

Proposal for Unexploded Ordnance (UXO) Risk Mitigation Measures (RMM) On-site Services Provision

Meeting the requirements of CIRIA's C681 Risk Management Framework
"Unexploded Ordnance (UXO) - A Guide for the Construction Industry" and in compliance with the Construction
(Design and Management) Regulations 2015



ENQUIRY NUMBER	SE5113_1	ORIGINATOR	M. Carpenter
VERSION NUMBER	1.0	REVIEWED BY	B. Wilkinson
CLIENT	Garenne Interiors	RELEASED BY	M. Carpenter (12 th April 2018)
SITE	Hoxton Hotel, 203 High Holborn, London, WC1V 7BD		



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Study Site

The scheme has been described as “Hoxton Hotel, 203 High Holborn, London, WC1V 7BD” This proposal will provide a breakdown of the costs associated with UXO risk mitigation measures required to reduce the identified UXO risk to as low as reasonably practicable (ALARP) as detailed in our report P6399 Detailed UXO Threat and Risk Assessment released 31st January 2018 and correspondence subsequent to that.

Overview

6 Alpha’s proposal will focus on undertaking pragmatic consultancy that not only adheres to the Health and Safety Executive’s (HSE) guidance but also discharges client liabilities in accordance with the Construction Design and Management (CDM) Regulations as well as with Unexploded Ordnance (UXO) risk management best practice, “UXO A Client’s Guide to UXO Contaminated Sites”, published by CIRIA (Ref C681) in 2009. Therefore, our objectives are to:

- **Ensure Safety** – Protect personnel and equipment during all site works;
- **Conduct Robust Risk Assessment** – Independently assess the actual UXO risk. 6 Alpha are consultants first and foremost, therefore we ensure that just enough risk is mitigated, just in time – which delivers best value solutions for our clients;
- **Design Pragmatic Risk Mitigation Solutions** – We design appropriate risk mitigation measures to reduce risk to meet with the legal ‘As Low as Reasonably Practicable’ (ALARP) principle;
- **Work to Best Practice Guidelines** – Protect the client by managing the UXO risk within a framework of recognised best practice. To address the UXO risk, 6 Alpha employs a **five-phase** UXO Risk Management Framework, which is outlined in CIRIA’s UXO guide. 6 Alpha were the lead technical authors for this document, which has been independently endorsed by the HSE;
- **Save Time & Money** – Unlike “turn-key” UXO contractors, 6 Alpha have no conflict of interest in providing a professional, auditable and independent assessment of risk and a focussed design for subsequent contractor mitigation. Alternatively, if our clients would prefer, we can also project manage the delivery, or provide indigenous on-site solutions and our flexible approach has proven to deliver appropriate UXO risk management solutions at best value for money.

UXO Risk Management Framework

The five CIRIA stages that 6 Alpha follow for managing UXO risk are:

Stage 1 - Preliminary UXO Risk Assessment. The purpose of a Preliminary UXO Threat Assessment is to inform environmental and construction professionals of the potential threat of military related explosives and/or ordnance on, or in, the vicinity of the site. This stage is designed to act as a screening tool to allow the potential UXO threat to be established quickly and efficiently.

Stages 2 and 3 – Detailed UXO Threat & Risk Assessment (2) and Strategy (3). The purpose of a Detailed UXO Threat and Risk Assessment is to not only to confirm the UXO threat present, but also to deliver a robust and independent, semi-quantitative risk assessment. If UXO risks are identified (based *inter alia* upon the probability of discovery and the potential consequences), then an appropriate Strategy will deliver recommendations for risk management and/or mitigation. Stage 2 and Stage 3 are delivered together and within the same report format. Those deliverables will be succinct but sufficient to clearly articulate the potential risks to the project design team as well as the site investigation/principle and sub-contractors. 6 Alpha will provide threat sources in GIS format (i.e. geo-referenced mapping) to clearly code and depict risk areas. Most importantly perhaps, the strategy will clearly depict what actions must be subsequently taken to ameliorate those risks to ALARP. Whilst the combined report will be based upon the best practice approach to UXO risk management, the content may vary depending on the type of site, the available raw data and the potential UXO threat. In outline, the following process will be implemented:

- Research will be conducted in external archives as well as drawing upon the considerable UXO threat data we have already geo-referenced and stored in 6 Alpha’s extensive “Azimuth” ©, UXO database;
- The specific Site and WWII history will be considered;
- The UXO threats and an assessment of the maximum and likely UXO penetration depths will be presented;
- The UXO risks will be assessed using qualitative and semi-quantitative methods with UXO risk zoning applied across the Site if it is possible;
- Risk mitigation measures will be presented to ameliorate the UXO risk on the Site; these will be designed to lower UXO risk to the specified operations on Site to ALARP – thus providing the most cost-effective solution.

