Technical note:
AGA Rangemaster Ltd, Coalbrookdale Foundry, Scope for Remedial Works at WS114

1. Introduction

1.1 Background

The AGA Rangemaster Ltd (AGA) Coalbrookdale Foundry has been decommissioned. The site remains regulated by Telford and Wrekin Council (the Council) under Environmental Permit No. 08/00011/PPCA2 and in order to surrender its permit, AGA must demonstrate to the Council that the site is in a 'satisfactory state'.

AGA commissioned Wood Environment and Infrastructure Solutions UK Ltd (Wood) to carry out desk based site assessment and intrusive ground investigations to assess the condition of site against the baseline site condition recorded at the start of AGA's Environmental Permit in 2003.

An area of oil contamination at a window sample borehole (WS114) was encountered during the ground investigation in 2018, which was laterally delineated in shallow ground during a supplementary investigation in 2019 to assess the extent of the oil contamination. Subsequent geophysical surveying (ground penetrating radar and microgravity) was completed in 2019 to assess the size and extent of a void identified during the supplementary investigation.

This document sets out the scope of work to enable AGA to demonstrate to the Council that reasonable measures have been taken to return the site to a 'satisfactory state' to enable the Environmental Permit to be surrendered.

1.2 Reference Documents

The scope has been designed in response to the results of the investigations to date and the site-specific constraints in the vicinity of WS114. The previous reports relevant to this scope of work are summarised below:

- Entec (August 2003), Aga Raeburn, Draft Phase 1a Site Condition Report and Phase 2 Site Investigation (PPC) (Ref. 10499RR028i1).
- Wood (December 2018) AGA Rangemaster, Coalbrookdale Foundry, Ground Investigation to Support Environmental Permit Surrender (Ref. 40048RR052i1 DRAFT).
- Wood (April 2019) Technical Note, AGA Coalbrookdale: Supplementary ground investigation for Environmental Permit Surrender.
- TerraDat (August 2019) Geophysical Survey Report, Geophysical survey to map buried structures and voids, Coalbrookdale Foundry (Ref. 6534, Version 1).

2. Objectives of the remediation

The objective of the remediation is to make reasonable efforts within the constraints at the site to restore the affected area in the vicinity of WS114 to its 2003 baseline state of mineral oil concentrations of 319 mg/kg or lower. The baseline mineral oil laboratory analytical technique is broadly equivalent to total aliphatic TPH concentrations using contemporary laboratory analysis techniques (TPH CWG).

There are a number of site specific constraints to excavations in the affected area including:

- A void from 3.0 to 6.0 m below ground level (bgl) close to the south of the proposed remediation area;
- A Severn Trent 525 mm gravity-fed combined sewer to the east;
- The adjacent warehouse building to the west; and
- Buried services (drainage).

Each of these constraints are identified on Drawing 1 and discussed further in the Scope of Work presented in Section 3.

3. Scope of Work and Constraints to remediation

3.1 Constraints

Identified constraints and initial design recommendations to reduce risks when undertaking the proposed remediation are outlined below (subject to amendments as needed during detailed design of the remediation). A constraints plan is presented as Drawing 1 in Appendix A.

Void at WS115 south of WS114

- A void at WS115 was encountered at 3 m depth, extending to 6 m. It has been modelled by TerraDat from geophysical data to be no wider than 2.0 m. A minimum stand-off of 2.0 m from the position of WS115 shall be maintained, with no mechanical plant or vehicles to operate in this area, and no stockpiling of material or excavation to take place within the stand-off.

Severn Trent sewer

- A Severn Trent gravity-fed combined sewer runs within the site close to its eastern boundary. The route of the sewer has been confirmed by services clearance specialists and the TerraDat 2019 GPR survey, and manhole access points to the sewer are present on the site in proximity to WS114, providing visible indicators of its position. A minimum 3.0 m stand-off for any remediation work shall be maintained along the length of the Severn Trent sewer.
- Work within the remediation area shall be depth limited in order to mitigate the risk of undermining the Severn Trent sewer. The maximum remediation depth shall be no greater than 1.6 m bgl (invert level of the sewer at c.1.7 m bgl).

