SHADBOLT ENVIRONMENTAL

Alconbury Weald KP3

Tranche A – Residential and Amenity

Remediation and Earthworks Strategy

Urban & Civic

Issue V4

November 2024

SHADBOLT GROUP

Alconbury Weald KP3
Tranche A – Residential and Amenity

Remediation and Earthworks Strategy

Project Reference: 2906

Client	Urban & Civic
Our Reference	2906 – Alconbury Weald KP3, Tranche A – Residential and Amenity
Produced by	Iain McLean
Checked by	Mike Taylor
Submitted	Issue V4 – November 2024

Urban&Civic

'The Shadbolt Group' is a trading name of 'Shadbolt Consulting Ltd' Company Number 8819849
The Shadbolt Group, 18 Bewick Road, Gateshead, NE8 4DP T: (0191) 478 3330 W: www.shadboltgroup.net

CONTENTS

1.0 SUBSTITUTIONS

2.0 PRINCIPLES OF REMEDIATION

3.0 GENERAL SPECIFICATION

4.0 EARTHWORKS SPECIFICATION

Extent of Works

Earthworks Contractor's Programme

The Control of Noise, Vibration and Mud/Dust Nuisance

Traffic Safety and Management

Private and Publicly Owned Services

Damage to Property

Site Clearance

Setting Out

General Earthworks Requirements

Bulk Excavation

Material Classification

Filling

Slopes

Specific Requirements

Health and Safety

Working Hours

Contractor's Report

APPENDICES

Appendix A
Report Conditions

Appendix B
Drawings

2906-006 – Alconbury Weald KP3 Tranche A – Identified Hotspot Plan

JTP Studios Drawing No. 00628S-RP01 Rev. P1, Alconbury KP3 Regulatory Plan (October 2022)

Stantec Drawing No. 332210769-STN-HGN-XX-DR-C-106 to -109 Rev P1 inclusive – Alconbury Weald KP3 Advanced Infrastructure Contours and Longsections Sheets 1 to 5

Stantec Drawing No. 332210769/SK002 – Alconbury Weald Proposed Key Phase 3 (West) Earthworks

Appendix
Tables 6/1, 6/2, 6/4 & 6/5 from Series 600 of the Specification for Highway Works

Appendix D
Hotspot Removal and Clean Cover Layer Validation Criteria

1.0 SUBSTITUTIONS

1.1 The following substitutions are to be used when reading this specification:

REFERENCE	COMPANY NAME	CONTACT	TELEPHONE NUMBER
MAIN CONTRACTOR			
EARTHWORKS/ GROUNDWORKS CONTRACTOR			
ENGINEER			
CLIENT	Urban & Civic		

2.0 PRINCIPLES OF REMEDIATION

2.1 Background and Site Description

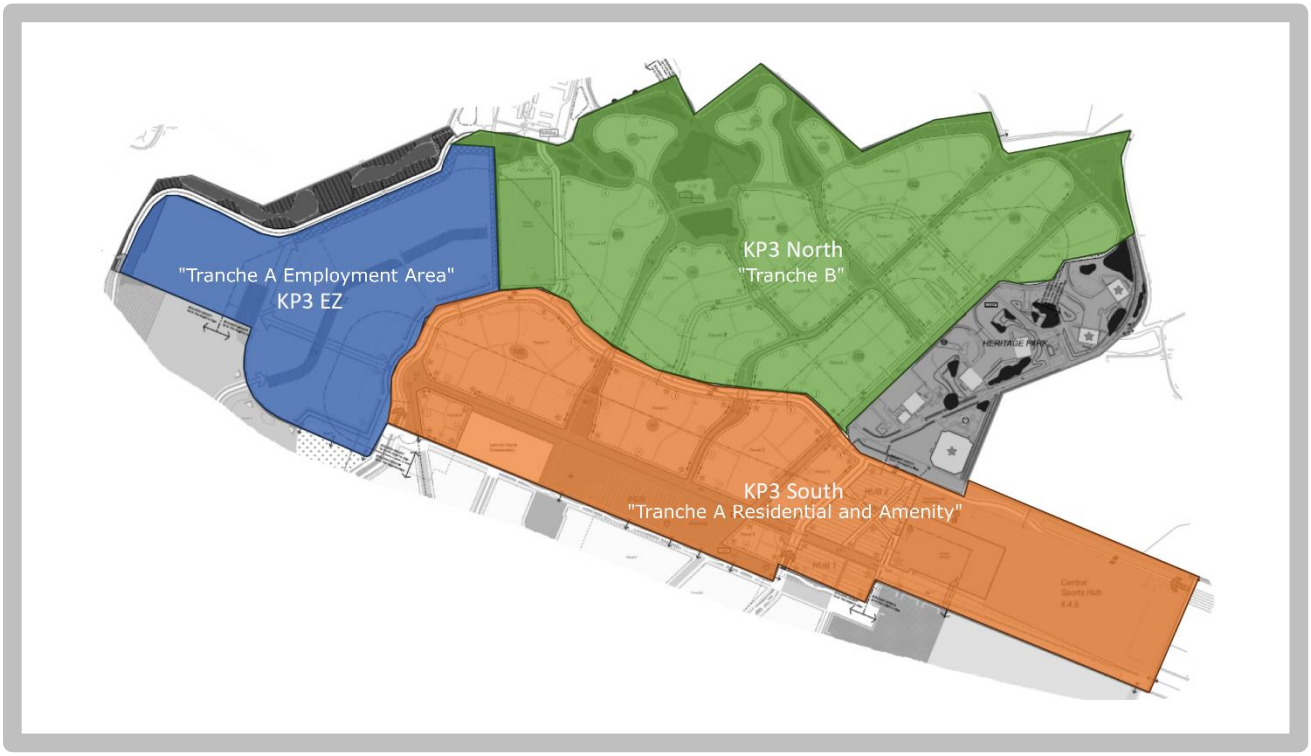
Alconbury Weald is located on a former military airfield to the east of Alconbury approximately 2km north east of Alconbury itself and 6.25km north west of Huntingdon town centre.

Key Phase 3 (KP3) is located in the north of the former airfield and includes hardstanding in the form of the former primary and secondary runways, taxiways and aprons and structures in the form of hangars and auxiliary structures including workshops, stores, offices and fuelling and power related infrastructure.

The proposed development comprises a mixed use development including residential, amenity, retail and primary school developments with a heritage park preserving historic structures towards the north east, and a larger scale commercial / industrial employment area in the west.

KP3 (Key Phase 3) is divided in to 3 No. sub areas, KP3 South, KP3 EZ, and KP3 North. At the commencement of the SG site investigation these were referred to as Tranche A (Residential and Amenity), Tranche A Employment Area, and Tranche B respectively. The area covered by this report is highlighted in orange, approximately centred on NGR 520750 276950

The KP3 nomenclature is shown below for reference.



Tranche A comprises an area approximately 2km long by around 500m wide on average which runs along the length of the former runway and taxi ways and has been relatively undeveloped with the exception of the runway hardstanding and associated services and infrastructure. Several structures are located in the north of Tranche A including hangars and workshops. These are currently leased out to companies such as vehicle logistics, preparation and repair specialists and light manufacturing or fabrication such as portacabin refurbishment along with instrumentation suppliers and recycling operators.

Parts of the northern taxiway and hardstanding to the north is in use as open storage for vehicles. Towards the eastern end of Tranche A the northern taxiway is used for vehicle testing and driver training.

The primary runway remains intact in the west and east of Tranche A but has been broken out in areas and is in use as contractor compounds and for the storage of aggregate in others.

