

OUTLINE ENGINEERING PLAN

Waste Recovery Permit - Deposit for Recovery

Reclamation of the former British Sugar Refinery Site, York

SEPTEMBER 2022



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Date SEPTEMBER 2022

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Outline Engineering Plan

British Sugar, York

1 Introduction

Arcadis UK Ltd (Arcadis) has prepared this Outline Engineering Plan in order to support the addition of a bespoke (Deposit for Recovery) waste operation and associated Waste Recovery Plan (WRP) as part of an application to vary Environmental Permit (EP) (EPR/QP3593NF) at the Former British Sugar Factory, Millfield Lane, York, YO26 6AY (the 'site'). A site location plan is presented as Figure 1.

Waste material is located within the current Environmental Permit (EP) (EPR/QP3593NF) boundary shown on the Site Layout Plan presented as Figure 2.

A Monitoring Plan has also been produced to support the Waste Recovery Permit application (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0060-03-Monitoring Report, September 2022) which details the monitoring procedures to be undertaken in relation to potential emissions to the wider environment associated with the proposed waste recovery operation.

Therefore, the objective of this report is to outline the engineering requirements and specifications in relation to the monitoring infrastructure required to support the monitoring activities.

A Waste Recovery Plan (WRP) (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0034-P6-Waste Recovery Plan, September 2022) has been produced to support an application to recover the waste as part of a reclamation process for the purpose of enabling residential development in accordance with the conditions of planning permissions granted in relation to the site.

The reclamation works incorporating the waste recovery process are supported by an approved Remediation and Reclamation Strategy (RRS) (URS, 2015) for which an addendum (RRSA) has been produced to incorporate the latest site data (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0049-P1 Arcadis, 2020).

1.1 Existing Engineering and Groundwater Sensitivity

The site is currently subject to an EP (EPR/QP3593NF) which has been in a state of Definitive Closure since October 2009 until EP variation consolidation in October 2015, when the period of aftercare monitoring & maintenance was commenced. The EP for the site previously permitted the activity of (D1) depositing aqueous solutions of soil and sludge in lagoons for precipitation and dewatering and other controlled wastes, with deposited soils originating from agricultural land supplying sugar beet to the site. Settled soils from the lagoons were principally sold commercially as topsoil. No engineered, artificial geological barrier was required to be installed beneath the waste deposits under the EP or subsequent variation (EPR/QP3593NF/V002, October 2015).

An Environmental Sensitivity and Site Design (ESSD) Report has also been produced to support the Waste Recovery (DfR) operation (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0058-03, September 2022) which summarised potential Source-Pathway-Receptor linkages which may present a risk to human health, buildings and/or the environment and thus require monitoring and management. This report was supported by the updated Hydrogeological Risk Assessment (HRA) (Arcadis, January 2020). Ammoniacal nitrogen is considered the primary contaminant in relation to groundwater and surface water receptors with metals and metalloids not considered to present a significant risk.

The previous Tier 3 risk assessment and sensitivity analysis undertaken by AECOM as part of the 2015 RRS as well as the updated Hydrogeological Risk Assessment (HRA) (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0020-01, January 2020) both included detailed assessment of the potential environmental risks posed by ammoniacal nitrogen. The updated HRA concluded that measured concentrations of ammoniacal nitrogen in groundwater were not identified in excess of the updated Site Specific Assessment Criteria (SSAC) derived for the protection of the Secondary A Aquifer or the River Ouse. As such, measured concentrations of ammoniacal nitrogen were not considered to represent a significant risk to water resources.

Outline Engineering Plan

British Sugar, York

As such, while active remediation works will be undertaken with respect to Made Ground soils in order to reduce the concentrations and leachability of ammoniacal nitrogen this will be for the purposes of 'Source Reduction' and no active remediation of groundwater is considered to be required.

