

Barracks Farm

Environmental Permit Application

Environmental Setting and Site Design

Oaks Land Management Limited

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Prepared on Behalf of Tetra Tech Environment Planning Transport Limited.

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DRAWINGS

OLM/A115247/PER/01 – Environmental Permit Boundary

BKP042017-BRK-003 – Proposed Site Plan

BKP042017-BRK-004 – Proposed Sections

OLM/A115247/REC/01 – Receptor Plan

1.0 INTRODUCTION

1.1 REPORT CONTEXT

- 1.1.1 This section of the Environmental Permit application corresponds to Question 1, Appendix 4 of Part B4 of the application forms, which requires the provision of an Environmental Setting and Site Design (ESSD) report.
- 1.1.2 The aim of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that will be used as the basis for the following risk assessments:-
- Hydrogeological Risk Assessment; and
 - Environmental Risk Assessment.
- 1.1.3 The Environmental Permit Application has been prepared on behalf of the operator Oaks Land Management Limited (Oaks Land Management), by Tetra Tech.

1.2 REGULATED FACILITY DETAILS

Site location

- 1.2.1 Barracks Farm is located on the southern side of Cobham Road and is located approximately 1.4km north from the village of Fetcham and is centred at approximate National Grid Reference (NGR) TQ 14277 57075. The site is located within the Mole Valley District Council area and the county of Surrey. The site location and proposed environmental permit boundary is detailed in drawing number OLM/A115247/PER/01.
- 1.2.2 The site is accessed via the main entrance which is located from an access road off Cobham Road.

Site Classification

- 1.2.3 The regulated facility comprises the importation of inert waste for the purpose of recovery.

Application Boundary and Site Security

- 1.2.4 The proposed application boundary is shown on drawing number OLM/A115247/PER/01. The site located on the northern side of barracks Farm and forms part of the wider Barracks farm site. The boundary of Barrack farm is bounded by hedgerows along Cobham Road.

- 1.2.5 Access to the site can be gained from an access road located off Cobham Road. The entrance to Barracks Farm is located on the eastern side of the site.

Site Context

- 1.2.6 Barracks Farm is used for the rearing of beef, sheep and turkeys. The owners of the farm (F Conisbee and Son) operate an independent family run butchers in Surrey. The site contains several barns, a farmhouse, offices, workshops, a lagoon, storage buildings with cold stores and a turkey processing plant. The older barns have been converted to business units in association with the principle farm use. All buildings are understood to be fully occupied. The existing farm complex is located on higher ground than the surrounding fields with a shallow gradient to the north and west which results in a fall of several metres across the fields.
- 1.2.7 The immediate surroundings of the application site are predominantly agricultural with the exception of the nearest property located approximately 60m south of the application site off Cobham Road.

Compliance with Environment Agency position statement on location of landfills

- 1.2.8 As mentioned in Section 1.2.3, the proposed development comprises the importation of inert waste for the purpose of recovery. As such, the Environment Agency's approach to groundwater protection guidance has not been considered regarding the landfill location criteria.

