

Characterisation and Preparation for the Renovation or Demolition of a Potentially Contaminated Explosives Building

by Jordan Hayston

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Characterisation and Preparation for the Renovation or Demolition of a Potentially Contaminated Explosives Building

Ordnance, Munitions and Explosives: Safety
Professional Project Proposal

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Contents

1 Introduction	3
2 Background	3
3 Project Design	4
4 Resources and Planning	4
4.1 Project Timeline	5
5 References	6
APPENDIX A - APPLICATION FOR ETHICAL APPROVAL.....	7

1 Introduction

A building within AWE's explosive area has been rendered unfit for use due to the main structure deteriorating to a point where it is unsafe for the storage or manufacture of explosives. The concrete ceiling and walls have become cracked over time and the safety of both personnel and explosives is now a major concern. Due to the nature of the work that has been carried out in this building, there is also the potential that it is contaminated with explosives. Furthermore, it is situated amongst several other buildings which currently store and manufacture explosives.



The aim of this project is to identify an appropriate method for either renovating the identified building for alternative use or complete demolition and removal with consideration to the surrounding explosives locations. This task is part of a greater scheme for the uplift of AWE's explosives estate, which will involve removing or repurposing old facilities to make space for new ones.



2 Background

Based on current information, the building under investigation is thought to be unfit for use for explosives operations. Regulation 26 of The Explosives Regulations 2014 [1] states the following:

'26.— (1) Any person who manufactures or stores explosives must take appropriate measures—

- (a) to prevent fire or explosion;
- (b) to limit the extent of fire or explosion including measures to prevent the spreading of fires and the communication of explosions from one location to another; and
- (c) to protect persons from the effects of fire or explosion.'

It is critical that the business makes every effort to adhere to Regulation 26 of ER 2014, if the business is unable to meet these requirements, the explosive licence of the building will be void, making it unusable for explosive operations.

Furthermore, Section 2 of the Health and Safety at Work Act 1974 [2] outlines that '*any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health*' and '*the provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health*'.

Therefore, structural assessments must be carried out to determine the full extent of any risks posed to both personnel and explosives.

The structure of the identified building is believed to have deteriorated to a point at which it is no longer safe to carry out explosives operations and/or storage. DSA 03.OME Part 2 (JSP 482) Chapter 6 [3] states that blast design methods and validation '*shall be carried out by competent persons (i.e as a minimum: Chartered Civil or Structural Engineers) with suitable and sufficient experience in blast design.*' Upon completion of the building surveys, the structural assessment team will be tasked with determining the suitability of the structure.

There is a chance that the building in question is contaminated with explosives as a result of operations carried out over the years. Contamination may be found within the structure of the facility, or in the grounds surrounding the location. The CBI EIG Management Guidance for the Safe Decommissioning of Explosives Sites [4] outlines relevant legislative requirements for the

decontamination of explosives facilities, as well as the recognised process and techniques for carrying out these tasks.

Once the relevant building assessments have been carried out, preparations will need to be made for the resulting works. DSA 03.OME Part 2 (JSP 482) Chapter 18 [5] outlines regulations for contractors and works within explosives areas. The work carried out will be classed as Major Works, defined in paragraph 5.3.1 as including '*all repair, refurbishment, modification or new construction activities*'. The process for evaluating such tasks can be found further on in Annex C of the document, which defines a form of Scaled Distance Assessment based on affecting buildings, numbers of personnel and the time period.

3 Project Design

The initial task for the project will be to assess the structure of the building to determine its suitability for future use. AWE's 3D scanning team have the capability to map the interior and identify any significant or cosmetic damage. AWE also has a team which can carry out topographical surveys using drones, which can be used to produce a profile of the over-mounding and external structure. Both methods will support the structural assessment team whilst completing their review.

Once the results have been produced from the structural assessment, Free From Explosive Hazard (FFEH) sampling will need to be carried out. This will involve swabbing of surfaces within the building, followed by intrusive sampling. To carry out intrusive sampling, holes will be drilled into the concrete and the dust collected for testing. Ground samples may also be collected from the earth surrounding.