Building west of WS114

- The large building west of WS114 is disused and derelict. This building is expected to remain in place until the site is redeveloped. The floor level within the building is approximately 1.6 m

lower than the external ground level at WS114 and the building structure is acting as a retaining wall. No remediation shall be completed below 1.6 m bgl to avoid undermining the structure.

- TerraDat's survey has identified an unknown linear feature running adjacent, roughly parallel to the building at its exterior (possibly drainage). No remediation shall be completed within 1 m of the external wall of the building, west of the contaminated area. Any surface water drainage shall be reinstated as part of the remediation scope of work.
- Site surface water drainage flows to an onsite culvert of the Lyde Brook that passes below the centre of the site. The culvert is not in close proximity to WS114 however drains in this area are thought to discharge to the culvert. Temporary surface water drainage measures shall be implemented during remediation works to capture run-off from saturated contaminated soil/ silty run-off and prevent it from entering site drains/ reaching surface water in the culvert or draining to ground. Measures shall be taken to prevent run-off entering damaged drainage and to prevent surface run-off from surrounding areas entering the open remediation area and becoming contaminated.
- The GPR survey completed by TerraDat identified below ground anomalies in proximity to WS114 (possible drainage). If surface water drainage pipes are encountered within the remediation area, they will need to be reinstated during the remediation works to retain the integrity of the current surface drainage system and avoid surface water flooding/impacts on other services and structures.

Retaining wall at the site's eastern boundary with Wellington Road

- Attention has been given to the presence of a retaining wall present at the site's eastern boundary with Wellington Road is noted. Based on the ground investigation findings, the oil impacted area does not extend eastwards beyond HP101 and the eastern extent of the remediation area shall be limited by the 3.0 m stand-off from the Severn Trent combined sewer. However, vigilance shall be made to any collapsing ground conditions or ground movement and any excavations associated with the remediation shall be backfilled with clean suitable materials as soon as reasonably practicable following remediation and verification.

3.2 Remediation scope of work

The following scope of work is proposed to remediate the oily ground in the vicinity of WS114:

- The Contractor shall inspect all Pre-Construction Information supplied by the Client and Designer and develop a suitable scheme of remediation work that fulfils the objectives outlined in Section 2 (as far as reasonably possible) and scope of work to safely remediate the area within the engineering and geotechnical constraints.
- The construction-phase of the remediation scheme shall be designed to be protective of ground, groundwater and surface water conditions.
- The remediation area is currently surfaced with hardstanding (not reinforced), which will require breaking/cutting out prior to remediation.
- Remediation of the oily material shall be undertaken using suitable methods, with continual observation/ monitoring of the condition of the building and ground to check for any movement, followed by backfilling with clean material (engineered fill e.g. 6F2). The length of time the excavation is open for should be minimised.

- The lateral extent of the remediation area will be strictly limited by the stand-offs applied to the building, the sewer (which will also address risk to the retaining wall at Wellington Road as the sewer is closer) and the void (as presented in Drawing 1).
- All plant, vehicles and stockpiles/storage of materials shall be located outside of the stand-off applied to the void, and as a general precaution any plant will be located as far away from the void as possible. Vehicles will be able to operate in proximity to the Severn Trent sewer however no excavation will take place within the 3 m stand-off of the sewer.
- All excavated materials shall be temporarily stored in an appropriate manner to minimise potential for contaminated surface run-off; or placed directly into a suitable container, wagon or skip.
- Representative samples shall be collected from the base and sides of the excavation and analysed at a laboratory for TPH CWG and Soil Organic Matter (SOM) for verification purposes and to document any residual contamination.
- Samples shall be collected and tested for Waste Acceptance Criteria (WAC) to allow a suitable disposal route to be identified for materials removed during the remediation work. Pre-classification indicates the oil contaminated ground to be hazardous, based on construction waste containing oil (which is unknown and cannot be determined) with a concentration of TPH ≥ 0.1 %.
- Any water / liquids pumped from the remediation area shall be contained appropriately and subject to laboratory testing for a suite including TPHCWG, prior to removal by a suitable licensed waste carrier and disposal facility disposal to a suitable facility with full duty of care documentation.
- Where hardstanding is removed to allow the remediation works to be completed, a hardstanding cover of concrete shall be restored once the excavation is backfilled. This is to avoid a significant increase in rainwater infiltration to the area which could destabilise existing ground conditions and potentially create new contaminant migration pathways for any residual oil contamination left in the ground.

