D	297646	266580
<b>Noise</b>		
N5	297862	267959
N6	298069	266882
<b>Surfacewater</b>		
SW10	297832	267206
<b>Leachate</b>		
LP-17	297178.9149	267314.3403
LP-18	297431.7139	267352.6671
LP-19	297157.7742	267436.1495
LP-20	297420.2549	267476.5585
LP-21	297155.4964	267460.4859
LP-22	297413.2442	267500.0493
LP-23	297140.2212	267560.3116
LP-24	297396.3194	267598.6386
LP-25	297136.0972	267583.3901
LP-26	297396.3194	267623.7777
LP-27	297116.7019	267684.5522
LP-28	297378.986	267724.5276

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**LEGEND**

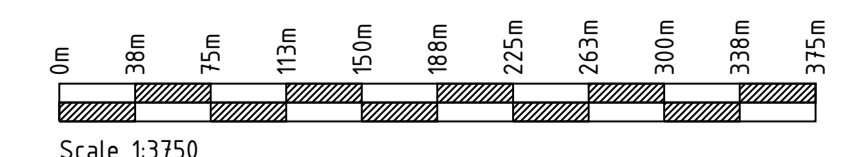
- Planning Boundary
- Areas Within Planning Boundary, Not Within Application Site
- Ownership Boundary

SCALE - VERTICAL

A

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A	SK	C/C	BC	Cork	10.07.18	Issue For Planning Application
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Rev.	Drawn	SK	CHKD	C/C	Appd	Rev Origin	Date	Description
								EAIR

Revision History A

**Name of Client**

**KNOCKHARLEY LANDFILL LTD.**

**Name of Job**

**PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL**

**Title of Drawing**

**PROPOSED ENVIRONMENTAL MONITORING LOCATIONS**

**Scales Used** 1:3750

**Dwg. No.** LW14-821-01-P-0050-002

**Rev.** A

**CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES**

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**Table 4.3 Monitoring Programme**

Condition / Schedule	Monitoring	Currently Monitored	Type	Licence Requirements	Current Frequency
Table D1.1 and Table D.2.1	Gas Monitoring: Site Offices Landfill Perimeter Gas Gas within waste mass	1 No. 36 No. 32 No.		Continuous Monthly Monthly	Continuous Monthly Monthly
Table D.1.1 and Table D.3.1	Dust samples	8 No.		Monthly	Quarterly
Table D.1.1 and Table D.3.1	PM <sub>10</sub>	6 No.		Quarterly	Annually
Table D.1.1 and Table D.4.1	Noise	4 No.		Quarterly	Quarterly
Table D.1.1 and Table D.5.1	Ground water	8 No.	Levels Analysis Analysis	Monthly Quarterly Annually	Quarterly Quarterly Annually
Table D1.1 and Table D5.1	Private Groundwater Wells	0		Annually	Not Required
Table D.1.1 and Table D.5.1	Surface water	8 No.	Visual Analysis Analysis	Weekly Quarterly Annually	Weekly Quarterly Annually
5.11.2 and Table D1.1 and Table D.5.1	Leachate	18 No. Cells 1 No. Lagoon	Levels Analysis Analysis	Weekly Quarterly Annually	Continuous Quarterly Annually
Table D.6	Meteorology:	1 No.		Daily	Daily
Table D.7	Landfill Gas Utilisation Plant / Enclosed Flares			Continuous Annually	Continuous Annually
				Weekly Quarterly Annually	Weekly Quarterly Annually
8.8.1	Surface Water Pond	1 No.		Continuous	Continuous
8.9	Topographical Survey			Annually	Annually
8.10.1 (Table D.5.1)	Biological Assessment			Annually	Annually
8.11	Archaeological Assessment***			*	*
8.12	Stability Assessment			Annually	Annually
8.13.1	Nuisance Monitoring			Weekly	Weekly
8.13.2	Odour Monitoring			**	**

\* To be carried out prior to development of any undisturbed area:

\*\* Frequency to be agreed with the Agency

\*\*\*Prior to new construction works in undeveloped areas of the site.

#### 4.21 Incidents

An incident is: -

- (i) an emergency;
- (ii) any emission which does not comply with the requirements of this licence;
- (iii) any exceedance of the daily duty capacity of the waste handling equipment;
- (iv) any trigger level specified in this licence which is attained or exceeded;
- (v) any compliance value specified in this licence which is attained or exceeded; and,
- (vi) any indication that environmental pollution has, or may have, taken place.

The licence requires KLL to notify the Agency of an incident as soon as practical and in any case no later than 10 am the following working day of the occurrence and submit a written report within 5 days of the of the incident practicable. Where the incident involves a discharge to surface water or groundwater KLL must inform Inland Fisheries Ireland (IFI) no later than 10 am the following working day after the incident.

Where follow up actions are taken in response to the incident e.g. clean-up KLL must submit a report to the Agency on the actions no later than 10 days after the start of the works.

#### 4.22 Complaints

KLL has established a procedure (EMS-OP-01) for recording and responding to complaints. All complaints are recorded as in a Complaint Report, as specified in Condition 10.4 (W0146-02). The information recorded includes: -

- Date and time of the complaint;
- Name of the complainant;
- Details of the nature of the complaint.

The Facility Manager, or nominated Deputy Manager must be informed of the complaint and is responsible for its investigation and the implementation of any corrective measures. In the event that corrective actions are required KLL records the actions and informs the complainant.

#### 4.23 Reports

The full reporting requirements are set out in Schedule E of the licence (W0146-02) and are summarised in Table 4.4, which includes amendments to the reporting frequency as agreed with the Agency. The reports, in conjunction with the AER required under Condition 11.7 of the licence (W0146-02) also meet the reporting requirements of the EMS. The preparation of the AER involves a review of the progress in achieving the EMS Objectives and Targets, reports on site development works, resource consumption, changes to existing or introduction of new operating procedures and an assessment of the impacts of site activities.

**Table 4.4 Reporting Frequency**

<b>Report</b>	<b>Frequency</b>	<b>Submission Date</b>
EMS Updates	Annually	1 month after reporting year
AER	Annually	By 31 March each year
Incidents	As they occur	Within 5 days of the incident
Bund, tank, integrity testing	3 years	1 month after end of 3 year period
Specified Engineering Works	As they arise	Prior to works commencing
Landfill Gas monitoring	Annually	1 month after reporting year
Surface Water Monitoring	Annually	1 month after reporting year
Groundwater Monitoring	Annually	1 month after reporting year
Leachate Monitoring	Annually	1 month after reporting year
Meteorological Monitoring	Annually	1 month after reporting year
Dust Monitoring	Annually	1 month after reporting year
Noise Monitoring	Annually	1 month after reporting year
Odour Management Plan	As required	
ELRA	Every Three Years	To be included in AER
Any other monitoring	As they occur	Within 10 days of obtaining results

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**APPENDIX 1**

**Fire Prevention Plan**

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## 1.0 Purpose

The purpose of this procedure is to identify fire prevention measures in order to:

- Minimise the risk of Fire.
- Ensure earliest possible detection of the outbreak of fire.
- Ensure earliest possible response in the event of fire.
- Ensure to follow the Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres at all times.
- Ensure in so far as is reasonably practicable that first aid and fire-fighting equipment are in place.
- Ensure that the Emergency evacuation controls are in place and implemented to safeguard the safety of site personnel, visitors and neighbours.

## 2.0 Scope

This procedure applies to all Knockharley activities

## 3.0 Responsibility

3.1 The Landfill Manager is responsible for implementation of this procedure and for ensuring that the necessary measures are in place to prevent fire across the site in line with this procedure, the site specific Emergency Preparedness Response Plan and the Explosive protection document 2016.

3.2 The operations/site supervisor is responsible for ensuring that:

- This procedure is implemented and maintained
- Site employees understand their responsibilities in relation to fire prevention and are aware of actions to be taken in the event of a fire.
- Appropriate emergency equipment is readily available, serviced and usable.

3.3 Site staff must adhere to the requirements defined in the Emergency Preparedness Response Plan, the requirements of this procedure and the explosive protection document 2016.

## 4.0 References

EMS-EF-11 Emergency Procedure Test

EMS-OP-11 WASTE ACCEPTANCE AT WEIGHBRIDGE

EMS-OP-05 FUEL STORAGE & DISTRIBUTION

EMS-EMP-04 LANDFILL GAS BALANCING & MONITORING

EMS-SOP-06 LANDFILL GAS FLARE MONITORING

EMS-EF-30 DAILY SITE CONDITION REPORT

EMS-EF-16 Non-Conformance & Corrective Action Record

EMS-SP-12 AGB and BPS communication procedure

HS-SF-034 Weekly fire safety inspection

IED Licence W0146-02

EPD/Atex (Explosive Protection Document 2016)

Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres Document

BPS Emergency Response Plan and risk assessments

## 5.0 Procedure

5.1 The following sources of ignition may cause a fire on the landfill/site:

- Fire/explosion at the diesel tank
- Incoming load on fire
- Landfill gas fire/explosion
- Fire within the waste
- Electrical or mobile plant/equipment overheating catching fire
- Smoking on site

5.2 The following control measures are initiated to control the sources of Ignition.

### Waste/gas:

- All loads checked at weight bridge
- No mattress policy in force
- Hazardous/flammable material such as pressurised containers are not allowed to be tipped at the site (as per clause 1.8 of our waste licence) Customers also informed of what waste we do not accept
- Tractor and water bower available on site to reduce dust concentrations and prevent fire
- Trained WFCO on site
- CCTV is in operation
- Landfill gas detection system in place and in offices (as per clause 3.20 of our waste licence).
- Atex assessed (EPD 2016)
- Electrical equipment used near leachate transfer sites are suitable
- LFG flares and engines are operating and burning off gas to prevent gas build up (as per clause 3.15.2 of our waste licence).
- Gas monitoring is carried on a weekly basis by a dedicated person to identify the potential for the release of odours and build-up of

gas. Following the gas balancing & monitoring, flares/engines can be used to increase suction (or decrease suction) to prevent gas build ups (or odours), to mitigate the risk of a fire/explosion from happening.

- Flares are ATEX approved and fitted with gas monitoring and ventilation.
- Flares are maintained in accordance with manufacturer's instructions
- Waste is compacted to prevent build-up of air and gases

### 5.3 Material Storage:

- Diesel tank is fenced off/ bunded
- Diesel tank pump is locked at all times, controlled by supervisor
- All spills are cleaned up immediately
- MSDS sheets are available
- Timely turnaround of waste containers.
- No smoking policy on site with a designated smoking area provided and adequate signage provided

### 5.4 Electrical/Mechanical:

- Adequate firefighting equipment available
- Pre-op checks carried out on all machinery
- Maintenance schedule in operation
- All portable electrical equipment tested annually
- Maintenance shop area to be kept tidy and gas bottles chained up
- Electrical switch rooms to be kept tidy and locked
- Mobile plant/equipment to be cleaned down regularly
- All mobile plant are equipped with fire extinguishers

### 5.5 Emergency Response:

Site specific Emergency Preparedness Response (EMS-SP-07a) is in Place (as per clause 9.2 in our licence) (and an EPD review has been carried out in 2016) to include:

- Weekly checking of all fire equipment to include fire extinguishers, fire hydrants and fire hoses.
- Ensure any extinguishers that are spent are refilled or replaced

- Annual checking and maintenance of all firefighting equipment as required by legislation.
- Six monthly fire drills (different scenario used each time)
- All Electrical equipment is selected as per “Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres” document.
- Trained fire wardens
- Fire detection systems are in place and serviced
- Permit to work system in place
- Contractor induction training on the ERP & the EPD/Atex areas

Revision No.	Revision Date	Description	Sections Affected	Revised BY	Approved BY
001	07/06/2016	EMS-OP-28 FIRE PREVENTION PLAN	All	MW	TF
002	19/09/16	EPD 2016 reference	All	MW	TF
003	30/08/17	Reference to gas monitoring as a fire prevention measure	4.2	MW	TF
004	25/05/18	Reference to procurement of equipment for use in potentially explosive atmospheres	4.2 & 4.5	MW	TF
005	31/05/18	Reference change to EMS-EMP-04 Landfill gas Balancing & Monitoring Procedure	1.0 & 4.0	MW	TF
006	21/06/19	Name Change	Header	POR	SS

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**APPENDIX 2**

Operating Procedures

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## 1.0 Scope

The purpose of this procedure is to ensure that complaints are handled in an effective and efficient manner and in accordance with regulatory requirements. This procedure applies to all staff.

## 2.0 Responsibility

The Facility Manager will implement this procedure. All site staff will be responsible for following this procedure.

The Facility Manager will also be responsible for responding to complaints in accordance with this procedure.

## 3.0 Definition

“Complaint” is a written or vocal expression of dissatisfaction or annoyance by a third party regarding the management of the site or nuisance caused by the operation of the site.

## 4.0 References

- EMS-EF-25 Complaints Register
- EMS-EF-24 Complaint Form
- EMS-EF-16 Non-Conformance, Corrective & Preventative Action.
- EMS-SP-07(a) Emergency Response Procedure
- EMS-EF-26 Assessment of Odour Impact Form

### Procedure

- 4.1. All complaints to site, whether in written form, in person, by telephone or by fax will be communicated to the Landfill Manager or nominated deputy.
- 4.2. Complaints or enquiries can be made:
  - in writing to Knockharley Landfill, Knockharley, Kentstown, Co. Meath,
  - by telephone: 041 - 9821650 or
  - by fax: 041 - 9821750.
  - Outside of office hours complaints can be made to the emergency on-call phone 086-8189533.
- 4.3. *Complaints made during office hours:*
  - 4.3.1. The staff member recording the complaint will note the name and contact details of the complainant, the date and time of the complaint and the nature of the complaint.
  - 4.3.2. The staff member will also ask the complainant if they require a verbal and/or written response. This will also be recorded.
  - 4.3.3. The complaint will be investigated filling out the relevant sections on the odour assessment form (EMS-EF-26).



Every complaint will be recorded on a Complaint Form (EMS-EF-24), including details of any investigations, corrective actions and mitigation measures .

- 4.3.4. The Facility Manager or nominated deputy will respond to the complainant directly, if required and/or applicable, informing them of any investigation details, corrective actions or mitigation measures if applicable. These responses will be noted on complaints form.
- 4.3.5. A written response will also be made to the complainant if requested, detailing any investigation details, corrective action or mitigation measures taken if applicable. If relevant to the nature of the complaint, the appropriate meteorological data will also be included in the complaint response.
- 4.3.6. Every complaint will be recorded on the Complaints Register (EMS-EF-25).

4.4. *Complaints made outside of office hours:*

- 4.4.1. The normal office hours at Knockharley Landfill are as follows:

Monday – Friday      08:00 – 17:00

- 4.4.2. Complaints outside of normal office hours, as well as on Saturday, Sundays and Bank Holidays shall be directed to the emergency on-call phone (see 5.2).

The staff member on duty who answers the call will record all relevant details in the same fashion as described in 5.3.1 and 5.3.2 above. The complainant will be asked if they wish to be called back immediately after the investigation of the complaint.

- 4.4.3. The staff member will then be notified by the third party on-call service. Any investigations relevant to the nature of the complaint will be initiated by the staff member on call. Following the initial investigation, the staff member on call will contact any complainant who specifically asked to be called back. In any other case, a call will be returned to the complainant on the morning of the next working day following the complaint.
- 4.4.4. The staff member will record the complaint on Complaint Form, including details of any investigations, corrective actions and mitigation measures.
- 4.4.5. If requested, a written response will also be sent to the complainant as described in 5.3.5 above.
- 4.4.6. In the case of a complaint relating to an emergency at the facility, the emergency services 112 will be contacted immediately by the staff member on call. Any other relevant measures as described in the

Emergency Response Procedure EMS-SP-07 (a) shall also be taken by the staff member on call.

- 4.5. For complaints which, following investigation, constitute non-conformances refer to EMS-SP-09 Non-conformity, Corrective Action & Continual Improvement Procedure.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-10 Complaints Procedure	All	GH	TF
002	23/07/18	Updated sections to reference to odour assessment form	4.0 & 4.3.3	MW	TF
003	14/01/19	Updated with reference to new form	Section 4.3.3	MW	DH
004	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

The purpose of this procedure is to ensure that all waste received on site (except for cover and inert materials) is tipped, correctly compacted and covered by the end of the working day in accordance with site licence conditions.

## 2.0 Responsibility

The Landfill Manager (LM) is responsible for implementing this procedure. Site staff & compactor drivers will be responsible for following this procedure.

## 3.0 References

EPA Landfill Operational Practices Manual (4/500/97)

IED Licence 146-02

## 4.0 Definitions (from IED Licence 146-02)

- 4.1. "Daily cover is the term used to describe material spread (about 150mm if soil cover is used) over deposited waste at the end of each day. Synthetic materials may also be used. Its objective is to minimise odour, the amount of litter generated and to control flies and access to the waste by birds and vermin. Where soils are used for daily cover, it is recommended that they be removed at the start of the day and subsequently reused as much as possible".
- 4.2. "Intermediate cover refers to placement of material (minimum 300mm if soil is used) for a period of time prior to restoration or prior to further disposal of waste".
- 4.3. "Working face: The area of the site in which waste other than cover material or material for the purposes of the construction of specified engineering works is being deposited".

## 5.0 Procedure

- 5.1. All waste received on site (except for cover and inert materials) must be compacted and covered by the end of the working day in accordance with site licence conditions.
- 5.2. All waste will be placed using the landfill compactor/s and/or a dozer. The operators of this machine will ensure that waste is placed in accordance with the following licence conditions at both facilities:
- *only one working face shall exist at the landfill at any one time for the deposit of waste other than cover or restoration materials; and*

- *the working face of the landfill shall be no more than 25 meters long and 25 meters wide (i.e. <math>625m^2</math> surface area), no more than 2.5 meters in height after compaction, and have a slope of 1 in 3.*
- *all wastes deposited at the working face shall be compacted, using a steel wheeled compactor, and covered as soon as is practicable and at any rate prior to the end of the working day.*

**6.0** The method of working the face shall be in accordance with the guidance laid down within the EPA Manual on Landfill Operational Practices (4/500/97).

6.1. During emplacement of the wastes operators and site operatives must be vigilant for hazardous materials and where possible isolate and remove these from the waste. Particular care should be taken with gas bottles and other pressurized containers, which could explode if tracked over by compactors or dozers etc.

6.2. When placing the first lift of refuse across the base of the site particular care should be taken to protect the liner. In such cases, all large items of metal and wood should where possible be removed from the waste to prevent puncturing the liner. If they cannot be removed, they should be aligned parallel to the liner to reduce the risk of puncturing and placed on softer refuse if possible.

6.3. All waste must be covered by the end of the working day in accordance with the licence conditions. This cover may be either inert materials or 'alternative covers' as approved by the EPA. The latter covers should be applied in accordance with the suppliers' instruction.

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Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-02	All	GH	TF
002	21/06/19	Name change	Header	POR	SS

## 1.0 Scope

To control operations at the facility, in adverse wind conditions, including litter management.

## 2.0 Responsibility

The Landfill Manager (LM) will implement this procedure. Site staff will be responsible for following this procedure and are responsible for collecting litter and assembling/disassembling litter netting.

## 3.0 References

IED Licence 146-02

## 4.0 Procedure

- 4.1. The Landfill Manager and/or Site Supervisor will assess weather conditions prior to any waste being unloaded. Weather conditions will be assessed by observation, on-site meteorological station data and hand held anemometers at the work face.
- 4.2. If conditions are deemed too windy only those waste types that are not affected by adverse wind conditions will be accepted on site.
- 4.3. All affected customers will be informed that the site is closed.
- 4.4. Any vehicles already on site will remain on the hard standing area until conditions improve or until the vehicles return to their point of origin.
- 4.5. If conditions are too variable to be determined, the following will be carried out:
  - The optimal location for the working face will be determined, based primarily on the wind direction
- 4.5.1. Mobile litter cages are placed as close as possible to the tipping area and the working face to contain litter locally. Cages must only be used on the direction of the FM or supervisor. The cages should be positioned next to each other in lines around the tipping area to minimise windblown litter. The cages should only be moved by on-site plant. This is the most common type of litter prevention on site. At the end of the working day daily cover may be placed on the litter collected within the cages or alternatively picked and placed in the working face for compaction.
  - The first consignments are allowed to unload on site.
  - Having examined the effect of the wind on these loads the Landfill Manager and/or Site Supervisor will decide whether to proceed with tipping operations or to restrict waste inputs.

4.6. In addition, the following regular operational measures will be continued:

*Assembling permanent litter nets around the site boundary:*

- 4.6.1. The Facility Manager and supervisor will agree on deployment of permanent nets along the operational landfill boundary to minimise the risk of litter leaving the site. All nets must be removed from the poles prior to moving the poles.
- 4.6.2. A boom lift or cherry picker will be used at all times when assembling, disassembling litter nets at height.
- 4.6.3. Regular boundary inspections will be carried out to ensure that all litter is collected. The facility licence requires that litter is controlled and wherever possible contained within the site boundary. However, under certain conditions it will be impossible to contain all litter. In such circumstances, litter that has left the site to the surrounding environs must be collected as a priority as soon as practicable.
- 4.6.4. Permanent netting will be kept free of wind blown litter to prevent build up and subsequent damage.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-03 Operation of Facility in Adverse Wind Conditions & Litter Prevention	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

**1.0 Scope**

Ensures that dust does not cause a nuisance at the facilities and that site roads are kept free of debris.

**2.0 Responsibility**

The Landfill Manager responsible for implementing this procedure. Site staff are responsible for implementing dust abatement/prevention measures.

**3.0 References**

EMS-EF-30 Daily Site Condition Report

IED Licence 146-02

**4.0 Procedure**

- 4.1. Adhering to site conditions, speed restrictions, and using only the designated access roads, will assist in limiting dust problems.
- 4.2. In dry weather, it may be necessary to damp down areas using water from bowsers, sprays or similar - this action is decided locally by the Site Supervisor or Facility Manager.
- 4.3. A wheelwash has been installed on site to prevent tracking of material onto the public road. All vehicles leaving the tip face must use this wheelwash.
- 4.4. Occasionally, due both to heavy traffic and works elsewhere on site, material may start to track past the wheelwash and along the site road. To remediate this, the site roads and hard standing surfaces are swept using a road sweeper as conditions dictate. The road should be swept until the Facility Manager or his representative is satisfied that the required standard has been reached and maintained.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-04 Suppression of Dust	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

## 1.0 Scope

Ensures that fuel is stored and distributed on site in a manner that does not lead to environmental pollution.

## 2.0 Responsibility

The Landfill Manager is responsible for implementing this procedure. Site staff are responsible for correctly storing and distributing fuel.

## 3.0 References

EMS-EF-30 Daily Site Condition Report

IED Licence 146-02

Explosive protection document (EPD 2016)

## 4.0 Procedure

### 4.1. Storage of Fuel/Liquids

4.1.1. In accordance with the waste licence all fuels must be stored within a designated, impervious, bunded storage area.

4.1.2. The bunded area must be capable of holding 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area.

4.1.3. Drainage from the bunded area must be diverted for collection and safe disposal.

4.1.4. Fuel/hazardous liquid storage areas at Knockharley Landfill include:

- 6000L locked & bunded diesel tank located opposite site offices
- Bunded drip trays within the lean-two work shed for storage of petrol, waste oils, paints, oil filters, etc.

4.1.5. Safety Data Sheets (SDS) are retained for all fuels and waste oils, paints etc. and held on site.

### 4.2. Delivery of Fuel

4.2.1. The main fuel storage onsite is the 6000 Litre diesel tank. This is used to fuel all site plant, e.g. compactors, excavators. On refilling the diesel tank, the quantity filled is entered into the electronic fuel recording system & fuel diary by the Site Supervisor or nominated staff member.

### 4.3. Refuelling of Plant

4.3.1. The Site Supervisor holds the keys that unlocks the diesel tank. The staff member must ask for the keys and fill up the diesel bowser, which is double skinned. The bowser is then driven by tractor to the landfill area where fuelling of plant takes place.



