

Mr R. Barlow
Casey Group

20th May 2024

Ref: K6123/ENV/L/001

**Re: Planning Permissions 14/01/0030 and 14/00/0285
Horncliffe Quarry Landfill, Rawtenstall
Extension to the Planning Permission for Landfill Gas & Leachate
Management**

Dear Mr Barlow,

[1] Introduction

Ayesa (ByrneLooby Partners UK Limited) have been commissioned by Casey Group Limited to prepare a technical justification in support of an application to extend the "Planning Permission Life" of the emission management control infrastructure at the Horncliffe Quarry Landfill ("the site"). Horncliffe Quarry Landfill is located at National Grid Reference (NGR) SD 80544 21135 and is operated by P. Casey Enviro Limited (a wholly own subsidiary of Casey Group Limited) under Environmental Permit EPR/KP3391CH.

The purpose of this letter is to outline that the continued operation of the landfills' emission management infrastructure until at least a further 25years, namely: under planning permissions:

- 14/01/0030 (Leachate Treatment); and
- 14/00/0285 (Gas Utilisation Compound)

These permissions, require that on-site leachate and landfill gas treatment ceases under these permissions with the associated infrastructure removed from site by 1st August 2025.

Horncliffe landfill site accepted wastes under a Waste Management Licence (WML) initially as a Pre-landfill directive (2001) landfill site, with the completion of the disposal of active wastes by 2006. This date was prior to the issuing of a Pollution Prevention and Control (PPC) for continued operation. The original waste licencing regulations required the operation of emission management control infrastructure is critical to not breach the conditions set out under Control of Pollution Act. 1974 and the Environmental Protection Act 1990.

The waste management licences were later transformed into an Environmental Permit, and the site is currently regulated under the Environmental Permitting Regulations 2016¹ (and as amended in 2023), which has superseded the previous regulatory frameworks.

¹ The Environmental Permitting (England and Wales) Regulations 2016. UK statutory Instrument 2016 No.1154

The Environmental Permitting Regulations refers directly to the Landfill Directive for landfills which accepted waste after 16th July 2001, of which Article 13 (c) states:

Article 13(c)

after a landfill has been definitely closed, the operator shall be responsible for its maintenance, monitoring and control in the after-care phase for as long as may be required by the competent authority, taking into account the time during which the landfill could present hazards.

The length of time that management is to be carried out is established through a combination of modelling and the conclusions drawn from the monitoring programme carried out under Article 13(d).

Article 13(d)

for as long as the competent authority considers that a landfill is likely to cause a hazard to the environment and without prejudice to any Community or national legislation as regards liability of the waste holder, the operator of the site shall be responsible for monitoring and analysing landfill gas and leachate from the site and the groundwater regime in the vicinity of the site in accordance with Annex III.

As a permitted landfill it is expected that the control of emissions is required.

The standard Environmental Permit conditions as set out in the Environmental Permit template requires that landfill gas and leachate are managed appropriately so as not to cause pollution and remain in force as Hornccliffe landfill has not stabilised to a state where the permit can be surrendered.

Emission control during the site's aftercare period is expected to be needed for at least a further 25years, or such time that the Environment Agency allows the surrender of the site's Environmental Permit, when active emissions management will no longer be required.

[2] Background

Hornccliffe Quarry Landfill is accessed via Bury Road, Rawtenstall, Rossendale, Lancashire, BB4 6JS.

The landfill site was developed within a former sandstone quarry with both opencast and underground mining techniques used. The site was first operated for the landfill disposal of commercial and industrial waste in the 1950's and 60's, prior to the first waste management license being issued in the late 1970's. A new licence was applied for and subsequently granted in June 1990. Following issue of this licence waste was disposed of within a fully engineering containment cell in the centre of the site, partially overlying the old uncontained wastes.

The site was effectively closed to the receipt of active waste for disposal in 2006, although some waste soils were imported after 2006 to complete the restoration and landscaping works. The containment landfill has been capped and there are active leachate and landfill gas management systems in place.

The Leachate management system consists of a stone blanket with drainage pipes and on side slopes, spine drains to collect leachate. Leachate is extracted from side riser connected to the drainage layer. The monitoring and extraction points are illustrated on Drawing Ref. 95005/149B.