2.0 SOURCE TERM CHARACTERISATION

2.1 THE DEVELOPMENT OF THE INSTALLATION

Development History

- 2.1.1 Based on historical mapping provided within the Groundsure Enviro and GeoInsight report (provided as part of the Hydrogeological Risk Assessment), in 1868 the site is depicted as agricultural lands which extend to the north, south, east and west. Barracks Farm is annotated to the east of the site, adjacent to an unnamed access road / track. To the south, Cobham Road is annotated and a single residential dwelling is noted at the southern boundary. The residential dwelling remains present on historical maps up to present day.
- 2.1.2 The site and surrounding lands remain relatively unchanged between 1868 and 1972. In 1972, Barracks Farm is shown to have expanded and has extended westwards, towards the eastern boundary of the site. Further expansion has occurred at the farm between this period and present-day mapping.
- 2.1.3 The Barracks Farm site forms part of a larger number of sites operated by a farming enterprise owned by F Conisbee and Son which have been operating for a number of years. The main livestock holding for the farming enterprise is at Barrack Farm.
- 2.1.4 According to Mole Valley District Council's planning register, 34 planning applications have been submitted since 2000 regarding Barracks Farm.
- 2.1.5 In February 2018, planning permission was approved by Mole Valley District Council (reference MO/2017/1198) to allow the erection of two livestock buildings at Barracks Farm as well as the construction of a banded manure store and a wetlands drainage scheme comprising reed beds. As shown on the Proposed Site Plan (Drawing Number BKP042017-BRK-003), the proposed development will be situated in an area to the north of the existing farm complex.
- 2.1.6 As part of the development, the permission allows the importation of 30,000m³ of inert materials to raise ground levels in the proposed development area up to the plateau that the existing farm yard sits on.

Proposed Development

- 2.1.7 The proposed development comprises the importation of inert construction waste fill material to raise ground levels in an area to the north west of Barracks Farm. The ground levels will be raised up to the plateau that the existing farm sits on as shown on the cross sections (Drawing Number BKP042017-BRK-004) approved under planning permission MO/2017/1198.

2.1.8 It is also proposed that inert material will be utilised to facilitate the development of a wetlands drainage scheme which has also been approved under the aforementioned planning permission. The system will comprise a reed bed system that will treat runoff from a bunded manure store that was approved under the aforementioned planning permission. Any runoff that is generated from the bunded manure store will be fed to the reed bed system via a 400mm and discharged into the reed bed system via a klargester.

Waste Types and Quantities

2.1.9 In accordance with the approved Waste Recovery Plan (Appendix G of the main application), Oaks Land Management will only accept inert waste to facilitate the development at Barracks Farm.

2.1.10 Permitted wastes accepted at the site will be strictly inert as classified under the Landfill Directive (1999/31/EC) and Council Decision (2003/33/EC) of 19 December 2002 'establishing criteria and procedures for the acceptance of waste landfills'.

2.1.11 The proposed development would require a volume of 30,000m³ of imported inert material to achieve the final profiles provided on the Proposed Site Plan (BKP042017-BRK-003) approved under planning permission MO/2017/1198. When using a bulk conversion factor of 2 tonnes/m³ this equates to 60,000 tonnes.

Final Landform and After Use

2.1.12 The Proposed Site Plan (Drawing Number BKP042017/BRK/003) and the cross section (Drawing Number BKP042017/BRK/004) details the final landform. The importation of the inert material will raise the land to the level of the plateau that the existing site is situated on. In accordance with planning permission MO/2017/1198 the raised land will be intended to allow the development of the following:-

- Two parallel livestock buildings would then be erected on the raised land each measuring 49m long, 15.25m wide with a height of 5.5m and a 4m separation between the two buildings.
- Construction of a bunded hardstanding measuring 70m x 30m for the storage of manure.
- Construction of a sustainable farm wetlands drainage scheme and the raising of ground levels to the minimum required to accommodate a reed bed system.

3.0 PATHWAY AND RECEPTOR CHARACTERISATION

3.1 CLIMATE

Rainfall

- 3.1.1 Rainfall data is available from a rain gauge at Wisley weather station, located approximately 7.5km north west of the site shown on the Met Office Website (Met, Office, 2020) from 1981 to 2010 with average monthly rainfall summarised in Table 1 below, with an average total rainfall of 590.8mm/a.

Table 1: Monthly Rainfall Data at Wisley (1981-2010)

Month	Average Rainfall mm (1981 – 2010)
January	61.8
February	45.4
March	44.1
April	47.1
May	51.3
June	44.4
July	46.3
August	52.8
September	54.4
October	77.8
November	67.9
December	63.4
Annual Average	656.6

Wind Rose

- 3.1.2 The wind rose data was obtained from Fetcham from www.meteoblue.com. The prevailing wind direction is from the south, south west (SSW). The prevailing wind direction is shown on Drawing Number OLM/A115247/REC/01.