The tractor and dumper can be filled at source on the hardstanding bunded plinth beside the diesel tank. The continuous supervision of refuelling must be conducted at all times during the refuelling of plant. The quantity of fuel removed from the tank for fuelling vehicles must be recorded manually.

A spillage of any quantity shall be reported immediately to the Site Manager/Site Supervisor.

If a spillage of any nature occurs, deploy relevant spill kit materials immediately as per chemical handling and spill kit training.

#### 4.4. Daily Checks

- 4.4.1. Daily checks are to be carried out on the condition of all fuel storage areas/ hazardous liquid storage areas, and any problems will be brought to the attention of the Site Supervisor/Landfill Manager immediately. These checks are recorded in the site daily condition report EMS-EF-30.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/2016	EMS-OP-05 FUEL STORAGE & DISTRIBUTION	All	GH	TF
002	07/03/2016	Update of Section 4.3 Refuelling of Plant	4.3	GH	TF
003	19/09/16	Updated with reference to EPD/Atex zones	3.0	MW	TF
004	21/06/19	Name Change	Header	POR	SS

## 1.0 Scope

Details the method of vermin control at the landfill facilities.

## 2.0 Responsibility

The Landfill Manager will implement this procedure. Vermin contractors will implement vermin control measures on site.

## 3.0 References

EMS-EF-30 Daily Site Condition Report  
Pest Control Customer Service Report

## 4.0 Procedure

### 4.1. Rats, Mice & Flies

4.1.1. Knockharley Landfill has retained the services of a specialist pest control contractor to provide a pest prevention service for the landfill, which includes rats, mice & seasonal treatment for flies, where necessary.

4.1.2. The specialist contractor visits the site approximately 8 times per year, to carry out inspections and service poison bait boxes which are installed strategically around the site.

4.1.3. Details of inspections are recorded in the contractors manual, which is retained on site.

4.1.4. SDS of all poisons and insecticides used are retained on site.

### 4.2. Birds

4.2.1. Birds are also classed as vermin and are controlled using distress calls, balloons, decoys, and shotguns.

4.2.2. Bird control measures are implemented on site as necessary and are assessed on a daily basis.

4.3. In addition to the above measures, a visual check is made on a daily basis for evidence of vermin infestation within the boundaries of the site. Details of these checks are recorded in the Daily Site Condition Report form EMS-EF-30.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-06 Vermin Control	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

Ensures that batteries & gas cylinders are quarantined from the waste-stream and stored in a safe manner in accordance with licence requirements.

## 2.0 Responsibility

The Landfill Manager is responsible for implementing this procedure. Site staff are responsible for correctly segregating and quarantining gas cylinders & batteries.

## 3.0 References

IED Licence 146-02

## 4.0 Procedure

4.1. Batteries are classified as hazardous waste and are not acceptable under the site licence conditions. However, it is possible that occasionally batteries or gas cylinders may be found within deposited waste.

4.2. If batteries or gas cylinders are discovered in waste, staff must inform the Supervisor or Landfill Manager. Identify where possible the load within which the batteries arrived. Where possible, the Supervisor or LM will notify the carrier of the load and the EPA of the problem.

### 4.3. Batteries

4.3.1. Examine the condition of the batteries. If they appear to be leaking additional care should be taken when handling due to the risk of severe burns from the acid contained within the batteries.

4.3.2. Always use protective clothing when handling batteries, i.e. gloves and aprons. This protective clothing is stored within the site office. Take care not to splash liquid on clothing or skin. If battery acid comes into contact with skin/eyes, wash off with clean running water and SEEK MEDICAL ATTENTION AS SOON AS POSSIBLE.

4.3.3. All batteries must be stored in the quarantine area in the battery boxes provided by Returnbatt. Lids to the battery boxes must be secured at all times to prevent liquid entering the box.

4.3.4. When battery boxes are full, inform the Supervisor/LM to arrange collection. A Waste Transfer Form must be completed for batteries leaving the site.

### 4.4. Gas Cylinders

4.4.1. Gas cylinders must be stored outside in cages in the quarantine area.

4.4.2. Gas cylinders are collected by FloGas as required.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-07 Handling of Storage of Batteries & Gas Cylinders	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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**1. Scope**

Details the method of daily inspections of the landfill.

**2. Responsibility**

The Landfill Manager will implement this procedure.

**3. References**

EMS-EF-30 Daily Site Condition Report  
EMS-EF-26 Assessment of Odour Impact  
EMS-SP-09 Non-conformity, Corrective Action, and Continual Improvement  
EMS-EF-16 Non-compliance & Corrective Action  
EMS-OP-01 Complaints Procedure  
Licence 146-02  
AG5 EPA odour assessment procedure

**4. Procedure**

- 4.1. The waste licence for Knockharley Landfill contains a number of conditions, which require checking and inspection on a daily or weekly basis. In order to comply with the licence conditions, ensure environmental protection and provide for a high standard of health and safety, it is essential that these conditions are fully met.
- 4.2. The daily site condition inspection report has been developed to ensure that the above conditions are checked on a regular basis and to provide an initial recording method for any incidents or non-compliances, which occur in relation to the sites. Additional, detailed odour inspections are also completed. The procedure for these is detailed in 4.9 below.
- 4.3. The Site Supervisor will complete the forms daily. In the absence of the Site Supervisor, the Chargehand will complete the forms.
- 4.4. Each of the main licence conditions which must be maintained on the site are summarised on the forms along with a space to record the condition of the site in reference to each condition. A simple five level approach is used to determine the above conditions. Satisfactory, Unsatisfactory, Poor, Not Checked or Inapplicable is ticked as appropriate dependent upon the findings.
- 4.5. If any of the conditions are rated as poor, form EMS-EF-16 Non-Compliance & Corrective action must be completed.
- 4.6. Spaces are allowed on the forms for the entry of information relating to the weather conditions on the day of the inspection. This information should be taken from the site weather station and recorded along with the time the readings were taken.
- 4.7. It is essential that the form be completed as fully as possible and complete information is recorded regarding any incidents or non-compliances.

- 4.8. Spaces are allowed on the form to enter any non-conformances or accidents which occurred on site during that day.
- 4.9. Odour inspections are carried out on a regular basis, and also in response to odour complaints and kept on file for reference. A more detailed approach is used to determine the results of odour inspections, including location, weather conditions, odour extent and intensity. In the case of an odour complaint, the complaint is logged as normal and a subsequent odour inspection carried out which is cross referenced with the complaint number and any relevant action(s) taken.
- 4.10. The staff member who completes the Odour Inspection Form EMS-EF-26 shall sign it, and all forms will be filed by month in date order and retained on site for the duration of the landfill operation.
- 4.11 All relevant landfill staff who carry out regular odour patrols are trained up on the EPAs AG5 odour assessment procedure.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-08	All	GH	TF
002	13/06/17	EMS-OP-08	Section 3 & 4.11	MW	TF
003	05/12/18	Updated Procedure	Sections 4.9 & 4.11	MW	MW
004	21/06/19	Name Change	Header	POR	SS

## 1.0 Scope

This procedure describes the method of accepting waste at the landfill. This document has been prepared in compliance with Condition 5.3 of the IED Licence Reg. No. W0146-02 and in accordance with Council Decision 2003/33/EC on establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Council Directive 1999/31/EC on the landfill of waste.

## 2.0 Responsibility

The Landfill Manager (LM) will implement this procedure. The Weighbridge Operator and Site Supervisor will ensure procedure is correctly followed.

## 3.0 References

- EMS-EF-30 Daily Site Condition Report
- EMS-OP-02 Operation, Start-up, Shut-down and Compaction of Waste
- EMS-OP-19 Odour Management Plan
- EMS-EF-22 Waste Acceptance control form
- EMS-EF-23 Certificate of Consignment
- EMS-EF-23b Certificate of Consignment (soils/stones)
- Planning Decision (Planning Register Reference Number NA/60336)
- IED Licence W0146-02
- Council Decision 2003/33/EC on establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Council Directive 1999/31/EC on the landfill of waste
- EPA Landfill Operational Practices Manual (4/500/97)
- EPA Municipal Solid Waste Pre-Treatment and Residuals Management (2009)

## 4.0 Procedure

- 4.1. The types and annual quantities of waste for disposal, as specified in Schedule A of the IED Licence W0146-02 are shown in Table 1 below. However, in accordance with Condition 3 of the Planning Decision (Planning Register Reference Number NA/60336), waste to be accepted at the facility shall be restricted to 132,000 tonnes per annum until December 2010 and 88,000 tonnes thereafter.

Waste Type	Maximum Quantities (in tonnes per annum)
Household	100,000



Commercial	45,000
Industrial	30,000
<b>Sub Total</b> (Waste for Disposal)	<b>175,000</b>
Construction & Demolition for recovery at the facility	25,000
<b>Total</b>	<b>200,000</b>

4.2. Limits on the acceptance of biodegradable municipal waste, as stipulated in Condition 1.13 of IED Licence W0146-02, state:

4.2.1. From 1 July 2010 to 30 June 2013 inclusive, a maximum of 47% by weight of municipal solid waste (MSW) accepted for disposal to the body of the landfill shall comprise biodegradable municipal waste (BMW), measured on a calendar year basis or, in 2010 and 2013, part thereof

4.2.2. From 1 July 2013 to 30 June 2016 inclusive, a maximum of 30% by weight of MSW accepted for disposal into the body of the landfill shall comprise BMW, measured on a calendar year basis or, in 2013 and 2016, part thereof, and

4.2.3. From 1 July 2016, a maximum of 15% by weight of MSW accepted for disposal to the body of the landfill shall comprise BMW, measured on a calendar year basis or, in 2016, part thereof.

4.3. Non-Acceptable Waste Types

In accordance with the licence the following waste types will not be accepted:

- No hazardous wastes or liquid wastes shall be disposed of at the facility  
Whole used tyres (other than bicycle tyres and tyres with an outside diameter greater than 1400 mm) shall not be disposed of at the facility.  
Shredded tyres shall not be disposed of at the facility.
- No waste which in the conditions of the landfill, is explosive, corrosive, oxidising. Highly flammable or flammable as defined in EU Council Directive 91/689/EEC shall be accepted at the landfill.
- Gypsum wastes shall not be placed in any landfill cell accepting biodegradable waste.
- The dilution or mixture of waste solely in order to fill relevant waste acceptance criteria established under Condition 5.3 is prohibited.

#### 4.4. Acceptance of Odorous Wastes

Please refer to Section 2.2 of EMS-OP-19 Odour Management Plan regarding the acceptance and management of odorous wastes.

#### 4.5. Waste Collection Permits

4.5.1. SEHL will only accept waste from holders of waste collection permits under the Waste Management (Collection Permit) Regulations 2007 as stipulated in Condition 5.2 of IED Licence W0146-02. All Waste Collectors must provide SEHL with copies of up to date collection permits which will be maintained on-site.

#### 4.6. Waste Treatment

4.6.1. As specified in Condition 1.6 of the IED Licence W0146-02, SEHL will ensure that all waste accepted at the facility has been subject to treatment prior to arrival at the facility. As specified in Condition 5.5 of the IED Licence W0146-02, SEHL will ensure that inert waste accepted at the facility is subject to pre-treatment where technically feasible and appropriate.

4.6.2. The facility is only licensed for the deposit and not the treatment of wastes, therefore SEHL will require all holders of waste to carry out the appropriate treatment at the point of origin or at accordingly licensed/permitted facilities. Details of treatment will be supplied to SEHL and verified as required.

#### 4.7. Waste Characterisation, Testing and Verification

Waste Acceptance at Knockharley Landfill will be carried out in compliance with the requirements of Council Decision 2003/33/EC, and will comprise the three following levels of waste characterisation and testing prior to acceptance.

##### 4.7.1. Basic Characterisation

4.7.1.1. Basic Characterisation is required for each type of waste prior to approval for disposal at Knockharley landfill, i.e. to decide whether or not the waste fulfils the criteria for acceptance.

4.7.1.2. The producer of the waste, or in default the person responsible for its management, is responsible for ensuring that the characterisation information is correct. Independent laboratory testing may be required to determine the leaching behaviour of the waste.

4.7.1.3. In addition to supplying the basic information on the waste, the basic characterisation shall also detect key variables (critical parameters) and specify the scope and frequency for compliance testing. SEHL will require the submission of the following information for all waste types prior to approval for disposal:

- Details of the source and origin of the waste.
- Information on the process producing the waste (description and characteristics of raw materials and products).
- Description of the waste treatment applied in compliance with Article 6(a) of Council Directive 99/31/EC, or a statement of reasons why such treatment is not considered necessary.
- Code according to the European Waste Catalogue
- Data on the composition of the waste (and the leaching test results, where the waste is not classified in Chapter 20 of the European Waste Catalogue and/or where there has been no pre-treatment carried out on the waste).
- Appearance of the waste (smell, colour and physical form).
- Information to prove that the waste does not fall under the exclusions of Article 5(3) of the Council Directive 1999/31/EC.

4.7.1.4. The procedure for the basic characterisation of waste is shown as a flow diagram in Appendix I.

4.7.1.5. In compliance with Section 2.2.1 of Council Decision 2003/33/EC, municipal waste (as defined in Article 2(b) of Council Directive 99/31/EC that is classified as non-hazardous in Chapter 20 of the European Waste Catalogue), separately collected non-hazardous fractions of household wastes and the same non hazardous materials from other origins can be admitted for disposal without testing.

4.7.1.6. Any other wastes will be subject to testing in accordance with Section 1.1.3 of Council Decision 2003/33/EC, which includes testing of the leaching behaviour and the assessment of the waste against the limit values for non-hazardous waste. Analysis Methods and Limit Values are shown in Appendix II.

4.7.1.7. During basic characterisation, it is established whether wastes are regularly generated in the same process or whether wastes are not regularly generated. This differentiation has an impact on both

the frequency and extent of tests for basic characterisation and compliance:

- If wastes are regularly generated from the same process in a single installation, or from the same process in different installations but the measurements sufficiently show the range and variability of the characteristic properties, then those wastes can be considered characterised and shall subsequently be subject to compliance testing only, unless significant changes in the generation process occur.
- If wastes are not regularly generated in the same process and are not part of a well characterised waste stream, then each batch of such waste will need to be subject to basic characterisation, which also means that no compliance testing is needed.

4.7.1.8. Basic Characterisation will be performed and/or paid for by the waste producer or by the person responsible for its management.

#### 4.7.2. Determination of Biodegradable Content of MSW

4.7.2.1. In accordance with Conditions 1.13 and 1.14 of IED Licence W0146-02, the biodegradable content of MSW accepted for disposal to the body of the landfill must be determined.

4.7.2.2. The producer of the waste, or in default the person responsible for its management, is responsible for submitting information on the treatment processes and BMW content of all municipal waste streams disposed of at Knockharley Landfill.

#### 4.7.3. Compliance Testing

4.7.3.1. In order to check regularly arising waste streams, any waste that has been deemed acceptable for disposal at Knockharley Landfill on the basis of basic characterisation shall be subject to compliance testing, to determine if it complies with the results of basic characterisation and the relevant acceptance criteria. The testing parameters and frequency will be determined following basic characterisation.

4.7.3.2. The compliance test shall, as a minimum, consist of a batch leaching test, and shall be carried out in the scope and frequency and for the key variables as determined during basic characterisation. Analysis Methods and Limit Values are shown in Appendix II. In accordance with Condition 8.14 of the licence, SEHL shall ensure that any waste acceptance testing and analysis required by this licence shall be carried out by competent

laboratories in accordance with CEN-standards. If CEN standards are not available, ISO, national or international standards or alternative methods shall apply with the agreement of the Agency.

#### 4.7.4. On-Site Verification

4.7.4.1. Each load of waste delivered to the landfill site will be subject to on-site verification to check that the waste presented for disposal is the same as that which has been subjected to basic characterisation and compliance testing and which is described in the accompanying documents. The first step of the on-site verification shall occur at the weighbridge office, where the weighbridge operator will check the documentation accompanying the load, and a first visual check of the waste will be carried out, while the waste is still contained. Should the waste delivered to the facility differ from that described in the accompanying documents, the procedures for rejection apply.

4.7.4.2. If the waste load has passed both initial checks it can be conveyed to the disposal area. After unloading the waste is subject to further visual inspection by site staff at the disposal area. If the load also passes this check it can be spread on the working face for compaction. Should any unacceptable wastes be discovered, the load or any relevant part thereof will be removed to the Waste Inspection Area for further investigation in accordance with Condition 5.4 of TED Licence W0146-02.

#### 4.8. *Waste Acceptance and Handling*

All holders of waste collection permits under the Waste Management (Collection Permit) Regulations 2007, who wish to deliver waste to the facility for disposal are informed of the relevant sections of the Waste Acceptance Procedures prior to the first delivery to the facility and must fill out EMS-EF-22 "Waste acceptance control" form beforehand. Waste Acceptance consists of five steps described below and also detailed in Appendix III.

##### 4.8.1. Arrival of Waste on Site

When a waste load arrives at the facility the weighbridge operator and any other site staff present check whether all site rules for hauliers are being and have been adhered to. Once a vehicle is approved for access to the site it will enter the entry weighbridge, where the weighbridge operator will perform the documentation check and the first visual inspection.

##### 4.8.2. Documentation Check

The documentation accompanying the waste load is checked by the weighbridge operator (either form EMS-EF-23 for waste or EMS-EF-23b for soil/stones will be filled out). All relevant details relating to the producer and

the current and previous carriers must be completed as well as all relevant sections relating to the description and treatment of the waste. The weighbridge operator will establish whether the waste has been subject to basic characterisation and has been deemed acceptable. The waste load shall only be accepted if the weighbridge operator is satisfied that all necessary information has been supplied and that the waste has been characterised and deemed acceptable. Should any of the above not be the case, the waste load has to be rejected and the facility manager or nominated deputy informed immediately.

#### 4.8.3. On-Site Verification

The weighbridge operator performs the initial visual inspection of the waste load to verify that the waste delivered is the same as that described in the documentation and has been subject to basic characterisation. The weighbridge operator is aided by the CCTV equipment installed at the weighbridge office if free vision is not possible. If the initial on-site verification at the weighbridge fails, the weighbridge operator will reject the load and immediately inform the facility manager or nominated deputy.

#### 4.8.4. Compliance Testing

If the waste delivered to the site is due for compliance testing, as specified in the basic characterisation for the waste, the weighbridge operator will, prior to accepting the waste, inform the facility manager and divert the waste load to the waste inspection area. All key parameters that can be verified on site will be checked for, while all other information like laboratory analysis will have to be supplied separately, based on samples taken from the waste load prior to delivery.

#### 4.8.5. Unloading of Waste

Any waste loads that have passed previous checks, are directed to the tipping area, where waste is unloaded under supervision of site staff. Should any non-conformity be identified during unloading, the site supervisor will immediately stop the unloading and notify the facility manager or nominated deputy. If the waste load is fully compliant, the driver will be directed through the wheelwash back to the weighbridge, on completion of unloading.

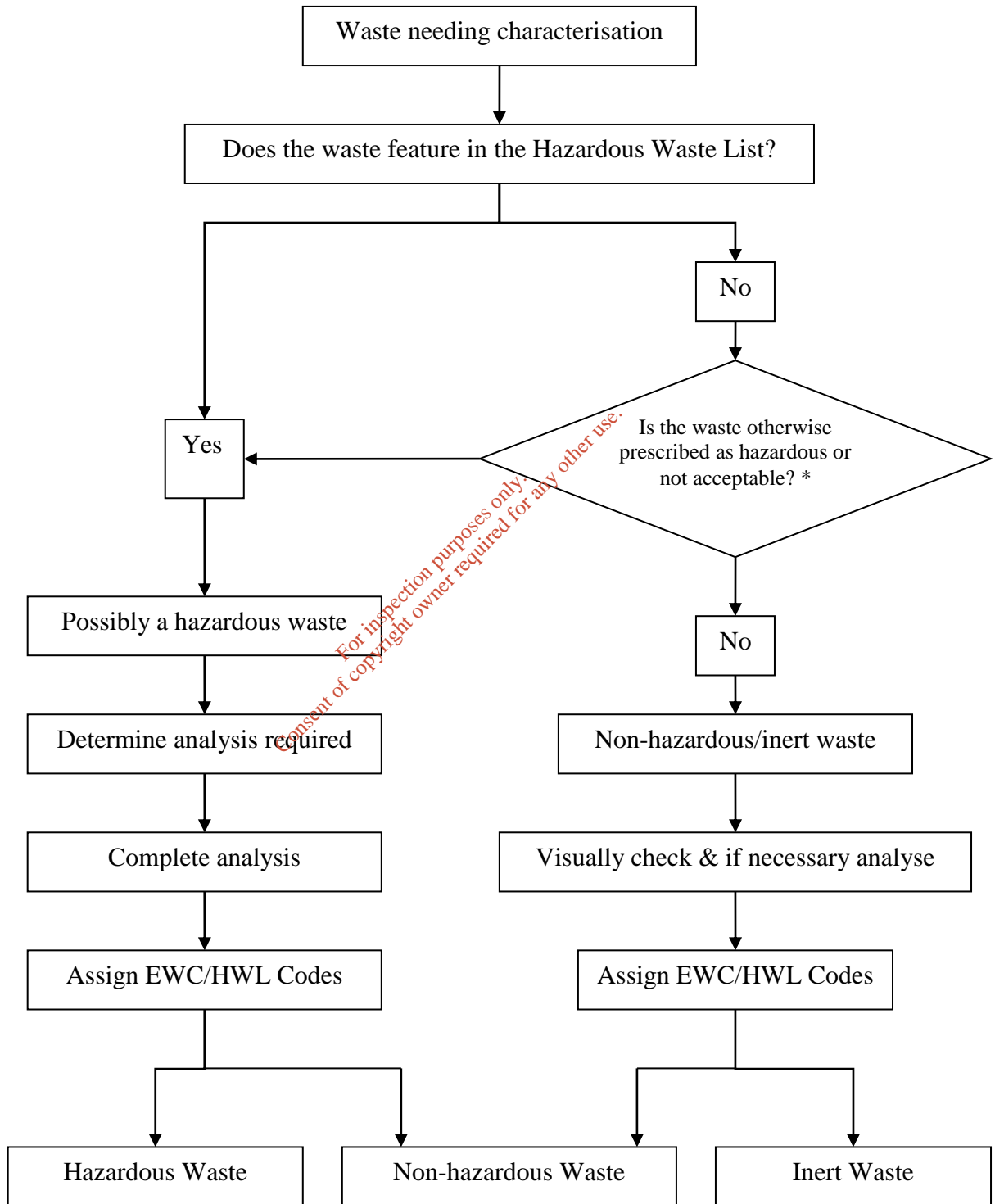
#### 4.8.6. Procedure for Rejected Waste Loads

During any of the above described steps, a waste load may be rejected, which constitutes an incident in accordance with Licence Condition 1.12 e). Whenever a waste load is rejected, it will be held until a decision has been made on how to proceed. Refer to EMS-OP-23 Reporting of Environmental Incidents.

- If the non-conformity has been identified after unloading the waste, the waste will be loaded back on a site truck and tipped into the Waste Inspection Area.
- If a load has been rejected while still contained, the truck or trailer will be moved into the Waste Inspection Area in agreement with the carrier. In the case that the non-conformity is only related to wrong or incomplete documentation, the necessary amendments will be made in cooperation with the carrier. Should the waste itself be non-conforming, it will be decided whether an alternative outlet for recovery or disposal has to be found or whether further inspection and/or testing is required to establish the exact characteristics of the waste. The carrier will be required to notify SEHL of the final destination of the waste load.