One of the final steps of this project will be to carry out a Scaled Distance Deployment Assessment. AWE has its own process for carrying out this assessment, which is derived from Chapter 18 of DSA 03.OME Part 2 [5]. Potential Explosion Sites (PES) within the vicinity of the work area will be identified, and the overall risk evaluated based on number of Non-Explosive Area Support Workers (NXASW) and explosive limits. The assessment will provide a pass/fail result and building operations/limits may need to be revised.

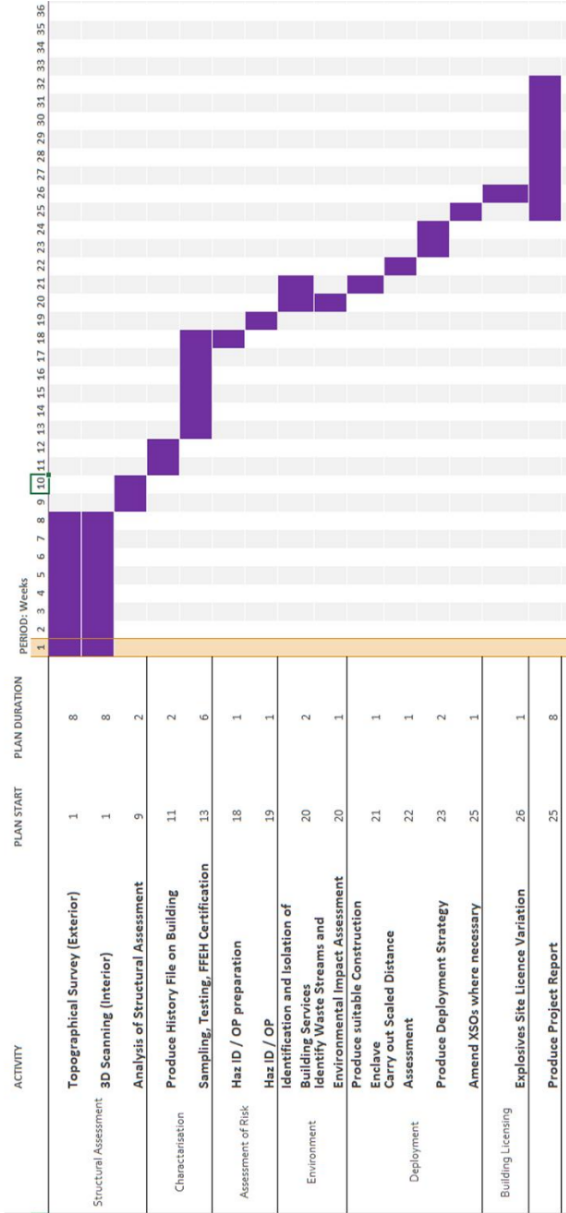
4 Resources and Planning

Access will be required for the following teams' time on this project:

- Topographical Survey Team
- 3D Scanning Team
- FFEH Team
- Environmental Team

Currently there is no requirement for a specific amount of funding to carry out any of the tasks in the project. The tasks identified in the Gantt chart below will be carried out by subject matter experts within AWE, and therefore will only charge man-hours against facility/project task codes. At this moment in time, it is not possible to provide accurate timescales for each activity. These will be quoted upon request. Each task will require its own unique set of physical resources (tooling, equipment etc) however, they will be readily available to the teams within AWE.

4.1 Project Timeline



FFEH – Free From Explosive Hazard XSO – Explosive Safety Order (AWE’s Interpretation of an Explosive Licence Schedule with additional controls)

5 References

- [1] HSE, "Health and Safety at Work Act 1974," in *Section 2 General duties of employers to their employees*, HSE, 1974, pp. 2-3.
- [2] CBI Explosives Industry Group, Management Guidance for the Safe Decommissioning of Explosives Sites, London: Confederation of British Industry, 2003.
- [3] HSE, "The Explosives Regulations 2014," in *Part 9 Safety of Explosives*, Health and Safety Executive, 2014, p. 31.
- [4] Defence Safety Authority, "DSA 03.OME Part 2 (JSP 482)," in *Chapter 6: buildings associated with military explosives*, Defence Safety Authority, 2019.
- [5] Defence Safety Authority, "DSA 03.OME Part 2 (JSP 482)," in *Chapter 18 Work Services, the Control and the Protection of Contractors in Explosives Facilities*, Defence Safety Authority, 2019.