3.2 GEOLOGY

- 3.2.1 Geology information for the site and the surrounding area has been reviewed using the British Geological Survey (BGS) Geological Map Reigate (1978), Sheet 286 (England & Wales) and the BGS Onshore viewer¹

¹ British Geology Survey GeolIndex Onshore Viewer - <http://www.bgs.ac.uk/data/mapViewers> [Accessed 12 October 2020]

Made Ground

- 3.2.2 There are no Made Ground deposits shown on site. Immediately to the east is the infrastructure associated with Barracks Farm and it is assumed there is a portion of made ground associated with its construction.

Superficial Deposits

- 3.2.3 There are no Superficial Deposits shown to be present across the site.
- 3.2.4 Superficial deposits are annotated c. 160m northeast of this and are noted as River Terrace Deposits and Alluvium.
- 3.2.5 The BGS describe the River Terrace Deposits as “*sand and gravel, locally with lenses of silt, clay or peat*”. However, this is likely to be underlying Alluvium deposits. Alluvium is described by the BGS as “*soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel*”.
- 3.2.6 Sheet 286, Reigate Drift, Scale 1:50,000 published in 1978 indicates there is no drift material across the site.

Solid Geology

- 3.2.7 The solid geology shown to be present beneath the site feature in this region’s solid geology is the London Clay Formation, which the BGS describe as “mainly comprises bioturbed or poorly laminated, blue-grey or grey-brown, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay”. The London Clay Formation formed in the Ypresian Age, 56 to 47.8 million years ago. It thins to c. 20m in Dorset.
- 3.2.8 According to Sheet 286, Reigate Drift, Scale 1:50,000 published in 1978, the site is underlain by the London Clays and noted to be 99-120m in thickness.
- 3.2.9** Underlying the London Clays is the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation which are all components of the White Chalk Supergroup. The BGS describes the White Chalk Subgroup as “*chalk with flints, with discrete marl seams, nodular chalk, sponge-rich and flint seams throughout*” and it formed between the Cenomanian Age (100.5 – 93.9 million years ago) and the Maastrichtian Age (72.1 – 66 million years ago).

Borehole Records

- 3.2.10 No borehole records are shown to be present within the site. However, six borehole records are shown to be present within a 1km area; the closest of which is c. 220m from site (TQ15NW49). All boreholes are shallow and installed into stiff, fissured clay. A summary of all boreholes is provided below in Table 2.

Table 2: BGS Borehole Records

BGS Reference	Name	NGR	London Clay Formation Thickness (m)
TQ15NW45	M25 S Orbital Rd Wisley Leatherhead 734	513290, 157120	>10.5
TQ15NW64	M25 S Orbital Rd Wisley Leatherhead 848	513670, 157000	>7.05
TQ15NW49	M25 S Orbital Rd Wisley Leatherhead 778	514000, 156820	>12
TQ15NW50	M25 S Orbital Rd Wisley Leatherhead 779	514170, 156530	>12
TQ15NW51	M25 S Orbital Rd Wisley Leatherhead 780	514190, 156390	>6
TQ15NW52	M25 S Orbital Rd Wisley Leatherhead 781	514310, 156150	>6

3.3 HYDROGEOLOGY

Aquifer Classification

- 3.3.1 According to the Hydrogeological Risk Assessment (Appendix E of the main application), the site is underlain by the London Clay which is classified as a Concealed aquifer or aquifer with limited or local potential. The Environment Agency further classify the Clays as an up-productive aquifer. The clays are reported as being up to 150m thick across the region, with cement-stone nodule bands at rare intervals. The clays confine waters in underlying beds.
- 3.3.2 The Environment Agency classify the London Clays as relatively impermeable and would have negligible significance for water supply and river baseflow.
- 3.3.3 The White Chalk Supergroup which underlies the London Clays is classified as a principal aquifer which are layers of rock or drift deposits that have high intergranular and / or fracture permeability.