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Appendix I: Figure 1: Procedure for the Basic Characterisation of Waste





\* Refer to Section 4(2)(a)(ii), Waste Management Act, 1996, and Article 5, Council Directive 1999/31/EC on the Landfill of Waste

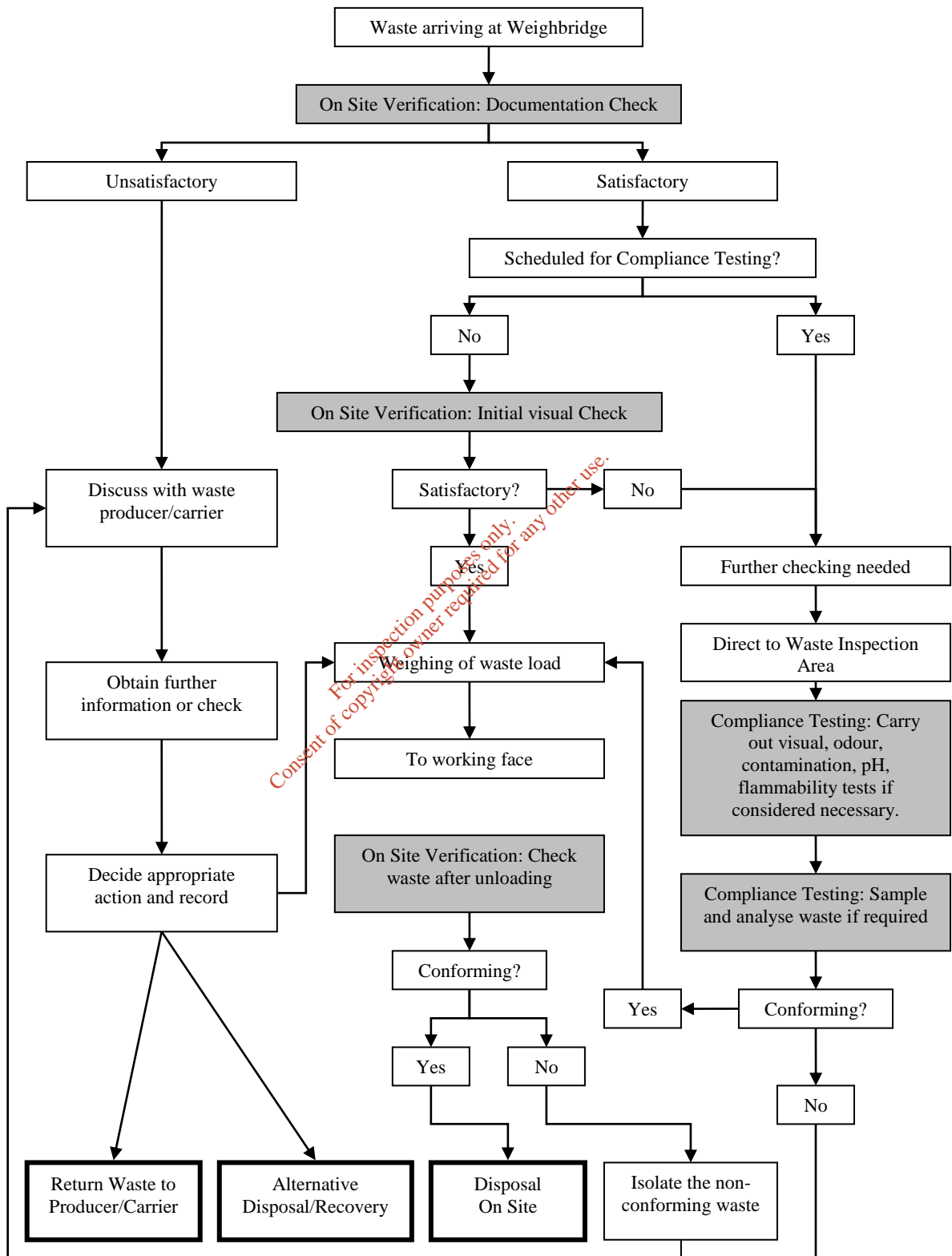
**Appendix II**

Independent laboratory testing required for basic characterisation and compliance testing will be carried out by an independent and accredited laboratory in accordance with the requirements of section 3 of Council Decision 2003/33/EC, in particular leaching test method EN 12457/1-4 with an L/S ratio of 10. The parameters and limit values for leachability testing as required in section 2.2.2 of Council Decision 2003/33/EC are shown in Table 2 below.

*Table 2: Limit values for acceptable waste at non-hazardous landfills as prescribed by the EU Commission Decision of "establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Council Directive 1999/31/EC on the landfill of waste"*

Component	(mg/kg dry substance)
	L/S = 10 l/kg
Arsenic As	2.0
Barium Ba	100
Cadmium Cd	1
Chromium Cr (total)	10
Copper Cu	50
Mercury Hg	0.2
Molybdenum Mo	10
Nickel Ni	10
Lead Pb	10
Antimony Sb	0.7
Selenium Se	0.5
Zinc Zn	50
Chloride	15,000
Fluoride	150
Sulphate	20,000
Dissolved Organic Carbon	800
Total Dissolved Solids	60,000

**Appendix III – Waste Acceptance Flow Chart**



Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	21/01/16	EMS-OP-09	All	GH	TF
002	15/03/16	EMS-OP-09	Section 4.3 added the list of Non-Acceptable waste types as conditioned by the licence	FTCO	GH
003	23/07/18	Update sections with reference to waste forms	Sections 30., 4.8 & 4.8.2	MW	TF
004	21/06/19	Name Change	Header & throughout	POR	SS

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## 1.0 Scope

This procedure describes the method of accepting waste at the landfill with an intended use for engineering, restoration or remediation purposes. This document has been prepared in compliance with Condition 5.3 of the IED Licence (W0146-02).

## 2.0 Responsibility

The Facility Manager shall implement this procedure.

The Site Supervisor shall ensure that wastes for recovery, in particular those of varying composition, are assigned the appropriate engineering, restoration or remediation purpose as detailed in Section 4.2.2 below.

## 3.0 References

European Waste Catalogue and Hazardous Waste List

IED Licence W0146-02

EMS-OP-04      Suppression of Dust

EMS-OP-09      Waste Acceptance and Handling Procedures

## 4.0 Procedure

### 4.1. Waste Acceptance

- 4.1.1. The acceptance of waste for disposal or recovery shall be decided upon in accordance with the Waste Acceptance and Handling Procedures EMS-OP-09.
- 4.1.2. The classification of waste shall be carried out in accordance with the European Waste Catalogue and Hazardous Waste List
- 4.1.3. All relevant conditions of the Licence W0146-02 relating to waste acceptance shall be considered when deciding whether a waste is suitable for acceptance.

### 4.2. Determination of engineering, restoration or remediation purposes

- 4.2.1. After completion of all required pre-acceptance procedures and documentation, all wastes for recovery shall be assigned an appropriate engineering, restoration or remediation purpose, utilising the list in Section 4.2.2 below.
- 4.2.2. The following list shall be utilised as a guidance in determining engineering, restoration or remediation purposes for wastes for recovery:
  - Final capping
  - Intermediate capping
  - Daily cover
  - Odour abatement
  - Construction of haul roads
  - Protection of landfill liner

- Acoustic screening bunds
- Visual screening bunds
- Construction of external bunds
- Construction of internal bunds

4.2.3. Materials used for engineering, restoration or remediation purposes should not:

- Give rise to odour
- Encourage or give rise to nuisances such as flies, dust, scavenging birds or litter
- Cause pollution
- Breach licence requirements in terms of what waste types are acceptable at the landfill
- Degrade over time causing secondary problems
- Impede proper functioning of site infrastructure
- Be a feedstock for future landfill gas production or conflict with biodegradable municipal waste diversion targets
- Cause ponding or perched leachate build-up within the landfill
- Interfere with the functioning of the landfill gas collection and extraction system

1.1. *Assessment of wastes for engineering, restoration or remediation purposes*

- All wastes intended for engineering, restoration or remediation purposes shall be assessed regularly regarding their suitability for these purposes. In particular the composition and any beneficial properties, such as odour abatement properties, shall be evaluated.
- The frequency of the assessment shall depend on the process from which the material arises, i.e. any material which is of inconsistent quality shall be inspected and assessed more frequently.
- The assessment shall focus on the suitability of the individual materials for the purposes listed in Section 4.2.2 above, with particular attention to be paid to the level of contamination, the mechanical stability and the permeability.
- In accordance with Condition 1.16 of IED Licence W0146-02 bio-stabilised waste shall only be used as landfill cover where it has been stabilised in accordance with Licence Condition 1.14.4 (or meets the requirements of an alternative protocol as may be agreed under Licence Condition 1.14.2), complies with any requirements of the Department of Agriculture, Fisheries and Food relating to the management of animal by-products and has been agreed in advance with the Agency.
- In accordance with the Agency Guidance Note on MSW Landfill Daily and Intermediate Cover (Draft), construction and demolition fines shall

only be used as landfill cover where it meets the respiration activity (AT<sub>4</sub>) limit <10mg O<sub>2</sub>/g DM and is of predominantly C&D origin.

- In accordance with the Agency Guidance Note on MSW Landfill Daily and Intermediate Cover (Draft), incinerator bottom ash (IBA) shall be accepted for intermediate cover and engineering use. Full characterisation of chemical composition has been undertaken and approved by the Agency.
- Non-hazardous IBA shall be accepted where evidence is supplied of continued classification of the ash as non-hazardous. This information will be submitted to Knockharley on a monthly basis, as agreed with the Agency. IBA consists mainly of aggregates such as sand, stone, glass, porcelain and ceramics, in addition to small quantities of ferrous and non-ferrous metals. This composition makes it a useful recovery engineering material.

**1.2. Waste Handling - Incinerator Bottom Ash (IBA)**

- IBA will not be accepted unless its temperature is less than 35 degrees centigrade. The temperature will be measured before the ash is tipped using a hand held thermometer. Records of the temperature of each load will be recorded on the weighbridge docket. These records will be retained on site.
- IBA will not be accepted unless it is damp (i.e. moisture content of approx. 20%). In the event of dust from the IBA being an issue, dampening down will be undertaken, in accordance with operating procedure EMS-OP-04 Suppression of Dust, using clean water from the storage lagoon. If necessary, the IBA producer will be requested to increase the moisture content of the IBA prior to delivery to the facility.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-10	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

## 1.0 Scope

This procedure applies to record-keeping in relation to the acceptance of waste, into Knockharley Landfill, at the weighbridge.

## 2.0 Responsibility

The Facility Manager will implement this procedure. The Weighbridge Operator and Site Supervisor will ensure procedure is correctly followed.

## 3.0 References

EMS-EF-23 Certificate of Waste Consignment

EMS-EF-23b Certificate for Waste Consignment

EMS-EF-22 Waste Acceptance Control Form

IED Licence W0146-02

## 4.0 Procedure

- 4.1. Before a waste stream can be accepted on Knockharley Landfill its suitability for acceptance under the site licence must be verified. All wastes accepted on site must comply with the following licence conditions:

*“1.4 Municipal Waste, Commercial Waste and Industrial Waste may be disposed of at the facility subject to the maximum quantities and other constraints listed in Schedule A: Waste Acceptance, of this licence.*

*1.5 No hazardous wastes or liquid wastes shall be disposed of at the facility.*

*1.6 Only waste that has been subject to treatment shall be accepted for disposal at the landfill facility.*

*(i) Treatment shall reflect published EPA technical guidance as set out in Municipal Solid Waste – Pre-treatment and Residuals Management, EPA, 2009.*

*(ii) With the agreement of the Agency, this condition shall not apply to:*

- inert wastes for which treatment is not technically feasible;*
- other waste for which such treatment does not contribute to the objectives of the Landfill Directive as set out in Article 1 of the Directive by reducing the quantity of the waste or the hazards to human health or the environment.*

*1.7 Whole use tyres (other than bicycle tyres and tyres with an outside diameter greater than 1400mm) shall not be disposed of at the facility. Shredded tyres shall not be disposed of at the facility.*

*1.8 No waste which in the conditions of the landfill, is explosive, corrosive, oxidising, highly flammable or flammable as defined in EU Council Directive 91/689/EEC shall be accepted at the landfill*

*1.9 Gypsum wastes shall not be placed in any landfill cell accepting biodegradable waste.”*

*1.13.1 Unless otherwise specified by the Agency, the following limits shall apply:*

(i) From 1 July 2010 to 30 June 2013 inclusive, a maximum of 47% by weight of municipal solid waste (MSW) accepted for disposal to the body of the landfill shall comprise biodegradable municipal waste (BMW), measured on a calendar year basis or, in 2010 and 2013, part thereof

(ii) From 1 July 2013 to 30 June 2016 inclusive, a maximum of 30% by weight of MSW accepted for disposal into the body of the landfill shall comprise BMW, measured on a calendar year basis or, in 2013 and 2016, part thereof, and

(iii) From 1 July 2016, a maximum of 15% by weight of MSW accepted for disposal to the body of the landfill shall comprise BMW, measured on a calendar year basis or, in 2016, part thereof.”

- 4.2. Schedule A of IED Licence W0146-02 allows for the acceptance and recovery of the following wastes:

<b>Disposal</b>	<b>Recovery</b>
Household	Construction and Demolition
Commercial	
Industrial	

- 4.3. If a waste enquiry contains information on a waste which may be suitable for disposal on Knockharley Landfill, but the waste type is not detailed in the tables, then SEHL may have to approach the EPA to obtain permission for the waste to be accepted on site.

4.4. *Completion of EMS-EF-22 Waste Acceptance Control Form*

- 4.4.1. The Waste Acceptance Control Form must be completed for each type of waste for which disposal is sought. Waste will not be accepted onto site until this completed form has been received. EMS-EF-22 only needs to be completed once for each separate waste stream.
- 4.4.2. EMS-EF-22 must be completed by the waste producer or broker and signed by a responsible person to declare that the information contained is correct. The form should be completed as fully as possible in order to allow a true picture of the waste type to be ascertained. Any relevant waste analysis information or leachability test information should be attached to the form.
- 4.4.3. The EWC number for the waste must be included on the form. It may be possible that the waste stream contains more than one waste type in which case additional waste catalogue numbers can be included at the bottom of the sheet.
- 4.4.4. Details of the treatment the waste has been subject to, and if no treatment has taken place, details of why the waste is exempt from treatment, must be included on the form.
- 4.4.5. Completed Waste Acceptance Control Forms must be returned directly to Knockharley Landfill Site at the address included on the form or faxed on (041) 9821750. If any assistance is required in their completion, please call the Site Manager on (041) 9821650. Once the completed form has been received and



assessed, Knockharley Landfill will contact the customer to confirm whether the waste is acceptable on site.

4.4.6. **Important Note:** Completion of the Waste Acceptance Control Form does not necessarily guarantee acceptance of the waste stream at Knockharley Landfill.

4.4.7. Further details for the completion of the form are as follows:

- **Customer:** this is defined as the client approaching SEHL seeking disposal of waste, e.g. waste company. Full contact details of this customer must be recorded
- **Waste producer:** this is defined as the actually producer of the waste, e.g. the industry from which the waste is collected. Full contact details of waste producer must be provided.
- **Waste Collectors:** All Waste collectors must provide SEHL with copies of up to date collection permits which are maintained on-site.
- The **process** producing the waste must be accurately defined e.g. a chemical, manufacturing, food preparation, packaging process.
- **What does the waste look like:** A full description of the waste should reference whether it is a solid, or powder, its colour, mixed appearance, and if there is an odour.
- **Chemical composition** - this data comes from analysis completed on the waste at a certified laboratory. In house results can only be used for reference purposes. All wastes must be tested for their leaching characteristics as detailed in the Landfill Directive. This provision may not apply to inert wastes for which treatment is not technically feasible.
- **Treatment** means the physical, thermal chemical or biological processes, including sorting that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.
- **Delivery Method** - type of truck used to transport waste. All truck must have automatic netting.
- **Signing:** In signing this form you confirm that you have completed this form as accurately as possible.

4.5. All waste carriers must hold a waste collection permit in accordance with the Waste Management (Collection Permit) Regulations 2007. Meath County Council is the nominated local authority for the North Eastern Region. A copy of the waste collection permit detailing types of waste specified on the permit must be submitted with the waste acceptance control form.

*4.6. Information on Biodegradable content of Municipal Waste*

- 4.6.1. The biodegradable content of each load of municipal waste accepted at the facility must be determined.
- 4.6.2. The producer of the waste, or in default the person responsible for its management, is responsible for submitting this information to the facility.
- 4.6.3. Each waste producer bringing waste to Knockharley Landfill will receive correspondence requesting this information and a table listing the specific waste types for which information is required (see Appendix 1).

*4.7. Completion of EMS-EF-23 & 23b Certificate of Waste Consignment*

- 4.7.1. All Waste Carriers must complete Certificate of Waste Consignment Form for each load of waste received on site.
- 4.7.2. This details the name and address of the waste carrier - including waste collection permit, & the composition and nature of the waste for disposal. Other information required includes the vehicle registration number and the European Waste Catalogue (EWC) code.
- 4.7.3. The net weight of the load is inserted on this form by the weighbridge operator.
- 4.7.4. Extra details on form 23b for soil are: excavation cell reference number, engineers name & company and composition/nature of waste.
- 4.7.5. This form is retained on site by the licensee to comply with the planning decision granted by An Bord Pleanála. There is no requirement for the waste carrier to retain a copy of the Certificate of Waste Consignment.

*4.8. Leachate Removal*

- 4.8.1. IED Licence Condition 3.11.7 states all tanks and containers, including tankers used to transport leachate from the facility, shall be labelled to clearly indicate their contents. The weighbridge operator shall check all tankers entering the site have the appropriate labelling.

## Appendix 1

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Dear Waste Producer,

Re: Waste Acceptance at Knockharley Residual Landfill

As you may be aware the EPA reviewed most of the licences of the active landfill facilities in the state last year including those of SEHL. Ostensibly the purpose of the review was to limit the amount of biodegradable waste disposed of at landfill in line with European and national policy and legislation. Further summary details of the relevant policy, legislative and licence requirements are attached to this letter.

In order for the landfill to comply with the requirements of the revised IED licence (W0146-02) each landfill customer will be required to quantify the biodegradable content of each municipal or similar waste stream delivered to the landfill.

Accordingly, I request that you supply waste treatment information relating to the waste streams which are accepted at this facility from your company. "Waste treatment" covers separately collected waste from 2-bin or 3-bin systems or residual waste from a processing facility. There are two options to calculate the biodegradable content depending on the complexity of the treatment system:

**1. Separately Collected**

Where it can be identified that the residual waste arise from a 2-bin or 3-bin collection or a combination it may be possible (and more straightforward) to apply the EPA's predetermined factors for biodegradable content. The resultant biodegradable content factor will be acceptable to SEHL provided that the methodology is clearly auditable. Reference: [EPA Approved Factors to Calculate the BMW Content of Municipal Waste Streams](#) available from EPA

**2. Processed Residual Waste**

In the case of more complex waste streams where there is a combination of residual waste from processing (and from separately collected systems) SEHL advises that the biodegradable content of the residual waste from the process be established through testing. The testing regime should follow the EPA's [Draft Protocol for the Evaluation of BMW sent to Landfill by Pre-treatment Facilities](#)

In order to progress this process, which will apply to all waste delivered from 1<sup>st</sup> July 2010, I enclose a table listing all relevant waste streams delivered by you to the landfill. I would be obliged if you could complete this table detailing the treatment to which **each waste stream** is subjected (See EPA guidance document) prior to disposal at this facility as well as the most appropriate EPA approved factors to calculate BMW content of **each Municipal Solid Waste (MSW) stream** (See EPA Approved BMW factors). Please note that the BMW factors only apply to Municipal Solid Waste.

The information which you provide will feed into a summary waste report on the quantity of MSW and BMW accepted at the landfill which will be submitted to the EPA on a quarterly basis as per licence condition 11.10. The information will also be held on file at this facility as the EPA have advised that they may audit these reports in order to verify data reported to them in quarterly summary reports.

Your cooperation with regard to the above will be greatly appreciated. SEHL staff are available to assist you and discuss the future management of your waste streams.

If you have any queries in relation to this correspondence, please contact Thomas Finnegan at 041-9821650.

Yours Sincerely

Landfill Manager  
Knockharley Landfill

### Biodegradable Municipal Waste

#### 1. Background Information

The EPA advised that the reasons for initiating the review were as follows:

- To give effect to articles 5 and 6 of Council Directive 1999/31/EC on the landfill of waste (the Landfill Directive) regarding the treatment of waste prior to landfill and diversion of biodegradable municipal waste from landfill.
- To incorporate limits on the acceptance of biodegradable municipal waste at landfill (expressed in the document *Municipal Solid Waste - Pre-treatment and Residuals Management: An EPA Technical Guidance Document* published 19 June 2009) that have regard to the need to implement and achieve landfill diversion targets set out in Landfill Directive. The diversion of biodegradable municipal waste will, *inter alia*, reduce landfill gas production and have consequent benefits regarding greenhouse gas emissions and the potential for odour nuisance.

The conditions limiting the acceptance of biodegradable municipal waste will contribute to implementation of the National Strategy on Biodegradable Waste (Department of the Environment, Heritage and Local Government, 2006). The principal new licence conditions were related to the following:

1. The requirement to treat all waste prior to acceptance for disposal (condition 1.6).
2. The imposition of new limits on the amount of biodegradable municipal waste that can be accepted at the facility (condition 1.13.1).
3. The need to measure waste intake and report compliance with the conditions described in items 1 and 2 above (condition 11.10).

#### 2. IED Licences

In considering all of the above the EPA issued new licenses to landfills in late March 2010.

The new licence contained several conditions relating to waste treatment and biodegradable municipal waste content, the most important of which are outlined below:

##### 1.6 Waste Treatment

Only waste that has been subject to treatment shall be accepted for disposal at the landfill facility.

(i) Treatment shall reflect published EPA technical guidance as set out in *Municipal Solid Waste – Pre-treatment and Residuals Management, EPA 2009*

(ii) With the agreement of the Agency, this condition shall not apply to:

- inert wastes for which treatment is not technically feasible:
- other waste for which such treatment does not contribute to the objectives of the Landfill Directive as set out in Article 1 of the Directive by reducing the quantity of the waste or the hazards to human health or the environment.

##### 1.13 Limit on acceptance of biodegradable Municipal waste

1.13.1 Unless otherwise as may be specified by the Agency, the following limits shall apply:

(i) From 1 July 2010 to 30 June 2013 inclusive, a maximum of 47% by weight of municipal solid waste (MSW) accepted for disposal to the body of the landfill shall comprise biodegradable municipal waste (BMW), measured on a calendar year basis or, in 2010 and 20 13, part thereof,

(ii) From 1 July 2013 to 30 June 2016 inclusive, a maximum of 30% by weight of MSW accepted for disposal to the body of the landfill shall comprise BMW, measured on a calendar year basis or, in 20 13 and 20 16, part thereof, and

(iii) From 1 July 2016. a maximum of 15% by weight of MSW accepted for disposal to the body of the landfill shall comprise BMW, measured on a calendar year basis or. in 2016, part thereof.

##### 5.3 Waste Acceptance and Characterisation Procedures

Within one month of the date of grant of this licence, the licensee shall submit to the Agency for its agreement updated written procedures for the acceptance and handling of all wastes. These procedures shall include details of the treatment of all waste to be carried out in advance of acceptance at the facility and shall also include methods for the characterisation, classification and coding of waste. The procedures shall have regard to the Council Decision (2003/33/EC) establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC on the landfill of waste.

##### 11.10 Reporting to Demonstrate Compliance with Diversion Targets

The Licensee shall report to the Agency such data and records, and at such frequency, as may be specified by the Agency in order to demonstrate compliance with the requirements of Condition 1.13.1. From 1 July 2010 and unless otherwise advised by the Agency, the licensee shall submit quarterly summary reports to the Agency within one week of the end of each quarter on the quantity of MSW and BMW accepted at the landfill during the preceding quarter and on a cumulative basis for the calendar year to date. The report shall detail the tonnage of MSW and BMW accepted and the basis (including all calculation factors) on which the figures have been calculated.