Stage 4 – Implementation. Following Stage 3, 6 Alpha will consider what sort of risk mitigation is required in practice. Our focus is to deliver only solutions that are beneficial, necessary and proportional to the risks posed.

Stage 5 – ALARP Sign-off Certification. Following the completion of any necessary UXO risk mitigative work in Stage 4, we would be pleased to offer a Safety Sign-off Certificate that warrants the UXO risk has been reduced to ALARP.

SECTION 1 - UXO RISK MITIGATION MEASURES

Service	Required	Description
Op UXO Emergency Response Plan (ERP)	✓	An emergency response plan provides clear and precise guidance on what to do should an item of UXO be encountered during site works. It details roles and responsibilities and should be included in the health and safety plan for the proposed works and communicated to the work force at the operational level, typically as part of a UXO Safety & Awareness Briefing (toolbox briefing).
UXO Safety & Awareness Briefing	✓	Essential when there is a possibility of an UXO / UXB encounter and are a vital part of the general safety requirement. All personnel working on the Site should receive a briefing on the identification of an UXO / UXB, what actions they should take to keep people and equipment away from such a hazard and to alert Site management. Information concerning the nature of the UXO / UXB threat should be held in the Site office and displayed for general information on notice boards, both for reference and as a reminder for ground workers. The Safety & Awareness briefing is an essential part of the Health & Safety Plan for the Site and helps to evidence conformity with the principles laid down in the CDM regulations 2015. Typically lasts 30 – 45-minutes and is accompanied with posters to be appropriately displayed on information boards and in communal areas.
EOD Banksman	✗	An EOD Engineer will monitor ongoing intrusive works to identify any suspicious items that may be UXB or UXO related. Routinely provided in support of ‘open’ intrusive construction works into <i>previously undisturbed ground</i> e.g. trial pits, trenching, shallow or bulk excavations etc when there is a possibility of an UXO / UXB encounter and where other proactive UXO RMM measures i.e. survey are likely to be or have proven to be partially or wholly ineffective.
Non-Intrusive Magnetometer UXO Survey	✗	Routinely provided where intrusive construction works into <i>previously undisturbed ground</i> are proposed and where the extent of these and/or the <i>average bomb penetration depth</i> is assessed to be within the capabilities of non-intrusive UXO survey equipment and implementation of this is assessed as potentially being or likely to prove partially or wholly effective.
Interim Report	✗	Following implementation of a non-intrusive UXO survey and off-site analysis of the collected, a report will be produced to explain the UXO RMM carried out and detail any further measures required to reduce the UXO risk to ALARP status. NB: Only applicable to non-intrusive UXO survey.
Intrusive UXO Investigation	✗	Following implementation of non-intrusive UXO survey, targets identified via off-site analysis of the survey data which model as the target UXO will require further UXO RMM to allow identification. Plant / excavator support may be required.
Down-hole Magnetometer Intrusive UXO Survey (handheld)	✗	Routinely provided in support of, and/or concurrently with ‘blind’ ground / site investigation works into <i>previously undisturbed ground</i> e.g. boreholes, drilling, window sampling etc when there is a possibility of an UXO / UXB encounter. Such a survey should be implemented at each position and extend to the <i>assessed average bomb penetration depth</i> or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as the target UXO.
CPT MagCone Magnetometer Intrusive UXO Survey	✓	Routinely provided ahead of site construction activities when there is a possibility of an UXO / UXB encounter and where ‘blind’ intrusive works into <i>previously undisturbed ground</i> are proposed e.g. piling etc. Such a survey should extend to the <i>assessed average bomb penetration depth</i> or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as the target UXO in advance of said works.
UXO ALARP Sign-Off Certificate	✓	Following implementation of UXO RMM, an UXO ALARP safety sign-off certificate will be produced, providing tangible evidence to support the fact that the UXO risk in areas covered by UXO RMM has been reduced to ALARP within the scale and depth of the proposed intrusive activities.