Groundwater Source Protection Zones

- 3.3.4 It is widely recognised that in some instances new developments can pose a risk to the quality and availability of groundwater. In such instances land-use planning policies and groundwater regulations play a vital role in the protection of groundwater. Source Protection Zones (SPZ's) are used by the EA to focus pollution prevention activities and inform planning decisions.

3.3.5 The Environment Agency uses SPZ's as a risk screening tool and they act as a first step to assessing the potential risk of a development and its impact on groundwater resources or abstraction sources.

3.3.6 According to the Environment Agency, the site is located in the Outer Protection Area (Zone 2) of a groundwater Source Protection Zone (SPZ). This is defined as:

"...400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken". The groundwater abstraction which is the focus of the SPZ is located c. 1,800m southeast of the site (down-hydraulic gradient).

Aquifer Properties

3.3.7 The London Clay has rapid lateral and vertical variations in the sand and clay content. This has a commensurate effect on aquifer properties. The presence of clay acts as a barrier to groundwater flow direction, primarily preventing vertical movement and subsequently forming aquitards and perched groundwater levels. In regions where sandy beds are well developed, boreholes of up to 200mm diameter may yield up to 200m³/d. This can increase to 1,800m³/d in sandier strata and larger boreholes. Water from these aquifers may be ferruginous (i.e. high in iron content).

Aquifer Recharge

3.3.8 The 'Unproductive' Aquifer (London Clays) is unconfined and water bearing, sand layers (if present) within the unit will be subject to direct recharge from rainfall falling into the open area of restoration. However, the majority of rainfall falling at the site is anticipated to run-off rather than infiltrate (effective rainfall) due to the low permeability nature of the clay which will serve to retard recharge. In its current condition, the site slopes steeply to the north and west, away from the farm buildings and there is an anticipated high volume of run-off.

Groundwater Occurrence and Levels

3.3.9 There are no groundwater monitoring boreholes currently installed at the site, and no groundwater monitoring data for the local area is currently available.

3.3.10 There are a number of publicly available drill logs for the local area which generally did not record groundwater within the London Clay Formation. One identification of a groundwater seepage at a depth of 16mbgl is noted from TQ15NW63, located c. 1.2km west-northwest of the site.