### **3. EPA Documentation**

Following on from the issuing of new waste licences the EPA held a Biodegradable Municipal Waste (BMW) workshop on the 24<sup>th</sup> June 2010. Over 185 delegates attended the event which was held as a follow-on to an October 2009 event in Athlone. The objective of the day was to present information to landfill operators (and other stakeholders in the waste sector) in relation to the calculation and reporting of BMW disposed of at landfills. All of the presentations are now on the EPA website and the following is the link: <http://www.epa.ie/news/events/old/>

The EPA have also issued the following guidance documents which are available on the EPA website:  
<http://www.epa.ie/downloads/advice/waste/municipalwaste/>

#### [EPA Approved Factors to Calculate the BMW Content of Municipal Waste Streams](#)

Table of EPA approved factors to calculate the BMW content of municipal waste streams. Factors have been derived from studies undertaken by the EPA and will be reviewed and updated as deemed necessary from time to time.

#### [Draft Protocol for the Evaluation of BMW sent to Landfill by Pre-treatment Facilities](#)

Sampling & monitoring regime which will provide acceptable evidence to the EPA of BMW content of MSW sent to landfill

#### [Municipal Solid Waste - Pre-treatment & Residuals Management - An EPA Technical Guidance document](#)

The purpose of this document is to set out the Environmental Protection Agency (EPA) standard for minimum acceptable pre-treatment for Municipal Solid Waste accepted for landfilling or incineration at EPA licensed waste facilities. The Guidance requires operators of landfills to demonstrate via their waste acceptance policy (as established by licence conditions) that waste accepted at these facilities has been subjected to appropriate pre-treatment.

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Waste Type	EWC code	Treatment to which this waste has been subjected to	Is this waste Municipal Solid Waste (MSW). Yes/No	If MSW please insert BMW factor to be applied to this waste type
MRF Municipal	19-12-12			
Mixed MSW	20-03-01			

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Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-11 Waste Acceptance at Weighbridge	All	GH	TF
002	05/02/18	EMS-OP-11 Waste Acceptance at Weighbridge	Section 3	MW	TF
003	23/07/18	Update with reference to 23b soil form	Section 4.7 & 4.7.4	MW	TF
004	21/06/19	Name Change	Header & throughout	POR	SS

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## 1.0 Scope

This document has been prepared in compliance with Condition 11.4.1.1 of the IED Licence No. 146-02 and describes the handling of Leachate during removal from the lagoon (refer to EPD 2016 for more information) and subsequent transport/discharge to a wastewater treatment plant. It also details the monitoring infrastructure and procedures for the monitoring of Leachate levels in the pump sumps, the cells and the lagoon.

*Sanitary Authority:* In accordance with Conditions 5.10.2, 5.11.4 and 6.7.1 of the IED Licence No. 146-02, any leachate removed from the facility will be disposed of by tankering off-site in fully enclosed road tankers and discharging at an agreed Sanitary Authority Wastewater Treatment Works. The agreement with a Sanitary Authority, as required by Condition 6.7.1 of the IED Licence No. 146-02 is in place and will be reviewed and renewed at appropriate intervals.

*Waste Contractor:* In accordance with Conditions 5.10.1 and 5.10.3 of the IED Licence No. 146-02, leachate will only be removed from the facility by a contractor agreed by the Agency and in a manner which will not adversely affect the environment.

## 2.0 Responsibility

The FM will implement this procedure. Consultants will maintain & calibrate monitoring equipment, and carry out monitoring.

## 3.0 References

EMS-EF-27 Daily Leachate Levels

Condition 5.11, 10.5 & 11.4.1 of IED Licence No. 146-02

Explosive Protection Document (EPD 2016)

## 4.0 Procedure

### 4.1. Leachate Removal

4.1.1. The tanker scheduled to collect leachate is registered and weighed at the weighbridge. The tanker travels to the leachate lagoon, and reverses into the bunded bay, adjacent to the lagoon and lines up the tanker to coincide with the yellow markings on the ground. The bund is equipped with a drain which, in the case of any spillage, will collect and discharge spilled liquids by gravity back into the leachate lagoon.

4.1.2. The driver of the truck connects the tanker to the fixed discharge point with a flexible hose (refer to risk assessment 9 in EPD), which is fitted with a standard Bauer coupling. The leachate hose is long enough to facilitate different types of tankers connecting up to the leachate hose and the length of the hose reduces manual handling

activities. The leachate hose is locked into position and is not allowed to be adjusted/moved without prior approval from site management (again this reduces handling of the leachate hose). The isolation valve is opened, and then the suction pump is started

- 4.1.3. Where necessary, during pumping the tanker driver connects the tank outlet exhaust to the activated carbon filtering system via the pipe that is permanently installed at the IBC. This filters out any odours from the tank.
- 4.1.4. During pumping the tanker driver monitors the level in the tank with a side glass. When the required volume of leachate has been extracted from the lagoon the driver will turn off the pump. If removal of a full load is required, the pump will stop automatically when the tank is full, (between 18,000 and 24,000 litres, depending on the size of the road tanker).
- 4.1.5. The connection between the tanker and leachate lagoon must remain intact for at least one minute, so that any liquids which might have remained in the pipe can drain back into the leachate lagoon.
- 4.1.6. Close valve and disconnect the hose. Wash down any liquids, which might have dripped into the bund, into the drain, from where they can gravitate back into the leachate lagoon.
- 4.1.7. The road tanker is directed back to the weighbridge where it is weighed. All relevant details, as required by Condition 10.5 a) – d) of the IED Licence No. 146-02, are recorded by the weighbridge operator, who notifies approved Wastewater Treatment Works of the consignment. The Consignment is transported to the Works via the most direct route, previously agreed between the carrier and the licensee, and without any unnecessary delay.
- 4.1.8. Following discharge of the consignment, the carrier is issued with a weight/volume docket. On return to the carrier's offices the driver will ensure that a copy of the docket is sent to SEHL, to enable the weighbridge operator record the outstanding information as required by Condition 10.5 c) and e) of IED Licence 146-1). Any incidents or spillages of leachate during transportation must also be recorded.

## 4.2. Leachate Monitoring

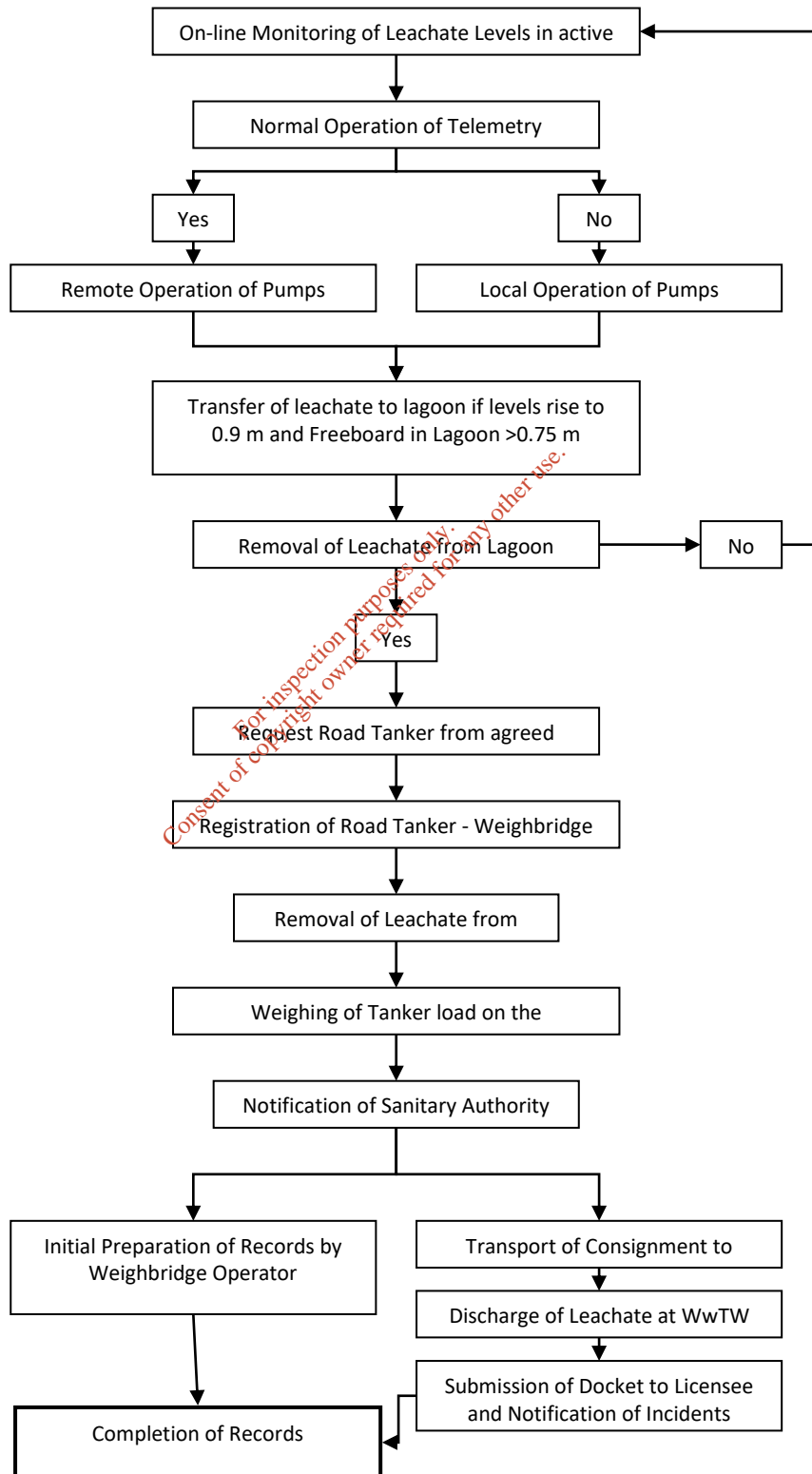
- 4.2.1. Measurement of leachate levels is on-line, so that changes in the liquid levels within the cells and in the lagoon are visualised on a continuous basis, and the relevant pumps are started and stopped automatically.

4.2.2. Leachate Levels in the active cells and in the leachate lagoon are measured with pressure transducers, which convert liquid levels ranging from 0 to 5 meters into 4 -20 mA signals. At the local control panels the signals are related back to the liquid levels and can be displayed locally or via PLC on a SCADA PC.

#### 4.3. *Level Control of Leachate Level*

- 4.3.1. With leachate levels being monitored as described above, the pumps are started automatically in the active cells once levels reach 0.9 m.
- 4.3.2. Leachate is transferred into the leachate lagoon, where the level is also monitored with pressure transducers as described above.
- 4.3.3. An alarm is activated when the leachate level in the lagoon rises above the minimum freeboard of 0.75 m, however, it is operational practice to remove leachate as described in section 4.1 prior to that situation.
- 4.3.4. If the minimum freeboard falls below 0.75 m an automatic inhibit disables the pumps in the active cells.
- 4.3.5. Leachate levels in the active cells and lagoon are read and recorded by trained site staff on a daily basis. The trends are utilised to establish routine intervals for removal of leachate from the lagoon.
- 4.3.6. Any foreseeable unusual events, including severe storm conditions, will be taken into account for preventative removal of leachate from the lagoon in order to provide buffer capacities in the lagoon.

**Appendix 1: Procedure for the Handling of Leachate and Monitoring of Leachate**



Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-12 Leachate Handling	All	GH	TF
002	19/09/16	EMS-OP-12 Leachate Handling Reference to EPD	All	MW	TF
003	17/04/18	Updated from accident	4.0 Procedure: Leachate removal	MW	TF
004	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure describes the method of recording locations of deposited waste within the cells in the landfill.

## 2.0 Responsibility

The FM will implement this procedure. Weighbridge operator and site supervisor will ensure that location is correctly recorded on records.

## 3.0 References

EMS-EF-30	Daily Site Condition Weighbridge Records
EMS-OP-09	Waste Acceptance and Handling Procedures
EMS-OP-11	Waste Acceptance at Weighbridge

## 4.0 Procedure

4.1. Procedures for the acceptance of wastes are detailed under work instructions listed above. Once waste has been accepted it is important that accurate and comprehensive records are maintained of the location of deposited waste.

4.2. These records are maintained for the following reasons:

- To aid later settlement calculations
- To assist in the calculation of landfill gas production (as the age and type of waste in each location is known)
- To prevent accidental disturbance of difficult wastes (when drilling future boreholes etc.)
- To assist in the event of any environmental pollution incidents

4.3. The locations of all deposited waste will be recorded on the WIMS computer system and on the Daily Site Condition Report.

4.4. Each of the seven operational phases of the site is divided into four cells. Each cell is further subdivided using a grid system; each grid square of which will be uniquely identified using the system shown below:

Example: Cell 2 Section F Lift 1

Cell 2 = Cell number

Section F = Specific grid of the cell

Lift 1 = The lift on which the waste is deposited.

4.5. All waste disposal location records are to be kept for the life of the site.

4.6. The Site Supervisor informs the weighbridge operator which grid location, tipping will be carried out each day. The weighbridge operator identifies that area on each weighbridge ticket. This allows future identification of the

location of specific loads to be quickly and easily made. The site supervisor also records this location on the daily Site Condition Report.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-13 Record of Disposal Location	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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### 1.0 Scope

To ensure that site infrastructure, plant and equipment is periodically inspected and properly serviced/calibrated and/or maintained.

### 2.0 Responsibility

The Facility Manager (FM) will implement this procedure. Site staff and external contractors working on site are responsible for ensuring that machines are properly maintained prior to use.

### 3.0 Definition

“Site Infrastructure” is defined as all permanent man made structures on-site (e.g. site offices, interceptors, bunds, weighbridges etc.)

“Plant” is defined as on-site mechanically propelled vehicles and machines (e.g. excavators, compactors, road sweepers).

“Vehicle” is defined as off-site mechanically propelled vehicles and machines (e.g. REL collection trucks, Ro-Ro tractor units).

“Equipment” is defined as all items of electrical equipment (inside and outside the site offices), safety equipment and monitoring equipment requiring servicing, inspection, calibration or maintenance.

### 4.0 References

- EMS-EF-12 Maintenance & Calibration Schedule
- HS-SF-04 Mobile Plant/Vehicle Daily Checklist

### 5.0 Procedure

- 5.1. The Site Supervisor will complete the maintenance and calibration schedule (EMS-EF-12) for all site infrastructure, plant, vehicles and equipment on-site. The Schedule provides details of the maintenance and calibration (if required) frequency of all infrastructure, plant, vehicles and equipment.
- 5.2. Maintenance & calibration records are retained on site.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-14 Maintenance	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS



## 1.0 Scope

This procedure shall ensure that all hired plant and equipment is regularly inspected and properly serviced/calibrated and/or maintained.

## 2.0 Responsibility

The Facility Manager (FM) will implement this procedure. Site staff and external contractors working on site are responsible for ensuring that machines are inspected prior to use and regularly and properly maintained as per manufacturer's recommendations or as otherwise specified in this procedure.

## 3.0 Definition

"Hired Plant" is defined as mechanically propelled vehicles and machines (e.g. excavators, compactors), hired from a third party contractor for a period exceeding one working week, for operation within the landfill footprint.

"Plant Operator" is defined as the machine operator employed by the third party contractor for operation of hired plant as defined above.

## 4.0 References

EMS-EF-12 Maintenance & Calibration Schedule  
HS-SF-04 Mobile plant/Vehicle daily checklist

## 5.0 Procedure

- 5.1. The Plant Operator shall, in addition to any other regular inspections and services, carry out a daily visual inspection prior to operation of his item of hired plant. This daily inspection shall include as a minimum:
- Visual inspection of the engine bay to identify any leaks of fuels, hydraulic fluids and other flammable liquids.
  - Visual inspection of the engine bay to identify any foreign objects, such as wipes, cloths or tools etc., which could trigger or support a malfunction or a fire in the engine bay.
  - Visual inspection of the engine bay to identify any cables and wires, hoses or fluid pipes etc., which are placed against engine parts that heat up during operation, such as turbo pipes.
  - Visual inspection of the engine bay to identify any cable, wire, hose or pipe insulation or isolation that has been damaged, for example due to mechanical abrasion or due to heat.
  - Visual inspection of the engine bay to identify any other potential causes of malfunction or fires during operation.
- 5.2. Any such leaks, foreign objects, wrongly placed or damaged cables etc. identified shall be reported to the Site Supervisor and to the maintenance

department of the third party contractor, and shall be logged in the Hired Plant Inspection and Maintenance Schedule.

- 5.3. The Site Supervisor shall inspect the above schedule on a weekly basis and carry out random checks to verify that the required inspections are being carried out by the plant operator as required. Such inspections shall be recorded in the Maintenance & Calibration Schedule EMS-EF-12.
- 5.4. Any such identified, logged and reported faults shall be remediated where possible prior to operation of the plant item.
- 5.5. Where remediation of such faults is not possible instantly, the plant item shall not be operated until the faults had been remediated by the maintenance department of the third party contractor or the manufacturer as appropriate.
- 5.6. In addition to the above mentioned daily inspection by the plant operator, and in addition any other scheduled or unscheduled preventative maintenance or services, the maintenance department of the third party contractor shall carry out fortnightly inspections and/or maintenance, as required, which shall include as a minimum:
- 5.7. Inspection of all fuel and oil filters including connections and replacement or cleaning as appropriate.
- 5.8. Inspection and tightening of all cable and wire, hose and pipe and other connections that could lead to leaks of fuels or other flammable liquids.
- 5.9. Inspection and replacement or cleaning as appropriate of any parts related to the engine cooling system.
- 6.0 Inspection and repair or replacement as appropriate of any hydraulic components including pipes and connections.
- 7.0 Any of the above fortnightly inspections, services and repairs shall be reported to the Site Supervisor and recorded in the Hired Plant Inspection and Maintenance Schedule.
- 7.1. The Site Supervisor shall inspect the above schedule on a monthly basis and carry out random checks to verify that the required inspections and repairs have been carried out by the maintenance department of the third party contractor as required. Such inspections shall be recorded in the Maintenance & Calibration Schedule EMS-EF-12.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-15 Hired Plant Inspections & Maintenance	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 01. Scope

Recoverable waste may occasionally arrive at the facility for disposal as part of loads of mixed municipal waste. Due to its potential for recovery, the waste should be removed from the waste loads at the working face by facility staff.

## 02. Responsibility

The Landfill Manager will implement this procedure and site supervisor will ensure the procedure is correctly followed.

## 03. References

IED Licence 146-02

## 04. Procedure

4.1. The following wastes are removed from the waste loads at the working face by facility staff

- Lead Batteries
- Empty Gas Bottles
- Metal
- Wood
- Tyres
- Other wastes may be removed following approval from the facility manager

4.2. The wastes are temporarily stored in a skip on the landfill or other designated areas, i.e., at the maintenance building.

4.3. In accordance with licence condition 5.10.2 "All waste transferred from the facility shall only be transferred to an appropriate facility agreed by the Agency". Copies of the relevant collection permits and waste permits/licences for each destination/haulier are maintained at the weighbridge.

4.4. Waste should only be removed from the working face if it is safe to do so. The site operatives should follow instruction given during manual handling training or use the on site equipment to move the material.

- 4.5. Site operatives should be aware of all moving plant and waste trucks at the working face and if necessary temporarily halt all traffic movement to safely recover the material.
- 4.6. Appropriate PPE must be used at all times.
- 4.7. Site operatives should consult with the site supervisor/facility manager prior to moving any unknown material.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-16 Waste Recovery Procedure	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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**01. Scope**

This procedure documents the approach to be taken when completing the facility and surrounds Daily inspection sheet

**02. Responsibility**

The FM will implement this procedure and site supervisor will ensure the procedure is correctly followed.

**03. References**

EMS-EF-30 Daily Inspection Sheet

IED Licence 146-02

License Condition 7.1: "The licensee shall ensure that vermin, birds, flies, mud, dust, litter and odours do not give rise to nuisance at the facility or in the immediate area of the facility. Any method used by the licensee to control any such nuisance shall not cause environmental pollution".

Licence Condition 8.14 Nuisance Monitoring: "The licensee shall, at a minimum of one week intervals, inspect the facility and its immediate surrounds for nuisances caused by litter, vermin, birds, flies, mud, dust and odours".

**04. Procedure**

For ease of completion of the inspection sheet the facility has been divided into five sections, Section A to E. The timescale for completing the inspection sheet is one week.

The scale used to demonstrate the compliance of the site is

- A= Good (no nuisance)
- B = Satisfactory
- C= Poor

The nuisance indicators include: Litter, Vermin, Birds, Flies, Mud, Dust and Odours.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-17	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 01. Scope

This procedure documents the approach to be taken when carrying out nuisance inspections at the facility.

## 02. Responsibility

The FM will implement this procedure and site supervisor will ensure the procedure is correctly followed. All site staff will notify the FM or the SS about any observations and will take any other measures necessary to avoid any nuisances from arising outside the facility boundary. The Vermin Control Contractor and their staff will carry out all duties required under the conditions of their contracts and will notify the Facility Management of any other observations which might have the potential to give rise to nuisances outside the facility boundary.

## 03. References

EMS-EF-30	Daily Site Condition Report
EMS-EF-26	Odour Inspection Record
EMS-OP-17	Daily Inspection Procedure
EMS-OP-08	Completion of Daily Site Condition Reports

IED Licence 146-02

AG5 EPAs Odour Assessment procedure

Licence Condition 7.1: The licensee shall ensure that vermin, birds, flies, mud, dust, litter and odours do not give rise to nuisance at the facility or in the immediate area of the facility. Any method used by the licensee to control any such nuisance shall not cause environmental pollution.

Licence Condition 8.13.1 Nuisance Monitoring: The licensee shall, at a minimum of one week intervals, inspect the facility and its immediate surrounds for nuisances caused by litter, vermin, birds, flies, mud, dust and odours unless otherwise agreed or instructed by the Agency.

## 04. Procedure

### 4.1 Litter

Litter inspections shall be carried out and recorded as part of the daily inspection, which is outlined in the Procedure for Completion of Site Condition Reports EMS-OP-08. It is of importance that the 5 individual areas, sections A to E as outlined in the Daily Inspection Procedure are inspected at a frequency of once per day if practicable. The presence of litter shall be noted on the Inspection Form and removed immediately if practicable. Any litter noted at or outside the boundary fence, which appears to be illegally dumped, shall be inspected for any indications of identity if possible and reported to the Facility Manager.



#### 4.2 *Vermin and Birds*

Inspections for vermin shall be carried out on a daily basis for rodents etc. and on a daily basis for birds, in particular crows. The bird control operator, who carries out regular bird control duties on site, shall assist the Site Supervisor by notifying him of any unusual observations. He shall also record any observations in the daily bird control report. Any observations made during inspections shall be recorded on the Daily Site Condition Report (EMS-EF-30).

#### 4.3 *Flies*

Particularly during the warmer months, attention shall be paid to observation of flies. Any observations shall be recorded on the Daily Site Condition Report (EMS-EF-30). The Facility Manager or the Site Supervisor shall be notified immediately in order to take measures to eliminate any fly populations from establishing. The areas around the surface water lagoon and the wetland, as well as the immediate vicinity of the working face, shall be inspected with particular intensity, as these are the most likely locations for fly populations to develop.

#### 4.4 *Mud and Dust*

The site roads shall be inspected on a daily basis for mud or dust and any observations recorded on the Daily Site Condition Report (EMS-EF-30). Special attention shall be paid to dust during the dry months and mud during the wet months and the Site Supervisor or the Facility Manager notified immediately in order to take measures to minimise or eliminate any potential nuisances arising from mud or dust accumulating on site roads.

