LANDFILL CAP AND WASTE EXCAVATION
REMEDIATION METHOD STATEMENT (RMS) AND VERIFICATION PLAN

SITE: **Leicester County Council (LCC),**
Kibworth Household Waste and Recycling Centre (HWRC)

DATE: **6th April 2021**

INTRODUCTION:

The site is located approximately 1km south-east of Kibworth village centre, comprising an area of approximately 2.0 Ha. The National Grid Reference (NGR) for the approximate centre of the site is SP 697 932. The site location, and development proposal are shown in **Appendix A**.

The site was a former brick pit that became a refuse tip between 1940-1980. The landfill was closed in the late 1980's and the site was redeveloped to the current arrangement of an active HWRC and a composting facility. The composting facility ceased operation in 2014.

The site re-development is to include the demolition, reconfiguration and expansion of the current waste transfer facility. The site has been subject to the a recent IHE site investigation and assessment of contamination levels across the former composting facility and the current waste transfer station, as well as an investigation into the condition and thickness of the former landfill cap upon which the composting facility is situated.

The development strategy is to undertake a limited cut and fill operation in order to enable the clay cap reinstatement in the previous composting area and creation of a development platform. The summary of the works is as follows;

- The existing HWRC will be demolished with all foundations/hardstanding removed and crushed on site for potential re-use or removal off-site.
- Removal and stockpiling of the Organic Rich material in the Former Composting Facility for re-use in adjacent LCC site for landscaping areas.
- Management, and treatment (if necessary) and encapsulation on adjacent LLC site, of excavated landfill materials where weighbridge installation and drainage work excavations will penetrate the materials.
- Import ~500m^3 of low permeability (1x10^{-9} m/s) clay, or use a low permeability (1x10^{-9} m/s) geosynthetic liner with overlying materials, to reinstate areas of the previously removed landfill cap in the western previous composting area of the site and integrate into other cap materials.
- Creation of a development platform to provide a minimum CBR value of 5%.

BRIEF:

The purpose of this RMS is to build upon the previous site investigation into the underlying landfill and the characterise the current status of the composting facility and the HWRC, with the results of the recent IHE site assessment. This enables a specific remediation strategy and methodology

for the shallow ground conditions within the upper 1m of the overall site in the overlying made ground and the landfill cap.

The brief for the RMS incorporates the following:

- An Appraisal of the previous Geo-environmental assessments of the Former Composting facility in the western part of the site.
- An assessment of the presence, integrity and extent of the Landfill Clay Cap placed over the former Landfill.
- An assessment of specific sources of potential contamination within the active Household Waste Recycling Centre.
- A Remediation Strategy for the development and implementation of a Remediation Method Statement (RMS), and a Materials Management Plan (MMP) with regulatory sign off for the proposed development.

Site investigation locations are shown as **Figures 2 and 3**, and the site investigation was undertaken in three zones of the site, see **Figure 4** - all in **Appendix A.**

PREVIOUS REPORTS:

A previous Risk Assessment and Geo-Environmental Assessment was produced for Willmott Dixon by Ivy House Environmental (IHE) to provide a contamination and geotechnical assessment of the site's known as Kibworth Household Waste Recycling Centre (HWRC), and Kibworth Composting Facility. This was to satisfy the Environment Agency (EA) that the sites are in a satisfactory state to allow the surrender of the sites Environment Agency permits and to provide a baseline for the redevelopment of the site.

The IHE Geo-Environmental Assessment has been used to inform the development of this Remediation Method Statement (RMS) to ensure that the site meets with the above 'satisfactory state' requirements as set out by the Environment Agency's Regulatory Guidance Note RGN9 - Surrender.

This RMS should be read in conjunction with the Geotechnical and Geo-environmental Assessment Report conducted by IHE (see below IHE Report Summary), and builds upon the conclusions and recommendations detailed therein. Constraints relating to the extent of potential ground contamination have been identified. This RMS document is intended to detail how such issues are to be managed during re-development of the site.

Reference should also be made to the following previous reports:

- Kibworth HWRC, Earthworks Strategy Statement, prepared for Willmott Dixon Construction Ltd (WDCL), Report Ref IV.293.20 by Ivy House Environmental (IHE), dated March 2021
- Kibworth HWRC, Geotechnical and Geo-environmental Assessment, prepared for Willmott Dixon Construction Ltd (WDCL), Report Ref IV.293.20 by Ivy House Environmental (IHE), dated March 2021
- Geo-environmental and Geotechnical Ground Investigation Interpretative Report, MHA PSP2, for LCC Kibworth RHWS, Project Number 60582224, by AECOM, dated August 2019.
- Kibworth HWRC, Geotechnical Ground Investigation (Stage 2) Factual report on Ground Investigation. Prepared for Leicester County Council Report Ref: 35169 by Geotechnical Engineering Ltd, dated July 2019.

Reference should also be made to the following industry guidelines:

- EA (2020) Land Contamination Risk Management (LCRM)
- Definition of Waste: Development Industry Code of Practice (DOWCOP) 2013 V2, Contaminated Land Applications in Real Environments (CL; AIRE)
- Environmental Services Association (ESA), Landfill Guidance Group (LGG), Design of Capping Systems, Industry Code of practice No 111, February 2018

IHE REPORT SUMMARY

Assessment Report (IHE) – Key Findings;

Towards the middle of the Former Composting Facilities operational life the Landfill Clay cap was installed, resulting in the inhibiting of rainfall and leachate from the Former Composting Facility.

Subsequently, investigations have shown that the central area of the Landfill Clay Cap is absent and appears to have been replaced by a granular surface layer for trafficking, thus allowing a degree of contaminant migration from the remaining Former Composting Facility material into the underlying Old Landfill.

The site investigation has confirmed that the Landfill Clay cap is absent from the central area of Zone A, see **Figure 5**. Therefore, there is a direct pathway for contaminants from the Former Composting Facility to migrate into the underlying Old Landfill. In other areas the cap remains, comprising of a lower and upper geotextile membrane encapsulating up to a 150mm (TP8) thick homogeneous bluish grey stiff to very stiff Clay. Most test pits and hand dug pits where the cap was found were intentionally not deepened, in order to not impact the function of the cap or basal membrane.

It is considered that historically contaminants from the Former Composting Facility materials are likely to have migrated into the Old Landfill material. The main mechanism for the migration is deemed to be rainwater infiltration. The pathway for contaminant migration during the initial operational phase of the Former Composting Facility was uninhibited and direct into the underlying Old Landfill.

However, the chemical analysis of the shallow materials sampled from the Former Composting Facility has shown that the concentrations of contaminants are generally significantly below the concentrations of contaminants derived from the Old Landfill.

It is considered that the contaminant concentration load is unlikely to have increased significantly within the Old Landfill, based upon the volume of the Former Composting Facility material, the lower contaminant concentrations, and impeded migration through the presence of the Landfill Cap following installation and subsequent partial coverage around the periphery of Zone A.

Site investigation locations are shown as **Figures 2 and 3**, and the site investigation was undertaken in three zones of the site, see **Figure 4.**

All logs detailing ground conditions encountered in windowless sample borehole, hand dug pits, and excavator dug trail pits are included in **Appendix C.**

CONCEPTUAL SITE MODEL:

The conceptual hydrogeological model for the site is based on the following source-pathway-receptor linkages, and relies on the geological and hydrogeological information gathered during site investigations as outlined above, see **Figure in Appendix B**

The **source** consists of landfill materials of varying thickness across portions of the development area, and overlying remaining organic rich materials from use as a composting facility the general site levels increase following the closure of the landfill.

The Former Composting Facility was not a landfill. However, it is situated upon a closed landfill and, therefore, previous site activities (the presence of the composting materials and the HWRC) may have impacted on the contaminant concentrations within the landfill leachate.

The leachate within the Old Landfill has the potential to impact the wider groundwater environment. Therefore, the contribution of contaminants from the Former Composting Facility and the current HWRC are considered to be the source terms for the purpose of this conceptual site model.

Contamination assessment summary
The variable fill material may represent a potential contamination hazard, and accordingly is considered to be the source in relevant pollution linkages.

Pollutant **pathways** to identified receptor groups are identified as follows:

Human Health: Ingestion of, and dermal contact with, contaminated soil, landfill materials and dust arising from development works. Inhalation of dust, vapours, and asbestos fibres.

Controlled Waters: Percolation of contaminants, or impacted infiltration waters, into underlying aquifer. Lateral movement/run-off into surface waters.

Receptors are identified below. An indication of the level of risk to each receptor is also stated.

Human Health:
Construction workers, utility contractors, site users in proximity to the proposed works due to potentially contaminated dust associated with the works. **Moderate Risk**

Construction workers, utility contractors, due to a known asbestos fibre hotspot at TP15 in the former composting facility area, and potentially in contaminated dust associated with the works. **Moderate Risk**

Construction workers, utility contractors, and end users in site buildings due to elevated carbon dioxide ground/landfill gas. **Moderate Risk**

It is noted that members of the public would only be subject to a very short/transient exposure to the development area, during and after works are completed. **Low Risk.**

Controlled Waters:
The receptors in respect to controlled waters considered in this risk assessment will be the groundwater within the Charnworth Mudstone (primary receptor). The bedrock deposits (Charnworth Mudstone) are designated as a Secondary Aquifer (undifferentiated) which is defined as generally the water-bearing parts of the former non-aquifers. There are no superficial materials overlying the weathered bedrock deposits.

The closest surface watercourse to the facility is the Langton Brook 955m south of the site, and a drainage channel 39m north of the site that flows to the brook.

There is one groundwater and two surface water abstraction facilities within 2km from the site. However, abstractions are private water supplies with no associated Source Protection Zone, and the site is not in such a zone either.