Extracted leachate is pumped to the leachate treatment plant in the northeastern part of the site where it is treated in two lined lagoons, prior to discharge to sewer. The leachate has not depleted to a state where a direct discharge to sewer is allowed.

The Gas management system comprises of around fifty gas extraction wells, connected to a ring main via four manifolds with two condensate knock out pots. The vast majority of the gas extraction well heads and associated pipe work have been buried or covered with restoration soils, only seventeen are evident at the ground surface.

The gas main connects to the landfill gas compound in the northern part of the site as illustrated on Drawing Ref. 95005/150. The Gas compound consist of a Mercedes 165 kW engine as well as a Biogas enclosed ground flare to treat any landfill gas that cannot be used for electricity generation.

[3] Landfill Gas and Leachate Management

[3.1] Gas Management

According to the environment Agency from the Guidance on the management of landfill gas² *“to control the potential risk associated with gas migration and emissions, Landfill gas must be removed from the waste, treated and if possible utilised.”*

Landfill gas comprises a number of potential hazards including specific volatile hazardous substances (e.g. benzene), malodorous compounds as well as being primarily methane based which is both a flammable hazard and a major contributor to climate change. Methane has 400 times the potential as carbon dioxide to adversely contribute to climate change. The only way to reduce both the polluting, amenity and climatic effects is to combust the landfill gas in either a flare or if at a high enough quantity within a gas to energy utilisation engine. The utilisation engine therefore not only treats the landfill gas, it also contributes a sustained supply to the National Electrical Grid and reduces the quantity of fossil fuels which would be used as an alternative.

Landfill gas generation rates peaked between 2002 and 2003 at ~1,000m³ per hour, and was capable of supporting 1,600kW per hour of electricity generation. Although depleting in rate, there remains sufficient landfill gas formation within the landfill to support the gas to energy utilisation engine, with gas generation rates still significant at between 100m³ to 200m³ per hour being formed.

Monitoring data demonstrates that the landfill gas at the input to the Gas Engine is typically a mixture of 35-50%v/v methane and 15-30%v/v carbon dioxide and is consistent with that expectation of a landfill gas. Once landfill gas generation rates decline below that which

² Guidance on the management of landfill gas, Environment Agency and SEPA Guidance 2004

can support a utilisation engine for energy generation, the flare will be used to treat the remaining gas component within the existing gas utilisation compound.

This is an environmentally significant volume of gas that needs to be managed onsite as the landfill gas formation continues to decline over an extended period, and is one of the defining features of the Environment Agency specifying a 60year aftercare period for non-hazardous landfills.

[3.2] Leachate Management

The leachate collected and treated from Horncliffe Quarry Landfill is consistent with that expected for a municipal landfill having accepted domestic, industrial, and commercial wastes *i.e.* a sodium-bicarbonate chloride solution containing elevated ammoniacal-N and potassium. Leachate therefore is needed to be treated in order to be discharged to Sewer in-line with the requirements of discharge consent Ref. 695UI21084.

The discharge consent requires that there is the removal or reduction of

- ammonia (as nitrogen) in excess of 1,000mg/l to less than 250mg/l;
- dissolved methane from up to 18mg/l to less than 0.14mg/l; and
- the complete removal of “prescribed substances” and sulphides that may be present in the leachate.

On-site treatment both conditions the leachate to a state which is safe for anyone who may come into contact with the sewer line between the site and the receiving wastewater treatment works as well as not overloading the receiving works.

The only sustainable mechanism to treat the leachate is under aerobic biological conditions which oxidise malodorous components, including sulphides and methane as well as removing ammonia and the organic components, along with reducing heavy metals.

The least intrusive mechanism for carrying out this treatment is within aeration lagoons, with the alternatives being large visually apparent 6m to 8m tall tanks, with a volume in the order of 900m³ to 1,100m³ in capacity. A minimum of three tanks would also be required to enable the treatment plant to be operating continually and meet the discharge flow rate demands of 0.78L/s (2.8m³ per hour).

Leachate generation into the permitted landfill through the capped surface was at an average rate of 41m³ per day. Therefore off-site tankering would not replace the need for holding lagoons or tanks, to enable storage of sufficient leachate over for example, weekends, bank holidays, or adverse weather conditions which do not allow tankering.