The southern taxiway extends a short way round to serve ongoing development works but has been grubbed out beyond the end of 'The Boulevard' which serves occupied developments to the south, and replaced with a new access road which runs slightly north of the line of the original taxiway.

A general site location plan of the site is presented as Figure 1 and an aerial photograph as Figure 2.

A proposed indicative development plan is presented as Figure 3.

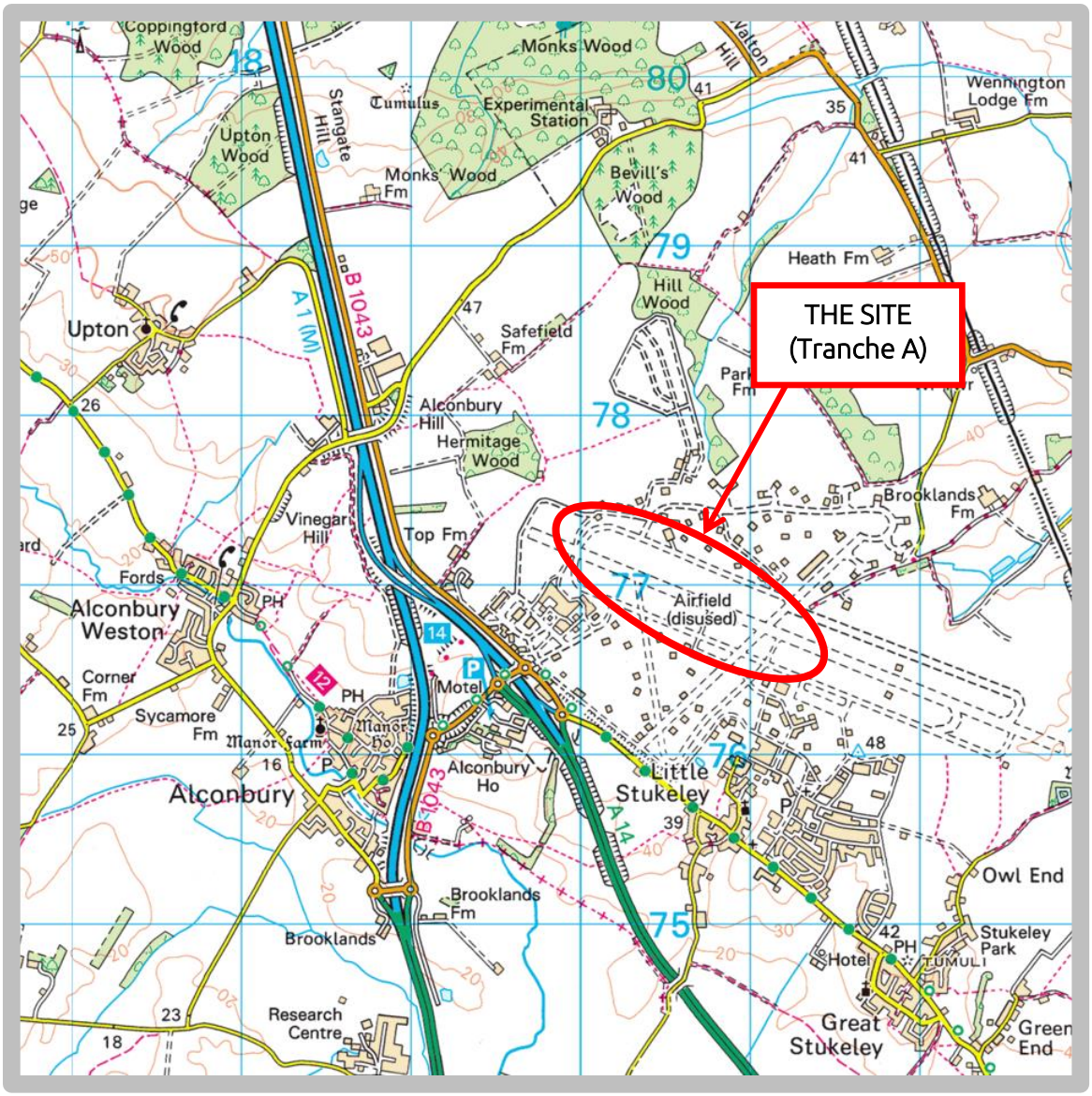


Figure 1 – General Site Location Plan

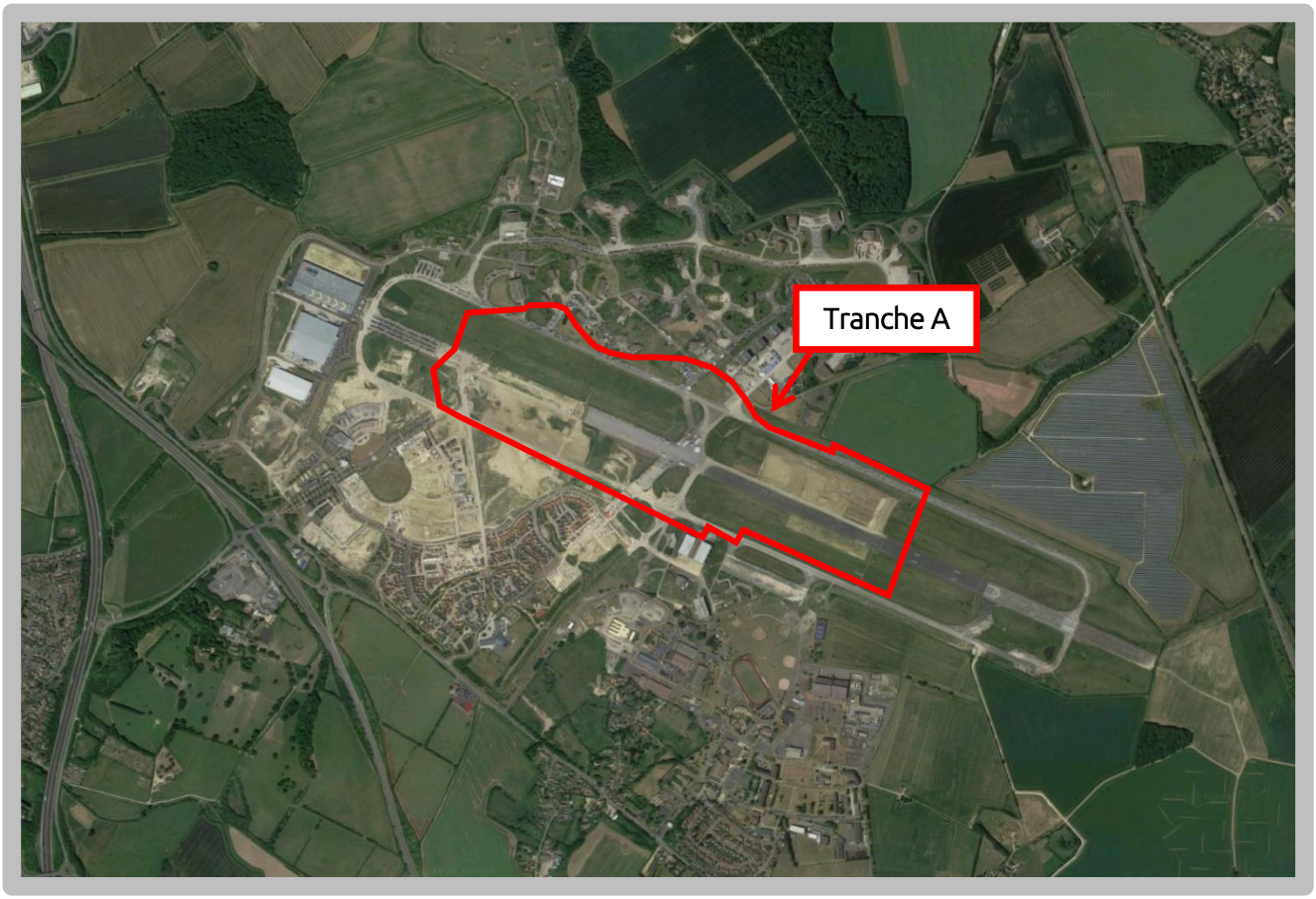


Figure 2 – Aerial Photograph

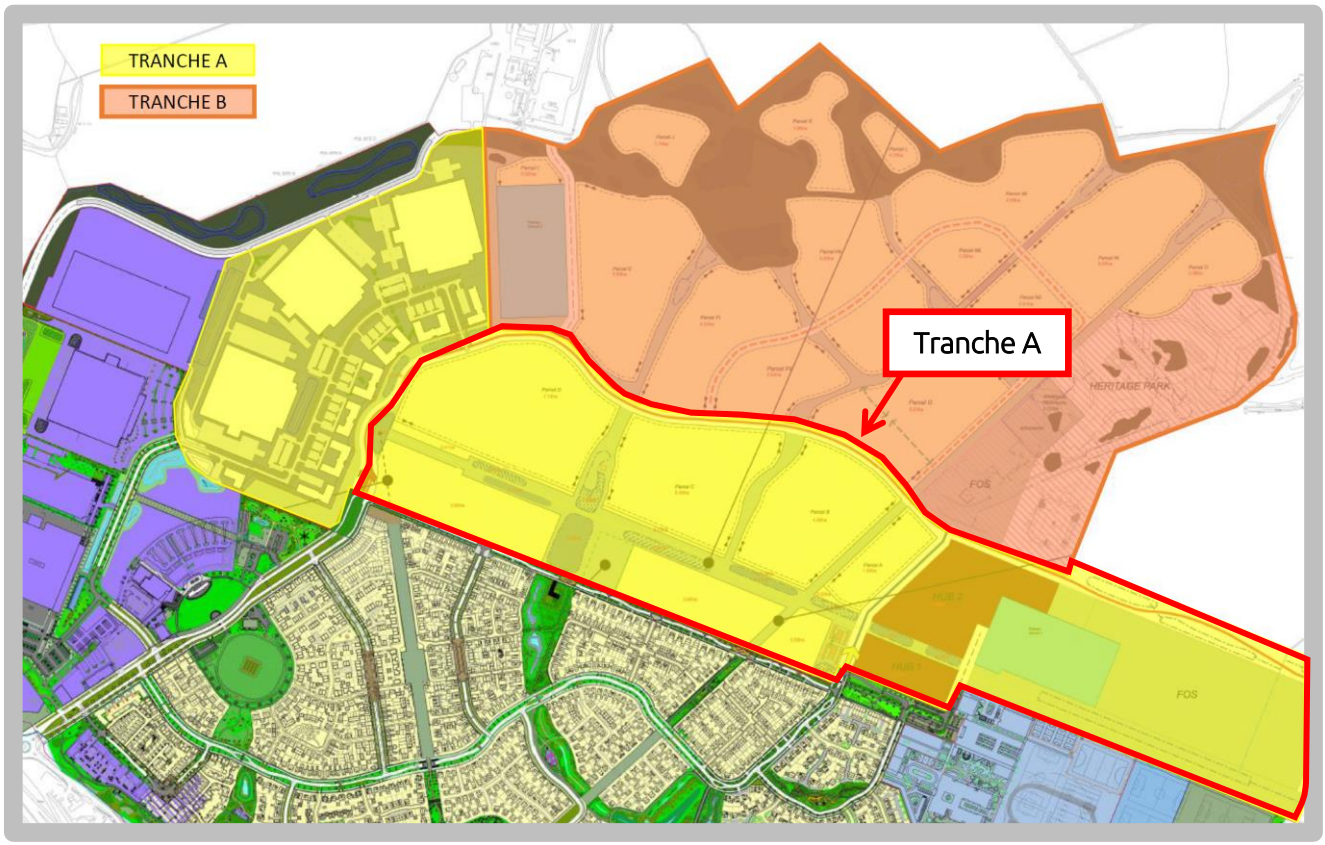


Figure 3 – Extract of Indicative Proposed Development Plan

2.2 Site History

A full historical appraisal of the Alconbury Weald development site has been carried out previously by Peter Brett Associates (PBA) and is as Project Ref: 24213/026, Doc Ref: A1/Geo v01 Rev C as "Alconbury Weald – Ground Stability and Phase 1 Contaminated Land Desk Study" dated July 2012. This document was produced for Urban and Civic as an appraisal of the entire development and reference should be made to this document for full details. A history of the airfield operations is also given in the BACTEC International Explosive Ordnance Threat Assessment contained within the PBA report.

Shadbolt Group have also produced specific Preliminary Risk Assessments for KP3 Tranche A and Tranche B (October 2022).

In earliest OS mapping the site is shown as agricultural land with the airfield opening in 1938 and used during WWII and through the Cold War to recent times by the United States Air Force before being purchased by Urban and Civic in 2009. The taxiways and roads around the development area were modified in the 1980s to accommodate reconnaissance planes used at the time. The airfield and infrastructure were returned to the British Ministry of Defence in 1995 with the USAF maintaining use of the housing and support areas for the near future.

Few details are indicated on OS plans within the airfield area likely due to censorship of sensitive information.

As discussed previously, Tranche A has remained relatively undeveloped but does include extensive areas of hardstanding and several structures north of the northern taxi way. Limited earthworks have been undertaken to provide the level corridors/areas for the original construction of the runway and associated infrastructure, but otherwise, recent works have been limited to grubbing out of the southern taxiway and adjacent structures and services as part of the KP1 extension works located immediately south of Tranche A.