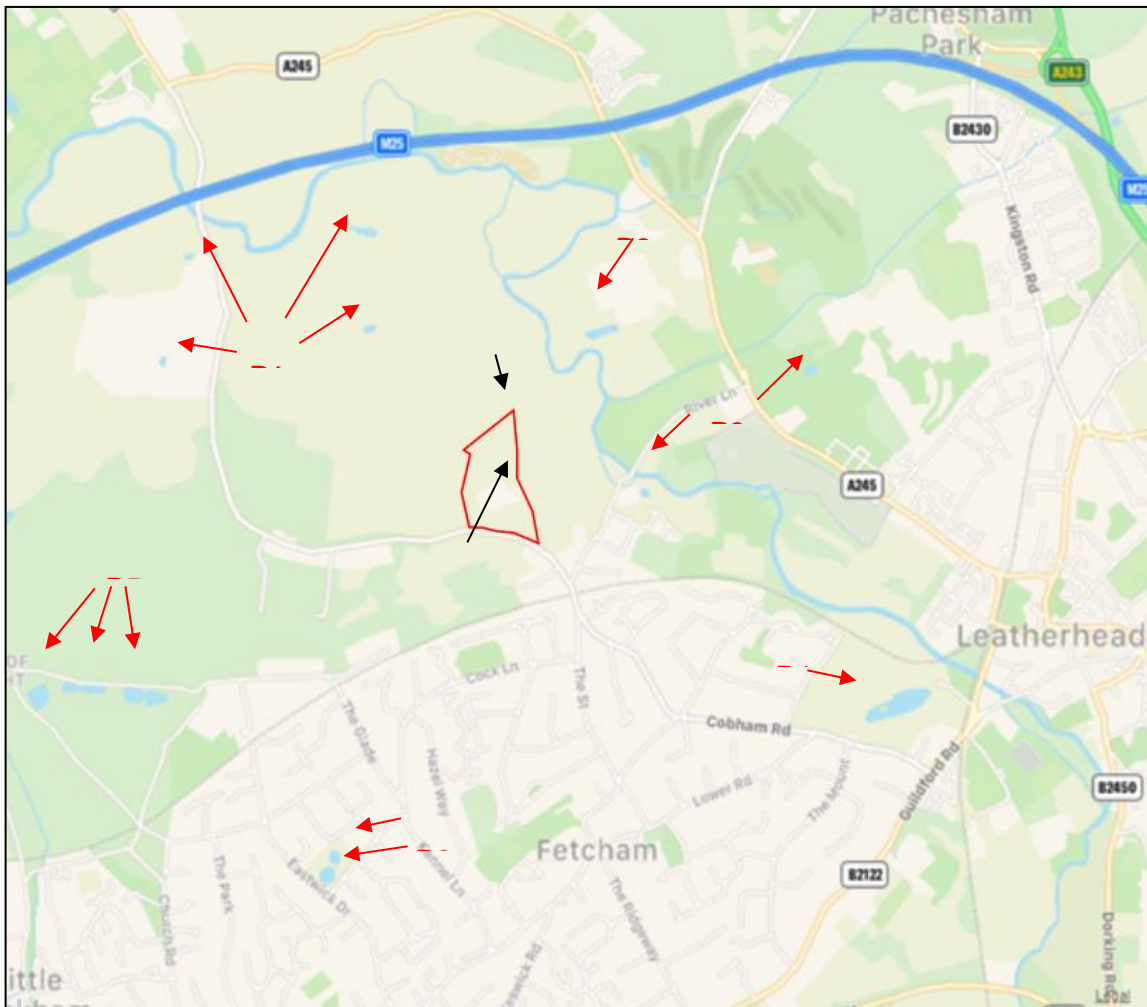
3.3.11 There are currently no time series groundwater elevation data available for the site and surrounding area.

- 3.3.12 Due to the lack of recorded groundwater strikes within the wider vicinity available within the historical boreholes logs there is insufficient data to estimate groundwater elevations across the site with a reasonable degree of confidence.
- 3.3.13 On a regional scale, groundwater elevations in the underlying bedrock are assumed to fall broadly east with the occasional northern influence.

3.4 HYDROLOGY

- 3.4.1 The presence of surface water features, including streams, rivers, drainage ditches and ponds have been determined from the Ordnance Survey (OS) Maps. Existing surface water features (labelled in red), and surface water collection ponds (labelled in blue) identified within the site area are depicted below in Figure 1.
- 3.4.2 Several surface water features are shown to be present on site and the immediate surrounding area. A pre-existing lagoon is shown to the north of the existing buildings. This lagoon area is approximated on Figure 1.
- 3.4.3 SW1 and SW2 lie outside of the site and relate to the primary river, River Mole and a feeding tributary respectively. The River is expected to be relatively shallow and fed via shallow groundwaters within the alluvium and sand and gravel deposits in the wider area. They are not anticipated to receive groundwater baseflow from the London Clay or any further underlying unit.
- 3.4.4 P1 – 6 are outside of the immediate site area and are less at risk of contamination. They are isolated and have no apparent connection to nearby watercourses. As they are located on the London Clays, they are anticipated to be maintained by rainwater only i.e. do not receive groundwater baseflow.