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APPENDIX A - APPLICATION FOR ETHICAL APPROVAL

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically.

The University follows the OECD Frascati manual definition of **research activity**: “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications”. As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the “principal researcher”.

This form must be completed and approved prior to undertaking any research activity.

SECTION A: About You (Principal Researcher)

1	Full Name:	Jordan Hayston
2	Student Number:	1910612
3	Email address:	1910612@student.uwtsd.ac.uk
4	Programme of Study:	Ordnance, Munitions and Explosives Level 6: Safety Professional
5	Director of Studies/Supervisor:	Gareth Collett

SECTION B: Internal and External Ethical Guidance Materials

	Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, location-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines. You may add rows to this table if needed.	
1	UWTSD Research Ethics & Integrity Code of Practice	☒
2	UWTSD Research Data Management Policy	☒
3	AWE plc Code of Ethics	☒

SECTION C: Details of Research Activity

1	Indicative title:	Characterisation and Preparation for the Renovation or Demolition of a Potentially Contaminated Explosives Building		
2	Proposed start date:	15/05/2023	Proposed end date:	21/12/2023

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	Introduction to the Research (maximum 300 words in each section) Ensure that you write for a <u>Non-Specialist Audience</u> when outlining your response to the three points below: • <i>Purpose of Research Activity</i> • <i>Proposed Research Question</i> • <i>Aims of Research Activity</i> • <i>Objectives of Research Activity</i> Demonstrate, briefly, how Existing Research has informed the proposed activity and explain • <i>What the research activity will add to the body of knowledge</i> • <i>How it addresses an area of importance.</i>
3	Purpose of Research Activity The purpose of this research activity is to determine the suitability of a structurally damaged explosives facility, and produce a plan for works to either renovate or demolish it. (this box should expand as you type)
4	Research Question Characterisation and Preparation for the Renovation or Demolition of a Potentially Contaminated Explosives Building (this box should expand as you type)
5	Aims of Research Activity • Determine whether the building can be renovated or requires demolition. • Determine if the building is contaminated or Free From Explosive Hazard (FFEH) (this box should expand as you type)
6	Objectives of Research Activity • Carry out structural assessment of building • Carry out FFEH sampling • Carry out Scaled Distance Deployment Assessment for works on the building (this box should expand as you type)
	Proposed data collection methods (maximum 600 words) Provide a brief summary of all the methods that may be used in the research activity to collect data, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods will be needed. You do not need to justify the methods here but should instead describe how you intend to collect the data necessary for you to complete your project.
7	Structural assessment – topographical survey, 3D scanning, visual inspection

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	FFEH – ground sampling, bore sampling, swab sampling History file on building – research of work files and explosives licence building schedules (this box should expand as you type)
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SECTION D: Scope of Research Activity

	Will the research activity include:	YES	NO
1	Use of a questionnaire or similar research instrument?	☐	☒
2	Use of interviews?	☐	☒
3	Use of focus groups?	☒	☐
4	Use of participant diaries?	☐	☒
5	Use of video or audio recording?	☐	☒
6	Use of computer-generated log files?	☐	☒
7	Participant observation with their knowledge?	☐	☒
8	Participant observation without their knowledge?	☐	☒
9	Access to personal or confidential information without the participants' specific consent?	☐	☒
10	Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒
11	Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
12	Investigation of participants involved in illegal activities?	☐	☒
13	Use of procedures that involve deception?	☐	☒
14	Administration of any substance, agent or placebo?	☐	☒
15	Working with live vertebrate animals?	☐	☒
16	Procedures that may have a negative impact on the environment?	☐	☒
17	Other primary data collection methods. Please indicate the type of data collection method(s) below.		
	Details of any other primary data collection method:	☐	☒
	(this box should expand as you type)		

If you have ticked NO to every question then the research activity is (ethically) low risk and you may skip section E and continue to section F.