2.3 Ground Investigation

A ground investigation was undertaken Shadbolt Environmental between August and November 2022 comprising Cable Percussive boreholes, Windowless Sample boreholes and Trial Pitting with in-situ testing and sampling for geotechnical and geo-environmental laboratory testing.

For full details of the ground investigation works undertaken by Shadbolt Environmental, reference should be made to Shadbolt Group's "Alconbury Weald KP3 Tranche A, Ground Investigation Report" (Issue V1, January 2023), however a summary of ground conditions and the contamination assessment is presented below;

Made Ground was encountered in 165 No. exploratory holes ranging from ground level to 2.40m bgl (and generally comprised reworked natural clays (cohesive glacial till). Several stockpiles of material encountered Made Ground deeper at 4.00m. Varying content of sub-angular to angular chert, chalk and limestone, with occasional brick, concrete and tarmac) with occasional concrete cobbles and other anthropogenic materials.

Topsoil was encountered in 267 No. exploratory holes across the site. The topsoil encountered from ground level to 0.20m bgl but more locally up to 0.50m bgl. The topsoil was generally described as brown organic slightly sandy slightly gravelly CLAY with occasional high root content'. Gravel was generally angular to sub-rounded fine to coarse and included limestone and chert.

Superficial deposits were recorded in all exploratory holes with the exception of trial pits conducted upon the mounds. The superficial deposits comprised cohesive material of firm to very stiff fissured light grey mottled brown slight sandy slightly gravelly CLAY and were encountered from ground to 10.00m bgl (maximum drill depth). Stiffness and greyness of clays generally increased with depth as strata became less weathered losing the brown mottling characteristic of weathered clay. Gravel fractions predominately comprising fine to coarse chalk, chert, flint and limestone with a generally low cobble content (although bands of more locally cobbly strata were encountered).

The solid geology beneath the site comprises the natural Clay formation but was not encountered during these works but is noted to be present at around 12m bgl under the site boundary. Solid deposits are described as very stiff to hard dark grey silty CLAY with occasional shell fragments.