The risk assessments undertaken and waste recovery operation (remediation) activities proposed (described within the WRP (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0034-P6-Waste Recovery Plan, September 2022) and the Remediation and Reclamation Strategy Addendum (Arcadis Report Ref: 10024487-AUK-XX-XX-RP-GE-0049-P1 Arcadis, 2020)) demonstrate that there are no requirements for an artificial geological barrier or other groundwater protection or leachate management measures to be installed prior to permanent deposit of recovered waste in order to protect groundwater.

The monitoring programme proposed will generate data to demonstrate that recovered waste is suitable for use within the development platform, is not presenting a significant risk to human health or groundwater receptors and that recovered waste is stable and unlikely to cause pollution in the future.

1.2 Ground Gas Protection Measures

The proposed remediation and reclamation works will modify the ground conditions, by increasing the in-situ density and decreasing air voids by optimised compaction and through bioremediation processes during treatment of selected hydrocarbon impacted materials and organic rich materials.

Therefore, in accordance with the 2015 RRS, ground gas protection measures for residential properties within the development will be determined following completion of the assessment of the post-works ground gas monitoring data.

It is recommended that gas protection measures for the residential properties follow the requirements of the NHBC Report Ed No4 (2007) and the British Standard Code of Practice (BS8485:2015).

As discussed in the RRSA (Arcadis, 2020), the likely Characteristic Situation (CS) following remediation will be a maximum of CS2 with the CS value used in Table 4 of BS8485:2015 to determine the minimum gas protection score (depending on the building type). Having determined the minimum gas protection score for the building, or each different part of the building an element or combination of elements should be chosen from Table 5, Table 6, and Table 7 with a combined score achieving the minimum recommended gas protection (BS8485:2015). The gas protection system should consist of at least two different elements; for example, a barrier element with either a membrane or a ventilation or dilution element (or both).

It is noted that, in accordance with the NHBC Report Ed No4 (2007) a gas protection membrane and ventilated sub-floor void is required for both Amber 1 and Amber 2 conditions, the difference being that for Amber 2 the membrane is to be fitted and fully certified by a specialist contractor.

2 Monitoring Infrastructure

Full details of the ground gas and groundwater monitoring activities are presented in the Monitoring Plan (10024487-AUK-XX-XX-RP-GE-0060-03-Monitoring Report) and the infrastructure required to enable this monitoring is outlined below.

2.1 Ground Gas Monitoring Infrastructure

Ground gas monitoring prior to and during works will be taken from 36 wells currently monitored as part of the EP monitoring programme (tables S3.1 and S3.3 within the EP Variation (EPR/QP3593NF/V002)). This includes 11 wells located within the EP boundary and 25 wells located outside the EP boundary. The monitoring well locations are shown on Figure 3.

Ground gas monitoring following the remediation works will be taken from 36 replacement wells located within the EP boundary (listed within tables S3.2 and S3.4 in the EP (EPR/QP3593NF/V002)). This includes 11 wells located within the EP boundary and 25 wells located outside the EP boundary. These monitoring well locations are shown on Figure 4.

The proposed construction of replacement ground gas wells is shown on the schematic presented as Figure 5.