It is considered that the Old Landfill is unlikely to have adversely affected the water abstractions, based on the distance from source to receptor and associated dispersion, the limited migration of low leachate concentrations and the low permeability of the underlying clays.

However, earthworks have the potential to pollute the aquifer by mobilisation of contaminants if adequate mitigating measures are not implemented. Stiff weathered mudstone as Clay is found above the Charnwood Mudstone bedrock. **Low Risk.**

REMEDIATION METHODOLOGY:

Asbestos fibre management

A hotspot was detected with fibres at 0.002% w/w in WS15 at 0.25mbgl.

The materials impact area will be delineated and excavated materials will be either encapsulated in-situ or at another area at depth dependant on final site levels, and placement area marked on works completion plans. If materials are excavated the remaining materials will be sampled for asbestos analysis for validation purposes.

Segregation of asbestos impacted soils will occur, and hand picking of any visible asbestos into double lined tied bags by a suitably licenced contractor for removal offsite as hazardous waste, to enable soils/materials to be reused on site.

Perched groundwater and drainage water management

While no visual evidence of impacted water was encountered during the IHE site investigation, AECOM did report some evidence. This was during the site walkover desk study stage, when on lifting two manhole covers in the current HWRC, distinct hydrocarbon odours and sheen were noted, and manholes were full of drainage water.

Any visual/olfactory impacted water in shallow made ground or the drainage network when being decommissioned should be pumped out and removed offsite to licensed treatment facilities.

Reinstatement of Landfill Clay cap materials

Composting area -

In the area to the west and centre where the composting facility was located, this area was originally covered with the landfill clay cap. There are some areas where the cap materials are now absent, see **Figure 4** and these areas will be infilled to create a complete and continuous cap again.

The materials used will consist of a natural imported low minimum permeability ($1x10^{-9}$ m/s) clay material, SHW Class 2A or 2B (estimated as ~$2300m^2$ /~$500m^3$), or use of an equivalent low permeability geomembrane eg

If clay is used it will be benched into the current clay cap edges and compacted to meet the specification as in the Earthworks Method Statement.

If clay materials are to be used they will be placed in a layer between approximately 100-150mm (to be confirmed) thick between two geotextiles and benched in to adjacent similar thickness cap materials.

If a geomembrane is used, inspection of placement for CQA purposes will be undertaken.

Any excavated landfill clay cap materials during benching in will be re-used as engineered backfill where possible, after picking out minor expected

deleterious materials at point of excavation and/or screening in the treatment area, or where there is no need to screen.

Existing HWRC area -

All previous landfill cap materials are absent underlying the current HWRC area, as this was replaced by the construction sequence of sub-base and hardstanding/concrete slabs which covers the underlying landfill in this area.

While a landfill cap is not present at the existing HWRC, the proposed replacement waste transfer development will require to be covered by hardstanding (concrete) with a drainage system.

The above will cap the landfill, and collect and limit both surface water migration off-site and rainfall infiltration into the underlying Old Landfill.

Management of underlying landfill waste materials

During restoration of the landfill cap some further excavation to a reduced level dig level may be within shallow waste materials, and also in an area of the weighbridge, and along the corridors of where site surface drainage will be installed.

These materials will be excavated and removed, either immediately offsite to licenced landfills or placed in temporary stockpile, until further sampling for waste classification prior to offsite disposal, or for site reuse in an area to the east of the site in Zone C where they will be encapsulated and capped, see **Figure 5** and depth and extent marked on final construction drawings.

If materials are to be removed offsite they will be separately temporarily stored in a quarantine/holding area, and removed offsite. This will be as soon possible as hazardous waste to licensed facilities if shown as gross contamination (e.g evidence of drums, tarry, free product, extensive asbestos fragments, black bag waste, extensive deleterious materials rather than soil/aggregate matrix).

The temporary waste storage treatment area will consist of a base membrane, covered with a protective soil layer and will be surrounded when not accepting materials by a perimeter bund.

All other landfill materials will be left in-situ, since it is not feasible or necessary for the development to excavate the full volume/depth of landfill materials. These range in depth from current levels up to 5.6m deep and overly stiff clay, as determined by the previous AECOM deeper site investigation.

The completion of the proposed development across all of the site will place an impermeable concrete layer and sealed surface drainage system over the impacted material. This will remove the risk of water infiltrating downwards through deeper soils that have the potential to impact the underlying secondary aquifer and thus remove the potential for further leaching.

Minimisation and re-use of excavated materials on site.

Further excavations and need for some temporary stockpiling and placement are expected during the progression of the works and these materials will be managed in a separate area, see in **Appendix A.** In accordance with the hierarchy of waste, the re-use of these materials on site will be considered before off-site disposal.

One of the primary objectives is to reduce the amount of material excavated, with generation of such being limited to only those areas stipulated by the

planning development and to a depth required by the geo-environmental investigation and needs of the development.

This approach will follow the below procedures:

Sampling Frequency.

Ideally, sampling should take place in-situ prior to excavation of materials, in a grid pattern at a rate of one sample per <500m^3, and at depths to accurately represent the composition of the material being excavated. Sampling locations will be recorded and directly related to subsequent excavation of that area.

It is noted that initial sampling has been undertaken already through 2 no. site investigations at the site, with the IHE sampling focussed on the shallow more recent ground materials, particularly in the former composting area.

Where tests results are awaited, the material should be segregated until results are available, upon which the material can be moved to the appropriate area for either treatment, re-use or disposal.

Limiting values for re-use of Site-won Material.

Limiting values for reuse of site materials will be in line with Suitable for Use Levels (S4ULs) for a commercial site for soils, and UK Drinking Water Standards (DWS) for leachate, or as advised by the relevant regulator.

Proposed limiting values for commercial end use are presented in for soils in Table 1 **Appendix D.**

Waste Materials Classification

Waste Acceptance Criteria (WAC) testing was undertaken on 8No samples that comprised of the organic rich Former Composting Facility material, and the 'trafficking' layer from Zone A, see **Figure 5.**

It should be noted that use of only WAC (Waste Acceptance Criteria) tests are insufficient to classify the hazardous/non-hazardous properties of excavated arising's for disposal to landfill.

The results of the analysis have indicated that 4No samples have been categorised as hazardous waste, 2No Non-hazardous waste and 2No inert for landfill purposes. Samples of both the Former Composting Facility material and 'Trafficking' layer showed results classified as hazardous waste. The defining characteristic driving the classification for the samples is Loss of Ignition (LOI) and Total Organic Matter (TOM) content. As a result, it is considered that they pose a low risk with regards to controlled waters based on their low contaminant concentration, and the presence of a substantial clay attenuation layer between the site and the groundwater**.**

The 'Trafficking' Layer material in the central area of Zone A has the potential to remain on site dependant on the new development finished levels with reference to the requirement for the replacement of the Landfill Clay Cap and subsequent sub-base construction.

The two layers of Made Ground associated with the Former Composting Facility are classified as Hazardous, based on Total Organic Carbon, Loss of Ignition, and Lead. However, it is considered that these materials could remain onsite subject to this Remediation Method Statement and a Materials Management Plan if agreed by the regulators. The organic rich material within Zone A has the potential to be reused as a growing medium in a landscape

area within Zone C, dependant on regulatory approval upon the production of a Materials Management Plan.

If materials are to be removed from site, then it is advised that the material is categorised as **Hazardous** (as elevated TOM/LOI), and not due to typical contaminants.

Hazardous waste assessment

In accordance with WM3.1 (Environment Agency, Technical Guidance WM3: Guidance on the classification and assessment of waste, 1st Edition v1.1 July 2018) materials have also been analysed for total concentrations prior to disposal. This allowed classification of the waste and consignment to a suitable waste facility if required.

A Hazardous waste assessment has been undertaken using HazWaste Online. The hazardous waste assessment has concluded that three of the samples are categorised as hazardous, samples, TP07 at 0.25m, TP10 at 0.1m (both former Composting Facility), and WS03 at 0.70m (landfill materials). Sample WS03 from the Old Landfill material within the currently active HWRC will remain undisturbed and in-situ and therefore is not considered further.

Samples TP07 and TP10 were classified as hazardous due to Lead, in accordance with Environment Agency Waste Classification Guidance Note WM3 and exhibits hazardous property HP7 (Carcinogenic).

As all samples do not contain Hazardous Properties HP12 (gas production in contact with water, air or acid) or HP14 (ecotoxic), we have considered that they will not have an impact on the surrounding environment should the materials be re-used on site.

Ground borne and landfill gas mitigation

The previous AECOM site assessment report assessed site gas risk categorised as Characteristic Situation 3 (Requiring gas protection measures). This was based on monitoring on 24/4/2019 from 10.no boreholes (7no. cable percussion holes, and 3no. window sample holes from a previous SI), but also previous January and February results.

A CS3 classification for any occupied Type D (low risk industrial style building) on the site requires the use of either;

- A reinforced cast in situ suspended floor slab with minimal penetrations.
- Minimum 2000g gas protection membrane installed.
- Laps and joints bonded as per manufacturers details.
- All services entries sealed.

Or if precast beam and block is to be used;

- A passive sub floor dispersal layer conforming to at least ‘good performance’.
- This should be in the form of either: a clear void, polystyrene void former blanket, geo-composite void former blanket or no-fines gravel layer.
- Gas membrane as above.

A suitable gas membrane would be the Visqueen Gas Barrier, or similar. A suitable gas membrane will require validation.

This is a preliminary assessment from Aecom and the IHE 2no. most recent monitoring visits. Results of further monitoring visits should be included to

determine the Characteristic Gas Situation. The final assessment will be reported in an addendum letter.