#### 4.5 *Odour*

Odour Inspections shall be carried out in accordance with AG5 guidance document and recorded on the Odour Inspection Record (EMS-EF-26) on a regular basis at the assigned monitoring locations on and on site as required. Any odour detected is recorded on the Daily Site Condition Report (EMS-EF-30) and as well as on regular Odour Inspection Records (EMS-EF-26), will be reported directly to the manager. Any odour inspections carried out following receipt of a complaint shall have particular regard to the location to which the complaint relates and shall also have regard to any other observations or other activities in the area that could have contributed to complaints, e.g. spreading of slurry by farmers, bins left out for collection etc.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-18 Nuisance Inspection Procedure	All	GH	TF
002	05/12/18	Updated procedure	Section 4.5	MW	MW
003	21/06/19	Name Change	Header	POR	SS

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## **01. Scope**

This procedure addresses all aspects of odour control and landfill gas management.

## **02. Responsibility**

The Facility Manager will implement this procedure. The site supervisor and site staff are responsible for implementing odour prevention and abatement measures, ensuring this procedure is correctly followed. Consultants and external experts will be used to carry out and manage specialist monitoring under the terms of the licence.

## **03. References**

EMS-EF-30	Daily Site Condition Report
EMS-EF-26	Odour Inspection Record
EMS-SP-04	Resources, Competence & Awareness
EMS-OP-02	Operation Start Up/Shut Down & Compaction of Waste
EMS-OP-08	Completion of Daily Site Condition Reports
EMS-OP-09	Waste Acceptance and Handling Procedure
EMS-OP-17	Weekly Inspection Procedure
EMS-OP-18	Nuisance Inspection Procedure
EMS-OP-22	Installation of Horizontal Wells Procedure
EMS-OP-23	Reporting of Environmental Incidents
EMS-OP-27	Haase Flare Operation
EMS-OP-29	Odour assessment procedure
EMS-OP-32	Installation of vertical wells Procedure
EPA IED Licence 146-02	
AG5	EPA Odour Impact Assessment Guidance

## **04. Procedure**

### *4.1. Training and Resources*

Adequate training and resources will be provided for the maintenance, monitoring and operation of landfill gas infrastructure. Training requirements for all site staff shall be identified in accordance with EMS Procedure EMS-SP-04 Resources, Competence & Awareness.

One staff member will be dedicated full time to landfill gas management at Knockharley Landfill and 3<sup>rd</sup> party specialist contractors used for regular servicing and maintenance of plant and equipment.

### *4.2. Acceptance and Management of odorous wastes*

The adoption of best practice is known to significantly reduce the release of odours to the atmosphere, particularly from the active disposal area. Odour nuisance is prevented by implementing the following measures:

- Pre-identification and booking of loads consisting of, or containing, malodorous wastes
- Any odorous waste received shall be tipped at the bottom of the working face and immediately covered with a layer of non-odorous waste or cover material

Any waste arriving at the facility, which can be clearly identified as being malodorous, shall be rejected in accordance with the EMS-OP-09 Waste Acceptance and Handling Procedure.

#### 4.3. Working face/active cell sizing and covering

In accordance with IED Licence W0146-02, the following shall apply:

- Only one working face for the disposal of waste shall be open at any one time
- The working face shall be restricted to 25m length by 25m width (625m<sup>2</sup> surface area) and 2.5m in height after compaction
- Application to the working face of 150mm of daily cover of a suitable material, to prevent odour migration, at the end of each working day
- Application of 300mm of suitable intermediate capping to temporarily un-worked areas

It shall be ensured that the joint between vertical bunds and horizontal layers of daily cover material and temporary capping is not less than the required 150 mm and 300 mm respectively, as it is potentially a weak point which could provide a migration path for landfill gas in addition to waste odours.

Daily cover material shall be placed in accordance with EMS-OP-02 Operation Start Up/Shut Down & Compaction of Waste Procedure.

#### 4.4. Odour suppression methods

Mobile misting units will be used at the working face or potentially odorous areas as necessary.

Contact neutraliser shall be sprayed directly on to odorous wastes on the working face using the water sprayer via the tractor, as required. The Supervisor will ensure the working face coordinator carefully monitors the working face for this requirement.

#### 4.5. Landfill gas collection and infrastructure

Long term odour control will be achieved via the active landfill gas extraction system, which collects landfill gas under negative pressure, reducing the potential for odours to be released in an uncontrolled manner. The gas extraction system will comprise the following:

#### 4.5.1. Vertical wells

Vertical landfill gas extraction wells shall be constructed, progressively with the development of the landfill, at 50 metre lateral and longitudinal centres. Additionally, vertical wells shall be drilled into the waste as required and determined by surveys of fugitive emissions, in order to minimise or eliminate landfill gas migration. The additional drilled wells shall be installed between the constructed main gas extraction wells, so as to reduce the distances between the individual wells and to increase the capture rate of landfill gas. Where appropriate, sacrificial vertical “pin” or “spike” wells will also be installed. It shall be ensured that the vertical gas wells are sealed at surface with bentonite as required in order to minimise the ingress of oxygen and the potential for migration of landfill gas. Vertical wells shall be installed in accordance with EMS-OP-32 Installation of Vertical Wells Procedure.

#### 4.5.2. Horizontal wells

In order to further enhance gas extraction, horizontal gas wells consisting of slotted gas extraction pipes embedded in stone filled trenches shall be installed as appropriate. Horizontal trenches shall be installed in accordance with EMS-OP-22 Installation of Horizontal Wells Procedure.

#### 4.5.3. Landfill gas collection network

All vertical and horizontal landfill gas extraction wells shall be connected to the gas collection pipe network which shall consist of a 355 mm ring main around the landfill footprint and 180 mm branches laid across the landfill surface. Each individual well as well as each individual branch shall, prior the point of connection into the next higher collection level (i.e. well-branch connections and branch-ring main connections) be equipped with shut-off valves, in order to enable flow restriction or isolation of individual wells or branches.

#### 4.5.4. Condensate removal

In order to continuously remove condensate from the landfill gas extraction network and therefore avoid uncontrolled flow restriction and pulsating, the ring main shall be connected to the gas flaring and utilisation plant via condensate knockout pots. The condensate accumulating in these pots shall be removed by pneumatic/electric pumps and piped back into the leachate riser pipes, from where it can drain to the cell base and be removed with the leachate.

#### 4.5.5. Field balancing and monitoring

Daily checks of the landfill gas field and combustion plant shall be undertaken to ensure optimum operation. Monitoring of internal and external landfill gas wells is carried out in accordance with IED Licence 146-02 (Schedule D).

#### 4.5.6. Landfill gas utilisation and flaring plant

The landfill gas collected in the landfill gas extraction and collection network shall, after passing through the condensate knockout pots, be flared off in an enclosed flare or utilised in gas combustion engines with electricity generation, as appropriate. Contingency arrangements shall be made to avoid gas venting in the case of plant failures.

EMS-OP-27 Haase Flare Operation Procedure for the operation of landfill gas flares addresses the operational requirements to optimise the combustion rates and maintain compliance with emission limits and monitoring requirements. Any significant downtime of landfill gas flares or other utilisation equipment shall be logged by Bioverda. Access to these files are available to site staff upon request. Should significant downtime of landfill gas flares or other utilisation equipment occur and cause potential for environmental pollution, the Environmental Protection Agency shall be notified in accordance with procedure EMS-OP-23.

#### 4.6. *Cover and capping*

Upon reaching the calculated filling heights, a settlement period is required prior to constructing an engineered cap. Premature capping could lead to problematic levels of differential settlement which would impact upon the integrity of the lining and gas extraction systems. When final levels are reached and sufficient settlement has occurred, the phased construction of the permanent, fully engineered capping system will act as a barrier to the migration of odours and increase the efficiency of the gas extraction system by removing oxygen ingress, hence improving gas quality.

Daily and intermediate covers shall be applied in accordance with the relevant conditions of the Waste Licence and in accordance with EMS-OP-02 Operation Start Up and Shut Down Procedure. The working face of the operational cell shall be covered with suitable material at the end of each working day to minimise nuisances from occurring.

Uncapped areas on non-operational parts of the site should be minimised to reduce the available area for uncontrolled landfill gas emissions. Areas with increased potential to allow fugitive emissions shall be identified, for example, haul roads and side slopes, and additional mitigation measures applied.

#### 4.7. *Identification and monitoring of landfill emissions*

##### 4.7.1. *Odour Inspections*

In conjunction with existing daily (EMS-OP-08 Completion of Daily Site Condition Reports and form EMS-EF-30) which include a specific section for nuisance control, odour inspections will also be carried out on a regular basis by site staff and also in response to any odour complaints. Odour inspections shall be carried out in accordance with EMS-OP-18 Nuisance Inspection Procedure and recorded

on Form EMS-EF-26 which will detail date, time, location, weather conditions, wind direction/speed and odour extent/intensity. The inspection will reference the complaint number and corrective action taken, as appropriate. Records of these inspections will be maintained on site.

Any odour inspections carried out following receipt of a complaint, shall have particular regard to the location to which the complaint relates and shall also have regard to any other observations or other activities in the area that could have contributed to complaints.

Knockharely staff have been trained up on the EPAs "AG5 Odour Impact Assessment Guidance" document.

These odour inspections shall satisfy the requirement of IED Licence Schedule D.10 Ambient Odour Monitoring.

#### 4.7.2. *VOC surface emissions monitoring*

Independent specialists will be commissioned to undertake Volatile Organic Compound (VOC) surface emission surveys on a biannual basis as required by Waste Licence Condition 6.10.2. The VOC survey is used to highlight areas where there may be potential for odour escape, by measuring VOC levels around the landfill area.

Additional VOC surface emission monitoring will be carried out by site staff to identify any fugitive sources of landfill gas emissions as necessary.

#### 4.8. *Monthly Review*

A monthly review of odour control measures in place at the facility shall be carried out. This review shall be recorded on EMS-EF-05 Odour Management Plan Report. Copies of the EMS-EF-26 Odour Inspection Record shall be maintained on site.

#### 4.9. *Annual Review*

The Odour Management Plan shall be reviewed annually and any updates/amendments submitted to the Agency as part of the Annual Environmental Report.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-19 Odour Management Plan	All	GH	TF
002	23/11/2017	EMS-OP-19 Odour Management Plan	All (reviewed Cell 15 entry). With upcoming Timoole Site Considered.	TF	MW
003	23/07/18	Updated with reference to vertical wells procedure	Sections 0.3 & 4.5.1	MW	TF
004	05/12/18	Updated OMP	4.7.1	MW	MW
005	21/06/19	Name Change	Header	POR	SS

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Odour Management Plan for Knockharley Landfill : design and operational management options

REV 05  
Date: 16/08/19

EMS-OP-19a

Control Aspect	Control Mechanism	Applications	Comments
Waste delivery routing	Route delivery vehicles to avoid residential and other sensitive receptors	Delivery route arranged to minimise contact with receptors Ensure vehicles properly sheeted/covered especially if carrying odorous wastes Avoid delivery of highly odorous wastes when wind directions adverse	Determined at the site selection or planning application stage Reduces extent of exposure of receptors to the odour source Limits the magnitude of the odour source term Odour impact dependent on wind direction, so avoid deliveries when windy directions likely to impact large numbers of receptors
Stored putrescible wastes	Putrescible wastes delivered from transfer stations/Bank Holiday periods	Wastes bulked up or stored over weekends, especially during Summer Full containers/skips left on site over weekends Reduced collection frequency increases storage times	Commencement of waste degradation before disposal produces offensive odours during delivery to site Degraded wastes are more odorous than usual and special handling required during disposal No odorous wastes stored on site Advise customers if waste is odorous.
Prohibition of specific wastes	Prohibit highly odorous wastes streams unless suitably pre-treated to reduce odour	Wastes with highly offensive odours e.g. seafood, animal by products etc. Wastes that may subsequently react to produce offensive odours e.g. sulphate bearing Wastes with odours that cannot be contained by sheeting/covering	Reduces highly odorous sources Minimises odour exposure during delivery Highly effective if pre-treatment used Potentially odorous waste not accepted when wind is blowing towards nearest residents Potentially odorous waste buried and covered immediately
Placement and Compaction.	Reduction of odour emission surface area and reduced waste porosity	Working face/area Cell flanks	Normal good operational practice. Increased waste density and daily cover reduces the odour emission rate Progressive covering during the day 53 tonne compactor & one compactor on stand by
Waste Cover	Reduces emission rate via surfaces and increases opportunity for biofiltering action	Adequate depth of daily cover over all operational areas Depth of cover maintained over time on temporary capped areas Type of daily/temporary cover material important Intermediate capping in non-operational areas	Thickness of cover correlates with reduced odour emissions Sandy and clay cover soils not as effective as loamy-type soils, due to difficulties of placement Woodchip improves permeability of cover and also acts as biofiltration Ability to place and retain cover thickness over time important e.g. rain wash, placement on cell flanks, movement etc.
Size of operational cells.	Water balance approach to prevent imbalance between odorous acetogenic leachates and establishment of methanogenic conditions	Whole site. Essential part of site operational plan	Reduced production of odorous gases at source. To be used concomitantly with phased capping and installation of gas control infrastructure Good practice
Odorous waste disposal	Disposal of odorous wastes in poor (wind) dispersal conditions.	Select disposal area remote from sensitive receptors if practicable Deep trench and cover immediately with nonodorous wastes Reduced acceptance hours for odorous wastes	Can be used when adverse wind directions apply if the exposure time is limited Relatively simple to apply, effective and low cost Requires careful management.
Excavation into previously deposited wastes.	Practicably undertaken only when wind direction suitable and for the minimum exposure time for excavated wastes	Installation/repair of landfill gas and leachate infrastructure	Difficult to prevent significant short-term odour releases from decomposed wastes and landfill gas Requires careful pre-planning and management Special procedure and agreement in place for excavating horizontal trenches
Site housekeeping	Avoid Odours from deposits of litter picking/road sweepings	All site areas	Primarily for aesthetic purposes but creates improved perception of operations Minimal effect on odour emissions Simple, low cost
Reduce extent of active working area	Reduces odour emission source area as per Condition 5.5 site EPA licence	Tipping area	Minimisation of a prime odour source. Reduced requirement for daily cover Simple in theory but requires careful management Difficult to achieve on sites with a wide range of inputs requiring separate disposal Progressive covering of waste throughout day
Limit extent of uncapped areas on non-operational parts of the site.	Reduces available area for uncontrolled gas emissions.	All areas with intermediate or temporary cover, particularly cell flanks.	Essential to coordinate with installation of gas control infrastructure Very effective in reducing LFG emissions Necessary for the control of site water balance Requires careful planning to obtain materials when needed Flanked areas and temporarily completed areas, temporary capped as soon as possible Installation of impermeable capping materials where possible and cost effective
Control Aspect	Control Mechanism	Applications	Comments
Limiting slope of and extent of cell flanks.	Flank area and slope both reduced to allow adequate placement of cover materials	Essential to reduce the extent of a key odour source Retro fit difficult to apply Planned at Working Plan Filling stage	Important to plan cell operation and phasing to ensure maximum flank slope of 1: 3 with short length and width Adequate cover thickness necessary to cope with movement of flank with waste settlement Necessary to maintain adequate levels of cover over time Flanked areas temporarily capped with clay
Counteractants	neutralising or suppressant agents	Site boundary adjacent to receptors Specific odorous site activities e.g. leachate storage tanks or aeration lagoons	Spray can produce odour complaints Public concern over the use of sprays potentially masking the presence of harmful compounds Home, mobile and permanent system is set and ready for use
Landfill gas control	Abstraction of landfill gas and the destruction of odorous and potentially harmful trace compounds present in landfill gas Drilling of Gas Wells On-call system if flares fail	Installation of gas abstraction wells and collection pipework infrastructure Destruction of methane and trace compounds by use of gas as a fuel in utilisation of plant and/or flare system. powered generator set Gas well drilling will be planned while taking into account wind direction as much as practicable, however this also will be contractor dependent General Manager and Site foreman carry out on-call duties to ensure LFG systems are running at optimum levels	Applicable to all sites producing landfill gas Operation of the control system is required to ensure adequate environmental performance, rather than meeting solely the commercial needs of any generation plant Gas collection system requires routine balancing to ensure adequate performance across the site System upgrades carried out proactively before odour issues arise Our system balanced regularly
Leachate management	Whole site, operational areas and pollution treatment area.	Landfill design requirement for collection systems Leachate risers should be sealed and under extraction for gas Leachate stored for treatment stored in closed lagoon Aeration lagoons located away from receptors	Acetogenic leachates are highly odorous and must be properly managed to avoid acting as an odour source Good working practice to cover chambers and place under extraction Storage of leachate prior to removal off-site may require chemical dosing to maintain Transport tankers require venting during filling and exhaust gas is passed via a carbon filter at KNH Aeration of leachate in lagoons can release absorbed odorant gases, producing an intermittent odour release
Pollution control and equipment maintenance	All sites with pollution control plant and equipment	Gas flare, engine exhaust, storage tank vents, lagoon aerators etc.	Electrical/mechanical items require regular and routine maintenance and calibration to operate efficiently

Odour Management Training	Emphasis on future LFG requirement needs to be assessed during annual and biannual budgetary planning General Manager and Deputy need relevant training be it technical, communications or otherwise	Maintaining sealing of gas/leachate risers and wells  seals as the landfill settles Maintaining integrity of any onsite pipework due to settlement, or damage by site plant and equipment	Odour emission checks on gas flares and engine exhausts should be undertaken on a regular basis Monitoring for fugitive emissions from defective valves and seals, blocked pipework reducing extraction efficiency etc. all part of routine maintenance All pipework and infrastructure checked by trained personnel on daily basis
Odour monitoring	All sites and all areas of the site, including any odour controls and pollution control infrastructure Monthly review as per condition 6.10.3 of our licence	Regular odour patrols in the vicinity of the landfill Site and boundary walk around Use of FID to identify potential emission sources such as VOCs as per Condition 6.10.5 of the site EPA licence Identified odour emission sources rectified  Use of specialist equipment to measure odorous gas concentrations	Good practice to continually monitor and measure the performance of odour control methods Simple to undertake and raises awareness of issues  Use of equipment to quantify odour release rates/odour type useful for identifying possible sources Consultation and liaison with public e.g. via Liaison Committee, is a useful means of assessing odour impacts and helping to deal with (possibly) unforeseen odour release sources
<b>Control Aspect</b>	<b>Control Mechanism</b>	<b>Applications</b>	<b>Comments</b>
Engineered capping layer	Surface containment of completed cells to keep out water and keep in odorous gases	Areas of the site filled to final level Progressively fill to enable capping to be installed progressively also	Achieves a significant reduction in a potential emission source Capping must be installed to high standard to prevent cracking of the clay cap or defects in synthetic capping material allowing emission of landfill gas If gas control or leachate recirculation pipework is installed beneath the capping layer, remedial works must ensure the continuing integrity of the re-installed cap
Restoration soils	Promotion of grass growth	Grass growth Stabilises final cap, reduces soil erosion and adds protection to engineered cap.	KNH progressively caps landfill with final topsoil and grass seeding promoted.
Site Diary	Record of site activities	All site activities noted on daily basis To include sub-contractor activities and any gas related works	Record of all site activities, routine and non-routine that can subsequently be used to identify processes that may have caused an odour Include all sub-contractor activities involved in potential odour-release activities e.g. installation of gas wells and pipework, modifications to leachate wells, gas system monitoring, placement of final capping layer etc.
Weather station	Record of local meteorological data	Site specific wind speed and direction, rainfall and pressure data	Provides the ability to assess what weather conditions prevailed at the time of an odour complaint Provides data for helping to benchmark future air dispersion modelling studies Can be used to provide data to assist with atmospheric pressure effects on gas emissions studies etc. Weather station linked to SCADA
Communications	Consultation with site operatives and the public Complaints procedure is applied as per Condition 10.4 of the site EPA licence Communication procedures also in place Interested parties identified	All site operatives and contractors Local residents Local authority  EPA and other agencies	Raises awareness amongst site operatives of the potential impact of their activities Routine and regular liaison with the public to learn of their concerns e.g. Community Liaison Committee Provide for site visits from interested parties, groups and local residents.

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Odour Management Plan for Knockharley Landfill : design and operational management options

REV 05  
Date: 16/08/19

EMS-OP-19a

Control Aspect	Control Mechanism	Applications	Comments
Waste delivery routing	Route delivery vehicles to avoid residential and other sensitive receptors	Delivery route arranged to minimise contact with receptors Ensure vehicles properly sheeted/covered especially if carrying odorous wastes Avoid delivery of highly odorous wastes when wind directions adverse	Determined at the site selection or planning application stage Reduces extent of exposure of receptors to the odour source Limits the magnitude of the odour source term Odour impact dependent on wind direction, so avoid deliveries when windy directions likely to impact large numbers of receptors
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Placement and Compaction.	Reduction of odour emission surface area and reduced waste porosity	Working face/area Cell flanks	Normal good operational practice. Increased waste density and daily cover reduces the odour emission rate Progressive covering during the day 53 tonne compactor & one compactor on stand by
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Size of operational cells.	Water balance approach to prevent imbalance between odorous acetogenic leachates and establishment of methanogenic conditions	Whole site. Essential part of site operational plan	Reduced production of odorous gases at source. To be used concomitantly with phased capping and installation of gas control infrastructure Good practice
Odorous waste disposal	Disposal of odorous wastes in poor (wind) dispersal conditions.	Select disposal area remote from sensitive receptors if practicable Deep trench and cover immediately with nonodorous wastes Reduced acceptance hours for odorous wastes	Can be used when adverse wind directions apply if the exposure time is limited Relatively simple to apply, effective and low cost Requires careful management.
Excavation into previously deposited wastes.	Practicably undertaken only when wind direction suitable and for the minimum exposure time for excavated wastes	Installation/repair of landfill gas and leachate infrastructure	Difficult to prevent significant short-term odour releases from decomposed wastes and landfill gas Requires careful pre-planning and management Special procedure and agreement in place for excavating horizontal trenches
Site housekeeping	Avoid Odours from deposits of litter picking/road sweepings	All site areas	Primarily for aesthetic purposes but creates improved perception of operations Minimal effect on odour emissions Simple, low cost
Reduce extent of active working area	Reduces odour emission source area as per Condition 5.5 site EPA licence	Tipping area	Minimisation of a prime odour source. Reduced requirement for daily cover Simple in theory but requires careful management Difficult to achieve on sites with a wide range of inputs requiring separate disposal Progressive covering of waste throughout day
Limit extent of uncapped areas on non-operational parts of the site.	Reduces available area for uncontrolled gas emissions.	All areas with intermediate or temporary cover, particularly cell flanks.	Essential to coordinate with installation of gas control infrastructure Very effective in reducing LFG emissions Necessary for the control of site water balance Requires careful planning to obtain materials when needed Flanked areas and temporarily completed areas, temporary capped as soon as possible Installation of impermeable capping materials where possible and cost effective
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Counteractants	neutralising or suppressant agents	Site boundary adjacent to receptors Specific odorous site activities e.g. leachate storage tanks or aeration lagoons	Spray can produce odour complaints Public concern over the use of sprays potentially masking the presence of harmful compounds Home, mobile and permanent system is set and ready for use
Landfill gas control	Abstraction of landfill gas and the destruction of odorous and potentially harmful trace compounds present in landfill gas Drilling of Gas Wells On-call system if flares fail	Installation of gas abstraction wells and collection pipework infrastructure Destruction of methane and trace compounds by use of gas as a fuel in utilisation of plant and/or flare system. powered generator set Gas well drilling will be planned while taking into account wind direction as much as practicable, however this also will be contractor dependent General Manager and Site foreman carry out on-call duties to ensure LFG systems are running at optimum levels	Applicable to all sites producing landfill gas Operation of the control system is required to ensure adequate environmental performance, rather than meeting solely the commercial needs of any generation plant Gas collection system requires routine balancing to ensure adequate performance across the site System upgrades carried out proactively before odour issues arise Our system balanced regularly
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Pollution control and equipment maintenance	All sites with pollution control plant and equipment	Gas flare, engine exhaust, storage tank vents, lagoon aerators etc.	Electrical/mechanical items require regular and routine maintenance and calibration to operate efficiently

Odour Management Training	Emphasis on future LFG requirement needs to be assessed during annual and biannual budgetary planning General Manager and Deputy need relevant training be it technical, communications or otherwise	Maintaining sealing of gas/leachate risers and wells  seals as the landfill settles Maintaining integrity of any onsite pipework due to settlement, or damage by site plant and equipment	Odour emission checks on gas flares and engine exhausts should be undertaken on a regular basis Monitoring for fugitive emissions from defective valves and seals, blocked pipework reducing extraction efficiency etc. all part of routine maintenance All pipework and infrastructure checked by trained personnel on daily basis
Odour monitoring	All sites and all areas of the site, including any odour controls and pollution control infrastructure Monthly review as per condition 6.10.3 of our licence	Regular odour patrols in the vicinity of the landfill Site and boundary walk around Use of FID to identify potential emission sources such as VOCs as per Condition 6.10.5 of the site EPA licence Identified odour emission sources rectified  Use of specialist equipment to measure odorous gas concentrations	Good practice to continually monitor and measure the performance of odour control methods Simple to undertake and raises awareness of issues  Use of equipment to quantify odour release rates/odour type useful for identifying possible sources Consultation and liaison with public e.g. via Liaison Committee, is a useful means of assessing odour impacts and helping to deal with (possibly) unforeseen odour release sources
<b>Control Aspect</b>	<b>Control Mechanism</b>	<b>Applications</b>	<b>Comments</b>
Engineered capping layer	Surface containment of completed cells to keep out water and keep in odorous gases	Areas of the site filled to final level Progressively fill to enable capping to be installed progressively also	Achieves a significant reduction in a potential emission source Capping must be installed to high standard to prevent cracking of the clay cap or defects in synthetic capping material allowing emission of landfill gas If gas control or leachate recirculation pipework is installed beneath the capping layer, remedial works must ensure the continuing integrity of the re-installed cap
Restoration soils	Promotion of grass growth	Grass growth Stabilises final cap, reduces soil erosion and adds protection to engineered cap.	KNH progressively caps landfill with final topsoil and grass seeding promoted.
Site Diary	Record of site activities	All site activities noted on daily basis To include sub-contractor activities and any gas related works	Record of all site activities, routine and non-routine that can subsequently be used to identify processes that may have caused an odour Include all sub-contractor activities involved in potential odour-release activities e.g. installation of gas wells and pipework, modifications to leachate wells, gas system monitoring, placement of final capping layer etc.
Weather station	Record of local meteorological data	Site specific wind speed and direction, rainfall and pressure data	Provides the ability to assess what weather conditions prevailed at the time of an odour complaint Provides data for helping to benchmark future air dispersion modelling studies Can be used to provide data to assist with atmospheric pressure effects on gas emissions studies etc. Weather station linked to SCADA
Communications	Consultation with site operatives and the public Complaints procedure is applied as per Condition 10.4 of the site EPA licence Communication procedures also in place Interested parties identified	All site operatives and contractors Local residents Local authority  EPA and other agencies	Raises awareness amongst site operatives of the potential impact of their activities Routine and regular liaison with the public to learn of their concerns e.g. Community Liaison Committee Provide for site visits from interested parties, groups and local residents.