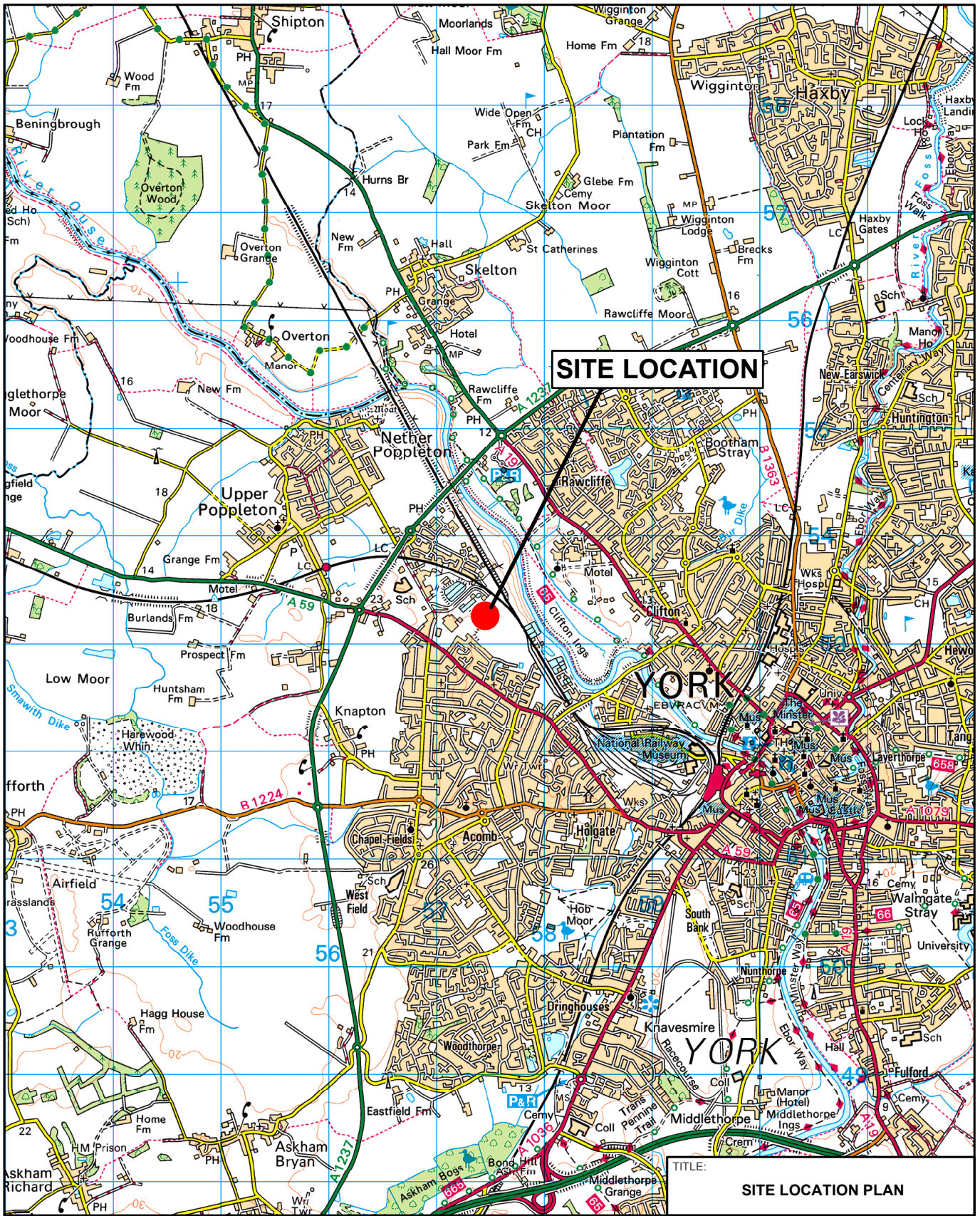
2.2 Groundwater Monitoring Infrastructure

Groundwater monitoring prior to and during works will be taken from 23 wells currently monitored as part of the EP monitoring programme (table S3.5 within the EP Variation (EPR/QP3593NF/V002)). This includes 11 wells located within the current EP boundary and 12 wells located outside the current EP boundary. Locations shown on Figure 3.


Groundwater monitoring following works will be taken from 14 replacement wells located within the current EP boundary (listed within tables S3.6 in the EP (EPR/QP3593NF/V002)). This includes 4 wells located within the current EP boundary and 10 wells located outside the current EP boundary. Locations shown on Figure 4.

The proposed construction of replacement groundwater monitoring wells is shown on the schematic presented as Figure 5.


FIGURES

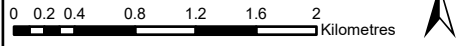


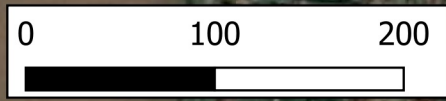
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LEGEND	
	SITE LOCATION

NOTES	
SYMBOLS FOR BOREHOLES, TRIAL PITS AND OTHER SPECIFIC FEATURES ARE REPRESENTATIONS OF LOCATION ONLY AND UNLESS OTHERWISE SPECIFIED, DO NOT REPRESENT THE TRUE SIZE OF THE FEATURE.	