MATERIALS MANAGEMENT PLAN

Excavated Made Ground materials will be processed and recovered and thus no longer classed as waste, and all such works will be controlled under a site Materials Management Plan (MMP) for Reuse on site of Origin and will be submitted to CL:AIRE following a Qualified Person Review, under the Definition of Waste: Development industry code of practice (DOWCOP).

Records of recovered materials movement tracking, photographs, and records sheets will be provided in an MMP verification report which will be produced showing compliance with the MMP. The verification report shall be submitted to CL:AIRE and will be made available to the Environment Agency upon request.

ENVIRONMENTAL MANAGEMENT:

Groundwater/surface water monitoring

Monthly groundwater monitoring of levels and specific determinants that were elevated during previous monitoring (Ammoniacal Nitrogen, Boron, PAH's-fluorene, fluoranthene, phenanthrene) will be undertaken during the earthworks/remediation works to ensure no impact upon the receiving environment as a result of the works.

This will be from IHE boreholes R001, R002, R003, and also previous AECOM borehole CP01D.

Previous groundwater monitoring has shown a hydraulic gradient from east to west.

It is considered that there is no significant direct pathway between the groundwater beneath the site and the Langton Brook and therefore there is no need to monitor the brook water quality.

Dust Minimisation.

The control of dust during construction is necessary to minimise the risk caused to human health. Dust clouds could also affect the safety of rail and cars on the adjacent railtrack and the A6 main road. A number of control measures will therefore be adhered to throughout the works to ensure dust is kept to a minimum.

- An adequate water supply will be available in all working areas for damping down excavated and placed soils by bowsers spraying water.
- Specific dust suppression in the vicinity of TP15, due to asbestos fibres during any excavations
- Damping down of work areas will be undertaken where necessary
- Wheel wash/ water spray facilities will be available near the site exit where there is potential for carrying dust or mud out of the work area onto the roads
- Road sweepers will be utilised for roads around the work site where necessary
- All skips will be sheeted or covered
- Materials with the potential to produce dust will be stored in designated areas which are enclosed or shielded, away from working area boundaries

All excavated materials will be managed and if necessary covered during storage in stockpiles until removal offsite or placement as fill in order to prevent dust arising's from surface soils.

Protection of Drainage Systems and Water Networks.

Best practice measures will be used on site at all times to prevent pollution. A site drainage plan which identifies the location of existing drains, boreholes and surface water flows will be produced prior to site set-up by the principal contractor. This shall include details of how foul and surface water drains will be protected, and any necessary treatment of water prior to discharge.

No water from site will be discharged to the surface water drainage network, with the exception of clean rain water from surface run-off. Where there is the potential for run-off to be contaminated, steps will be put in place to ensure this water doesn't enter the surface water drainage system.

No water will be abstracted from controlled waters throughout the work.

Oil interceptors already present at the HWRC will be maintained throughout the works until replaced and integrated into the new drainage system.

Requirement for additional soil materials

As the development of the site progresses, there may be a need for additional soils and fill materials to be imported from external sites. These sources should be assessed as fit for purpose prior to purchase and should be validated in-situ.

All samples should be scheduled for the analytical suite presented within Tables 1 **Appendix D**, and assessed in relation to the proposed limiting commercial end use values. Sampling frequency should be at least one per 500m^3 of imported materials, with a minimum of three samples per source.

DISCOVERY STRATEGY:

Discovery Strategy for Additional Contamination.

Works will stop if the following materials are encountered:

In underlying landfill materials if gross contaminated materials are excavated (e.g evidence of drums, tarry, free product, extensive asbestos fragments, black bag waste, extensive deleterious materials rather than a soil/aggregate matrix), works will stop.

The area will be fenced and all site workers made aware of material encountered. Details will be agreed on the method and lateral and vertical delineation of material, and materials shall be sampled if necessary.

Hazardous waste (any waste which contains or is suspected to contain high levels of contamination as above) will be segregated on site in a separate area. The materials will be temporarily stored (if necessary) on a membrane in a bunded area prior to disposal in conjunction with Duty of Care/Waste Management regulations and consignment notes.

VALIDATION PLAN:

During all the earthworks Ivy House Environmental will attend site to inspect and sample/ test materials for waste classification and potential reuse of cap materials and to ensure records are kept for the Materials Management Plan verification report and the Earthworks Validation Plan.

In addition, inspection of imported materials and site materials for reuse will occur, as well as the monitoring of materials movements and ensuring records are kept for the MMP verification report

Following the earthworks, IHE will collect validation samples across any final soils formation areas of the site prior to construction of pavement layers and impermeable surfacing. These samples will be analysed and compared against re-use criteria to confirm that remediation objectives have been achieved.

COMPLETION REPORTING:

A validation report will be provided on completion of the post-works analysis. This will comprise of:

1. Site Diary.
2. Validation sampling.
3. Risk Assessment.
4. Phase 3 CSM.
5. Soils Materials Management movement and testing verification records
6. Typical site works photographs
7. Conclusions.

This remediation method statement will be revised as necessary, should any materials be encountered change, or strategy change, before or during the landfill excavation work.

APPENDICES:

A. Figures
   A1 Figures 1-6; Site location and investigation locations, site zones, clay cap extent, schematic cross sections
   A2 Current site plan and development plan
B. Conceptual site model
C. IHE site investigation report logs
D. IHE proposed materials reuse limiting values

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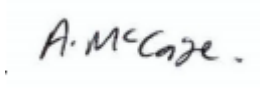
Reviewed:		Amanda McCabe *Technical Director - Waste*
Authorised		Richard Sutton MRICS *Director*
Date:	6th April 2021	
Version:	2.0	

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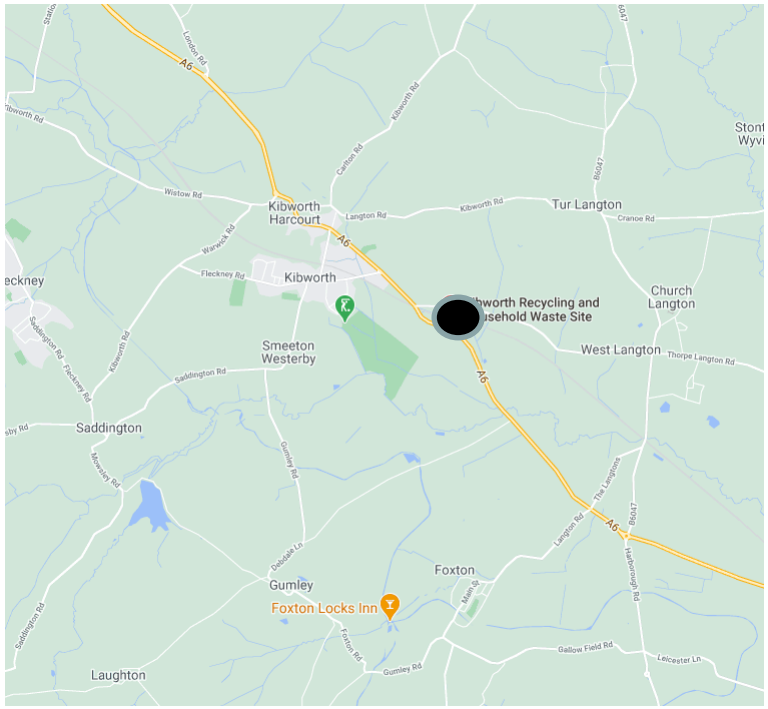
APPENDIX A



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KEY:

Site Location

DO NOT SCALE

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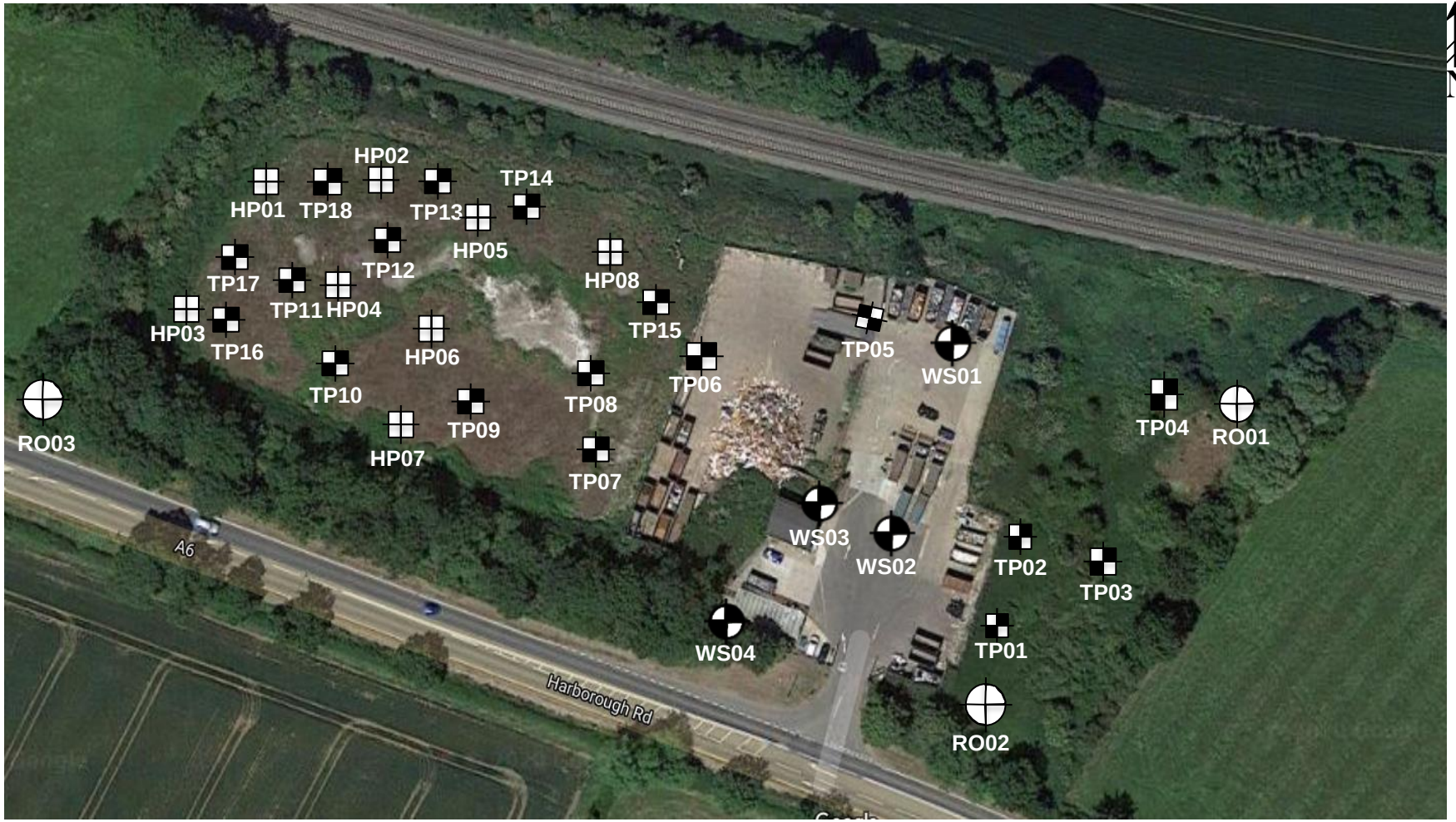
TITLE:	Site Location and Layout
PROJECT:	Kibworth HWRC
PROJECT No:	IV.293.20
DATE:	02/2021
SCALE :	NTS
DRAWN :	SS
DWG No:	Figure 1