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## 01. Scope

The aims of this procedure area as follows –

- Raise Awareness of the hazards posed by needle stick injuries
- Eliminate the incidence of needle stick injury to operatives on a landfill site
- Give guidance on what to do in the event of a needle stick injury through tool box talks given to all relevant staff.

## 02. Responsibility

The FM will implement this procedure and site supervisor will ensure the procedure is correctly followed. All site staff will notify the FM or the SS about any observations of needle sticks.

## 03. Procedure

### Hazards Associated with Needle Stick Injuries

Needle stick injuries have the potential of transferring bacteria, protozoa, viruses and prions, from a practical point the transmission of the hepatitis B and hepatitis C viruses and the Human Immunodeficiency Virus (HIV) are also possible.

Needle stick injuries may occur not only with freshly contaminated sharps, but also, after some time, with needles that carry dry blood. While the infectiousness of HIV and HCV decrease within a couple of hours, HBV remains stable during desiccation and infectious for more than a week.

### Prevention of Needle Stick Injury

The main way of preventing needle stick injuries is to ensure that site staff do not come into contact with the waste stream.

This will be done as follows –

- Litter Picking – Litter picking sticks must be used for collecting refuse which has left the working area
- If it is possible to move waste using a machine such as an excavator then this would always be preferable to handling waste
- If waste has to be handled for any reason then this can only be done using needle proof gloves and not standard issue gloves
- Before waste is handled it should be inspected carefully to ensure that there are no signs of contamination with either sharps or medical waste.

If there are any signs of contamination then the Site Foreman/Manager should be informed immediately

#### Immunisations

All facility staff must receive inoculations against Hepatitis A, Hepatitis B, Tetanus and Polio. Staff must also be tested to ensure that the course of inoculations have been successful. If inoculations have not been successful then an additional course of inoculations will be required until all tests prove satisfactory.

#### Provision of Personal Protective Equipment

All site operatives must be issued with a pair of needle proof gloves. This includes General Operatives, Site Foreman and Chargehand. All staff should sign to acknowledge receipt of the gloves. Additionally, one spare pair of gloves should be kept in the landfill site compactor and kept in the facility manager's office. If a member of staff loses or damages their gloves they must be replaced immediately.

#### Other Requirements

The site induction procedure should be up dated to cover the risks associated with needle stick injury and procedures to be followed in the event of an accident.

Mobile Plant Maintenance Contractors are also at risk from needle stick injury. All maintenance contractors must be made aware of and sign off on this procedure. Needle stick gloves stored in the compactor will be available for them to use during maintenance operations.

#### Immediate First Aid Procedure

In the event of a needle stick injury the following first aid should be carried out immediately -

- Percutaneous injuries from used needles, bites, cuts from sharp Objects etc, should be gently encouraged to bleed
- Do **NOT** suck the wound
- The wound should then be washed with soap and water, dried and covered with a waterproof plaster

Following administration of first aid the injured party should seek immediate professional medical attention.

If possible, try and identify the load of waste in which the needle was found so that the source of the waste can be warned of possible sharps contamination.

As with any other accident the Facilities Manager should be informed immediately, and a detailed accident report should be submitted as soon as possible.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-20 Needle Stick Procedure	All	GH	TF
002	23/07/18	Updated with reference to TBT	Section 0.1	MW	TF
003	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

The purpose of this procedure is to ensure that a system is in place to be followed in the event of loads arriving after the normal hours of waste acceptance.

## 2.0 Responsibility

The Landfill Manager has implemented this procedure. The Site Foreman and Weighbridge Operator are responsible for ensuring the procedure is complied with and all staff are required to comply with this procedure.

## 3.0 References

IED Licence 146-02

## 4.0 Procedure

- 4.1. Normal hours of waste acceptance are Monday to Friday 08.00 – 16.30.
- 4.2. The waste licence allows waste acceptance at the facility until 18.30.
- 4.3. A courtesy of 5 minutes will be allowed for loads arriving at the weighbridge after 16.30.
- 4.4. If a customer has telephoned and notified the facility that a load is running late and may arrive after 16.35, the Site Foreman or Site Manager receiving the call must follow the following procedure:
  - 4.4.1. Upon receipt of the notification, immediately contact the excavator driver and banksman responsible for the daily waste cover.
  - 4.4.2. The Site Foreman/Manager will ascertain the stage of the covering and decide whether acceptance of an additional load of waste is practical.
  - 4.4.3. Once a decision is made, notify the customer/lorry driver and Landfill Manager of the decision.
  - 4.4.4. If the decision is yes, notify the weighbridge operator.
- 4.5. In the event of a load arriving at the weighbridge after 16.35, with no prior notification from the customer, then the Site Foreman or Site Manager receiving must follow the following procedure:
  - 4.5.1. Site Foreman/Manager will immediately contact the excavator driver and banksman responsible for the daily waste cover and ascertain the stage of the covering and decide whether acceptance of an additional load of waste is practical.
  - 4.5.2. Once a decision is made, notify the customer/lorry driver and Landfill Manager of the decision.



4.5.3. If the decision is yes, notify the weighbridge operator.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27/01/16	EMS-OP-21 Late Load Procedure	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure details the method to be used by landfill staff when installing horizontal gas extraction wells within the body of the landfill.

## 2.0 Responsibility

The Facility Manager will implement this procedure. It is the responsibility of all staff to follow this procedure at all times.

## 3.0 Procedure

### Before Works Begin:

- 3.1. Notify the Site Supervisor that work is about to start.
- 3.2. Check the wind direction.
- 3.3. If the wind is south westerly, westerly or north-westerly turn on the odour control system on the litter nets.
- 3.4. If the wind is easterly, northerly or southerly set up the mobile odour control unit in the most appropriate place.
- 3.5. Have all equipment and sufficient cover material (fines and woodchip) ready at the location of the trench before starting to excavate.

### Installing the wells:

- 3.6. Excavate the trench in 10m sections to minimise the area of exposed waste at all times and follow these steps:
  - Excavate the waste using the tile bucket.
  - Fill in trench with stone and lay 63mm pipe.
  - Back fill trench with excavated waste.
  - Remove any excess waste to the working face.
  - Continue with the next 10m section, and so on.
  - Cover the new trench immediately with fines and woodchip.
- 3.7. Ensure the end of the 63mm pipe is capped if the pipe is not going to be put under suction straight away.

3.8. Check the trench area, if there is an odour, fill the bowser and spray the area with BAT 505.

<b>Revision No.</b>	<b>Revision Date</b>	<b>Description</b>	<b>Sections Affected</b>	<b>Revised By</b>	<b>Approved By</b>
001	27-01-2016	EMS-OP-22 Procedure for Installation of Horizontal Wells	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure applies to IED Licence 146-02, Condition 9.1 concerning the reporting of incidents to the Environmental Protection Agency (EPA).

## 2.0 Responsibility

The Facility Manager is responsible for the reporting of incidents to the EPA. In the absence of the Facility Manager, an EPA approved Nominated Deputy should follow this procedure.

## 3.0 References

IED Licence 146-02 Condition 1.11, Condition 9.1 and Condition 11.2

EPA Guidance to Licensees/COA holders on the Notification, Management and Communication of Environmental Incidents (2010)

EMS-SP-07(b) Emergency Preparedness and Response Procedure – Public

EPA Incident Notification Form – Annex 1

## 4.0 In accordance with IED Licence 146-02 the following shall constitute an incident:

### 4.1. An emergency, defined as:

- 4.1.1. All significant spillages occurring at the facility shall be treated as an emergency and immediately cleaned up and dealt with so as to alleviate their effects.
- 4.1.2. No waste shall be burnt within the boundaries of the facility. A fire at the facility shall be treated as an emergency and immediate action shall be taken to extinguish it and notify the appropriate authorities.
- 4.1.3. In the event that monitoring of local wells indicates that the facility is having a significant adverse effect on the quantity and/or quality of the water supply this shall be treated as an emergency and the licensee shall provide and fund an alternative supply of water to those affected.
- 4.1.4. In the event that monitoring of the side slopes of the facility indicate that there may be a risk of failure this will be treated as an emergency.
- 4.1.5. In the event that monitoring should indicate contamination of the site surface water in the Knockharley Stream, the stream shall be diverted to the surface water lagoon.

### 4.2. Any emission which does not comply with the requirements of the IED Licence. Emission limit values are listed in Schedule C of the Licence.

- 4.3. Any trigger level specified in the Waste Licence which is attained or exceeded.
- 4.4. Any indication that environmental pollution has, or may have, taken place.
- 4.5. Any rejected load (see EMS-OP-09 Waste Acceptance & Handling Procedure)
- 5.0 To determine the significance of an incident, the Agency has provided the following classification system, which is based on their effect or potential to impact on the environment.

When reporting environmental incidents to the Agency, the incident should be ranked as per this table.

Ranking	Classification	Impact on the environment
1	Minor	<ul style="list-style-type: none"> <li>▪ <b>No contamination, localised effects</b></li> <li>▪ Minor effect on air quality as evidenced by dust or odour complaint(s)</li> <li>▪ ELV breaches</li> <li>▪ An emission which does not comply with the requirements of the licence/COA (a pattern of repeated minor incidents should be taken into account when considering the level of response)</li> </ul>
2	Limited	<ul style="list-style-type: none"> <li>▪ <b>Simple contamination, localised effects of short duration</b></li> <li>Local limited impact to water, land and air</li> <li>Notification to and short term closure of potable water extractors required</li> </ul>
3	Serious	<ul style="list-style-type: none"> <li>▪ <b>Simple contamination, widespread effects of extended duration</b></li> <li>▪ Significant effects on water quality</li> <li>▪ Major damage to an ecosystem (e.g. significant impact on fish population)</li> <li>▪ Longer term closure of potable water extractors</li> <li>▪ Significant reduction in amenity value</li> <li>▪ Significant damage to agriculture or commerce</li> <li>▪ Significant impact on man</li> </ul>
4	Very Serious	<ul style="list-style-type: none"> <li>▪ <b>Heavy contamination, localised effects of extended duration</b></li> </ul>
5	Catastrophic	<ul style="list-style-type: none"> <li>▪ <b>Very heavy contamination, widespread effects of extended duration</b></li> </ul>

Rankings of very serious or catastrophic impact on the environment are new incident classifications and are for incidents at a level that would be considered major emergencies. A major emergency is defined as an event which, usually occurs with little or no warning, causes or threatens death or injury, serious disruption of essential services, or damage to property, the environment or infrastructure beyond the normal capabilities of the principal emergency services in the area in which the event occurs and requiring the

activation of specific additional procedures to ensure an effective, coordinated response.

The following should also be considered as part of the assessment:

- The effects on water quality
- The potential for damage to an ecosystem (e.g. impact on fish population)
- Any requirement for notification or closure of potable water extractors
- The potential reduction in amenity value
- The potential for damage to agriculture or commerce
- The broader impact on man
- The remedial action necessary
- The likely timescale of short term and longer term environmental consequences
- The environmental consequences of likely response action
- Any injury or loss of life caused by the incident

6.0 In the event of an incident occurring at Knockharley Landfill, the following steps should be followed:

6.1. Deploy the necessary resources to deal with the incident

6.2. Activate the Emergency Preparedness & Response Procedure (EMS-SP-07(b), where necessary

6.3. Notify the EPA by telephone as soon as practicable and in any case not later than 10.00am the following working day after the occurrence of any incident. During office hours, Monday to Friday 09:00 to 17:00 number 01-2680100. Notifications of environmental incidents outside normal working hours can be made by telephone to EPA headquarters on telephone number 053-9160600, or by telephoning any of the Regional Inspectorates. Callers are given the option to record a message or an urgent environmental pollution incident message. All Rank 2 to 5 incident notifications should be recorded as urgent environmental pollution incidents to ensure that the message is accessed and assessed by EPA staff. The EPA staff member will assess the message and decide what action/response is required by the EPA. Rank 1 Incident notifications should be recorded as a non-urgent environmental incident.

6.4. Submit a written record

Communicate details of the incident to the EPA Inspector in the electronic reporting system **EDEN**, as soon as practicable and in any case within five working days after the occurrence of any incident, also by telephone depending on the severity of the incident.

This written record should include all the aspects detailed below:

- 6.4.1. The date, time and place of the incident
- 6.4.2. Details of the immediate investigation which was carried out to identify the nature, source and cause of the incident and any emission arising there from.
- 6.4.3. Details of the isolation of the source of any such emission.
- 6.4.4. Evaluation of the environmental pollution, if any, caused by the incident.
- 6.4.5. Identification and description of the execution of measures to minimise the emissions/malfunction and the effects thereof.
- 6.4.6. A proposal to the Agency for its agreement within one month of the incident occurring to:
  - 6.4.6.1. identify and put in place measures to avoid reoccurrence of the incident: and
  - 6.4.6.2. Identify and put in place any other appropriate remedial action.
- 6.5. In the event of any incident which relates to discharges to surface water or groundwaters, notify the Eastern Regional Fisheries Board as soon as practicable and in any case not later than 10.00am on the following working day after such an incident.
- 6.6. Should any further actions be taken as a result of an incident occurring, we shall forward a written report of those actions to the Agency as soon as practicable and no later than ten days after the initiation of those events.
- 6.7. All incidents recorded as part of the waste licence should be recorded as Non Conformance.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-23 Reporting of Environmental Incidents	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure details the method to be used by landfill staff when disposing of special waste types requiring secure burial, for example, Department of Agriculture, Fisheries and Food (DAFF) designated Category 1 wastes.

## 2.0 Responsibility

The Facility Manager will implement this procedure. It is the responsibility of all staff to follow this procedure at all times.

## 3.0 References

EMS-OP-09 Waste Acceptance and Handling Procedure  
Department of Agriculture, Fisheries & Food Swill Licence

## 4.0 Procedure

In the case of Category 1 Waste:

- 4.1. Prior to arrival at the landfill, waste will be characterised in accordance with the facility waste acceptance procedure EMS-OP-09. If this characterisation identifies the waste as a Category 1 waste, the secure burial procedure will be applied.
- 4.2. When the waste arrives at the weighbridge, the weighbridge operator will ensure "Category 1 waste" is marked on the weighbridge docket.
- 4.3. The DAFF swill licence requires that *"the container shall be unloaded and the waste covered and backfilled immediately in such a way as to prevent access by wildlife. The location where the waste is buried should not be disturbed in subsequent operations"*.

To ensure this is complied with, the following steps will be taken –

- 4.3.1. A section at the base of the working area is selected as the secure burial site
- 4.3.2. The surrounding waste is pulled back to create a pit in which the specific waste can be tipped or where this is not possible, a bunded area is created to provide a secure, designated area for tipping
- 4.3.3. The specific waste is tipped into the designated area and then immediately covered over with other waste materials

4.3.4. The area is then compacted using a landfill compactor to ensure the waste is securely enclosed

4.3.5. Additional waste loads are subsequently tipped over the area and repeatedly compacted

4.3.6. At the end of the day the full working area is covered with 150mm of mineral fines and woodchip

4.3.7. Once the section is completed the entire area is capped with minimum 400mm of clay

For all other special waste requiring secure burial:

4.4. Prior to arrival at the landfill, waste will be characterised in accordance with the facility waste acceptance procedure EMS-OP-09. If this characterisation identifies the waste as special waste which requires secure burial, the following steps will be taken.

4.4.1. A section at the base of the working area is selected as the secure burial site

4.4.2. The surrounding waste is pulled back to create a pit in which the specific waste can be tipped or where this is not possible, a bunded area is created to provide a secure, designated area for tipping

4.4.3. The specific waste is tipped into the designated area and then immediately covered over with other waste materials

4.4.4. The area is then compacted using a landfill compactor to ensure the waste is securely enclosed

4.4.5. Additional waste loads are subsequently tipped over the area and repeatedly compacted

4.4.6. At the end of the day the full working area is covered with 150mm of mineral fines and woodchip

4.4.7. Once the section is completed the entire area is capped with minimum 400mm of clay

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-24 Procedure for Secure Burial of Waste	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure details the working face co-ordinator (WFCO) duties and responsibilities and sets out the method to achieve these without harm to human health or the environment.

## 2.0 Responsibility

The FM will implement this procedure. The WFCO is responsible for working in accordance with this procedure.

## 3.0 References

EMS-EF-30 Daily Site Condition  
EMS-OP-09 Waste Acceptance and Handling Procedures  
Working face coordinator TBT training  
Haulier and contractor site inductions

## 4.0 Procedure

The WFCO must abide by the following procedures:

- 4.1. Only the driver of the waste vehicle is allowed to operate the controls of the ejector.
- 4.2. The WFCO must stand well clear of the vehicle at all times.
- 4.3. The WFCO must not walk underneath the back door of a vehicle when it is raised. This is because the back door could close suddenly causing injury to the WFCO.
- 4.4. Drivers must not be allowed to climb on top of vehicles. If a driver attempts to climb on top of a waste vehicle, please inform the site foreman or manager immediately.
- 4.5. Only the vehicle driver is allowed to attach the towing sling to his vehicle. The WFCO must not attach the towing sling.
- 4.6. The WFCO must not clear the tail boards of ejector trailers. This is the responsibility of the driver.
- 4.7. Always stand well clear of the waste as it is being pushed out of the ejectors. The waste heap can fall suddenly and unexpectedly to one side.

The WFCO has the following *duties* and *responsibilities*:

- 4.8. The WFCO is responsible for checking and ensuring that all drivers are wearing appropriate PPE
  - 4.8.1. Appropriate PPE includes hard hat, hi-viz jacket or vest and safety boots.
  - 4.8.2. Bump caps must not be worn under any circumstances – drivers must wear proper hard hats.

- 4.9. The WFCO must wear a hard hat, hi-viz jacket or vest, safety boots, safety gloves, eye protection and ear protection at all times.
- 4.10. The WFCO must visually check the waste as it is being deposited and ensure that the site foreman is notified of any non-conforming waste. Any waste such as tyres should be removed immediately and consigned to the quarantine receptacle.
- 4.11. The WFCO must ensure that vehicle drivers do not smoke on site. Knockharley Landfill is a non-smoking site with the exception of the designated smoking area to the rear of the site offices.
- 4.12. The WFCO must identify reasonably firm level ground in order to discharge tippers such as vehicles carrying C&D fines. These must be tipped in a safe location so that should they tip over, no damage or injury is caused. If a tipper raises its body and appears to sway or lean to one side then the driver must be instructed to lower his body immediately. The vehicle should then be repositioned on more firm level ground before it attempts to discharge its load again.
- 4.13. If conditions in the working area become dusty, the WFCO should inform the site foreman immediately so that arrangements can be made for dampening down. Eye and ear protection must be worn on the working face at all times. Dust masks are available in the site office.
- 4.14. Before the vehicle leaves the working area, the WFCO should ensure that the body or back door is fully lowered and nets are in place.
- 4.15. The WFCO must never leave the working area unattended unless advised to do so by the foreman or manager.

**Never take short cuts in order to speed up the process.**

**The priority is to discharge the loads as safely as possible, not as quickly as possible.**

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	21/01/16	EMS-OP-25 Banksman Operating Procedure	All	GH	TF
002	24/01/17	Change wording from banksman to working face co-ordinator	All	MW	TF
003	23/07/18	Updated with reference to haulier/contractor	Section 3.0	MW	TF

		inductions & TBT training on Working face coordinator			
004	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure documents the approach to be taken to prevent fraudulent acceptance of waste loads at the facility.

## 2.0 Responsibility

The LM will implement this procedure and provide the required training and tuition. The LM and other nominated staff will ensure that the procedure is correctly followed.

## 3.0 References

Weighbridge Dockets  
WIMS Reports  
Camera Recordings

## 4.0 Procedure

- 4.1 The area at the facility entrance (e.g. weighbridge) and any other bypass roads shall be covered by security cameras. The cameras shall be connected to a recording device with a memory capacity of at least 10 days of recordings. This shall take into account the increased amount of recordings during summertime with longer hours of daylight. On a weekly basis, the recordings shall be saved on a read-only memory device, e.g. CD-ROM. The saved recordings shall be safely stored at the facility for not less than one year.
- 4.2 The camera recordings shall be inspected on a random basis by the LM or nominated staff, in any case not less than once per week. Particular attention shall be paid to unscheduled vehicles accessing the facility during weekend or other non-weekend periods.
- 4.3 On a regular basis, in any case not less than once per month, the LM or nominated staff shall carry out an inspection of camera recordings of one randomly selected day and compare the weighbridge records and WIMS reports with the camera

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recordings for that selected day. It shall be ensured that all waste vehicles accessing the facility have been entered on the WIMS system and are recorded on weighbridge docketts.

4.4 During the random inspections of recordings attention shall also be paid to the waste types recorded on weighbridge records and WIMS reports. These shall correspond with the waste types identified on the recordings.