Due to the constraints to groundworks at this site, notably the building, the void and the sewer, the excavation shall be continuously inspected by a suitably experienced person for signs of collapse/ building movement, and excavation will be stopped if any warning signs are observed. This may result in the remediated area being limited laterally or depth-wise, and some contaminated material being left. If this occurs, the reason for the change to the anticipated excavation depth/volume shall be documented.

The ground conditions encountered may be variable, and care shall be taken by the Contractor to ensure that the remediation work does not introduce new contaminant pathways or result in impact on clean underlying materials. Attention is needed to the presence of perched oily contaminated groundwater. Care shall be taken not to breach any confining structures until the contaminated material has been removed.

The contaminated ground shall be removed within the constraints to the east, south and west to a maximum depth of 1.60 m bgl. The remediation may cease at shallower depths if there is clear evidence that the contamination has been removed.

A schematic of the proposed remediation and constraints is presented below in Figures 1 and 2.

Figure 1 Plan view of the constraints and previous excavation locations

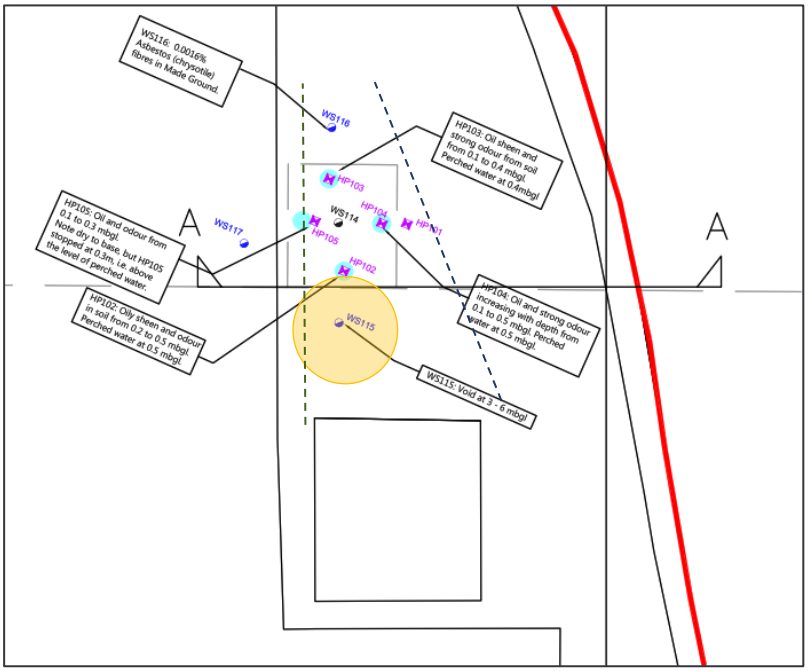
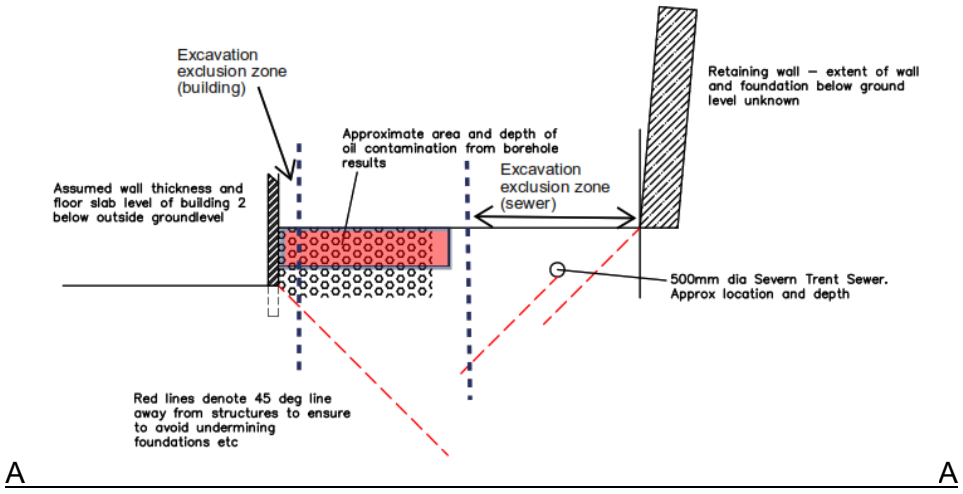


Figure 2 Preliminary schematic of constraints and possible remediation area



3.3 Management of the remediation work

The remediation work will fall under the Construction (Design and Management) Regulations 2015 (CDM2015). Table 3.1 sets out the key roles required to comply with CDM2015 with regard to the health, safety and environmental management of the remediation work and identifies the parties envisaged to take on these roles.