KEY:

- Hand Dug Trial Pits
- WS Concrete core
- Rotary/Groundwater Borehole
- Trial Pit

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TITLE: Exploratory Hole Location Plan

PROJECT: Kibworth HWRC

PROJECT No: IV.293.20

DATE: 02/2021

SCALE : NTS

DRAWN : SS

DWG No: Figure 2

KEY:

Dynamic Cone Penetration Locations

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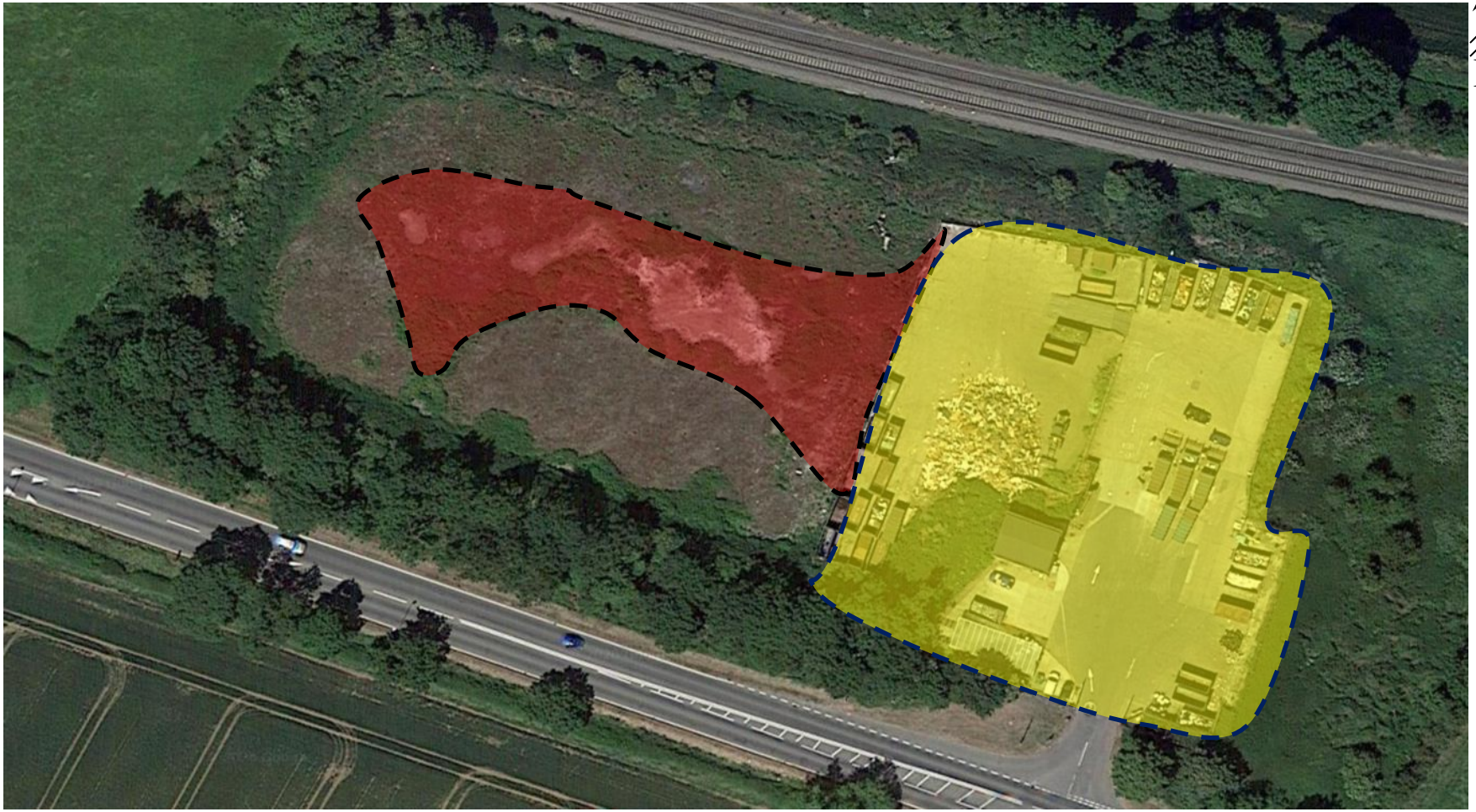
TITLE:	DCP Locations
PROJECT:	Kibworth HWRC
PROJECT No:	IV.293.20
DATE:	02/2021
SCALE :	NTS
DRAWN :	SS
DWG No:	Figure 3



KEY:

Landfill Clay cap absent within composting facility area

Landfill Clay cap absent beneath concrete/asphalt slab

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TITLE: Extent of Landfill Clay Cap

PROJECT: Kibworth HWRC

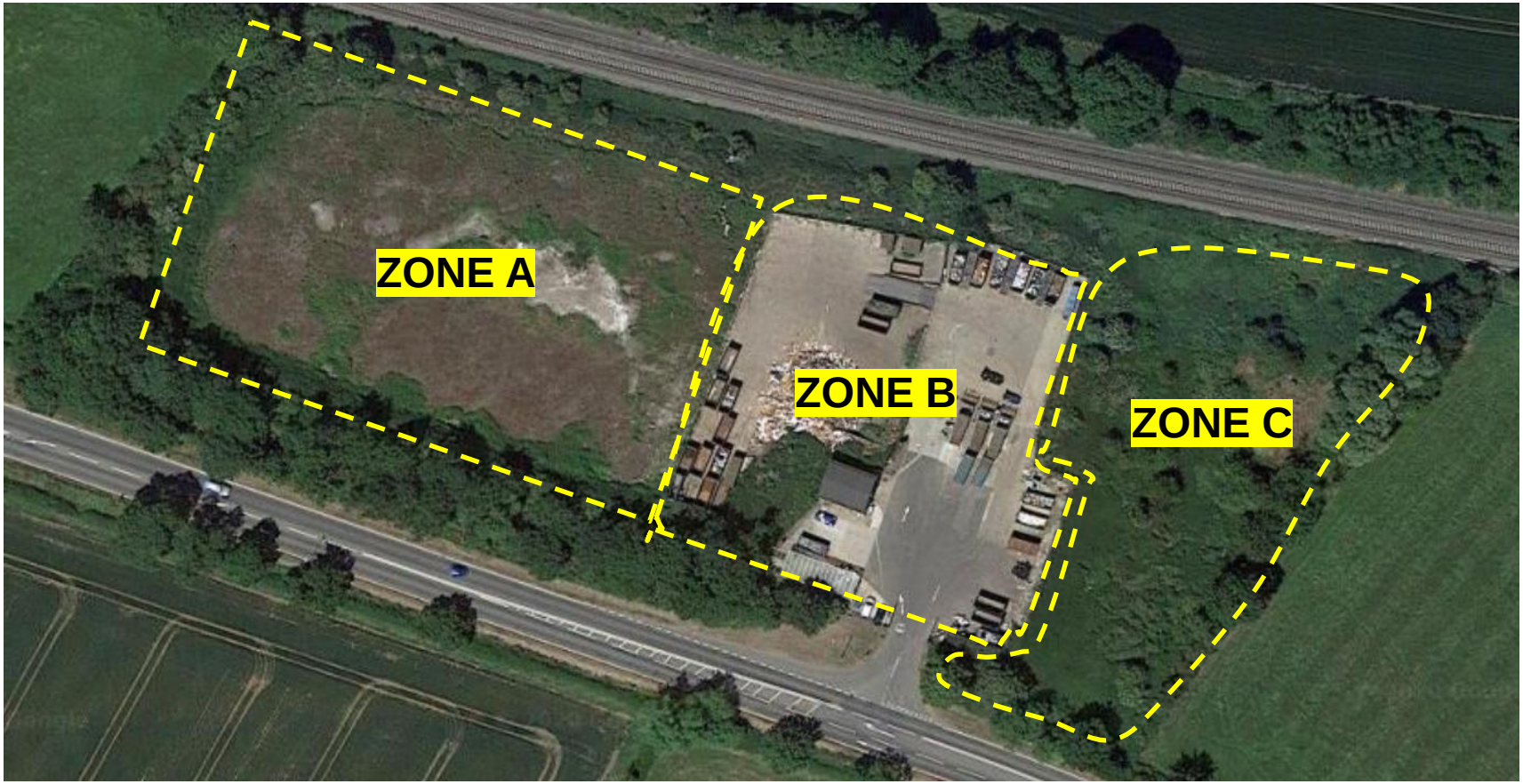
PROJECT No: IV.293.20

DATE: 02/2021

SCALE : NTS

DRAWN : SS

DWG No: Figure 4



KEY:

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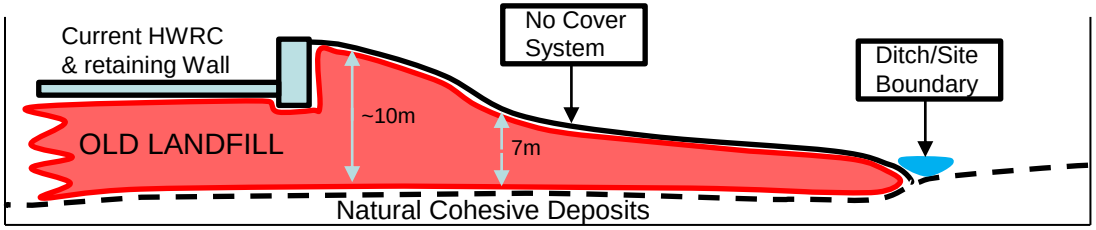
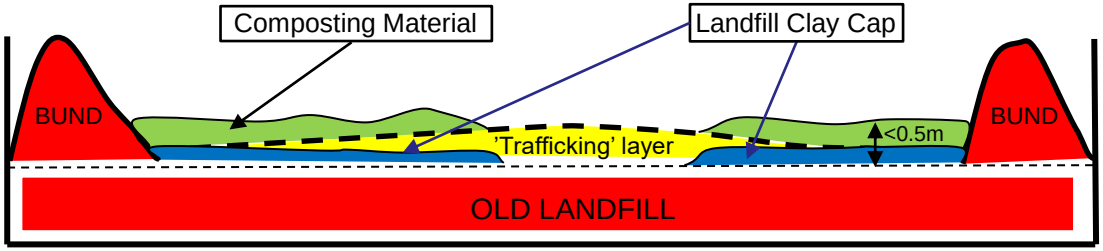
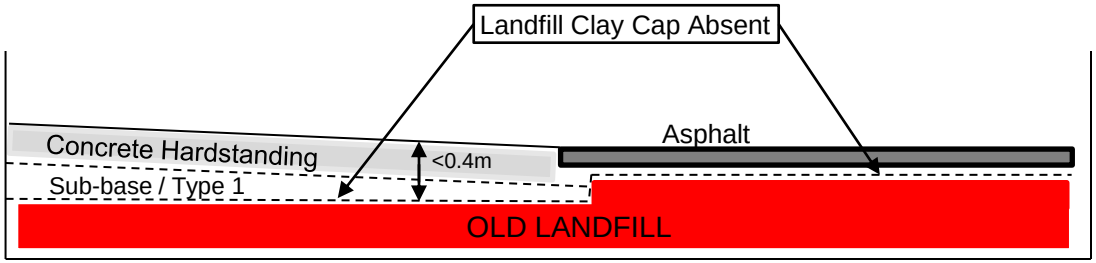
TITLE:	Site Zonation Plan
PROJECT:	Kibworth HWRC
PROJECT No:	IV.293.20
DATE:	02/2021
SCALE :	NTS
DRAWN :	SS
DWG No:	Figure 5







KEY:

DO NOT SCALE

IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE:

PROJECT: Kibworth HWRC

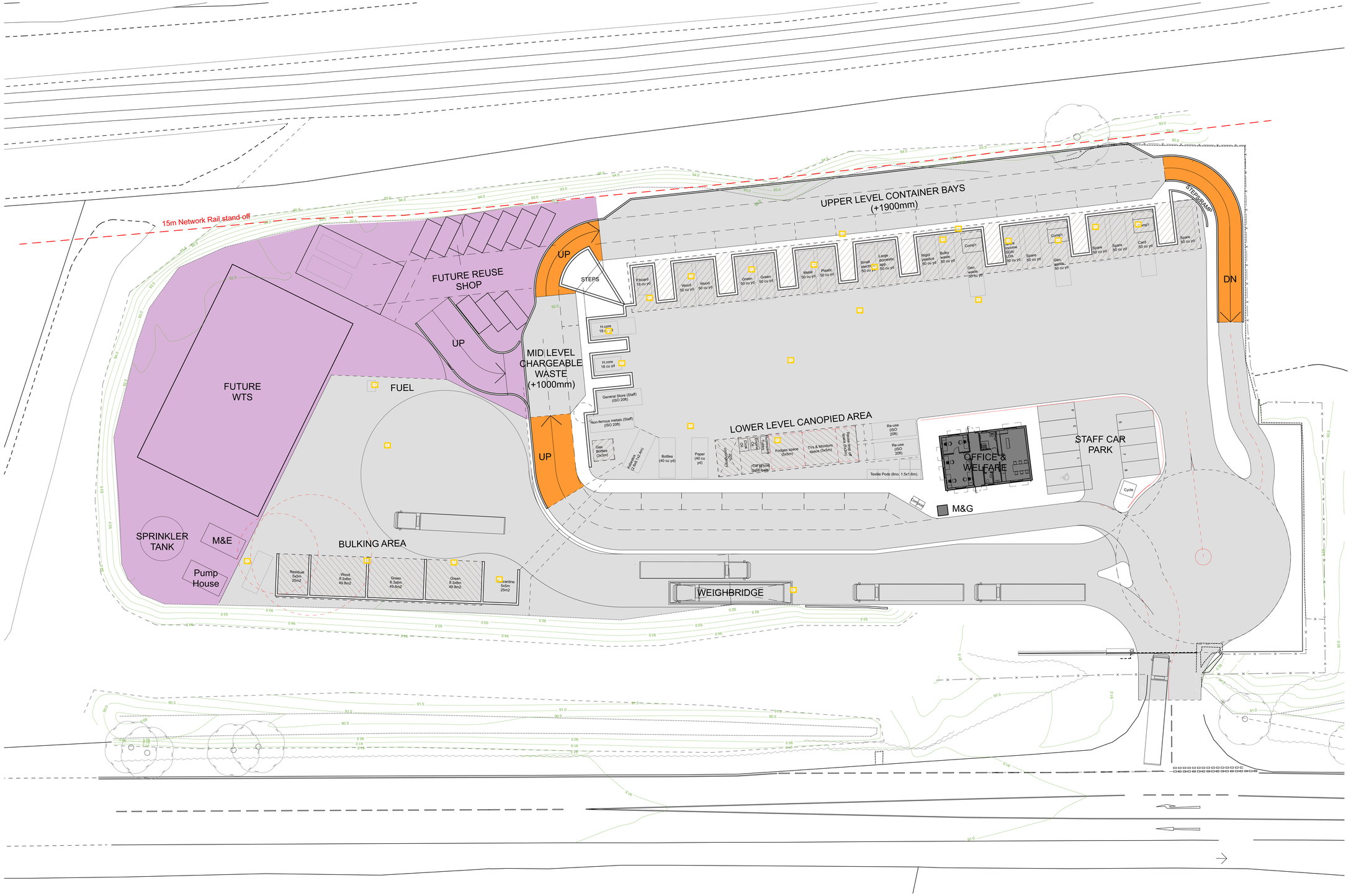
PROJECT No: IV.293.20

DATE: 02/2021

SCALE : NTS

DRAWN : SS

DWG No: Figure 6



1 **Site Plan** 1:200

N

SCALE 1:200
0 5 10 15

Key

Denotes canopy cover

Denotes future phase

rev	date	description	by	ckd
P01	08.10.2020	Preliminary Issue	TAn	GBo

RIBA Stage 2

project:
Kibworth RHWS

drawing name:
Concept Site Layout

drawing ref: 3214-MAB-00-00-DR-A-00016
status / revison: S2 / P01
mb job no: 3214
scale / format: 1:200 @ A0