4.5 On a daily basis, the Site Supervisor or other nominated staff overseeing the opening of the working face, shall inspect the area of the working face for any irregularities, e.g. uncovered, uncompacted or otherwise unusual sections of waste, which could indicate the deposit of a waste load outside of normal waste activities.

4.6 The working hours of waste compactors and other machines employed for placement and compaction of waste shall be recorded on a daily basis at the end of each working day. On a random basis these records shall be verified with the readings of the machines prior to commencing operations on the following day.

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-26 Fraud Protection Procedure	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS



## 1.0 Scope

Provides for the correct operation of Knockharley Gas Utilisation Plant Haase Flares

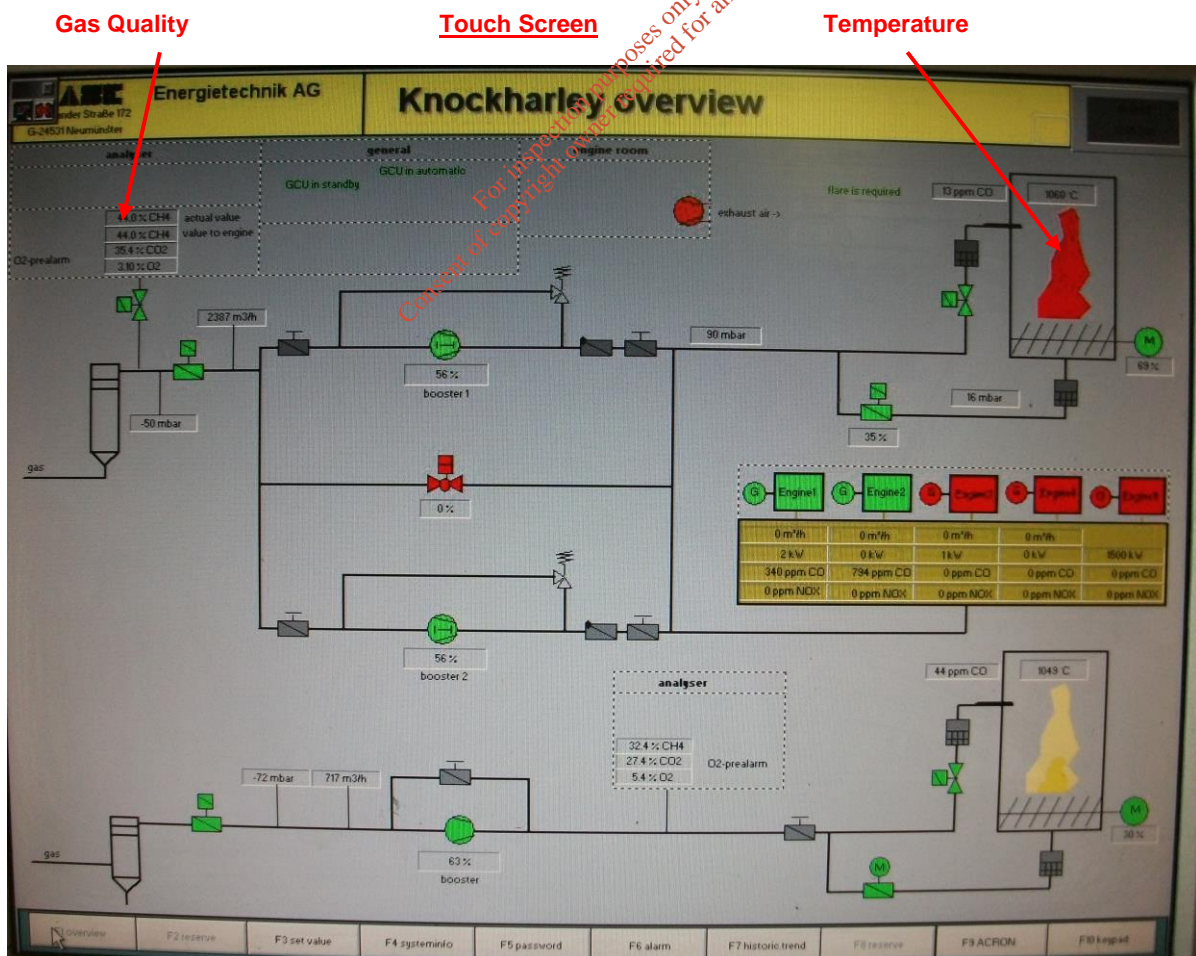
## 2.0 Responsibility

The FM will implement this procedure. All staff are responsible for following the correct start-up procedure.

## 3.0 References

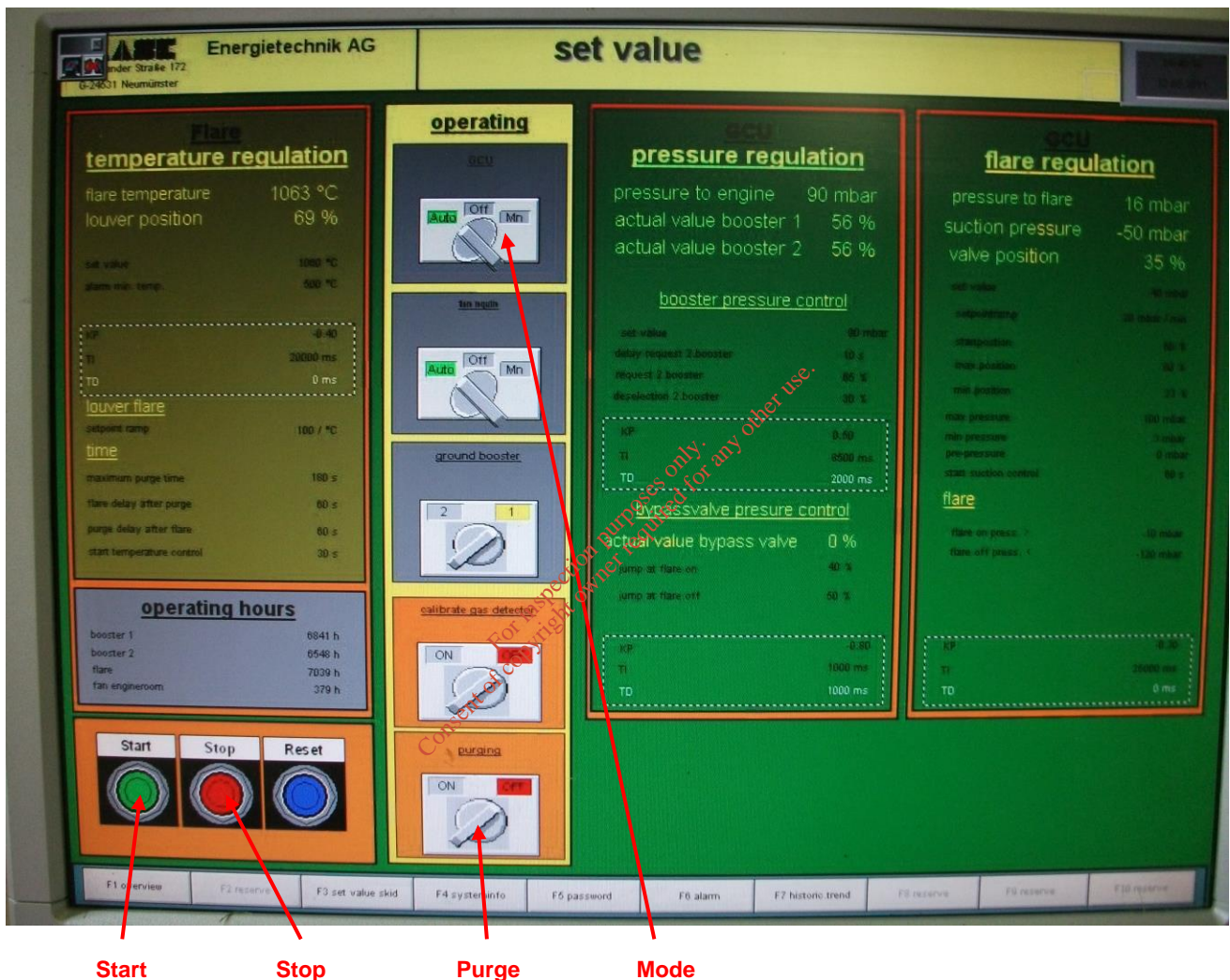
## 4.0 Procedure – Start-Up

- 4.1 Locate the operating control panel inside the booster control room at rear of booster container of Flare 3 (lights switch located immediately inside the doors).
- 4.2 Touch the display panel in any location to activate the control panel screen
- 4.3 On **F1-OVERVIEW** screen the gas quality will be indicated in the centre left hand side of screen. Gas quality of >36% CH<sub>4</sub> and <6% O<sub>2</sub> will be required to start either flare. If the quality is outside of this range the flare will have to be purged before it can be started.



4.4 Locate the **F3-SET VALUE** function key at the bottom of the control panel. Tap a second time to bring up flare 2 controls.

Set Value Screen



4.5 Purge flare by moving purge switch located on set value screen to auto and then pressing start. The blower will run drawing fresh gas into analyser. Once gas quality is in correct range press stop and purging process will stop.

4.6 Ensure the Flare is operating in **AUTOMATIC MODE**. Automatic mode can be activated by touching the green **AUTO** mode on the touch screen. Flare will ramp up to set values in run mode automatically.

## 5.0 Procedure – Shut Down

- 5.1. Locate the operating control panel, in the control room at the rear of the Flare Container adjacent to the flare stack (light switch is located immediately inside the door).
- 5.2. Touch the display panel in any location to activate the control panel screen, as above.
- 5.3. Locate the F3-SET VALUE function key at the bottom of the control panel, as above.
- 5.4. Locate the **STOP** button at the bottom Left Hand Corner of the control panel. Push.

## 6.0 Procedure – Operating MV Switch Gear

- 6.1. If power has failed at the site the following steps should be taken starting with the “Main Supply from ESB” Circuit Breaker and then on the other circuit breakers as necessary. The following Procedure is for basic operation of the Circuit Breakers in the Panel by a site operative. The Circuit Breakers are Main ESB Supply, Generator 1 and Generator 2.
- 6.2. The picture below shows the MV four panel boards in the Knockharley substation.



- 6.3. Check the Power indicator on Main ESB Supply.
- 6.4. If the lights are off call the ESB as there is no longer a supply to the site.
- 6.5. If the lights are on check to see the Circuit Breaker is Closed Indicated by the white Close Indicator.

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Open Indicator

Closed Indicator

Power Indicators

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6.6. If the White Closed Indicator is Off and the green open indicator is On check for faults on the Sepam Relay.

6.7. If there is a fault displayed, record the information that is displayed on the Sepam Relay.



- 6.8. Most faults are over current trip issues where a disturbance in the network causes a trip. The Sepam will allow the breaker to be closed in this situation.
- 6.9. To Close the Breaker press the Green Close Button. **THERE WILL BE A LOUD BANG FOLLOWED BY A WHIRRING NOISE THIS IS NORMAL.**
- 6.10. The circuit Breaker should be closed now and the White close indicator should be lighting.
- 6.11. If the Circuit Breaker Trips on closing (i.e. it remains open) do not attempt to close again instead call Bioverda for assistance.



Open Button      Close Button

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Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	27/01/16	EMS-OP-27	All	GH	TF
002	21/06/19	Name Change	Header	POR	SS

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## 1.0 Purpose

The purpose of this procedure is to identify fire prevention measures in order to:

- Minimise the risk of Fire.
- Ensure earliest possible detection of the outbreak of fire.
- Ensure earliest possible response in the event of fire.
- Ensure to follow the Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres at all times.
- Ensure in so far as is reasonably practicable that first aid and fire-fighting equipment are in place.
- Ensure that the Emergency evacuation controls are in place and implemented to safeguard the safety of site personnel, visitors and neighbours.

## 2.0 Scope

This procedure applies to all Knockharley activities

## 3.0 Responsibility

3.1 The Landfill Manager is responsible for implementation of this procedure and for ensuring that the necessary measures are in place to prevent fire across the site in line with this procedure, the site specific Emergency Preparedness Response Plan and the Explosive protection document 2016.

3.2 The operations/site supervisor is responsible for ensuring that:

- This procedure is implemented and maintained
- Site employees understand their responsibilities in relation to fire prevention and are aware of actions to be taken in the event of a fire.
- Appropriate emergency equipment is readily available, serviced and usable.

3.3 Site staff must adhere to the requirements defined in the Emergency Preparedness Response Plan, the requirements of this procedure and the explosive protection document 2016.

## 4.0 References

EMS-EF-11 Emergency Procedure Test

EMS-OP-11 WASTE ACCEPTANCE AT WEIGHBRIDGE

EMS-OP-05 FUEL STORAGE & DISTRIBUTION

EMS-EMP-04 LANDFILL GAS BALANCING & MONITORING

EMS-SOP-06 LANDFILL GAS FLARE MONITORING

EMS-EF-30 DAILY SITE CONDITION REPORT

EMS-EF-16 Non-Conformance & Corrective Action Record

EMS-SP-12 AGB and BPS communication procedure

HS-SF-034 Weekly fire safety inspection

IED Licence W0146-02

EPD/Atex (Explosive Protection Document 2016)

Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres Document

BPS Emergency Response Plan and risk assessments

## 5.0 Procedure

5.1 The following sources of ignition may cause a fire on the landfill/site:

- Fire/explosion at the diesel tank
- Incoming load on fire
- Landfill gas fire/explosion
- Fire within the waste
- Electrical or mobile plant/equipment overheating catching fire
- Smoking on site

5.2 The following control measures are initiated to control the sources of Ignition.

### Waste/gas:

- All loads checked at weight bridge
- No mattress policy in force
- Hazardous/flammable material such as pressurised containers are not allowed to be tipped at the site (as per clause 1.8 of our waste licence) Customers also informed of what waste we do not accept
- Tractor and water bower available on site to reduce dust concentrations and prevent fire
- Trained WFCO on site
- CCTV is in operation
- Landfill gas detection system in place and in offices (as per clause 3.20 of our waste licence).
- Atex assessed (EPD 2016)
- Electrical equipment used near leachate transfer sites are suitable
- LFG flares and engines are operating and burning off gas to prevent gas build up (as per clause 3.15.2 of our waste licence).
- Gas monitoring is carried on a weekly basis by a dedicated person to identify the potential for the release of odours and build-up of

gas. Following the gas balancing & monitoring, flares/engines can be used to increase suction (or decrease suction) to prevent gas build ups (or odours), to mitigate the risk of a fire/explosion from happening.

- Flares are ATEX approved and fitted with gas monitoring and ventilation.
- Flares are maintained in accordance with manufacturer's instructions
- Waste is compacted to prevent build-up of air and gases

### 5.3 Material Storage:

- Diesel tank is fenced off/ bunded
- Diesel tank pump is locked at all times, controlled by supervisor
- All spills are cleaned up immediately
- MSDS sheets are available
- Timely turnaround of waste containers.
- No smoking policy on site with a designated smoking area provided and adequate signage provided

### 5.4 Electrical/Mechanical:

- Adequate firefighting equipment available
- Pre-op checks carried out on all machinery
- Maintenance schedule in operation
- All portable electrical equipment tested annually
- Maintenance shop area to be kept tidy and gas bottles chained up
- Electrical switch rooms to be kept tidy and locked
- Mobile plant/equipment to be cleaned down regularly
- All mobile plant are equipped with fire extinguishers

### 5.5 Emergency Response:

Site specific Emergency Preparedness Response (EMS-SP-07a) is in Place (as per clause 9.2 in our licence) (and an EPD review has been carried out in 2016) to include:

- Weekly checking of all fire equipment to include fire extinguishers, fire hydrants and fire hoses.
- Ensure any extinguishers that are spent are refilled or replaced

- Annual checking and maintenance of all firefighting equipment as required by legislation.
- Six monthly fire drills (different scenario used each time)
- All Electrical equipment is selected as per “Procedure for selection & Procurement of Equipment for use in potentially Explosive Atmospheres” document.
- Trained fire wardens
- Fire detection systems are in place and serviced
- Permit to work system in place
- Contractor induction training on the ERP & the EPD/Atex areas

Revision No.	Revision Date	Description	Sections Affected	Revised BY	Approved BY
001	07/06/2016	EMS-OP-28 FIRE PREVENTION PLAN	All	MW	TF
002	19/09/16	EPD 2016 reference	All	MW	TF
003	30/08/17	Reference to gas monitoring as a fire prevention measure	4.2	MW	TF
004	25/05/18	Reference to procurement of equipment for use in potentially explosive atmospheres	4.2 & 4.5	MW	TF
005	31/05/18	Reference change to EMS-EMP-04 Landfill gas Balancing & Monitoring Procedure	1.0 & 4.0	MW	TF
006	21/06/19	Name Change	Header	POR	SS

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## 1.0 Scope

This procedure is to ensure a consistent and systematic approach to the assessment and investigation of odours when carrying out odour patrols & odour investigations of the landfill & the surrounding facility.

## 2.0 Responsibility

KNH Facility Management are responsible for the implementation of this procedure. All relevant KNH personnel who carry out odour patrols will follow this step by step procedure.

## 3.0 References

EPA Air Guidance Note (AG5) Odour Impact Assessment Guidance for EPA

Licensed sites

EMS-OP-19 Odour Management Plan for Knockharley Landfill

EMS-OP-18 Nuisance Inspection Procedure

EMS-OP-01 Complaints Procedure

EMS-EF-30 Daily Site Condition Report

EMS-EF-26 Odour Inspection assessment

EMS-SP-04 Resources, Competence & Awareness

EMS-OP-02 Operation start-up/shut down & compaction of waste

EMS-OP-08 Completion of daily site condition report

EMS-OP-09 Waste Acceptance & Handling Procedure

EMS-OP-17 Weekly inspection Procedure

EMS-OP-22 Installation of Horizontal Wells Procedure

EMS-OP-23 Reporting of Environmental incidents

EMS-OP-27 Haase Flare Operation

EPA IED Licence 146-02 KNH

“License condition 6.2: The licensee shall ensure that the activities shall be carried out in a manner such that emissions do not result in significant impairment of, or significant interference with the environment beyond the facility boundary.

Licensee condition 7.1: The licensee shall ensure that vermin, birds, flies, mud, dust, litter and odours do not give rise to nuisance at the facility or in the immediate area of the facility. Any method used by the licensee to control any such nuisance shall not cause environmental pollution.

## Procedure

- 4.1 All KNH personnel that carry out odour patrols/Investigations, under go training so that KNH Ltd will achieve consistency in the way odour assessments are carried out and that the appropriate information is recorded in the odour assessment reports.
- 4.2 Odour patrols are recorded on EMS-EF-26 "Assessment of Odour Impact", are carried out on a regular basis and also in response to odour complaints.
- 4.3 The ranking system in the notes section must be referenced at all times when completing your field observations ie wind strength, observation sensitivity, weather conditions, odour persistence and odour intensity.
- 4.4 Daily weather condition information must be recorded off the weather station and logged on the odour impact form ie wind direction, temp & atmospheric pressure, before you start your odour assessment.
- 4.5 All other relevant sections are to be filled in ie name, date, start time, reason for odour assessment etc.
- 4.6 A scaled map of the area is used for every odour patrol/investigation, with fixed odour assessment locations marked on the map, with observation point sensitivity levels from 1-5 for reference to how near you are to housing/commercial property from your odour assessment location.
- 4.7 The assessment of odour locations will depend on: responding to a complaint, routine assessment or attempting to establish the source of an odour.
- 4.8 The odour assessor must adhere to the following rules before he/she conducts an odour patrol/investigation:
- If the assessor has a cold, flue, sore throat, sinus trouble, they mustn't carryout an odour patrol
  - the assessor shouldn't smoke, consume strongly flavoured drinks, coffee or food for at least half an hour before assessment is carried out.
  - Soft drinks should be avoided immediately before and during an assessment.
  - Scented toiletries ie perfume/after shave should not be applied immediately before or during assessment.
  - Vehicles that are used for assessments should not contain deodorisers or air freshers.
- 4.9 The odour assessor drives to the chosen location, stops, gets out of the vehicle and smells the air (sniff test) for a minimum of 5 minutes at each location.
- 4.10 The odour assessor will note any odours, smells or activities in this assessment area, into the "odour description section" on the odour assessment form ie, fresh waste, gas smell or no odour detected. Anything else that may have an impact on odours in the assessment area ie waste bins left out for

collection, farmers spraying slurry or any other relevant information should also be noted in this section.

- 4.11 If the odour assessor meets any residents or receives a complaint during the their odour assessment, they must record the details of what was said in the “brief details of any meeting” section on the odour assessment form.
- 4.12 This procedure must be followed at all times for odour assessments, until the odour patrol/investigation is completed.

## 5.0 Post Odour Assessment Site Inspection

- 5.1 Following an odour assessment during which a potential odour has been recorded off site, an inspection of the facility will be carried out by the odour assessor, in order to determine whether or not the odour detected outside can be contributed to or linked to any onsite activities.
- 5.2 The “Odour Source Investigation” section on EMS-EF-26 is filled out by the odour assessor (this is the only time this section is filled out).
- 5.3 The on-site assessment investigation should include:
- A walk downwind of the site boundary to verify if odours can be detected.
  - An examination of site activities, to identify practices that may give rise to odours.
  - An assessment of particular areas (this assessment will cover all possible odour sources on site).
  - SCADA information will be reviewed to verify wind directions etc and any possible equipment malfunctions or equipment shut downs.

## 6.0 Complaint

- 6.1 Any odour inspections carried out following receipt of a complaint, shall have particular regard to the location to which the complaint relates and shall also have regard to any observations or other activities in the area that could have been the source of the complaint
- 6.2 The starting point should be upwind of the complaint prior to visiting the complainant.
- 6.3 The odour assessment procedure detailed in **section 4.0** should be followed to complete the complaint investigation.
- 6.4 A written response will be sent to the complainant or a phone call if requested, detailing any investigation details, corrective action or mitigation measures taken if appropriate. If relevant to the nature of the complaint, the appropriate meteorological data will also be included in the complaint response.
- 6.5 If the complaint is made through EDEN then the complaint response will be uploaded onto EDEN (EPAs website) with supporting documentation if applicable.



**7.0 EPA Inspector issuing a Non-compliance for odour following site visit**

License condition 6.2: “The licensee shall ensure that the activities shall be carried out in a manner such that emissions do not result in significant, impairment of, or significant interference with the environment beyond the facility boundary”

- 7.1 If an EPA inspector/contractor is of the opinion there is an odour following his/her site visit that would cause an *“impairment of, or significant interference with the environment beyond the facility boundary”* then in order to confirm or deny the presence of an odour off site, KNH landfill management will offer the opportunity to the EPA inspector to Conduct a joint (but separate) odour assessment of the effected area(s) as per the recommendation in **section 3.2 of the EPAs Air Guidance Note (AG5) Odour Impact Assessment Guidance for EPA Licensed sites**, which states:  
*“The odour assessment has added value if two or more odour investigators take part. This provides an option to: Make "side by side" assessments. In such cases there should be no discussion about their results until the assessment is completed. Each odour investigator completes their own Field Record Sheet (Annex A).*

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
EMS-OP-29	03/04/17	Odour Assessment Procedure	All	Michael Walker	TF/TF
002	05/12/18	Updated procedure	Section 4.2	MW	MW
003	10/01/19	Added in joint odour assessments	Section 7.0 & 7.1	MW	DM
004	21/06/19	Name Change	Header	POR	SS

## 1.0 Scope

This procedure describes the instructions to be followed for using the lone worker system and in case of an emergency while carrying out lone working activities on Knockharley landfill.

## 2.0 Responsibility

The Health & Safety Manager (HS) will implement this procedure. Site management and site personnel working on site are responsible for ensuring that they switch on and use their lone worker system at all times while conducting lone worker activities, failure to adhere (switch on the lone worker system) and follow this procedure may lead to disciplinary proceedings.

## 3.0 References

Emergency Response Plan (ERP)  
Lone Worker Information Documents  
Lone Worker Risk Assessment

## 4.0 Procedure

4.1 When working alone you should enable the “lone working and man-down” on your phone.

This is easily done using the on-screen widget.