Tankering leachate will also incur an additional fossil fuel combustion demand to transport the leachate to add to the climate change disbenefit if the on-site infrastructure is removed. There would be no reduction in leachate treatment demand either which will take place either on-site or the receiving works.

On-site treatment with discharge to sewer is always preferred as it reduces the potential for spillages, allows for double treatment stages, removes the leachate from direct handling and is environmentally more sustainable with respect to climate change and energy use. The continued use of the on-site lagoon based system is therefore recommended.

In addition to managing emissions, there is also a further need to ensure that permit/license conditions are met, such as by the continued removal of leachate to prevent an excessive leachate head developing and exceeding height limits. These limits will remain in force until the site's permit has been surrendered, or the Environment Agency are satisfied that there is no longer a pollution potential from the residual leachate constituents.

[4] Closure and recommendations

This letter above highlights that there is an ongoing need to manage emission produced within the Horncliffe Quarry Landfill Site for regulatory compliance purposes, operator best practice and operator Duty of Care.

It is apparent in the data collected that the production of landfill gas and leachate is consistent with that expected of a Landfill and is not sufficiently depleted for passive controls to mitigate against the potential for pollution. Consequently the emissions management infrastructure should remain in place past the 2025 limit as set out in the associated planning permissions for the treatment lagoons and the gas utilisation compound.

The rate of depletion of potential emissions reduced following the capping of the landfill, which reduced infiltration / rainwater ingress rates. Consequently the depletion of landfill gas and leachate constituents has slowed and will gradually taper off until such time that the passive properties of the landfill liner on the base and sides, in combination with the capping layer and restoration soils can attenuate the residual pollutants present.

Extending the planning permissions for at least a further 25years, equates to a timescale in the order of 2050, which is consistent with the recommended 60 year minimum aftercare period for non-hazardous landfill sites that would nominally end in 2065. The precise date and timescale aftercare is required for will depend on the stabilisation rate of the deposited wastes and future environmental regulations which could require improved environmental standards than are currently in place.

Landfill gas and leachate mismanagement is not only environmentally irresponsible it is illegal under the Environmental Permitting Regulations to cause pollution. There is therefore a need for continual management. Emission control infrastructure is expected to be needed for at least the next 25 years.

Emission management control will not be possible if the "Planning Permission Life" is not extended. Critically if an extension is not granted the operator will no longer be able to continue efforts to manage emissions into the environment and will be in breach of the conditions set out under Control of Pollution Act. 1974, the Environmental Protection Act 1990 and the Environmental Permitting Regulations (2016 and as amended 2023).

It is therefore recommended that the planning permission of both the Gas management compound and Leachate treatment plant is extended in order to allow the operator to continue managing emissions throughout the aftercare period of the site in order to prevent unlawful, damaging emissions into the environment, whilst also meeting licence / permit requirements.