Significant groundwater was not recorded during these works. Groundwater has been reported during return monitoring visits from a minimum depth of 0.30m bgl WS AA 05 and WS PSA 01. However, the shallow waters are more likely to be associated with surface flooding of boreholes rather than a high water table.

Natural groundwater levels are expected to lie beyond the base of any anticipated excavations but perched groundwater may be encountered within granular lenses or around services and buried structures.

2.4 Contamination Assessment

A strong hydrocarbon odour was noted in the Made Ground in TP-B09 (0.50-1.90m bgl), TP-C23 (0.2-1.20m bgl) and TP-POS39 (2.30-2.40m bgl). An organic odour was noted in natural strata in BH-HUB1 (0.60-1.30m bgl) and TP-POS02 (0-1.50m bgl). The presence of further contaminants cannot be ruled out given the site's history.

In total 327 No. soil samples recovered during the site investigation were tested for a suite of common contaminants as part of the Shadbolt Environmental ground investigation.

Each of the 327 No. samples were also tested for the presence of asbestos. 2 No. returned positive detections and were submitted for further quantitative analysis, which reported amosite asbestos concentrations of 0.033% and 0.001% reported from samples retrieved from TP-A01 and TP-B06A respectively.

Additionally, isolated instances of Benzo(a)pyrene, Arsenic, Naphthalene and Petroleum Hydrocarbons were identified as may be expected considering the sites historic use as a military airfield.

Further statistical analysis indicated 4 No. outliers (Hotspots) with elevated concentrations of Benzo(a)pyrene which would require removal or treatment ahead of proposed residential development works.

The results of the testing otherwise reported chemical contaminants to be within their respective ATRISK Assessment Criteria for a Residential with Plant Uptake End Use which represents the most sensitive end-use in the proposed development.

The findings of the environmental testing indicate that the soils encountered during the ground investigation do not present a risk to human health or the environment with respect to the proposed development or any development which may follow on with the exception of those instances described above.

2.5 Remediation Objectives / Strategy

Remedial measures are required in respect of the unacceptable concentrations of Asbestos fibres identified at within TP-A01 and TP-B06A, along with 4 No. identified hotspots of Polyaromatic Hydrocarbons (Benzo(a)pyrene) which have the potential to cause harm to human health during the construction phase and beyond. On this basis it was recommended that a site-specific remediation strategy be produced in order for the site to be developed on a more assured basis.

Minor earthworks may be required across the site to create a suitable development platform for the proposed development and infrastructure and to produce any landscaping features within Public Open Space elements.

It is anticipated that the majority of materials will remain on site or within the Alconbury Weald development with only soils which cannot be safely retained within the Alconbury Weald development (beneath a clean cover layer for example) being removed to a suitably licensed landfill.

It is proposed that the contaminants impacted hotspot materials are to be treated as follows.

Due to the presence of isolated (2 No. samples) occurrences of Asbestos and 4 No. identified hotspots with elevated concentrations of Polyaromatic Hydrocarbons (Benzo(a)pyrene) the emphasis on the remediation strategy is to undertake hotspot removal works of the impacted soils and placement below a clean cover layer in an appropriate location within an area of the development with a low sensitivity end use such as Commercial or Public Open Space in order to break the pollutant linkage between impacted soils and future site users.

The objective of the remediation works is to;

- Reduce the risk from identified and potential contamination within soils and groundwater, allowing the safe redevelopment of the site as appropriate for a Residential with Plant Uptake end use or the less sensitive commercial, amenity and public open space developments;
- Reduce the risk of pollution/contamination of neighbouring land and groundwater resources, improving the local environment;
- Minimise off-site disposal of contaminated materials;
- Minimise the requirement to import clean fill; and
- Provide a suitable development platform.

In order to achieve the above objectives, the following remediation works will be undertaken:

- Site set up and site clearance works;
- Hotspot removal works of 6 No. identified areas of concern.
- Removal of structures and grubbing out of existing foundations and redundant services.
- Placement of suitable clean cover layer (construction materials, subsoils and topsoil where appropriate – a 600mm cover layer (450mm clay and 150mm topsoil).

The works to be undertaken is described below;

Site Set-Up and Site Clearance Works (A)

The site will be made secure to prevent access by trespassers, children and/or local residents. Security will be maintained throughout the remediation works and a cabin village and contractors compound implemented at the site. Site clearance works will be undertaken which will include vegetation removal with any suitable topsoil's placed into stockpile for assessment and potential reuse / offsite disposal.

The excavated arisings of topsoil from identified potential hotspots should be stockpiled separately from all other stripped topsoil. All stockpiles are required to be subjected to confirmatory laboratory chemical analysis.

Hot Spot Removal and Cut and Fill Earthworks (B)

Following the site clearance works, 6 No. identified hotspots will be excavated and segregated for assessment or placement at a suitable location with validation samples submitted for analysis from excavation sides. Cut and fill earthworks with then be completed to accommodate the appropriate falls for the surface water drainage and create suitable development platforms. This may be completed across all parcels or across selected parcels to suit the development timescales.

Should any demolition / brick fill be encountered during the cut and fill works these materials will be stockpiled separately, subjected to chemical testing and reused if appropriate within the earthworks.

Similarly any deleterious materials should be stockpiled for assessment before a suitable destination is identified.

Hotspots requiring remediation were identified in TP-A01, TP-B06A, WS-C06, TP-C11, TP-C21 and TP-C23. These locations are presented on SG Drawing No. 2906-006 (A-C).

Proposed finished levels for primary roads are presented on Stantec Drawing Nos. 332210769-STN-HGN-XX-DR-C-0106 to -0108 with an indicative Cut and Fill model for the residential parcels presented as 332210769-SK002.

Drawings are presented in Appendix B for reference.

Removal of Structures, Foundations, Hardstanding and Services (C)

The site has a number of structures and significant areas of hardstanding and associated subbase linked to former air field operations which are to be removed ahead of the development. In addition to this a number of Underground and Above-ground Storage Tanks (aviation fuel and diesel) are present in grounds adjacent to Tranche A with connected pipelines and services running through Tranche A.

Hardstanding and subbase materials are to be broken out and excavated, then crushed and screened to produce Type 1 / 6F2 recycled aggregates as appropriate. Any concrete or brick arising from structures and foundations are to be treated similarly. Metals are to be recovered for recycling.

Reference should be made to the Interlocks Surveys plan of known services issued February/March 2023 and any services to be removed should be located and chased out in their entirety. Similarly, services to be retained should be located and marked to ensure they are suitably preserved.

Tanks are to be exposed and inspected in accordance with current best practise. Specialist advise and certification should be sought as required with respect to degassing, cleaning and removal of tanks.

Previous developments to the south of KP3 identified fuel contamination in ground surrounding fuel pipelines and along service runs from historic leaks including within old drains and this should be anticipated.

Care should be taken to avoid cross contamination of clean materials and any suspected fuel impacted materials should be stockpiled separately on an impervious surface pending assessment and placement at a suitable location, for example beneath a clean cover layer.

Placement of Clean Cover Layer (D)

Following the completion of the earthworks a clean cover layer is to be placed at the site. Roads, driveways and parking areas will provide an impermeable barrier to the potential contamination at depth, however, protection within gardens and public open spaces is required. Therefore, a 600mm cover layer comprising 450mm subsoils and 150mm topsoil will be placed within gardens and public open spaces.

Subject to earthworks volumes and finished remediation levels and suitable handling and storage, clean cover materials may be generated from development arisings and stockpiled topsoil.