TITLE: SITE LOCATION PLAN	
SITE: BRITISH SUGAR YORK	
CLIENT: BRITISH SUGAR	
PROJECT: 10024487	FIGURE 1
DATE: 30/07/19	DRAWN BY: AP
DRG No. : 10024487-AUK-XX-XX-DR-ZZ-0002-P1.GIS	
SCALE: 1: 50,000	PRINT: A4
 Design & Consultancy for natural and built assets	





- Legend**
- Former Water Treatment Area
 - Former Factory Area
 - Historic Ponds and Soil Conditioning Area
 - Site Boundary
 - Current Ponds on Site
 - Permit Boundary
 - Sitewide Topo Contours



Issued for Information			
Design	S.Sohni	5-6-2020	
Drawn	S.Sohni	5-6-2020	
Checked	J.Hurst	5-6-2020	
Approved	C.Piddington	5-6-2020	
Scale	1:4000	Datum	AOD
Original Size	A3	Grid	OS
Suitability Code:		Project Number	10024487

Client - British Sugar Plc



Figure 2

PROJECT	British Sugar, York
TITLE	Site Layout Plan



Registered office: Arcadis House, 34 York Way, London N1 9AB

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Drawing Number: 10024487-AUK-XX-XX-DR-ZZ-0047-P1-Site layout Plan

Under the Microsoft® BingTM Maps



- Legend**
- Monitoring Locations**
- Ground gas Monitoring Locations
 - Groundwater and Groundgas Monitoring Well
 - Groundwater Monitoring

- Site Boundary
- Permit Boundary



Issued for Information			
Design	S.Sohni	16-4-2020	
Drawn	S.Sohni	16-4-2020	
Checked	J.Hurst	16-4-2020	
Approved	C.Phillington	16-4-2020	
Scale	1:4000	Datum	ADD
Original Size	A3	Grid	OS
Suitability Code		Project Number	10024487

Client - British Sugar Plc



Figure 3

PROJECT	British Sugar, York
TITLE	Existing Ground Gas and Groundwater Monitoring Well Location Plan

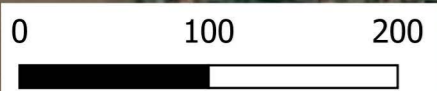
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Drawing Number: 10024487-AUK-XXXX-DR-ZZ-0043-P1-Groundgas and Groundwater monitoring Location Map

Under the Microsoft® BingTM Maps



- Legend**
- Proposed Ground Gas and Groundwater Monitoring Locations
 - Proposed Ground Gas Monitoring Location
 - Proposed Ground Gas Monitoring Location in Natural Strata
 - Proposed Groundwater Monitoring Location
 - Site Boundary



Issued for Information			
Design	S.Sohni	3-4-2020	
Drawn	S.Sohni	3-4-2020	
Checked	J.Hurst	3-4-2020	
Approved	C.Piddington	3-4-2020	
Scale	1:4000	Datum	AOD
Original Size	A3	Grid	OS
Suitability Code:		Project Number	10024487

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Figure 4

PROJECT	British Sugar, York
TITLE	Proposed Replacement Ground Gas and Groundwater Monitoring Wells