Yours sincerely

For Ayesa,

Oliver Nickson

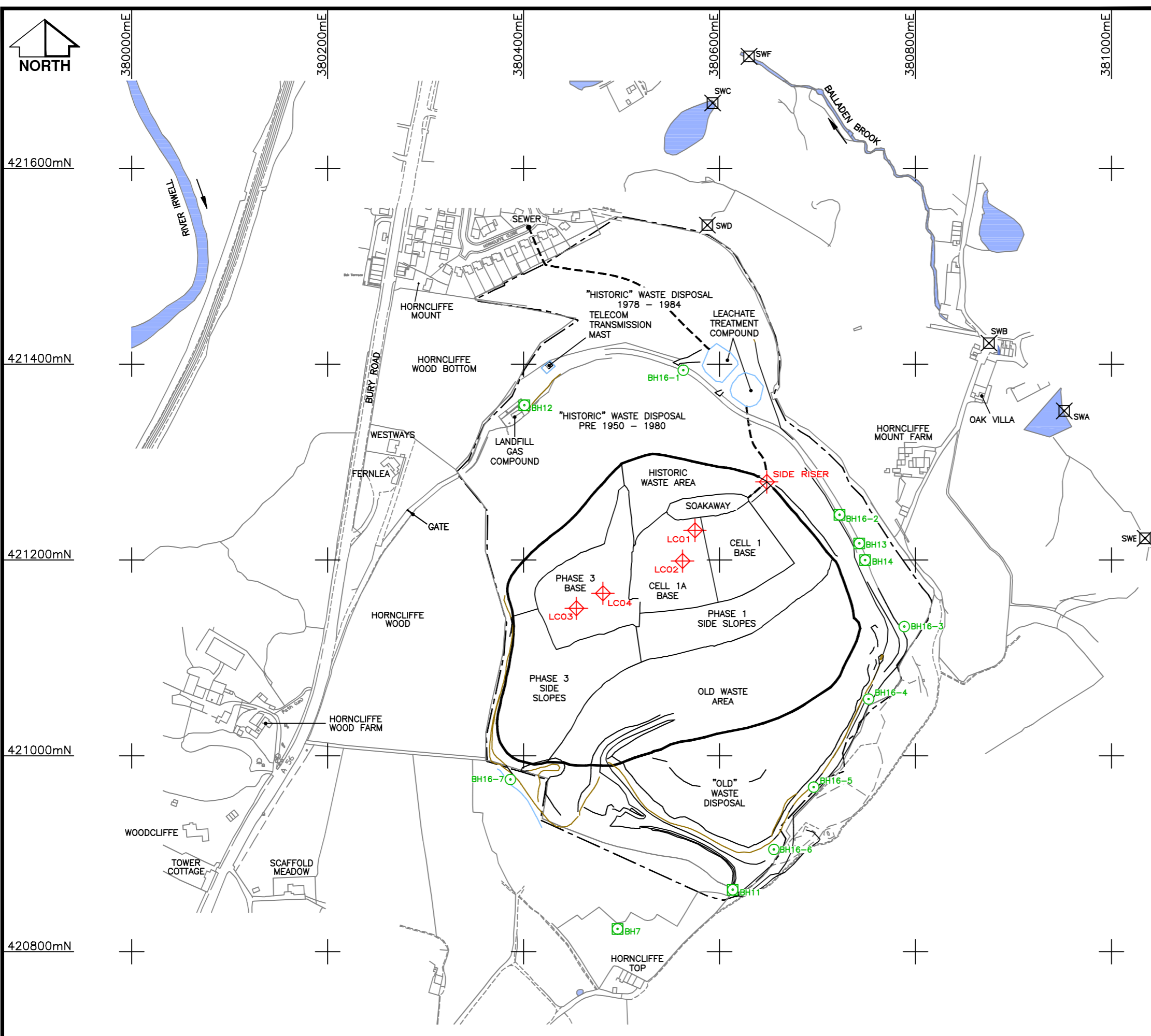
Oliver Nickson
Graduate Consultant

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Craig A Fannin

Dr Craig Fannin PhD MSc BSc CSci Chem MRSC FGS
Technical Director

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KEY

- SITE BOUNDARY
- BOUNDARY OF CONTAINMENT LANDFILL SITE
- GAS MONITORING BOREHOLE
- ◻ DUAL/COMBINED GROUNDWATER & GAS
- ⊗ SURFACE WATER SAMPLING POINT
- ◇ LEACHATE MONITORING AND EXTRACTION POINT
- - - LEACHATE PIPELINES (ILLUSTRATIVE ONLY)