UXO RISK MITIGATION MEASURES (continued)

Service	Required	Description
On Line (virtual) UXO Safety & Awareness Briefing	✗	Online virtual briefing to provide awareness and guidance to all onsite personnel. NB: Not recommended or applicable to sites rated as HIGH or VERY HIGH
On Call EOD Engineer (EODE)	✗	<p>An on-call EOD Engineer will be able to remotely identify and/or advise on the appropriate course of action in the event of any suspicious and/or real UXO finds. Three tiers of immediate telephone and/or email response are offered, namely:</p> <ul style="list-style-type: none"> Bronze – Monday to Friday during normal office hours (0830 to 1730), excluding weekends and public holidays; Silver – Seven day a week service during normal office hours (0830 to 1730), 365 days a year (NB: Up to 1 hour consultancy included at weekends. Normal day rates will apply beyond this; Gold – As silver but 24 hours a day service. (NB: Up to 1 hour consultancy included in this service. Normal day rates will apply beyond this)

SECTION 2 - FEES

Service	Fees	Detail
EOD ENGINEER / SURVEYOR COSTS		
EOD Engineer (EODE) in the UXO banksman role	£400 per/day	Duration will be determined on scope, extent and progress of Client intrusive works into <i>previously undisturbed ground</i> (see Cost Analysis Estimate).
Surveyor / EOD Engineer (EODE) in the non-intrusive magnetometer UXO survey role	£500 per/day	As a planning figure, survey coverage of 1.5 – 2.0ha per day is achievable by a single surveyor / EOD Engineer. Sites larger than 1.5ha require a minimum of one survey team comprising 2 surveyors / EOD Engineers (see Cost Analysis Estimate).
Surveyor / EOD Engineer (EODE) Team in the non-Intrusive magnetometer UXO survey role	£900 per/day	
EOD Engineer (EODE) in the intrusive UXO investigation role	£500 per/day	Duration will be determined on scope and quantity of targets requiring investigation NB: Plant / excavator support may be required (see Cost Analysis Estimate).
Surveyor / EOD Engineer (EODE) in the intrusive UXO survey role	£500 per/day	Duration will be determined on scope, extent and progress of Client intrusive works into <i>previously undisturbed ground</i> or extent and scope of other works (see Cost Analysis Estimate).
Mobilisation	£150 per occasion & weekly	Mob / demob charges will apply at commencement and completion of the requirement and following a stand-down / cessation and recommencement of on-site activities over a weekend (see Cost Analysis Estimate).
Subsistence	£100 per/night	Where on site provision requirement extends into 2-days or more, subsistence charges may apply should a local EOD Engineer / surveyor not be available (see Cost Analysis Estimate).
CPT MAGCONE RIG		
CPT MagCone Magnetometer Intrusive UXO Survey Rig	Mobilisation - £tbc Day rate - £tbc	Duration will be determined on scope, extent and progress of Client intrusive works into <i>previously undisturbed ground</i> or extent and scope of other works (see Cost Analysis Estimate). Costs will be determined by duration and type of rig. Additionally, CPT rigs will always mobilise with a qualified EOD Engineer in addition to a qualified rig operator able to provide maximum flexibility and available technical advice to cover all foreseen eventualities.
REPORTS & SIGN-OFF		
Op UXO Emergency Response Plan	£250	Delivered in electronic format via email prior to initial mobilisation. Or delivery of other services

FEES (continued)

Service	Fees	Detail
Interim Report	£250	Delivered within 3-days following implementation of survey and off-site analysis of the survey data.
UXO ALARP Sign-Off Certificate	£500	Delivered within 3-days following implementation of recommended UXO RMM and covering all areas / locations where the UXO risk has been assessed as being ALARP
SAFETY BRIEFINGS, VIRTUAL & REMOTE SERVICES		
UXO Safety & Awareness (UXO S&A) Briefing	FOC - £500	If an EOD Engineer is otherwise engaged by the Client to provide additional recommended UXO RMM then briefings will be provided as required FOC. If, however the requirement is standalone / one-off then charges apply.
On Line (virtual) UXO Safety & Awareness Briefing	£20 per person	On receipt of a purchase order an email will be issued detailing the login information required to undertake this briefing. A unique code will be provided for each employee. The Q&A will be verified by 6 Alpha and a certificate will be issued to successful candidates.
On Call EOD Engineer (EODE)	Bronze - £400 p/w Silver - £600 p/w Gold - £1,000 p/w	Bronze cover is provided for a minimum of 5-day block (Mon – Fri). Silver cover is provided for a minimum 7-day block (Mon – Sun) or 7-days blocks thereafter. Gold cover is provided for a minimum 7-day block (Mon – Sun) or 7-days blocks thereafter.

SECTION 3 - SITE / PROJECT SPECIFIC SECTION

DESCRIPTION OF SCOPE OF UXO RMM TO BE PROVIDED AS AGREED WITH THE CLIENT

The Client has provided a report titled 'The Hoxton Hotel, Holborn London WC1V 7BD Desk Study' which states that 'piling will be required to support the proposed extension, likely to extent to a significant depth into the ground.