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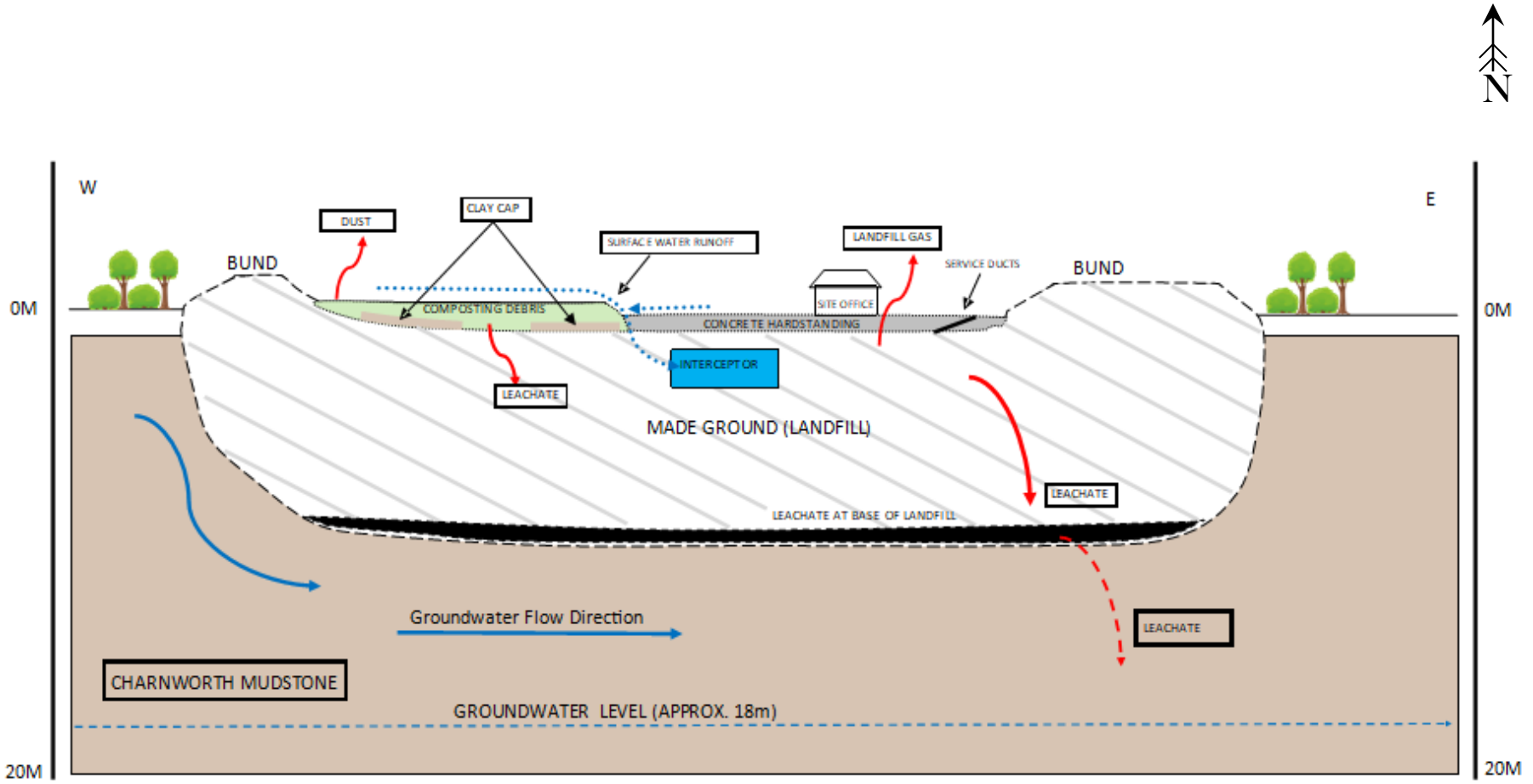
00016

APPENDIX B



KEY:

DO NOT SCALE

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TITLE:	Conceptual Site Model
PROJECT:	Kibworth HRWC
PROJECT No:	IV.293.20
DATE:	03/2021
SCALE :	NTS
DRAWN :	KH
DWG No:	Figure 1

APPENDIX C

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	HP01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND. Compost consisting of fragments of wood, plant debris and rootlets.		
0.10-0.10	ES1				0.10 (0.10)	MADE GROUND. Firm greyish mottled brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded mixed lithologies including concrete and brick.		
0.20-0.20	ES2				0.20 (0.10)	MADE GROUND. Landfill material (Construction Waste) consisting of slightly clayey gravelly SAND. Sand is coarse. Gravel is fine to coarse subangular to subrounded mixed lithologies including brick, concrete and metal.		
					0.30	Complete at 0.30m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP01

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	HP02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.01	MADE GROUND. Compost cosisting of moss, wood fragments, weeds, and gravel. Gravel is fine to coarse angular to subrounded mixed lithologies including brick, concrete, quartz and chert.		
					(0.29)	MADE GROUND. Sandy GRAVEL. Gravel is fine to coarse mixed lithologies including concrete and brick. Boulders are subangular consisting of brick and concrete.		
					0.30	MADE GROUND. Landfill material (General Household Waste and Construction Waste). Landfill is slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded mixed lihtologies including ash, wood, glass, concrete and brick.		
					(0.10)			
					0.40	Complete at 0.40m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP02

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	HP03

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.05-0.05	ES1				(0.10) 0.10	MADE GROUND. Compost consisting of plant debris, wood fragments and rootlets.		
0.12-0.12	ES2				(0.05) 0.15	MADE GROUND. Soft greyish mottled brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to rounded mixed lithologies including contcrete and brick.		
					(0.15) 0.30	MADE GROUND. Landfill material (Construciton Waste) brown slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is coarse angular to subrounded mixed lithologies including concrete.		
						Complete at 0.30m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP03

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Site	Trial Pit Number
Kibworth HWRC	HP04

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND. Compost including wood fragments, plant debris and rootlets.		
0.10-0.10	ES1				0.10 (0.10)	MADE GROUND. Firm brownish mottled grey slightly gravelly CLAY. Gravel is fine to coarse angular to rounded mixed lihtologies including chert and concrete.		
					0.20	Complete at 0.20m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP04

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Site	Trial Pit Number
Kibworth HWRC	HP05

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.05	ES1				(0.10) 0.10	MADE GROUND. Compost including wood fragments, moss, plant debris and rootlets.		
					(0.02) 0.12	MADE GROUND. Geotextile Membrane.		
					(0.08) 0.20	MADE GROUND. Landfill material (COnstruction Waste) brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse angular to rounded mixed lithologies including concrete and brick.		
						Complete at 0.20m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP05

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Site	Trial Pit Number
Kibworth HWRC	HP06

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.03) 0.03	MADE GROUND. Compost including wood fragments, plant debris, rootlets and brick.		
					(0.02) 0.05	MADE GROUND. Geotextile membrane.		
					(0.15)	MADE GROUND. Soft grey slightly gravelly CLAY. Gravel is fine to corase angular to subrounded mixed lithologies including brick and concrete.		
0.18-0.18	ES1				0.20			
						Complete at 0.20m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5		IV.293.20.HP06

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Site	Trial Pit Number
Kibworth HWRC	HP07

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.02) 0.02	MADE GROUND. Compost including wood fragments, plant debris and rootlets.		
					(0.02) 0.04	MADE GROUND. Geotextile membrane.		
					(0.08) 0.12	MADE GROUND. Landfill material (Construction Waste) soft greyish mottled brown slightly gravelly CLAY. Gravel is fine to coarse andgular to subrounded mixed lithologies including concrete, chert, bricxk and metal.		
						Complete at 0.20m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP07

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	HP08

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						MADE GROUND. Compost including plant debris, rootlets and wood frangments.		
					(0.30)			
0.25-0.25	ES1							
					0.30	MADE GROUND. Brown gravelly SAND. Sand is fine to corase. Gravel is fine mixed lithologies inclusing brick, concrete and wood.		
0.40-0.40	ES2				(0.20)			
0.50-0.50	ES3				0.50	MADE GROUND. Firm blueish grey slightly silty CLAY with a black membrane at the top and a grey membrane at the bottom.		
					(0.10)			
					0.60	Complete at 0.60m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:5	KH	IV.293.20.HP08

D0.5
D1
D2
D2.5
D3

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Site	Trial Pit Number
Kibworth HWRC	TP01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.50)	MADE GROUND: Greyish brown to brown clayey silty Sand with ocassional gravel. Gravel is fine to coarse angular glass, brick, wood. Rare plastic and concrete.		
					1.50 (1.10)	MADE GROUND: Firm light greyish brown and light brown sandy gravelly Clay. Gravel is fine to coarse angular brick, glass, quartz, ceramic and concrete.		
					2.60 (0.40)	MADE GROUND: Grey, greyish brown and dark grey silty slightly gravelly Sand. Gravel is fine to coarse angular glass and ceramic, rare brick and bone. Sand predominantly ash.		
					3.00	Complete at 3.00m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	SS	IV.293.20.TP01

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Site	Trial Pit Number
Kibworth HWRC	TP02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	D				(1.50)	MADE GROUND: Dark greyish brown to greyish brown slightly clayey silty Sand with ocassional gravel. Gravel is fine to coarse angular brick, glass (bottles), ceramic with ocassional plastic and metal.		
1.00	D							
1.50	D				1.50			
2.00	D				(1.00)	MADE GROUND: Soft to firm yellpowish brown to light brown sandy slightly gravelly Clay. Gravel is fine to coarse angular ceramic, glass (bottles). Rare plastic, wood and flint. From 2.0m to 2.50m Abundant boulders of concrete and tarmac.		
					2.50			
3.00	D				(1.60)	MADE GROUND: Greyish brown and yellowish brown mix of sandy gravelly Clay and silty gravelly Sand. Gravel and cobbles fine to coarse angular brick, glass, concrete and plastic. Ocassional tarmac and metal. Rare boulders of tarmac and concrete.		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP02

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Site	Trial Pit Number
Kibworth HWRC	TP02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					4.10	Complete at 4.10m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP02

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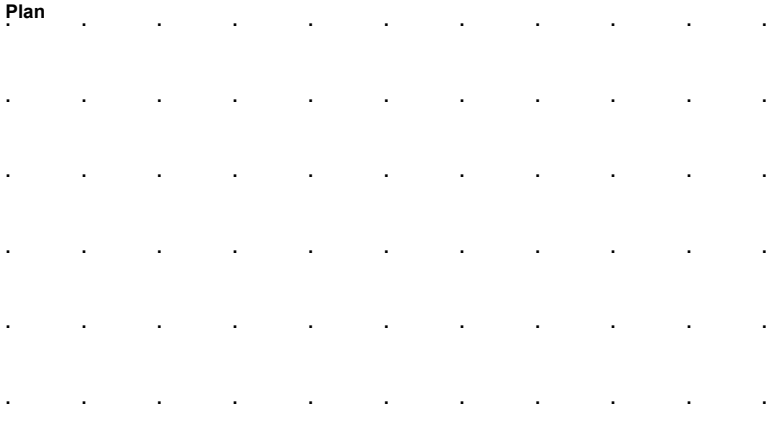
Site	Trial Pit Number
Kibworth HWRC	TP03