B	AMENDED SAMPLE LABELS	30/07/21	M.Y.B.
A	LANDFILL CELL LAYOUT ADDED	31/05/19	M.Y.B.
REV.	DESCRIPTION	DATE	BY

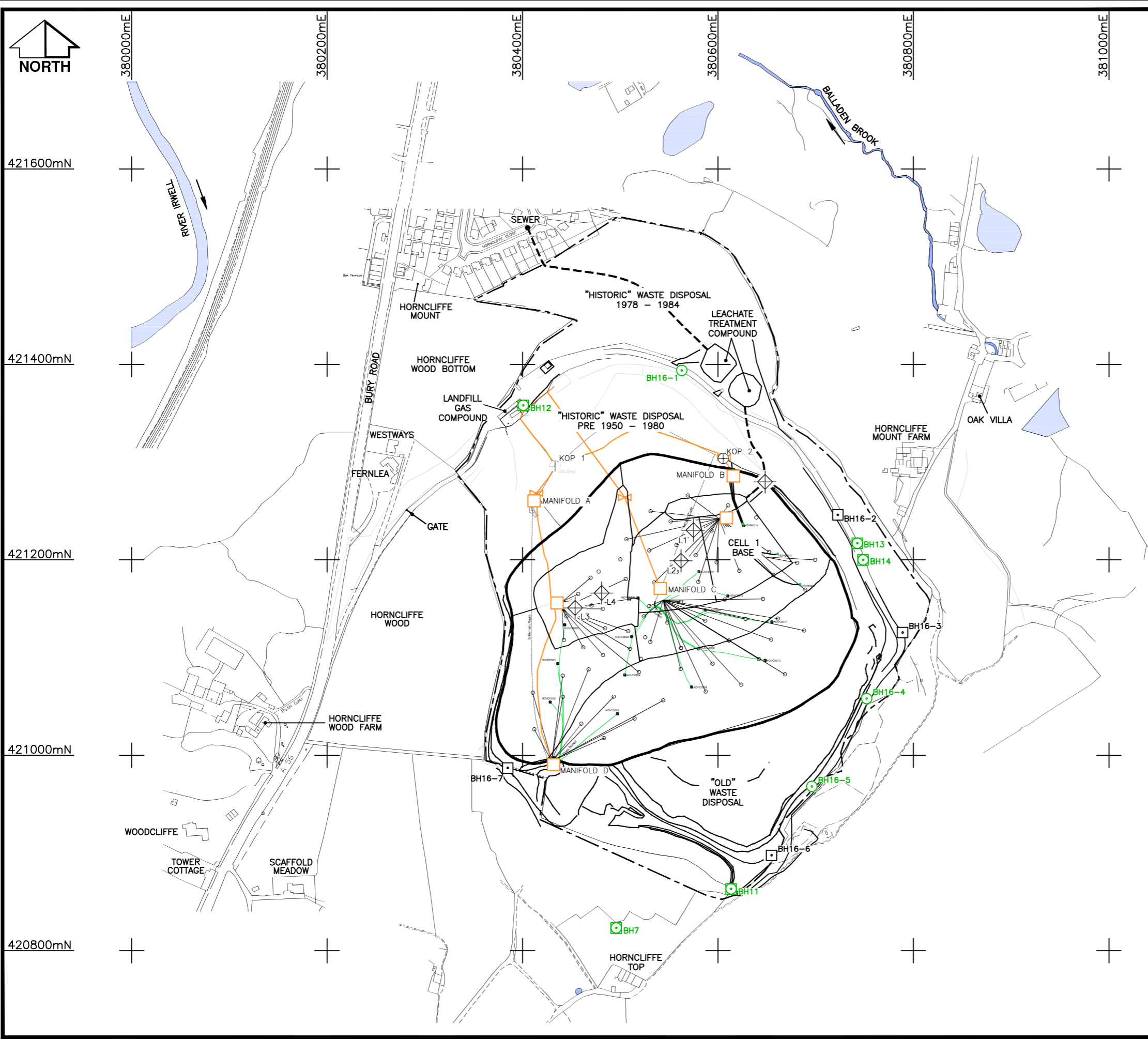


CLIENT:
**P. CASEY
ENVIRO LIMITED**

JOB TITLE:
**HORNCLIFFE QUARRY
LANDFILL SITE**

DRAWING TITLE:
**MONITORING AND
EXTRACTION POINT
PLAN**

DRAWN BY. M.Y.B.	APPROVED BY. M.L.	DRAWING No. 95005/149B
DATE. 03/04/2019	SCALE. 1:4000	



KEY

- SITE BOUNDARY
- BOUNDARY OF CONTAINMENT LANDFILL SITE
- GAS MONITORING BOREHOLE
- DUAL/COMBINED GROUNDWATER & GAS
- GROUNDWATER MONITORING BOREHOLE
- ◇ LEACHATE MONITORING AND EXTRACTION POINT
- ⊕ KOP - KNOCKOUT POT
- MANIFOLD
- LEACHATE PIPELINES (ILLUSTRATIVE ONLY)

REV.	DESCRIPTION	DATE	BY



CLIENT:

**P. CASEY
ENVIRO LIMITED**

JOB TITLE:

**HORNCLIFFE QUARRY
LANDFILL SITE**

DRAWING TITLE:

**GAS EXTRACTION
SYSTEM LAYOUT
PLAN**

DRAWN BY. M.Y.B.	APPROVED BY. M.L.	DRAWING No. 95005/150
DATE. 08/01/2020	SCALE. 1:4000	