The cover layer thickness and chemical suitability will be assessed in accordance with YALPAG Technical Guidance on the Verification Requirements for Cover Systems on the basis of 1 trial hole per 3 houses following construction of the properties, but prior to occupation, to provide a final validation of the works on a plot by plot basis.

Based on the Ground Investigations undertaken across Tranche A in 2022 the Topsoil and Near Surface clays outside of identified hotspots are considered suitable for reuse within residential developments and import of clean cover materials is not required.

Under YALPAG guidance brownfield soils are to be tested at a frequency of 1 per 100m³ with a minimum of 6 No. per source or material.

If materials are tested going in to stockpile these may contribute towards this frequency and subject to reliance and good working practices a reduced frequency of testing should provide adequate confirmation that the materials have not been cross contaminated during storage or transport.

Suitable records of testing undertaken on stockpiled materials should be maintained for use by developers in specific parcels. It is recommended that validation testing is undertaken at an approximate rate of 1 per 200m³ going in to stockpile and at 1 per 200m³ again prior to reuse to avoid over-testing and additional expense unless specific concerns are raised.

The following remediation / construction cover layer is to be constructed within landscape areas;

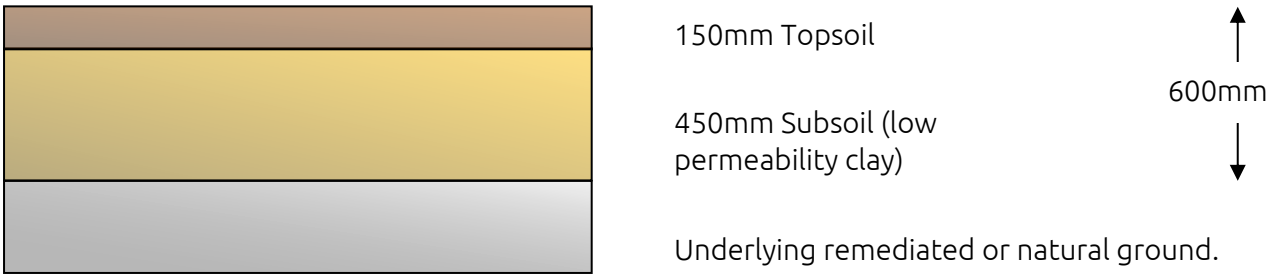


Figure 3.1: Proposed cover layer within garden areas and soft landscaping.

Extent of Works

This specification relates to the proposed earthworks in residential and amenity parcels at Alconbury Weald KP3, Tranche A in order to prepare the site for development.

In pursuit of a development scheme layout with as indicated on:

- JTP Studios Drawing No. 00628S-RP01 Rev. P1, Alconbury KP3 Regulatory Plan (October 2022)

It should be noted that the above layout differs from the one in use at the time of the SG Site Investigation and so reference should be made to plans within the Site Investigation report for specific references, however, parcel specific strategy addenda will be produced to supplement this strategy based on current parcel references at the time of writing.

The Shadbolt Group proposes the excavation, potential re-use of topsoil within the proposed residential development. 6 No. hotspots are required to be excavated and placed into temporary stockpile for assessment and potential reuse at depth in less sensitive areas (i.e. public open space (POS))

The locations of the identified hotspots are shown on Drawing:

- 2906-006 – Alconbury Weald KP3 Tranche A – Identified Hotspot Plan

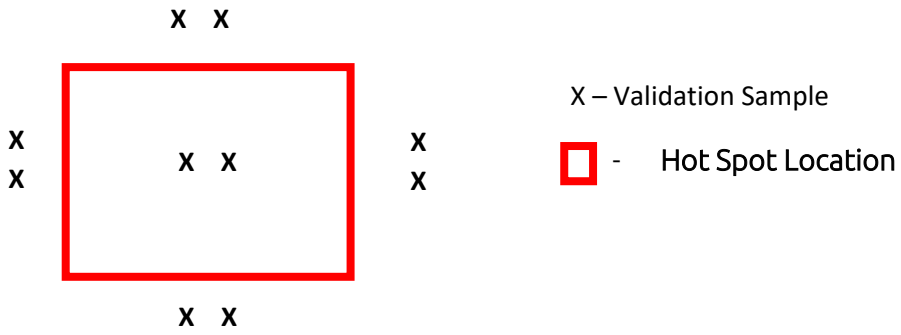
6 No. hotspots are to be excavated to the full extent of Made Ground and placed into a segregated stockpile. This should be completed and the excavation validated ahead of any topsoil stripping works to avoid cross contamination.

Hotspots have been identified as follows:

Reference	Contaminant	Easting	Northing	Depth of MG
TP-A01	Asbestos Fibres	521276	276872	1.10m
TP-B06A*	Asbestos Fibres	521145	276836	2.00m*
TP-C11	Benzo(a)pyrene	520858	277005	1.50m
TP-C21	Benzo(a)pyrene	521000	276970	0.70m
TP-C23	Benzo(a)pyrene	521062	276948	1.20m
WS-C06	Benzo(a)pyrene	520858	277040	0.40m

*TP-B06A is located in a stockpile so removal of all Made Ground is not considered practicable. Asbestos was not identified at 1.00m to 1.10m or at 2.90m to 3.00m in TP-B06A.

Representative samples of the sides of the excavation and base are to be retrieved and submitted for chemical analysis to assess if the hotspot has been sufficiently removed or if it is to be extended (i.e. 2 No samples will be retrieved from each side of the excavation and the base (10 No. in total) and submitted for chemical analysis).



Following removal of the hotspots all remaining topsoil is to be stripped from the site and placed into stockpile for future use.

Should further suspected contamination or unsuitable Made Ground materials be encountered they will be investigated / delineated further. If such materials are within a development are they should be excavated and segregated pending treatment and reuse following assessment. Any additional instances of contamination and treatments are to be documented within the relevant Validation Report for that phase of works.

As part of the remediation works a "clean" cover layer of 600mm (450mm low permeable clay and 150mm topsoil) will be required within gardens and public open space. It is anticipated that site won topsoil from the site strip will be utilised on site for this purpose, subject to acceptability testing.

Care should be taken in the locality of the potential hotspot of asbestos noted within the Made Ground. Site staff should receive asbestos awareness toolbox talk prior to undertaking works within this area and site staff should remain vigilant during the earthworks due.

Subject to finished remediation levels the finished surface will be sampled and validated on a 50m grid to provide surety that soils within the upper 600mm are chemically suitable for the proposed development.

2.6 Indicative Volumes

Proposed levels are expected to remain similar to those at the time of the investigation with small areas of fill in the north and south of Tranche A.

Approximate areas of spaces and volumes of materials arising / required from the proposed development works in respect of the identified hotspots are as follows.

Location	Contaminant	Indicative Excavation	Indicative Volume
TP-A01	Asbestos	5m x 5m x 1.1m	27.5m³
TP-B06A	Asbestos	5m x 5m x 1.0m	25.0m³
TP-C11	B(a)P	5m x 5m x 1.5m	37.5m³
TP-C21	B(a)P	5m x 5m x 0.7m	17.5m³
TP-C23	B(a)P	5m x 5m x 1.2m	30.0m³
WS-C06	B(a)P	5m x 5m x 0.4m	10.0m³

Note: These volumes are calculated based on the stated thicknesses and a square excavation with sides of nominal length of 5m x 5m.

Indicative volumes have been provided for illustrative purposes only and should not be taken as an accurate representation of the required remediation works. Impacted soils may extend further than has been estimated, the nominated earthworks/remediation contractor should base their costings on their own calculations based on the available information.

3.0 GENERAL SPECIFICATION

All materials and workmanship shall be in accordance with the 'Particular Specification' below and the 'Specification for Highway Works' (latest edition), Volume 1 of the Manual of Contract Documents for Highway Works published by HMSO.