4.2 Tap the “**Lone Working**” button to change it from Grey to Green to enable lone working. When lone working is green, this will allow you to activate an SOS alert should you need to. If it is grey **you** will not be able to activate SOS or Man Down alerts.

4.3 Tap the “**Man Down**” button to change it from Grey to Green to enable Man Down detection. When Lone Working and Man Down is enabled the angle and movement of the phone is monitored by the Atlas SOS Smart app. If the angle of the phone is beyond 30° from horizontal and is not moving for 10 seconds a warning sound will be given. This warning sound will continue for 40 seconds and then an alert will be automatically sent. If, during the warning sound, the phone is moved or brought above 30° the warning sound will stop, and the alert will **not** be sent.

***It is recommended that you carry your smartphone in a holster/pouch on your belt to keep it upright in normal conditions.***

### 4.4 Activating an SOS Alert

- Using the **Keyfob**, press and hold Button 1 for at least 3 seconds. You will feel a short vibration each second that you are holding the button. After 3 vibrations are felt you can release the button and the alert activation process will begin.
- To activate an SOS alert using only the app, tap the SOS button in the middle

of the Widget or launch the Atlas SOS Smart app. The Atlas SOS Smart app will fill the screen and there will be a large SOS button with a green circle around it.

- Press and hold the large on-screen SOS button. The on-screen SOS button will change from **green** to **red** while it is being pressed and a short vibration will be given each second until the button has been held for long enough. Keep pressing it for 5 seconds. The vibration pulses will stop, and a notification beep will be given and at this point the alert will be sent.
- *Once an alert is activated it cannot be stopped mid-way and you should let it proceed until you are given the option to close the alert. The Atlas SOS Smart app will stay in the foreground until the alert is closed (see Deactivating an Alert for more information)*

#### 4.5 Activating a Man Down Alert:

- Both Lone Working and Man Down must be enabled in the Widget for Man Down detection to occur. Carry the phone in a suitable place e.g. pouch/holster on our belt or in a chest pocket. If while carrying the phone normally it is detected that the smartphone is in the man down position and not moving for a period of time, a warning sound will be given. After 40 seconds of warning sounds an alert will be automatically sent. Returning the phone to the upright position or moving it will stop the warning sound and prevent the alert from being sent. *Once the Man Down alert is activated it cannot be stopped mid-way and you should let it proceed until you are given the option to close the alert. The Atlas SOS Smart app will stay in the foreground until the alert is closed (see Deactivating an Alert for more information)*

#### 4.6 Deactivating an Alert:

- If an alert is activated either by pressing the SOS button or through a Man Down detection it should be allowed to complete the process of transmitting the alert. Once completed the display will change to a large red SOS button, stay in the foreground and 2 option buttons will appear, **False** and **Close**.

##### **False Button**

- If the alert was a false alert, was accidentally activated or was a test activation then the False option should be chosen. When chosen and confirmed that it was a false alert, a notification will be sent to all responders notifying them that it was a false alert.

##### **Close Button**

- If the alert was a real alert but the situation is now resolved this option should be chosen. When chosen and confirmed a notification will be sent to all responders notifying them that the alert is now closed.

#### 4.7 Activating “Time Personal Alert” (TPA)

- Launch the TPA app by selecting the TPA icon
- Select the number of minutes ie 15, 30, 60 or 90 and add notes in, about location, task, etc into the text box
- Click the “start TPA” button to start the TPA.
- At set intervals you will receive up to 4 SMS text messages and up to 4 reminders from the app
- From the reminder screen you have 3 options to choose from (select what is most appropriate):
  - 1) Cancel the current TPA
  - 2) Restart the TPA
  - 3) Ignore reminder
- When a TPA expires an alert screen is displayed automatically, two options are available:
  - 1) **False:** send a false alert notification to all responders. The alert will be automatically closed.
  - 2) **Close:** Close the alert on the app and send a notification to all responders that the alert is closed

#### 4.8 Receiving and Responding to SMS text messages alerts

- When an alert is activated by a lone worker their nominated responder will receive a number of text messages alerting them to the situation.
- Reply to any of the received SMS messages with the word “**manage**” and the lone workers ID. **Note: the lone workers ID is the last 4 digits of their phone number which would have been included in the alert SMS text message you received.**
- Within a few seconds (normally less than 30 seconds) you will receive a confirmation SMS text message ie *<your name> is dealing with case:4567 – 20160202215302450, for john smith.*
- This message is also sent to all responders for this alert and to the lone worker.
- The lone workers device will give a GPS position to responders in the form of longitude and latitude coordinates or the last known GPS coordinates (GPS coordinates are up-dated every 5 minutes on lone worker device).
- It is possible you could receive multiple mapping SMS messages. Each SMS message will have the word “**MAP**” in the message, how old the information is and a link to the map, click on text that is under lined ie **John smith, map fix age:0 old**<http://maps.google.com/maps?q=53.276276,-6.208407&z=15> ,
- Clicking on the underlined text in the message will open the map.
- You will be asked to choose which app to use to open link, click “Google and select always”.
- From within google maps you can ask it to provide you with directions directly to the lone worker (see also point 4 on aspect 247).

- Assess patient and situation ie do you need to call the emergency services etc  
**See Important notes 1,2, & 3 below for more information.**

#### 4.9 Contacting the lone worker

- When the lone worker has used their UrSOSbutton and activated an alert, their smartphone will enter a mode that enables a responder to talk to the lone worker on their phone to answer calls.
  - 1) You should first manage the alert as described earlier in section 4.8.
  - 2) Call the lone worker on the number provided in the text message.
  - 3) Once you hear either a **ring tone** from the lone workers phone or a **busy tone** or the lone workers voice mail, hang up the call
  - 4) The lone workers phone will now call you back automatically and enter **hands free/speaker phone** mode. You can now talk to the lone worker without them needing to select any buttons on the phone.

**Note:** As part of the alerting mechanism the lone works phone will make a voice call to the monitoring system. The call will last a minimum of 30 seconds and is used as a secondary method of raising the alarm. Do not attempt to call the lone worker during this time frame, wait for a suitable period before you ring the lone worker after their alert. Any calls made to the lone worker during this call will be ignored and you **will not** receive a call back.

#### 4.9.1 False Alerts

If you contact the lone worker and determine that the alert is a false alert,

- 1) Rely to any of the received messages with the word **FALSE** and the lone Workers ID e.g False 4567 (last 4 digits of their phone number contained in the text messages you would have received).
- 2) Within a few seconds (normally 60 seconds) you and all the other responders will receive a SMS text message stating that the alert was a false alert and the case is now closed

#### Important Notes:

- 1) BNG (and KTK) personnel will unlock the front gate (close over while on site) and leave the gate unlocked should the emergency services need to gain entry to the landfill site in case of an **emergency (these details must be passed onto the emergency services should they be needed).**
- 2) KNH landfills front gate code is 4321 and the main gate can be opened by netwatch security once the emergency services ring the bell located on the wall to talk to netwatch security personnel **(these details must be passed onto the emergency services should they be needed).**
- 3) BNG & KNH first responders are to use the latitude and longitude coordinates given in the SMS messages for the emergency services to locate the lone worker, should they be unable to attend/get to the person in time or they need the help of the emergency services.

- 4) KTK first responders are to use the latitude and longitude coordinates given in the SMS messages to contact Kennedy Security to give the location of the lone worker, should they be unable to attend/get to the person in time or they need the help of the emergency services.
- 5) After turning on or rebooting your phone you must unlock your phone at least once for all features to work correctly
- 6) Make sure lone working is **enabled** when you are required to do so
- 7) Confirm/check that the battery in your smartphone has sufficient charge to last the entire day
- 8) Make sure your sound levels are turned **up**, so you can hear the warning beeps from the Atlas SOS Smart app.
- 9) Test the Man Down sensor by tilting the smartphone to the horizontal position, wait for at least 15 seconds to hear the warning beep and then turn the smartphone upright to stop the warning beep.
- 10) Make sure you have mobile phone signal when working alone. Even in very low signals the advanced design of the Atlas SOS Smart app allows alerts to be transmitted but if you have no/zero signal then it will not be possible for an alert to be sent. Above normal risk lone working should not be continued in locations where it might not be possible to transmit an alert.
- 11) Test the app and all its features at least 2 times per year and if you are in any doubt of its correct operation please contact site management ASAP.
- 12) Make sure the app is kept up to date via the Google Play Store. This is normally automatic, but you should check the Google Play store regularly to ensure all updates have been applied.
- 13) In the event of an emergency situation when working alone, activate your SOS button or your lone working alarm from your smart phone. The alarm system **must** be switched on at all times during lone working. If persons are found to be working without enabling the lone working system KNH disciplinary procedure will be implemented.
- 14) Notification from the lone working alarm will be sent directly to the nominated person listed on the Emergency Contact List.
- 15) The notified person will accept the notification and attempt to contact the lone worker to assess the situation as per the Lone Worker Procedure.
- 16) In the event of no contact with the lone worker contact emergency services immediately and if required the Gardaí, giving the persons last known GPS position.
- 17) If the contact person is not the landfill Manager or site supervisor contact should be made with them as soon as possible.

- 18) On arrival at the site assess the situation and only approach the lone worker if it is safe to do so.
- 19) If ambulance is called make sure exact location is given and that the ambulance can access the location as near as possible to the injured person.
- 20) Establish location of the hospital and travel with the injured person, if it is safe to do so.
- 21) The landfill Manager or supervisor shall notify the family or next of kin of the injured person.
- 22) If the HSA are required to inspect the premises location & cause of the accident, do not move anything unless further serious risk has to be avoided.
- 23) Gather all information immediately about the accident and what led to it.
- 24) Obtain witness statements, write them down as they are given.
- 25) Communicate with the Landfill Manager to document the accident on the Accident Report Form.
- 26) KNH Eircode is: C15 FX09 for the emergency services.

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Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	31/10/17	EMS-OP-31 Lone Worker Procedure	All	MW	TF/TF
002	11/09/18	Added in Eircode for KNH	Important note section (25)	MW	TF
003	02/06/19	Updated information for KTK	Updated section KTK information (4)	MW	DH
004	21/06/19	Name Change	Header & throughout	POR	SS

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## 1.0 Scope

This procedure details the method to be used by landfill staff when installing or raising up vertical gas extraction wells on the landfill.

## 2.0 Responsibility

The Facility Manager/Site supervisor will implement this procedure. It is the responsibility of all staff to follow this procedure at all times.

## 3.0 Procedure

### Before Works Begin:

- 3.1. The Site Supervisor will notify you what wells are to be raised.
- 3.2. Check the weather (no work to take place in extreme weather conditions).
- 3.3. Ensure that there are no machinery working close or in your work area. If there are machinery in your work area then work may need to be suspended until a later date.
- 3.4. Inform machinery drivers where you are working and for how long if they are in the vicinity.
- 3.5. Ensure you are wearing the correct PPE for the job.
- 3.6. Load the jeep with the necessary tools ie chainsaw, hand tools, extension lead, and hand held angle grinder & pipe fittings.

### Raising the vertical wells:

- Identify the correct vertical well to be raised. Drill a hole into the pipe (for gas to flow out).
- Sand the top of the 125 pipe with the angle grinder to prepare for welding (this ensures a smooth weld) at the back of the jeep.
- Put Coupler onto 125 pipe and place half way down the pipe and mark position for welding.
- The 125 pipe is then carried over to the vertical well to be welded.
- The 125 pipe is lifted into place by the 2 G.Os and lightly hammered down onto the vertical well.
- One G.O holds the pipe while the other G.O connects the welder leads to the coupler
- The bar code is scanned on the pipe to set the time for the welding of the pipe (times may vary due to the outdoor temp and pipe size).
- Once the welder has finished, the 125 pipe is left stand for 20 minutes.

- The pipe is held straight by the G.O for this time.
- Now 63mm pipes are connected to the vertical well through the valve after the weld has taken.
- If required pipe is slotted using a chain saw to cut slotted into the pipe (pipe is only slotted to the level of the waste).
- Task is now finished and repeated for all other vertical wells

Finished wells (capping)

- The cage is connected to the tractor and used to lift the G.O up to the top of the vertical well to put a sleeve over the well (as per risk assessment "Working at height in the man cage").
  - The pipe seal and inner fittings are put together (the cap) to be fitted onto the vertical well
  - The 63mm pipe on the vertical well is disconnected.
  - Benonite pellets are placed around the bottom of the vertical well to create a seal (when the well has cooled after welding and soils placed around the well then water is added to the bentonite pellets to create a seal).
  - Benonite powder is put into the sleeve on the vertical well and water is added to seal the pipe and stop gas escaping.
  - Cap is lifted up and placed over the vertical well with a rubber seal clip fitted and tightened onto the vertical well.
  - 63mm pipe is then reconnected.
  - Task is repeated for all other vertical wells .
- (Water is only added to bentonite pellets after all welding has finished).

Revision No.	Revision Date	Description	Sections Affected	Revised By	Approved By
001	30-05-2018	EMS-OP-32 Procedure for the raising of Vertical Wells	All	MW	TF
002	21/06/19	Name Change	Header	POR	SS

**APPENDIX 3**

Emergency Response Procedures

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**Emergency Preparedness and Response Procedure**  
**Knockharley Landfill**  
**Last revision – July 2019**

**1.0 Scope**

- 1.1 Knockharley Landfill Ltd has established, implemented and maintains a procedure to identify potential emergency situations and respond to those situations preventing associated adverse environmental or OH&S consequences.
- 1.2 In planning emergency responses Knockharley Landfill Ltd has taken account of emergency services, neighbours etc.
- 1.3 Knockharley Landfill Ltd tests these procedures periodically.
- 1.4 Knockharley Landfill Ltd reviews and revises this procedure after testing or emergency situations, as necessary.

**2.0 Responsibility**

- 2.1 The Landfill Manager is responsible for establishing, implementing and maintaining this procedure along with periodical testing of the procedures.
- 2.2 All persons working at Knockharley Landfill are responsible for responding to emergency situations to prevent adverse environmental and OH&S situations.

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**Emergency Preparedness and Response Procedure**  
**Knockharley Landfill**  
**Last revision – July 2019**

**3.1 Emergency contact list**

Emergency Type	Company	Contact name	Contact number
Emergency Services	Fire Brigade / Ambulance / Police		112/999
A&E Department	Our Lady's Hospital Navan		046 902 1210
Site	Knockharley Landfill	Site Office	041 982 1650
		Sean Smith (Landfill Manager)	087 264 4112
		Michael Noone (Site Supervisor)	087 385 9219
		Out of hours mobile	086 818 9533
Breach of the waste licence, pollution incident etc.	Environmental Protection Agency (Dublin)	-	01 268 0100
Pollution of a waterway	Inland Fisheries Ireland	-	1890 347 424
Pollution incident or major breach of the waste licence	Meath County Council	Emergency number	1890 445 335
Reportable injury or accident	Health & Safety Authority	-	1890 289 389
Walk-in medical care for minor illnesses and injuries	VHi SwiftCare Clinic Columba House Airside Retail Park Swords Co. Dublin	Fractures, sprains, stitches, eye/ears, burns, scalds, bites, joint/muscular pain and other minor illnesses	1890 866 966
Powercut	ESB Networks	-	1850 372 999

**3.2 Contacts outside of normal working hours**

3.2.1 The site has monitored CCTV installed and in the case of an emergency outside of normal working hours the security company telephones the duty manager and/or deputy. The duty manager responds as quickly as possible.

**4.0 References**

Accident Report Form  
 Accident and Incident Register

## **5.0 Emergency procedures**

### **5.1 Identification of potential emergency situations**

5.1.1 Knockharley Landfill Ltd has identified a list of potential emergency situations from various sources including -

- Results of hazard identification and risk assessment
- Legal requirements
- Previous accidents, incidents and emergency situations
- Emergency situations on other AGB Landfill Holdings sites
- Specific activities on site during normal and abnormal conditions
- Results of daily site condition reports

### **5.2 Emergency procedures**

5.2.1 This procedure has been developed to minimise the adverse consequences of an emergency event on the environment and OH&S.

5.2.2 This procedure is clear and concise and details potential emergency situations, details of actions to be taken by personnel, evacuation procedures, roles of personnel, communication with emergency services and anyone else concerned and information about the emergency response.

5.2.3 A safety plan for Knockharley has been drawn of the site to be used as part of the emergency response and provides location details of the following.

- fire alarms / detection system
- fire protection equipment
- assembly points
- first aid boxes
- spill kits
- isolation valves
- chemical storage
- diesel storage
- gas bottles
- fire retention areas
- gas mains
- overhead power lines
- underground cables
- potential explosive points

5.2.4 Consideration has been given to the following when drawing up this emergency procedure.

- number of people on site

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- first aid training and kits
- control systems in place
- back up systems
- fire detection and suppression
- availability of emergency services

5.2.5 This procedure deals with the following potential emergencies.

- Electrocution from faulty power tools
- Electrocution from contact with live equipment and power lines
- Electrocution from office equipment
- Electrocution from generator
- Fire in the canteen
- Fire at the diesel storage tank
- Incoming load of waste on fire
- Overturned vehicles
- Site personnel hit by a vehicle
- Falling from a height
- Mutilation from hand tools or equipment
- Explosion from flammable materials on site
- Explosion from pressurised containers on site
- Explosion from build up of landfill gas in office building
- Release of asphyxiant or poisonous gas on site
- Drowning in pond
- Drowning in leachate lagoon
- Chemical burn

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Emergency	Detection	Response including personnel responsible and communication systems
Electrocution from power tools	<ul style="list-style-type: none"> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• DO NOT rush to help otherwise current will pass through victim to you – all personnel</li> <li>• Turn off source of electrocution – all personnel</li> <li>• If not possible, separate victim from source using non conductive material such as plastic or wood – all personnel</li> <li>• Weighbridge operator to call Ambulance if serious injury has been sustained.</li> <li>• First aiders to check vital signs</li> <li>• If unconscious First aiders to begin CPR</li> <li>• First aider to treat burns, if necessary</li> <li>• If victim is conscious treat for shock and seek medical advice asap – all personnel</li> </ul>
Electrocution from contact with live equipment and power lines		
Electrocution from office equipment		
Electrocution from generator		
Fire in the canteen	<ul style="list-style-type: none"> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuate to a safe distance / assembly point – all personnel</li> <li>• Weighbridge operator to call the Fire Brigade</li> <li>• Weighbridge operator to prevent further vehicles entering site</li> <li>• If safe to do so, tackle the fire using hose, sand, extinguishers or water bowser – Foreman and general operatives</li> <li>• DO NOT take risks – all personnel</li> </ul>
Fire at diesel storage tank		
Incoming load of waste on fire		<ul style="list-style-type: none"> <li>• Weighbridge operator to call the Fire Brigade</li> <li>• Weighbridge operator to prevent further vehicles entering site</li> <li>• If safe to do so, tip load at the working face. The manager or deputies will then decide to either smother by covering with clay (excavator drivers) or extinguish by dosing with water bowser (Foreman or general operatives).</li> <li>• Once fire extinguished, load to be raked out carefully to ensure fire is out (excavator drivers)</li> </ul>

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Emergency	Detection	Response including personnel responsible and communication systems
Overturned vehicles	<ul style="list-style-type: none"> <li>Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>Weighbridge operator to call Ambulance if serious injury has been sustained</li> <li>Weighbridge operator to prevent further vehicles entering site</li> <li>General operatives to move all personnel and vehicles from area</li> <li>Check all around and underneath of vehicle for persons trapped / injured – all personnel</li> <li>First aiders to attend to injured, as appropriate</li> <li>Switch off ignition of vehicle overturned – all personnel</li> <li>If fuel leaking or fire retreat to safe distance / assembly point – all personnel</li> </ul>
Site personnel hit by a vehicle	<ul style="list-style-type: none"> <li>Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>Weighbridge operator to call Ambulance if serious injury has been sustained</li> </ul>
Falling from a height		<ul style="list-style-type: none"> <li>Weighbridge operator to prevent further vehicles entering site</li> </ul>
Mutilation from hand tools or equipment	<ul style="list-style-type: none"> <li>Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>First aid to be administered to injured, as appropriate</li> <li>Treat for shock if conscious or if unconscious begin CPR – First aiders</li> </ul>
Explosion from flammable materials on site		<ul style="list-style-type: none"> <li>Evacuate to safe distance / assembly point – all personnel</li> </ul>
Explosion from pressurised containers on site	<ul style="list-style-type: none"> <li>Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>Weighbridge operator to call emergency services and prevent further vehicles entering site</li> </ul>

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Emergency	Detection	Response including personnel responsible and communication systems
Explosion from build-up of landfill gas in office building	<ul style="list-style-type: none"> <li>• Gas building alarm sounds</li> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuate to safe distance / assembly point – all personnel</li> <li>• DO NOT switch on electrical appliances which will cause spark - all</li> <li>• DO NOT light naked flame/smoke - all</li> <li>• If possible, open windows and doors to allow air to vent - all</li> <li>• Weighbridge operator to call emergency services</li> <li>• Specialist gas testing to be carried out before safe to re-enter building – General Manager or deputies</li> </ul>
Release of asphyxiant or poisonous gas on site	<ul style="list-style-type: none"> <li>• Personal gas detector beeps</li> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuate to safe distance / assembly point – all personnel</li> <li>• First aid to be administered to injured, as necessary by First Aiders</li> <li>• Weighbridge operator to call emergency services</li> <li>• Specialist gas testing to be carried out before safe to re-enter building – General Manager or deputies</li> </ul>
Drowning in pond	<ul style="list-style-type: none"> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Throw buoyancy aid to injured party – all personnel</li> <li>• Weighbridge operator to call emergency services if serious injury has been sustained</li> <li>• Attempt rescue where possible and without risking own safety – all personnel</li> <li>• First aiders to attend to injured</li> </ul>
Drowning in leachate lagoon		
Chemical burn	<ul style="list-style-type: none"> <li>• Raise the alarm / radio/phone to manager or weighbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Evacuate to safe distance / assembly point – all personnel</li> <li>• First aiders to attend to injured</li> <li>• Weighbridge operator to call emergency services if serious injury has been sustained</li> <li>• First aiders to consult MSDS sheets for first aid treatments but in any case dose with water to stop burn</li> <li>• If ambulance not required, injured party to seek medical advice asap</li> </ul>

### **5.3 Emergency response equipment**

- 5.3.1 Once annually an independent fire equipment specialist carries out a service on all fire fighting equipment on site. The specialists recommend improvements in the equipment and replace or refill equipment, as necessary. They also provide a call out service, as required. In addition, each month the extinguishers are visually checked for discharge, pressure, defects and if found to be faulty, repaired, replaced or renewed, as necessary.
- 5.3.2 First aid boxes, spill kits and life buoys are available on site and these are checked each month to ensure supplies are replenished, as necessary. The locations of the boxes and kits are recorded on the emergency location plan.
- 5.3.3 The fire detection systems – fire alarm, smoke detectors and emergency lighting - are serviced annually or as required by an independent competent electrician.

### **5.4 Training and testing of emergency procedures**

- 5.4.1 Site personnel participate in 2 emergency tests per annum, at least one of these tests is carried out on a fire drill. Practical evacuations are carried out during these tests.

Following the tests, if areas of training are identified this is undertaken.

- 5.4.2 Site personnel are trained initially on this emergency procedure with refresher training carried out annually thereafter.
- 5.4.3 First aid training is undertaken by personnel on site, currently the following employees are trained first aiders – listed below. Refresher training is undertaken every 2 years.
- Sean Corrigan
  - Michael Noone
  - Bebhinn Brennan
- 5.4.4 All visitors and contractors are inducted to site, where appropriate. The induction includes being provided with information on emergency response procedures and assembly points on site.

### **5.5 Reviewing emergency procedures**

- 5.5.1 This procedure is reviewed and revised once annually as part of the management review or following the occurrence of an incident, as necessary.