Figure 1: Surface Water Features



3.4.5 According to the Flood Map for Planning Service website, the site is not situated within a flood risk zone.

3.5 MAN-MADE SUBSURFACE PATHWAYS

3.5.1 According to the Groundsure 'Enviro Data Viewer', there are no man-made subsurface pathways within the application site.

3.6 RECEPTOR AND COMPLIANCE POINTS

Groundwater

3.6.1 A Hydrogeological Risk Assessment (Appendix E of the main application) was undertaken as part of the Environmental Permit Application which concludes that the risk to groundwater is low and therefore no

groundwater management system or monitoring is required at the site.

Surface Water

- 3.6.2 The closest surface water feature to the site is a stream which runs along the western boundary of the wider Barracks Farm site and flows in a south to north direction. There are also a number of streams located to the north and south east of the application site which flow off the River Mole which is located approximately 380m east of the site.
- 3.6.3 The risk of contaminated rainwater run-off as a result of the proposed development has been considered in the Environmental Risk Assessment (Appendix D of the main application).

Amenity

- 3.6.4 Sensitive receptors located within 1km of the application site have been considered in the Environmental Risk Assessment (Appendix D of the main application).

4.0 POLLUTION CONTROL MEASURES

4.1 SITE ENGINEERING

Geological Barrier

- 4.1.1 The proposed development comprises the importation of inert waste material to raise ground levels in an area to the north west of the existing Barracks Farm site. The ground levels will be raised up to the plateau that the existing farm sits on as shown on the cross sections (Drawing Number BKP042017-BRK-004) approved under planning permission MO/2017/1198.
- 4.1.2 As mentioned in Section 2.1.8, only inert materials will be accepted at the site and strict waste acceptance procedures will also be employed on site to minimise the risk of non-compliant wastes accepted on site.
- 4.1.3 In addition, a Hydrogeological Risk Assessment (Appendix E of the main application) was undertaken as part of the Environmental Permit Application which concludes that the risk to groundwater is low and therefore no groundwater. As such, it is considered that a geological barrier is not required for the development. This is the case across the whole permitted site due to the presence of a natural geological barrier in the form of the London Clay Formation at the base. The London Clay is reported to extend up to 150m beneath the region in which the site lies. The London Clays are reported to have a vertical hydraulic conductivity (permeability) of approximately 5.8×10^{-11} m/s. Therefore, the geological barrier across the site will be formed by leaving the clays in-situ.

Side Wall Liner

- 4.1.4 It is considered that an engineered side wall liner is not required due to the presence of a natural geological barrier in the form of the London Clay Formation at the base. The London Clay is reported to extend up to 150m beneath the region in which the site lies. The London Clays are reported to have a vertical hydraulic conductivity (permeability) of approximately 5.8×10^{-11} m/s. Therefore, the side wall liner will be formed by leaving the clays in-situ.

Above Ground Bund

- 4.1.5 As the recovery operation is primarily above ground, a new artificial boundary will be required along the northern and western edge of the proposed works area. It is proposed that a bund will be constructed above ground level using available soils in essence to create a new side wall for the area of recovery. The bund will be sloped and constructed in a phased manner in line with the infill levels from the inert waste.

- 4.1.6 The construction of the bund is proposed to be in accordance with the Highways Agency Specification for Highways Series 600 which provides specification for the construction of earthwork environmental bunds. The bund will comprise a restoration soils layer of 0.45 to 1.00m topsoil/subsoil in order to enable planting of broad land shrubs and trees. The compaction of the bund in layers coupled with the overlying low permeability restoration soils will encourage surface water run-off towards the edge of the site. Therefore, infiltration into the bund is anticipated to be within the top 200/300mm within the restoration soils layer with negligible amount of infiltration into the inert waste.