The Earthworks Contractor will be deemed to be fully conversant with the latter document and to possess his own copy.

All work shall follow the guidelines and recommendation contained within BS6031:2009 Code of Practice for Earthworks.

4.0 VALIDATION

A validation report will be required to be produced by a suitably qualified Geo-Environmental consultant in order to verify works have been carried out in accordance with the remediation strategy.

This should include a 'watching brief' in order to collect a photographic record of site works and to advise on any suspected contamination encountered that is not anticipated.

Drawings indicating movement of materials within the site (i.e., what materials and where) as well as records of appropriate off-site disposal will be required.

Where earthworks are required to achieve the required levels (for either the development platform or to achieve drainage levels) earthworks should be undertaken in accordance with SHW (as detailed in section 6.0 of this report and Appendix C).

In addition to classification testing (detailed in section 6.0) in-situ earthworks validation testing will be required as below;

- CBR testing in roadways at formation level (considered at this stage to be not less than 3% within road area).
- CBR testing where earthworks are required to achieve the required levels within areas of proposed buildings on a 50m grid.
- NDM (Nuclear Density) or SRD (Sand Replacement Density) testing where earthworks are required to achieve the required levels within areas of proposed buildings on a 50m grid.
- Chemical validation on a 50m grid (finished remediation level).

The contractor should undertake appropriate earthworks trials to ensure the most suitable method of compaction of utilised.

The results of geotechnical and chemical testing will be required to be supplied by the contractor to the supervising engineer for review.

At this stage it is not considered that import of materials is required beyond virgin natural quarried stone for use within roads. Should the import of soils be required these should be tested at source appropriate rate in accordance with YALPAG – figure 5.1. Chemical screening values are included within Appendix D.

Any site won recycled aggregates (e.g. crushed concrete etc) should be produced in accordance with the 'WRAP' protocol for production of Aggregates from Inert Waste.

A Validation report is required to be produced to confirm that the remediation works have been undertaken in accordance with this strategy.

Type	Number of Samples	Testing Schedule	Assessment Criteria
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As,Cd,Cr,CrVI,Cu,Hg,Ni,Pb,Se,Zn)	This needs to be agreed with the Local Authority. The Assessment criteria needs to be UK based, e.g. SGV's, LQM or other similarly derived GAC's.
Crushed Hardcore, Stone, Brick	Minimum 1 per 1000m^3	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Greenfield/ Manufactured Soils	Minimum 3 or 1 per 250m^3 (whichever is greater)	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos	
Brownfield/ Screened Soils	Minimum 6 or 1 per 100m^3 (whichever is greater)	Standard metals/ metalloids (As above) PAH (16 USEPA speciation) TPH (CWG banded) Asbestos Any additional analysis dependant on the history of the donor site.	

Figure 5.1 – YALPAG testing guidelines for imported materials.

5.0 EARTHWORKS SPECIFICATION

Extent of Works

5.1 This specification relates to proposed remediation / earthworks at the site known as The Glade within the Alconbury Weald development, in order to prepare the site for a commercial development with adjacent Public Open Space.

5.2 In pursuit of an indicative development scheme layout as presented on:

- JTP Studios Drawing No. 00628S-RP01 Rev. P1, Alconbury KP3 Regulatory Plan (October 2022)

5.3 The proposed earthworks within the planning boundary include the creation of infrastructure as indicated on:

- Stantec Drawing No. 332210769-STN-HGN-XX-DR-C-106 to -109 Rev P1 inclusive – Alconbury Weald KP3 Advanced Infrastructure Contours and Longsections Sheets 1 to 5

An indicative Cut and Fill model for Parcel F (D on original layout) is presented on:

- Stantec Drawing No. 332210769/SK002 – Alconbury Weald Proposed Key Phase 3 (West) Earthworks

5.4 Any hardstanding areas (including subbase construction materials) or remnant buried structures are be removed.

The excavated hardstanding material and subbase are to be stockpiled by type and processed by crushing and screening to a 6F2 recycled aggregate product.

Clay subsoil arisings are to be placed in stockpile until required and placed to an engineered fill specification within areas where hardstanding has been removed or to raise levels to the design levels.

Earthworks Contractor's Programme

5.5 The Earthworks Contractor's programme shall take full account of the conditions of the Main Contract for the proposed phasing of the overall site work, and other activities taking place on the site. This programme shall be agreed prior to the commencement of the Works.

The Control of Noise, Vibration and Mud/Dust Nuisance

5.6 The Earthworks Contractor shall comply with the recommendations for practical measures to reduce noise set out in BS5228: Parts 1, 2 and 4 and with any specific Main Contractor requirements.

5.7 The Earthworks Contractor shall take all reasonable measures to prevent any dirt or foreign matter being deposited upon or falling upon any public or private highway or access. Where any such material is on any such highway or access, the Earthworks Contractor shall forthwith remove the offending material at his own expense and clean the surface of the highway or access to the satisfaction of the Main Contractor and/or Engineer and/or the Highway Authority.

5.8 The Earthworks Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, earthworks etc. It is likely that an environmental monitoring system will have to be established on site. The contractor is to make allowances for discussions with the local authority on this matter and complying with any requirements set out.

Traffic Safety and Management

5.9 The Earthworks Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affecting the public highway and/or any private roads forming the highway access to/from the site. The Earthworks Contractor should obtain all necessary consents from the Local Highway Authority for works on the public highway.

5.10 On-site accesses and haul routes should be provided and maintained by the Earthworks Contractor in such a manner so as not to endanger either the user, those working in the vicinity of such accesses, haul routes and/or the Works.

Private and Publicly Owned Services

5.11 Due to the sites military history service records are likely to be incomplete. A GPR survey has been undertaken on behalf of Urban and Civic. Prior to commencing work the Earthworks Contractor shall obtain copies of all available services records and excavate trial pits to locate as necessary.

5.12 During the progress of the works the Earthworks Contractor shall:

- Take all measures reasonably required by any Public or Statutory Authority for the full protection of its sewers, drains, pipes, mains, cables or any other apparatus, and shall afford proper facilities to accredited representatives of such authorities for access as may be necessary for inspection, repair, renewal or removal of any such apparatus;
- Temporarily support any sewers, drains, pipes, mains, cables or other services affected by the works;
- Take responsibility for ensuring that all hydrant covers, stop tap boxes, manhole covers and the like are raised or lowered to suit the finished levels of the road and footway, margin or verge;
- Comply with the requirements to utilities providers on all matters relating to services; and indemnify the Client and the Engineer against any claim arising in consequence of the operations.

5.13 During the progress of the works the Earthworks Contractor shall provide an alternative service, in full working order to the satisfaction of the owner of the service and the Engineer before any privately owned service for water, electricity, etc. passing through the site and affected by the works, is cut or disconnected.

5.14 Trial pits shall be excavated by hand as necessary in order to verify the position of known existing services to be retained.

Damage to Property

5.15 The Earthworks Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the Works and shall be responsible for the same in the event that any damage should arise from his failure to exercise due care. Any adjacent structures, services and the like shall be inspected prior to commencement of the Works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried out by the Earthworks Contractor prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of said structure, service or apparatus has occurred as a result of the Works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

5.16 The Earthworks Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

5.17 All fences, trees, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected from spillage and damage caused by site operations and they shall be handed over in an undamaged and proper state to the satisfaction of the Engineer upon completion of the works. The Earthworks Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Engineer.