In order to reduce the risk from UXO to said works to ALARP (*as low as reasonably practicable*), 6 Alpha recommends the following UXO RMM Services where intrusive works are likely to extend into *previously undisturbed ground*:

- Intrusive UXO Survey (CPT MagCone) should be implemented to cover all 'blind' intrusive works (drilling, probing, piling etc). Survey burden is estimated as depicted in drawing *10795-CRH-X1-00-DR-S-1001 P1_6AMarkup* where each blue circle represents the 3.0m diameter coverage of an individual UXO survey,. To clarify:
 - Qty of piles – # 241 piles made up of # 59 permanent and # 182 temporary piles;
 - Qty of surveys - # 57 individual surveys each covering an individual pile location or groups thereof within 1.5m radius;
 - Estimated Duration - 2-days;

FINAL COST ESTIMATE ANALYSIS

ITEM / SERVICE	COST	ESTIMATED DURATION/QUANTITY	ESTIMATED TOTAL
Op UXO ERP	£250	1	£250
UXO S&A Briefing	£FOC <i>Assuming EODE already mobbed and on-site</i>	N/A	£0
CPT Rig Mobilisation	£1,000	1	£1,000
CPT MagCone Magnetometer Intrusive UXO Survey	£2,280	2	£4,560
UXO ALARP Sign-Off Certificate	£500	1	£500

TOTAL ESTIMATED COST – £6,310

NOTES:

- Provision of services will not commence until an official notice to proceed in the form of a Purchase Order and/or completed SEAF has been received.

Commercial Notes

The work will be carried out in accordance with the ICC infrastructure Conditions of contract, ground investigation version 2011, approved by the Association of Consultancy and Engineering (ACE) and Civil Engineering Contractors Association (CECA), insofar as they can be held applicable to our work and except where amended by the conditions below and the construction Act 2011:

- The quote remains valid for 3 months following the date of submission. The works will be subject to re-measurement based upon the actual quantities and agreed rates for the work. The work shall be performed in accordance with the content of this proposal;
- If you require that we enter into a Sub-Contract Agreement for the works, such an agreement shall be prepared in a mutually agreed format and reflective of the content and intent of this proposal. Unless otherwise agreed this proposal in its entirety shall be incorporated into the Sub-Contract Agreement and in the event of any conflict, our offer shall take precedence;
- All additional Client requested travel and subsistence expenses out with this quote will be re-charged at cost plus 10%; mileage claims shall be at a rate of £0.45 per mile (plus 10%);
- Any changes to the agreed scope of works will be the subject of a Variation Order and agreed additional quotation before the work commences;
- Our offer is conditional on there being adequate working access and appropriate working conditions as well as licences in place for such works;
- We shall not be accountable for damage to underground services or the consequence thereof because of excavation unless such services have been adequately marked out. If we arrive on site to find that this has not been complied with, then any resulting standing time will be payable by the client at the rates quoted in our fee proposal;
- All intrusive works conducted near live or HV power cables and indeed gas mains require hand-dug inspection pits at agreed intervals along their length;
- No allowance has been made for overtime, the normal working hours will be from 0800 – 1700 Mon to Fri;
- 6 Alpha holds and maintains Professional Indemnity insurance cover and shall ensure that all professional consultants involved in the provision of the Project hold and maintain appropriate cover. Such insurance held by 6 Alpha or by any agent, sub-contractor or sub-consultant involved in the provision of the Project may be limited in respect of any one claim (but shall not be limited in any other respect). PROVIDED THAT any such limit shall in any event be:
 - For projects which value does not exceed £20,000 (twenty thousand pounds), ten times contact value;
 - For projects which value exceeds £20,000 (twenty thousand pounds) but does not exceed £100,000 (one hundred thousand pounds), five times contract value;
 - For projects exceeding £100,000 (one hundred thousand pounds), then not exceeding £5,000,000 five million pounds.
- 6 Alpha offers 30-day payment terms, all prices are exclusive of VAT. Application for payment will be rendered on completion of the task or at identifiable stages of the work (e.g. at the end of field work or submission of final report whichever is the soonest) **N.B UXO RMM is only complete when a technical report / UXO ALARP Sign-off Certificate is issued. This may take up to 3-days following completion and demob from site. Any client led and subsequent intrusive activity taking place before this report/certificate is issued is done so at the client's own risk;**
- Failure to complete the 'Sales Enquiry Acceptance Form' and / or issue a PO may delay the provision of the services;
- Cancellation/delay penalties will be charged as follows:
 - Written confirmation of cancellation/delay > 5 working days in advance of delivery date – no cost;
 - Cancellation/delay < 5 working days or less before delivery of onsite services – 100% of the cost of work will be charged.

For further information, please contact 6 Alpha Associates:

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