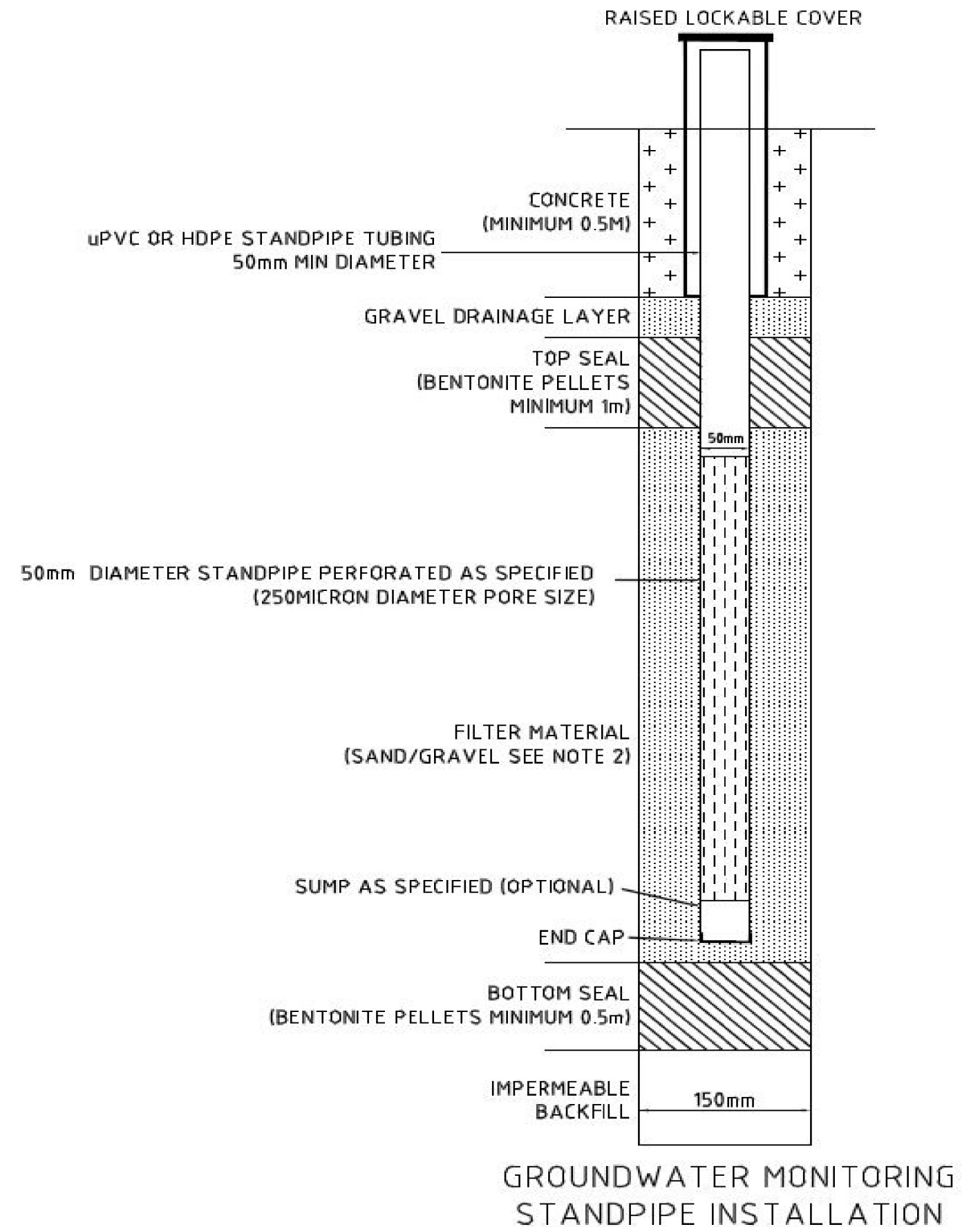
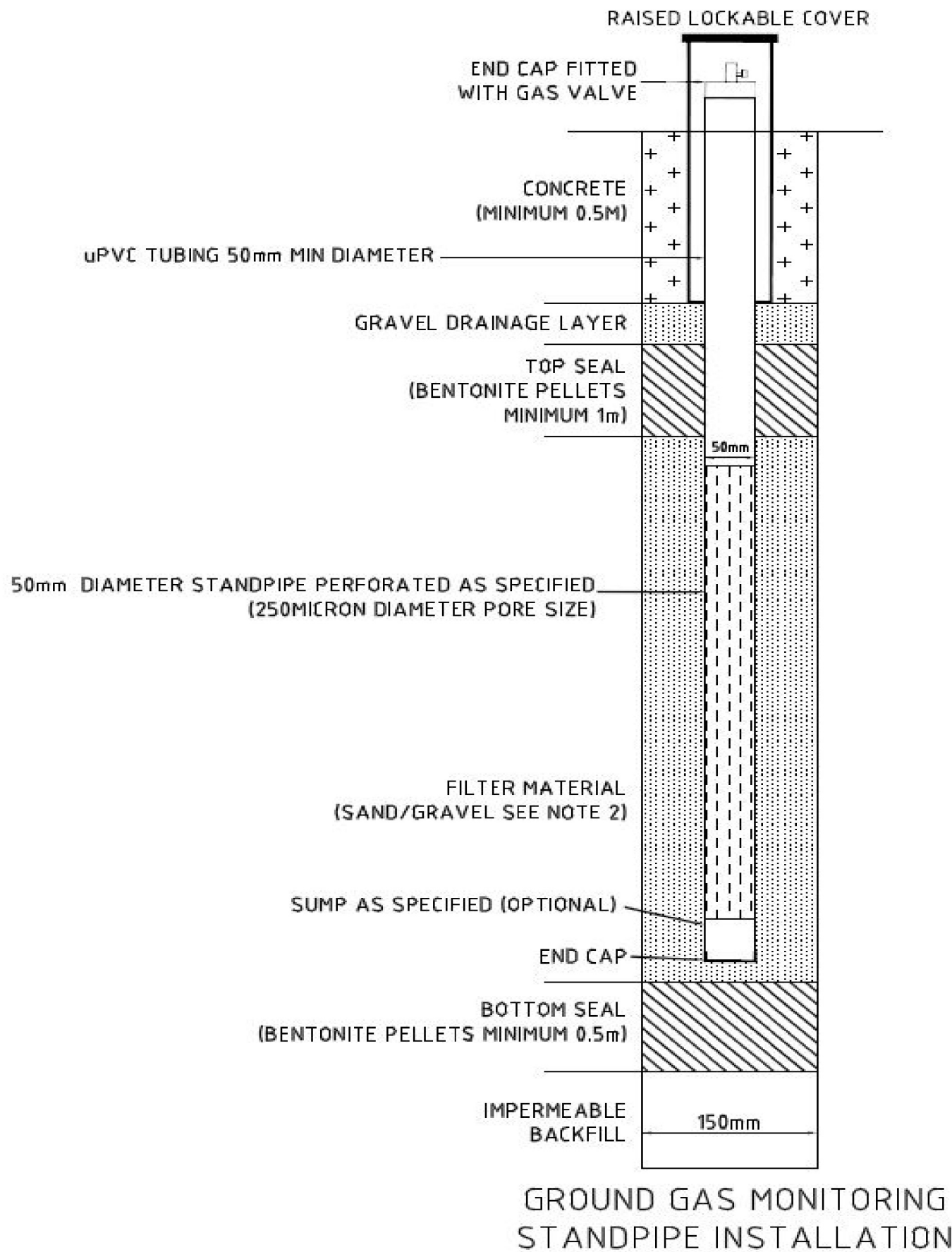
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Drawing Number: 10024487-AUK-XXXX-DR-ZZ0054-P1-Proposed Ground Gas and Groundwater Monitoring Locations

Under the Microsoft® BingTM Maps



- NOTES:**
1. This document has been prepared with reference to the drawing produced by URS Infrastructure & Environment UK Ltd in February 2015, with drawing number 'FBSS-URS-XX-XX-DR-GE-00105'.
 2. Length and depth of screen to be determined for each installation.
 3. Filter material to be composed of non-carbonate non-carbonaceous composed of siliceous sand/gravel.
 4. Minimum borehole diameter to be 150mm.



Issued for Information			
Design	Arya M S	4-5-2020	
Drawn	Arya M S	4-5-2020	
Checked	J.Hurst	4-5-2020	
Approved		4-5-2020	
Scale	1:1	Datum	AOD
Original Size	A3	Grid	OS
Suitability Code:		Project Number	10024487

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Figure 5

PROJECT
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TITLE
Proposed Monitoring Well-Schematic

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Drawing Number:
10024487-AUK-XX-DR-ZZ-0065-P1-Proposed Monitoring Well-Schematic

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