Site Clearance

5.18 Before starting the site clearance works, the Earthworks Contractor shall verify with the Client which existing structures, fences, gates, walls, roads, paved areas, trees, shrubs, etc., are to be removed. Any existing water features are to be made redundant and are to be filled. Water features must be cleared of all vegetation and soft/ organic deposits before filling. Any water features / watercourses which have previously been filled should be re-excavated and treated likewise.

5.19 All materials removed as part of the site clearance shall be disposed of off-site at suitably licensed facilities unless otherwise described in 4.21. On-site burning of materials shall not be permitted.

5.20 The Earthworks Contractor shall demolish, break up and remove any redundant concrete slabs, structures, drains and other superficial obstructions in the way of the works or otherwise obstructing the construction of the works as instructed. Where old foundations, beds, basements, filling material, tanks, service pipes, drains, etc., not shown on the drawings are encountered, instructions should be obtained from the Engineer before proceeding.

5.21 At the Earthworks Contractor's discretion, any demolished or cleared materials (e.g. existing brick structures and former stockpiled brick wastes) may be retained on site for use as filling material provided that they are acceptable or are treated so as to become acceptable. Materials are to comply in all respects with this specification for such use and be approved by the Engineer.

5.22 The use of explosives shall not be permitted.

5.23 All fossils, coins, bottles, articles of value or antiquity and structures or other remains or items of geological or archaeological interest discovered on the site shall be immediately reported to the Engineer and shall be deemed to be the absolute property of the Client.

Setting Out

5.24 The Earthworks Contractor shall be responsible for the true and proper setting-out of the Works and for the correctness of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith. The Earthworks Contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other articles used in setting out the Works.

5.25 Should the Earthworks Contractor find any discrepancies on the drawings he is to refer the matter to the Engineer for verification before proceeding with the works.

General Earthworks Requirements

5.26 The Specification for Highway Works (SHW) Series 600 published by HMSO shall form the base specification for all earthworks.

5.27 Acceptable general fill materials shall meet the requirements of Table 6/1 enclosed as Appendix A to this specification (Appendix 6/1 requirements of which are to be determined after material classification) and Tables 6/2, 6/4 and 6/5 of the SHW reproduced within Appendix A.

5.28 Unacceptable material shall be:

- Peat, materials from swamps, marshes and bogs;
- Logs, stumps and perishable material;
- Materials in a frozen condition;
- Clay having a liquid limit determined in accordance with BS1377: Part 2, exceeding 90% or plasticity index determined in accordance with BS1377: Part 2, exceeding 65%;
- Material susceptible to spontaneous combustion;
- Materials with a calorific value in excess of 7MJ/kg, measured in an as received condition, placed within the upper 2.0m of the required formation level;
- Materials containing invasive plant species or roots and rhizomes of such; and
- Material having hazardous chemical or physical properties requiring special measures for its excavation, handling, storage, transportation, deposition and disposal.

5.29 Prior to works commencing the material to be excavated and replaced should be classified in accordance with the above specification.

5.30 If an authorised formation or material deposited as fill subsequently deteriorates due to inclement weather (or for any other reason) such that it would be reclassified as unacceptable and cannot be compacted in accordance with the Contract, the Earthworks Contractor shall, at his own expense, either:

- Cease work on the material until its condition is such that it can again be classified as acceptable.
- Make good by removing and disposing of the unacceptable material and replacing it with acceptable material.

5.31 The Earthworks Contractor shall provide for such measures as may be necessary to ensure that water, whether groundwater, precipitation or water from any other source does not accumulate in excavations or on subgrades.

5.32 The Earthworks Contractor shall arrange for the rapid dispersal of water shed on to the surface of earthworks or completed formation during construction or which enters the earthworks above the water table from any source.

5.33 The Earthworks Contractor shall provide where necessary temporary watercourses, ditches, drains, pumping or other means of maintaining the earthworks free from water. Such provision shall include carrying out the work of forming the earthworks in such a manner that their surfaces have at all times a sufficient minimum cross-fall and, where practicable, a sufficient longitudinal gradient to enable them to shed water and prevent ponding.

5.34 The Earthworks Contractor shall submit proposals for disposal of water to the relevant authority. Where pumping is authorised, precautions shall be taken to prevent disturbance of material in and around excavations. Adequate means of trapping silt shall be provided on temporary systems discharging into permanent drainage systems.

5.35 The Earthworks Contractor shall allow for such seasonal and other variations to the ground water levels indicated in the Site Investigation Reports as might reasonably be anticipated.

5.36 Where, in the opinion of the Engineer, earthworks have been adversely affected by the ingress of water during the earthworks contract so as to render the material unacceptable, these works shall be removed and made good at the Earthworks Contractor's expense.

5.37 The Earthworks Contractor is required to remove all topsoil and to remove any soft spots prior to filling with acceptable material. Any surplus topsoil shall be removed from site to a suitably licensed off-site tip or other approved location.

5.38 Surfaces of excavations with a gradient greater than 1:5 which are to receive filling must have horizontal benches constructed to match the depths of compacted layers of filling.

5.39 Where, during the progress of the work, the difference in level between adjacent areas of filling exceeds 600mm, the Earthworks Contractor shall cut into the edge of higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. The Earthworks Contractor shall spread and compact new filling to ensure maximum continuity with the previous filling.

5.40 The accuracy of and permissible deviation from required formation levels (underside of sub-base/capping) shall be as follows:

- Beneath mass concrete foundations: ± 25mm
- Beneath ground bearing slabs: ± 15mm
- Beneath roads and other paved areas: ± 20 – 30mm
- Other areas: ± 50mm

Bulk Excavation

5.41 The bulk excavation shall be carried out as necessary to remove all unsuitable soils (e.g. topsoil, vegetation, Asbestos impacted soils to an anticipated depth of 1.00m bgl, and any obstructions and / or extraneous items).

5.42 Shear Vane testing shall be undertaken at the base of excavations to prove the base is suitable for the infilling work. An undrained shear strength of value of not less than 50kPa is required in road areas.

5.43 Precautions should be taken to ensure the stability of the excavation due to the presence of granular Made Ground deposits when encountered; the Earthworks Contactor is responsible for maintaining the stability of temporary excavations during the Works and the stability of adjoining land/ property.

5.44 Should the Earthworks Contractor intend to use any special methods to assist in excavation work, such as 'soil freezing', 'chemical stabilisation', etc., then details shall be submitted to the Engineer for comment at least three weeks in advance of the work. No work shall be commenced on the portion of the excavation concerned until consent is given.

5.45 Any large obstructions or unexpected findings discovered during excavation shall be reported immediately to the Engineer.

5.46 Following completion of any excavation, particular care must be taken to avoid deterioration of the excavated surface. The Earthworks Contractor shall be responsible for protecting the excavations against damage from weather and/or construction traffic.

5.47 Where areas of ground considered unsuitable by the Engineer are identified at the base of excavations the Earthworks Contractor shall, under the direction of the Engineer, excavate to such further depth as may be required. Such extra depth shall be filled with, acceptable general fill materials or sub-base/capping materials as required by the Engineer.

5.48 Excavations shall be carried out by the Earthworks Contractor in such a way as to avoid disturbance and/or damage to the surrounding ground, existing roads, pavements, buildings and services, etc. on and/or adjoining the site.

5.49 The Earthworks Contractor shall be solely responsible for the safety of all excavations and for the sufficiency of all temporary supports thereto.

5.50 The Earthworks Contractor shall be responsible for disposing of all unacceptable or surplus materials arising from the Works.

5.51 Should material be encountered that appears contaminated, either by olfactory or visual evidence, the material will be brought to the attention of the Engineer who will advise as to the appropriate course of action.

Material Classification

5.52 To provide formation levels for the proposed development, suitable material may be processed from excavated site soils.