Table 3.1 CDM 2015 Roles and Responsibilities

Role	Party	Main Duties
Client	AGA Rangemaster Ltd	• Initiating and instructing the design and construction work, deciding what is to be constructed, when and by whom; • Appointing construction contractors; and heading up the construction procurement; • Making suitable arrangements to ensure that construction work is carried out safely; • Ensuring there is proper cooperation and coordination between those involved in the planning, design and management of construction work; • Ensuring that pre-construction information is provided to the right people at the right time to help with designing the structure/s and construction planning; • Ensuring a suitable document (referred to in the regulations as a construction phase plan) has been drawn up before construction work begins onsite; • Ensuring that arrangements for the provision of suitable welfare are put in place for construction workers, by the Principal Contractor/Contractor; • Ensuring that the project is notified to the Health and Safety Executive (HSE) if construction work lasts longer than 30 working days *and* has more than 20 workers working simultaneously on it *or* exceeds 500 person days.
Designer	Wood Environment and Infrastructure UK Ltd	• Advising the client about bringing together preconstruction information. • During the pre-construction phase, ensuring coordination and cooperation amongst the project team; • Working with any other CDM designers on the project to eliminate foreseeable health and safety risks to anyone affected by the work and, where that is not possible, taking steps to reduce or control those risks; • Liaising with the Contractor about design matters.
Contractor	TBC – contractor to be appointed by AGA	• The organisation (or individual) in control of the construction phase; • Planning, managing and monitoring the construction phase of a project; • Check all workers they employ or appoint have the skills, knowledge, training and experience to carry out the work; • Provide a site induction and provide appropriate supervision, information and instructions to workers under their control; • Ensure suitable welfare facilities are provided for workers and maintained throughout the work.

4. Reporting

A factual report shall be completed by the Contractor to fully document the work that has been completed and shall include disposal records for all waste materials taken from the site associated with the remediation work.

A verification report of the ground conditions following remediation shall be completed to support the surrender of the Environmental Permit, including a review of chemical test data against the baseline conditions. Should residual contamination remain, it shall be documented and considered in the context of current and likely future site use.

5. Preliminary Programme

The preliminary programme for the remediation scoping, detailed design and implementation and reporting of the works is outlined below. There may be an opportunity to reduce the programme if the Contractor lead-in time and commissioning can be reduced.

	26/08/2019	02/09/2019	09/09/2019	16/09/2019	23/09/2019	30/09/2019	07/10/2019	14/10/2019	21/10/2019	28/10/2019	04/11/2019	week 12 to Week 16 (minimum)
	week 1	week 2	week 3	week 4	week 5	week 6	week 7	week 8	week 9	week 10	week 11	
Scope / Specification / Commissioning												
Draft scope of work to AGA												
Scope of work to the Council												
Specification to Contractors												
Commissioning / Contractor Lead-In time												
Remediation and Reporting												
Remediation Excavation and Validation												
Laboratory Testing												
Factual Reporting												
Laboratory Results & Interpretative Reporting												
Draft Report for Client Comment												
Final Report for Issue to the Council												
Environmental Permit Surrender												
Issue Permit Surrender to the Council												
Finalise SSCR												