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(3.00)	MADE GROUND: Dark grey and greyish brown gravelly silty Sand. Gravel is fine to coarse angular brick, ceramic, glass, clinker with ocassional cobbles of brick. Sand is predominantly ash.		
1.00	D							
2.00	D		Water strike(1) at 2.30m.			From 2.50m Running 'sand and gravel'		▽1
3.00	D				3.00	Complete at 3.00m		

Plan



Remarks

Moderate collapse from 1.50m

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP03

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Site	Trial Pit Number
Kibworth HWRC	TP04

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D				(0.30) 0.30	MADE GROUND: Greyish brown to grey silty Sand and Gravel. Gravel is fine to medium quartz, ocassional glass and brick.		
					(0.20) 0.50	MADE GROUND: Asphalt.		
1.00	D		Slight(1) at 1.20m.		(0.70) 1.20	MADE GROUND: Yellowish brown and orangish brown sandy Gravel with ocassional cobbles. Gravel is fine to coarse angular ceramic, glass and brick. Cobbles of brick. Metal sheets. Slight Hydrocarbon odour.		▽1
1.50	D							
2.00	D				(1.80) 3.00	MADE GROUND: Soft to firm yellowish brown and light greyish brown slightly sandy slightly gravelly Clay. Gravel is fine to coarse angular flint with ocassional brick and glass.		
3.00	D					Complete at 3.00m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP04

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Site	Trial Pit Number
Kibworth HWRC	TP05

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25) 0.25	MADE GROUND: Reinforced concrete on a plastic membrane.		
					(0.15) 0.40	MADE GROUND: Dark greyish brown sandy Gravel. Gravel is fine to medium angular limestone, brick and concrete.		
0.35	D							
0.50	D					MADE GROUND: Greyish brown light brown very gravelly sandy Clay. Gravel is fine to coarse angular ceramic, concrete, brick and glass. Cobbles are brick and ceramic. ocassional metal and plastic fragments. Locally calayey gravel. (Old Landfill)		
					(1.10)			
1.00	D							
					1.50	Complete at 1.50m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP05

IVY HOUSE environmental

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Site	Trial Pit Number
Kibworth HWRC	TP06

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	MADE GROUND: Reinforced concrete over a plastic membrane.		
					(0.10) 0.30	MADE GROUND: Grey to light grey brown sandy Gravel. Gravel is fine to coarse angular limestone on geotextile.		
0.50	D				(0.90)	MADE GROUND: Dark greyish brown, dark brown and black. clay sandy Gravel. Gravel is fine to coarse angular brick, quartz, ceramic, glass, wood, metal and fabric. Cobbles of brick, concrete and plastic pipes. (Old Landfill)		
1.00	D				1.20	Complete at 1.20m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP06

IVY HOUSE environmental

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Site	Trial Pit Number
Kibworth HWRC	TP07

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.01			
					0.02	MADE GROUND. Compost including plant debris, wood fragments and rootlets.		
					(0.28)			
0.25-0.25	ES1				0.30	MADE GROUND. Light grey silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular mixed lithologies inclusing limestone and concrete.		
0.35-0.35	ES2				0.35	MADE GROUND. Dark brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded concrete wood debris and metal. Intact geotextile membrane.		
						MADE GROUND. Firm blueish grey slightly silty CLAY.		
						Complete at 0.35m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	KH	IV.293.20.TP07

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP08

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30	D				(0.25) 0.25	MADE GROUND: Light greyish brown sandy Gravel and Cobbles. Gravel and cobbles angular concrete and limestone.		
					(0.15) 0.40	MADE GROUND: Dark greyish brown and greyish brown silty sandy Gravel. Gravel is fine to coarse angular concrete, brick, glass, wood and ceramic.		
					(0.15) 0.55	MADE GROUND: Stiff to very stiff bluish grey slightly silty CLAY. Geotextile top and bottom. (Landfill Cap)		
					(0.35) 0.90	MADE GROUND: Black silty sandy Grvel. Gravel is fine to coarse brick, glass and ceramic. (Old Landfill)		
						Complete at 0.90m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	SS	IV.293.20.TP08

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Site	Trial Pit Number
Kibworth HWRC	TP09

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D				(0.10) 0.10	MADE GROUND: Light grey slightl sandy Gravel. Gravel is fine to coarse angular limestone.		
					(0.20) 0.30	MADE GROUND: Dark greyish brown and greyish brown silty sandy Gravel. Gravel si fine to coarse angular ceramic, brick, wood, glass, ceramic, plant debris and cobbles of brick.		
					0.35	MADE GROUND: Stiff bluish grey Clay with geotextile on top. (Landfill Cap)		
						Complete at 0.40m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP09

IVY HOUSE environmental

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Site	Trial Pit Number
Kibworth HWRC	TP10

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.15) 0.15	MADE GROUND: Light grey sandy Gravel with some cobbles. Gravel is fine to coarse angular limestone with ocassional brick and concrete. Cobbles of brick.		
0.30	D				(0.20) 0.35	MADE GROUND: Greyish brown sandy Gravel. Gravel is fine to coarse angular brick, limestone, asphalt and ocassional wood fragments.		
					0.40	MADE GROUND: Stiff Bluish grey Clay with geotextile on top. (Landfill Cap)		
						Complete at 0.40m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP10

IVY HOUSE environmental

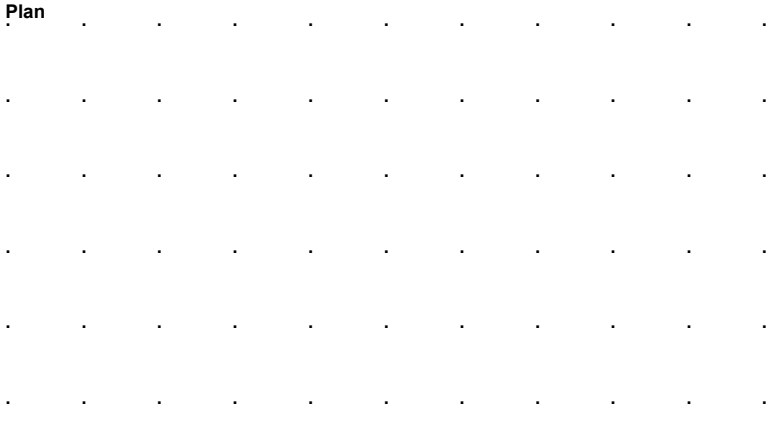
Chartered Environmental Surveyors & Environmental Consultants
Scotland Farm, Ockbrook, Derby DE72 3RX
Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP11

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 14/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.05	D				0.05 (0.15)	MADE GROUND: Dark brown peaty wood debris.		
0.15	D				0.20	MADE GROUND: Greyish brown silty sandy Gravel. Gravel is fine to coarse angular limestone with ocassional brick and concrete.		
					(0.80)	MADE GROUND: Greyish brown, brown and grey sandy very gravelly Clay. Gravel is fine to coarse angular brick, concrete, coke, glass with ocassional plastic and wood. Ocassional cobbles of brick, concrete and wood. Locally clayey gravel. (Old Landfill)		
					1.00	Complete at 1.00m		

Plan



Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP11

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP12

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	MADE GROUND: Light grey sandy Gravel. Gravel is fine to coarse angular limestone, concrete and brick.		
					(0.90)	MADE GROUND: Dark greyish brown and greyish brown mix of gravelly Clay and clayey sandy Gravel with some cobbles. Gravel is fine to coarse angular brick, wood, glass, plastic and metal fragments. Cobbles are brick, concrete and wood, rare fabric. (Old Landfill)		
					1.00	Complete at 1.00m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	SS	IV.293.20.TP12

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP13

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.20) 0.20	MADE GROUND: Dark brown clayey Peat with abundant wood debris.		
0.30	D				(0.30) 0.50	MADE GROUND: Greyish brown to dark grey sandy gravelly Clay/clayey Gravel. Gravel is fine to coarse angular brick and concrete.		
						Complete at 0.70m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	SS	IV.293.20.TP13

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP14

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20

	Location	Dates	Engineer	Sheet
		15/12/2020	SS	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D				(0.20) 0.20	MADE GROUND: Dark brown clayey sandy Peat with abundant wood debris.		
0.30	B				(0.15) 0.35	MADE GROUND: Dark greyish brown and greyish brown very clayey sandy Gravel is fine to coarse angular brick, concrete and limestone with ocassional cobbles of brick and concrete.		
0.30	D				0.40	MADE GROUND: Stiff bluish grey Clay with geotextile on top. (LandFill Cap)		
						Complete at 0.40m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP14

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP15

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.10) 0.10	MADE GROUND: Very dark brown clayey silty Peat with abundant plant debris.		
0.25	D				(0.20) 0.30	MADE GROUND: Grey clayey sandy Gravel and Cobbles. Gravel is fine to coarse angular brick, concrete and wood with ocassional ceramic.		
					0.35 (0.25)	MADE GROUND: Stiff bluish grey Clay with ocassional brick and wood. Geotextile membranes not intact (Land fill Cap)		
					0.60	MADE GROUND: Greyish brown silty sandy Gravel. Gravel is fine to coarse angular brick, glass and concrete with ocassional metal. (Old landfill)		
						Complete at 0.60m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP15