5.53 Compliance testing of all imported and site won materials selected as earthworks materials required to achieve formation levels shall be carried out by the Earthworks Contractor at a UKAS accredited testing laboratory. Site Investigations undertaken across Tranche A to date have indicated materials to be relatively consistent, therefore testing at a frequency of 1 no. suite of tests to be undertaken per 1,500m³ of single class material type, or a minimum of 3 samples per material type (as defined in SHW) imported is considered appropriate.

The testing suite is to comprise Moisture Content, Atterberg Limits (if applicable), Particle Size Distribution and Optimum Moisture Content, with the addition of Water Soluble Sulphate / Total Sulphur / pH (for materials to be placed within 2.0m of required formation level, within roads). The Earthworks Contractor should ensure the environmental and geotechnical suitability of acceptable site materials. The results of the tests shall be made available to the Engineer prior to placement of material as fill.

5.54 Should processed materials be encountered that appear contaminated, either by olfactory or visual evidence, the material will be brought to the attention of the Engineer who will advise as to the appropriate course of action. Bulk earthworks environmental compliance testing shall be undertaken at a rate of 1 No. per 1000m³ (minimum of 3 No. tests) of placed fill. The testing suite is to be in accordance with that presented in Appendix D.

Filling

5.55 The performance of fill material placed at the site can be ensured by placement of the fill to an End-Product Specification.

5.56 The Earthworks Contractor shall ensure that the final platform is suitable for proposed development.

End-Product Fill Specification

5.57 In the proposed development areas the Contractor shall undertake filling to an End Product Specification in accordance with SHW Section 612, clauses 11-15 and appendices and tables as referenced therein.

5.58 On the basis of the results of the site investigation which has been carried out, the Engineer shall provide the Contractor with the results of the following tests for each type of fill to be used on site.

- Natural moisture content (BS1377: Part 2:1990: Section 3).
- Liquid and plastic limits for cohesive soils (BS1377: Part 2:1990: Section 4 and 5).
- Particle density (specific gravity) to assist in evaluating compaction results.
- Particle size distribution by wet sieving method to give the distribution of particle sizes down to fine sand and the percentage of fines (BS1377: Part 2:1990.
- A separate compaction trial shall be carried out for each type of fill to be used on the site to confirm the most efficient methodology to meet the required performance.

5.59 The frequency of geotechnical testing anticipated is shown below;

- Earthworks Classification Testing (as above) every 1,500m³ (placed)
- In-situ Density Tests (Sand Replacement or NDM) every 1,500m³ (placed)
- CBR tests by Plate Load Testing at finished remediation level and at 1m height intervals as fill is placed 50m grid

Furthermore, where material is predominantly cohesive in nature then the validation testing will also include a series of hand shear vanes (every 1,500m³) with target shear strength of no less than 50kPa (base of excavation within roads and does include cover layers).

General Filling Requirements

5.60 The Earthworks Contractor shall be responsible for removing from site any unacceptable material to suitably licensed tips.

5.61 Moisture content testing shall also be undertaken on each layer of material excavated and re-compacted. Initially the material placed will be observed by both the plant operators and the attendant Geotechnical Engineer to ensure that compaction is being achieved.

5.62 Should imported materials be at or near to its optimum moisture content and the material prove to be too wet to achieve adequate compaction, then the material will be removed, and consideration given to the addition of lime to reduce the moisture content to make the material suitable for placement.

5.63 The Earthworks Contractor should ensure suitability of fill materials for lime modification if required. Such testing will also include for swell potential. Where lime modified material is incorporated in the works a record will be kept of its location, and layer thickness.

5.64 Any in-situ validation tests (if required and under instruction) will include a record of their layer number and associated X, Y and Z co-ordinates.

5.65 Bulk earthworks environmental testing shall be undertaken at a rate of 1 per 1000m³ (minimum of 3no tests) of placed fill. The testing suite is to be in accordance with that presented in Appendix D. Environmental validation testing will be undertaken on cover materials (i.e. those within 600mm of finished level) within public open space / landscape and garden area, again in accordance with Appendix D. Tests are to be undertaken at a rate of 1 per 100m³ of clean cover materials with a minimum of 6 No. per source. It is anticipated that the cover system validation testing will be carried out by the onward developer subsequently to the completion of the bulk earthworks.

Slopes

5.66 Slopes cut into natural soils should be no steeper than 1:5 (vertical: horizontal); should this be not be achievable a full slope stability assessment should be undertaken. Temporary slope stability assessment should be undertaken when conducting excavations within granular or made ground deposits.

5.67 Temporary batters may be formed at a gradients of 1:3. If permanent batters steeper than 1:5 are required a slope stability assessment should be undertaken to ensure that the batter can be safely accommodated.

Specific Requirements

5.68 None

Health and Safety

5.69 The Earthworks Contractor shall not commence construction works until the project health and safety plan has been prepared to the Main (Principal) Contractor's satisfaction. The Earthworks Contractor shall be responsible for complying with the plan and he shall be required to:

- Ensure co-operation between other Earthworks Contractors so that they all may comply with the relevant statutory provisions as are relevant to the project themselves;
- Ensure that everyone on site complies with the health and safety plan;
- Take reasonable steps to ensure that only authorised persons are allowed on site (or part thereof as the case may be);
- Display, where they can be easily read, any notification that has been sent to the Health and Safety Executive;
- Prepare method statements for construction operations as required by the CDM Co-ordinator; and
- Provide the CDM Co-ordinator with any other relevant information.

5.70 The Earthworks Contractor shall pay particular attention to the following in the context of this Specification:

- Potentially hazardous or contaminated materials used or encountered on site;
- Deep excavations;
- Working in the vicinity of underground or overhead services;
- Working in confined spaces;
- Working in or adjacent to watercourses /water features; and
- Working on or in the vicinity of highways.
- Provision of temporary slope stability.

5.71 The Earthworks Contractor shall take all necessary safety precautions throughout the ground treatment operations and shall comply with the Health and Safety at Work Act 1974 or any subsequent re-enactment thereof.

5.72 The Earthworks Contractor shall take note of the Pre-Tender Health & Safety Plan and comply with the CDM Regulations 2015.

5.73 The Earthworks Contractor shall submit for approval all necessary method statements to the Main Contractor prior to commencing the works.

Working Hours

5.74 The Earthworks Contractor must liaise with the relevant Environmental Health and Safety Executive to determine the permitted working hours, which must be strictly observed throughout the duration of the operations. The tender sum and contract programme presented at tender submission must take into account such restrictions on working hours.

Contractor's Report

5.75 The Earthworks Contractor shall on a weekly basis provide the Engineer within the following information:

- Compliance test results and the locations of sampling;
- Site compaction records of layer thicknesses and compactive effort;
- Details of compaction plant used;
- Verification test results and their location;
- Material placement records (e.g. what materials were placed where);
- Photographs of the work;
- Base of excavation topographical survey; and
- As-Built final topographical survey.

APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

REMEDIATION STRATEGY

This report is produced solely for the benefit of ***Urban and Civic (Alconbury) Ltd.*** *and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing by Shadbolt Environmental. This report refers to the condition of the site at the time of the investigations and no warranty is given as to the possibility of future changes in the condition of the site.*

This report is based on the preceding SE intrusive investigation and referenced sources as contained therein. The impact of our assessment on other aspects of the development requires evaluation by other involved parties. The possibility of the presence of contaminants not revealed by this research and works, perhaps in higher concentrations than previously identified elsewhere on the site, cannot be discounted.
This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. It should be noted that in time improved practices or amended legislation may necessitate a re-assessment.

The opinions expressed within this report cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

Shadbolt Environmental

APPENDIX B

DRAWINGS