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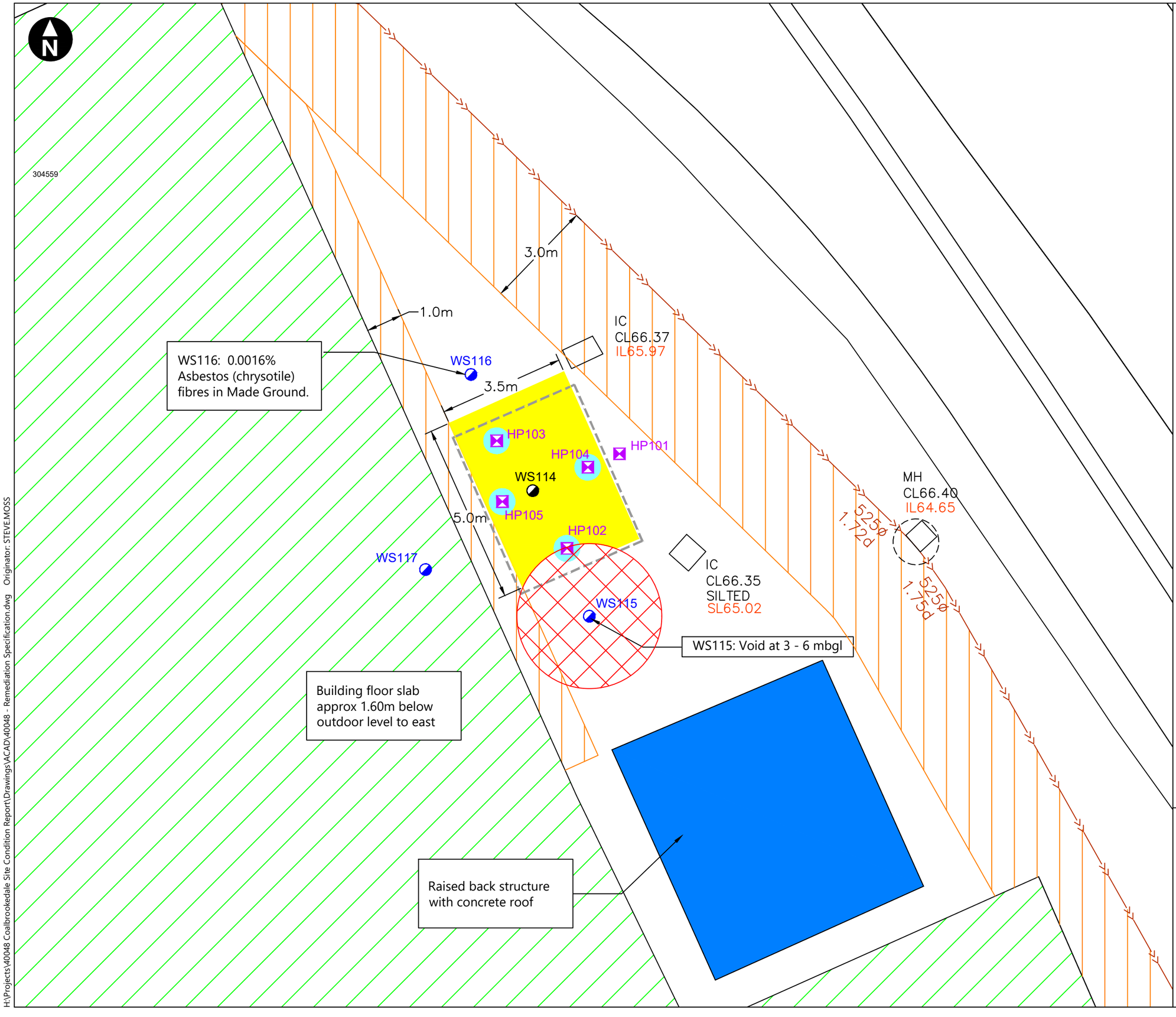
Management systems

This document has been produced by Wood Environment & Infrastructure Solutions UK Limited in full compliance with our management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.

Appendix A
Drawing



Key

- Approximate extent of excavation area = 26.1m²
- Exclusion zone
- Existing foul water sewer
- Cable percussion borehole (2018)
- Hand dug pit (supplementary SI 2019)
- Window sample borehole (supplementary SI 2019)
- Surface evidence of possible former structure
- Evidence of oil in Made Ground and perched water (2019)
- 2m buffer around the void location (NB entire void is expected to be <2m diameter)

Notes

- Maximum excavation depth of 1.60m below existing ground level.
- Excavation to proceed working away from the void encoutred in WS115 (i.e. from south to north with tracked excavator situated to the north of the excavation)
- No excavation within exclusion zones. (1m zone parallel to building, 3m zone from combined sewer)

0 m — 5 m

Scale 1:100 @ A3

AGA Rangemaster
Coalbrookdale Foundry
Remediation Specification

Drawing 1
Excavation Constraints Plan

August 2019

wood.

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