IVY HOUSE environmental

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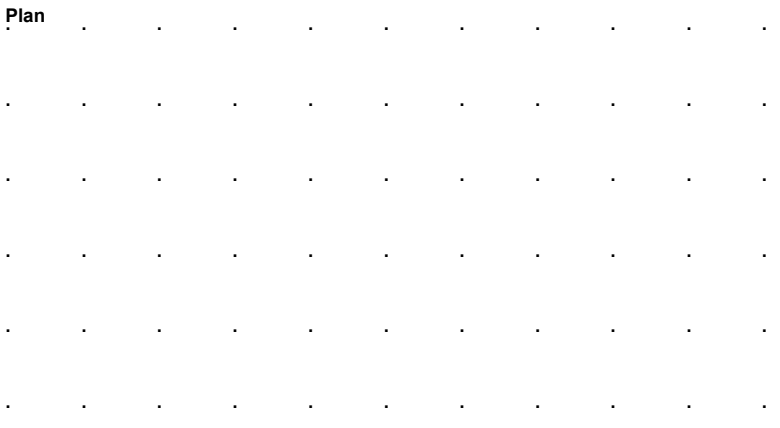
Site	Trial Pit Number
Kibworth HWRC	TP16

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D				(0.25) 0.25	MADE GROUND: Grey sandy gravel. Gravel is fine to coarse concrete and brick with plant debris.		
					0.30	MADE GROUND: Stiff bluish grey Clay with geotextole on top. (LandFill Cap)		
						Complete at 0.30m		

Plan



Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP16

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP17

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Dark brown peaty material.		
					(0.95)	MADE GROUND: Greyish brown, reddish brown and black sandy gravelly Clay with ocassional cobbles and boulders. Gravel is fine to coarse angular plastic, brick, wood, glass (bottles) and concrete. Cobbles and boulders are brick and concrete. Rare metal.		
					1.00	Complete at 1.00m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP17

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Trial Pit Number
Kibworth HWRC	TP18

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.05	D				0.05 (0.10)	MADE GROUND: dark brown peat with abundant plant debris		
0.10	D				0.15 (0.35)	MADE GROUND: Stiff bluish grey Clay with geotextile at the base. (Land fill Cap)		
					0.50	MADE GROUND: Greyish brown to reddish brown silty sandy Gravel. Gravel is fine to coarse angular glass, brick, concrete, wood and ceramic with ocassional metal and fabric.		
						Complete at 0.50m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	ss	IV.293.20.TP18

IVY HOUSE environmental

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Site	Number
Kibworth HWRC	**WS01**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Willmott Dixon	IV.293.20
	Location	**Dates** 01/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND. Reinforced concrete.		
					0.20			
					(0.20)	MADE GROUND. Dark brown slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular mixed lithologies including concrete and limestone.		
					0.40			
0.45-0.45	ES1				(0.55)	MADE GROUND. Landfill material (General Household Waste and Construction Waste) black clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular mixed lithologies including chert and brick with frequent frgaments of glass occasional pieces of glass and rare brick cobbles.		
					0.95	Complete at 0.95m		

Remarks

Scale (approx)	Logged By
1:5	KH

Figure No. IV.293.20.WS01

IVY HOUSE environmental

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Site	Number
Kibworth HWRC	**WS02**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND. Macadam.		
					0.10	MADE GROUND. Landfill material (General Household Waste and Construction Waste) dark brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angualr to subangular mixed lithologies including limestone, flint and sandstone with occasional limestone cobbles.		
0.30-0.30	ES2							
0.40-0.40	ES1							
					(0.80)			
					0.90	Complete at 0.90m		

Remarks

Scale (approx)	Logged By
1:5	KH

Figure No. IV.293.20.WS02

IVY HOUSE environmental

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Telephone. 01332 661987

Site	Number
Kibworth HWRC	**WS03**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.00)	Grass over soft dark brown silty slightly sandy gravelly CLAY. Sand is fine to medium. Grvael is angular to subrounded fine to coarse mixed lithologies includign flint, brick and limestone with occasional brick cobbles, plastic fragments and glass with rare metal fragments and slate.		
0.70-0.70	ES1				1.00	Slight hydrocarbon odour at 0.7mbgl.		

Remarks

Scale (approx)	Logged By
1:5	KH

Figure No. IV.293.20.WS03

IVY HOUSE environmental

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Site	Number
Kibworth HWRC	**WS04**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			Willmott Dixon	IV.293.20
	Location	**Dates** 15/12/2020	**Engineer** SS	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.25-0.25	ES1				(0.80)	Grass over soft dark brown silty slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to coarse mixed lithologies including flint, brick and limestone with frequent brick cobbles, plastic and occasional metal.		
					0.80	Complete at 0.80m		

Remarks

Scale (approx)	Logged By
1:5	KH

Figure No. IV.293.20.WS04

APPENDIX D

IVY HOUSE environmental

Tier 1 Generic Assessment Criteria

	Residential With Produce	Residential Without Produce	Allotments	Commercial (office)	Commercial (warehouse)
Arsenic	32.40	35.00	43.00	635.00	635.00
Cadmium	5.17	17.70	1.05	230.00	230.00
Mercury, elemental	1.02	1.02	316.00	109.00	83.40
Mercury, inorganic	169.00	238.00	80.30	3640.00	3640.00
Mercury, methyl	11.40	14.10	7.97	407.00	409.00
Selenium	350.00	595.00	121.00	13000.00	13000.00
Phenol	415.00	519.00	282.00	37600.00	38000.00
Toluene	611.00	2710.00	118.00	189000.00	166000.00
Lead	210.00	210.00	84.00	2300.00	2300.00
Nickel	130.00	130*	180.00	980.00	980.00
Total Cyanide	34.00	34.00			
Benzo(a)pyrene	3.00	3.20	3.50	36.00	14.40
Dibenzo(a,h)anthracene	0.30	0.32	0.43	3.60	13.00
Acenapthene	1100.00	6000.00	200.00	100000.00	103000.00
Acenapthylene	920.00	6000.00	160.00	100000.00	103000.00
Anthracene	11000.00	37000.00	2200.00	540000.00	542000.00
Benzo(a)anthracene	13.00	15.00	13.00	180.00	97.50
Benzo(b)fluoranthene	3.70	4.00	3.90	45.00	103.00
Benzo(g,h,i)perylene	350.00	360.00	640.00	4000.00	661.00
Benzo(k)fluoranthene	100.00	110.00	130.00	1200.00	144.00
Chrysene	27.00	32.00	19.00	350.00	143.00
Fluoranthene	890.00	1600.00	290.00	23000.00	22700.00
Fluorene	860.00	4500.00	160.00	71000.00	70700.00
Indeno(1,2,3-c,d)pyrene	41.00	46.00	39.00	510.00	61.70
Phenathrene	440.00	1500.00	90.00	23000.00	22600.00
Pyrene	2000.00	3800.00	620.00	54000.00	54500.00
Napthalene	13.00	13.00	24.00	1100.00	875.00
Chromium VI	3.38	4.12	2.11	34.20	34.20
Chromium III	627.00	627.00	15300.00	8840.00	8840.00
Copper	2330.00	6200*	524.00	71700.00	71700.00
Vanadium	79.00	226.00	17.90	5590.00	5590.00
Zinc	3750.00	40400*	618.00	665000.00	665000.00

Note:
All figures are in mg/kg
Values calculated using CLEA v1.071
Soil type chosen is sandy loam, pH 7
All organic determinands calculated using 6% SOM
PAH = S4UL (except warehouse model - CLEAv1.071)
* Phytotoxic assessment based on pH range of <6.0 to >7.0
Copper = 100 - 200mg/kg
Nickel = 60 - 110mg/kg
Zinc = 200 - 300mg/kg

Generic Assessment Criteria

Contaminants	Land Use Scenario				
	Residential With Produce	Residential Without Produce	Allotments	Commercial (office)	Commercial (warehouse)
Benzene	0.33	1.00	0.07	94.70	80.30
Ethylbenzene	354.00	843.00	91.20	65700.00	55600.00
Phenol	415.00	519.00	282.00	37600.00	38000.00
Toluene	611.00	2710.00	118.00	189000.00	166000.00
Xylene, o-	246.00	321.00	159.00	34600.00	27600.00
Xylene, m-	240.00	302.00	175.00	32700.00	26100.00
Xylene, p-	228.00	288.00	164.00	31400.00	25100.00
Aliphatic C5 - C6	113.00	113.00	3910.00	12800.00	10800.00
Aliphatic C6 - C8	48.10	48.20	13300.00	5470.00	4620.00
Aliphatic C8 - C10	108.00	109.00	1710.00	11900.00	10200.00
Aliphatic C10 - C12	537.00	538.00	7280.00	49300.00	43700.00
Aliphatic C12 - C16	3030.00	3040.00	13400.00	90500.00	89600.00
Aliphatic C16 - C35	88400.00	89100.00	281000.00	1910000.00	1910000.00
Aliphatic C35 - C44	88400.00	89100.00	281000.00	1910000.00	1910000.00
Aromatic C5 - C7	275.00	978.00	57.30	89900.00	76800.00
Aromatic C7 - C8	611.00	2710.00	118.00	189000.00	166000.00
Aromatic C8 - C10	151.00	189.00	50.50	17800.00	15700.00
Aromatic C10 - C12	346.00	866.00	73.80	34500.00	33800.00
Aromatic C12 - C16	593.00	1710.00	134.00	37800.00	37800.00
Aromatic C16 - C21	770.00	1340.00	260.00	28600.00	28600.00
Aromatic C21 - C35	1230.00	1340.00	1550.00	28600.00	28600.00
Aromatic C35 - C44	1230.00	1340.00	1550.00	28600.00	28600.00
Combined Ali & Aro C44 - C70	1300.00	1340.00	2950.00	28600.00	28600.00

Note:
All figures are in mg/kg
Values calculated using CLEA v1.071
Soil type chosen is sandy loam, pH 7
All organic determinands calculated using 6% SOM