Capping

- 4.1.7 As mentioned in Section 1.2.3, the development comprises the importation of inert waste for the purpose of recovery.
- 4.1.8 In accordance with the Environment Agency's 'Standards and Measures for the Deposit of Inert Waste on Land' guidance, an engineered cap is not required for sites that comprise the recovery of inert waste. Therefore, on completion of infilling, the sloping side of the site will be restored with c. 1m of previously stripped low permeability restoration soils and no less than 0.30m of topsoil. On the plateau area, a layer of hardstanding (concrete) will be installed to allow for the construction of barns

Restoration

- 4.1.9 At present the application site is currently undeveloped and is used as open grassland. The proposed development would raise the ground levels of the application site up to the plateau that the existing farm yard sits on as shown on the cross sections (Drawing Number BKP042017-BRK-004) approved under planning permission MO/2017/1198.
- 4.1.10 As shown on the approved cross sections, the restoration profile for the proposed landform is designed with slope angles not exceeding 1 in 4. As such, it is considered that the proposed landform is inherently stable and as such no Stability Risk Assessment has been prepared for the proposed restoration scheme. By raising the ground levels within the application site, the new buildings will be situated within a clear air zone that is separate from other animals that are kept at the farm.
- 4.1.11 Once the ground levels have been raised, it is proposed that the new buildings will be developed on a reinforced concrete slab.
- 4.1.12 As detailed in the proposed development Drawing Number approved under planning permission MO/2017/1198, the scheme comprises the construction of two parallel livestock buildings used to house young livestock with an area of bunded hardstanding located on the western side of the buildings for the storage of manure.

4.1.13 The proposed develop also involves the development of a wetland drainage scheme.

4.1.14 Once the restoration has been completed the site will continue to be operated as farmland and the two proposed buildings on the raised land are to be used to house young livestock.

4.2 LEACHATE MANAGEMENT AND MONITORING

Leachate Generation

4.2.1 Due to the inert nature of the material to be used to restore the quarry, it is considered highly unlikely that water coming into contact with the material at the restored site will generate high concentrations of pollutants. As such, no leachate management or monitoring is proposed.

4.3 LANDFILL GAS MANAGEMENT AND MONITORING

Landfill Gas Management and Monitoring

4.3.1 A Gas Risk Assessment (GRA) has not been prepared for Barracks Farm, as the Landfill Technical Guidance Note LFTGN03 indicates that new inert landfills do not pose a landfill gas hazard. Although the proposed activity comprises a recovery operation (using inert waste) as opposed to a disposal operation, it is considered that the principle is still applicable.

4.4 GROUNDWATER MANAGEMENT

4.4.1 A Hydrogeological Risk Assessment (Appendix E of the main application) was undertaken as part of the Environmental Permit Application which concludes that the risk to groundwater to low and therefore no groundwater management system or monitoring is required at the site.

4.5 SURFACE WATER MANAGEMENT SYSTEM

4.5.1 In order to minimise potential pollution from surface water the proposals include the construction of a reed bed drainage system. The raised ground level would raise the ground levels to the minimum required in order to accommodate the wetland. The wetland would enable the purification of the runoff from the bunded hardstanding used to store manure generated in the livestock buildings.

4.5.2 Clean surface water from development platform will be collected by the central dished concrete channel within the concrete handling area. This clean surface water will be directed to the existing surface water lagoon which will in turn discharge to the proposed new reed bed as shown on Drawing Number BKP042017-BRK-003.

5.0 SITE CONDITION REPORT

5.0.1 The Environmental Permitting Regulations – Site Condition Report (H5) states that a Site Condition Report (SCR) is 'not applicable to those parts of a permitted activity that have permanent deposits of waste'. As such, a Site Condition Report has not been prepared for this application.

6.0 CLOSURE

- 6.0.1 Environment Agency Guidance EPR5.02 details that where records demonstrate that a recovery site has accepted Landfill Directive compliance inert wastes during its lifetime, the site is applicable for a low risk surrender based on records alone. As such no further monitoring or post closure monitoring is deemed necessary. As such, no further closure and aftercare plan has been prepared in support of this Environmental Permit Application.