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION E: Intended Participants

	Who are the intended participants:		
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		YES	NO
1	Students or staff at the University?	☐	☒
2	Adults (over the age of 18 and competent to give consent)?	☐	☒
3	Vulnerable adults?	☐	☒
4	Children and Young People under the age of 18? (Consent from Parent, Carer or Guardian will be required)	☐	☒
5	Prisoners?	☐	☒
6	Young offenders?	☐	☒
7	Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
8	People engaged in illegal activities?	☐	☒
9	Others. Please indicate the participants below, and specifically any group who may be unable to give consent.	☐	☒
	Details of any other participant groups: N/A <i>(this box should expand as you type)</i>		

	Participant numbers and source Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?	
10	How many participants are expected?	N/A <i>(this box should expand as you type)</i>
11	Who will the participants be?	N/A <i>(this box should expand as you type)</i>
12	How will you identify the participants?	N/A <i>(this box should expand as you type)</i>

	Information for participants:	YES	NO	N/A
13	Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☐	☐	☒
14	Will you tell participants that their participation is voluntary?	☐	☐	☒
15	Will you obtain written consent for participation?	☐	☐	☒
16	Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☐	☐	☒
17	If the research is observational, will you ask participants for their consent to being observed?	☐	☐	☒
18	Will you tell participants that they may withdraw from the research at any time and for any reason?	☐	☐	☒
19	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
20	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☐	☐	☒
21	Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☐	☐	☒
22	If NO to any of above questions, please give an explanation			

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	<i>(this box should expand as you type)</i>
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	Information for participants:	YES	NO	N/A
24	Will participants be paid?	☐	☐	☒
25	Is specialist electrical or other equipment to be used with participants?	☐	☐	☒
26	Are there any financial or other interests to the investigator or University arising from this study?	☐	☐	☒
27	Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☐	☒
28	If YES to any question, please provide full details			
	<i>(this box should expand as you type)</i>			

SECTION F: Anticipated Risks

	Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them.	
	Risks to participants	
1	For example: sector-specific health & safety, emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information. If you have identified in section D that there are no participants, then enter N/A and go skip to question 3.	
	Risk to participants: N/A <i>(this box should expand as you type)</i>	How you will mitigate the risk to participants: N/A <i>(this box should expand as you type)</i>
2	If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities	
	N/A <i>(this box should expand as you type)</i>	
	Risks to the investigator	
3	For example: personal health & safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest	
	Risk to the investigator:	How you will mitigate the risk to the investigator:

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	Structure of building is compromised, risk of falling debris whilst working inside. <i>(this box should expand as you type)</i>	Appropriate PPE to be worn. <i>(this box should expand as you type)</i>
4	University/institutional risks For example: adverse publicity, financial loss, data protection	
	Risk to the University: Work carried out is for a major UK Defence company may bring the risk of adverse publicity for the university. <i>(this box should expand as you type)</i>	How you will mitigate the risk to the University: UWTSD openly delivers the OME course to the explosives industry, and accepts the risks brought with that. <i>(this box should expand as you type)</i>
5	Environmental risks For example: accidental spillage of pollutants, damage to local ecosystems	
	Risk to the environment: N/A <i>(this box should expand as you type)</i>	How you will mitigate the risk to environment: <i>(this box should expand as you type)</i>

SECTION G: Feedback, Consent and Confidentiality

If you have identified in section D that there are no participants then enter skip this section and continue to section H.

1	Feedback What de-briefing and feedback will be provided to participants, how will this be done and when? <i>(this box should expand as you type)</i>
2	Informed consent Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded in accordance with prevailing data protection legislation. <i>(this box should expand as you type)</i>

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3	Confidentiality / Anonymity	Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case.
		<i>(this box should expand as you type)</i>

SECTION H: Data Protection and Storage

	Does the research activity involve personal data (as defined by the General Data Protection Regulation 2016 "GDPR" and the Data Protection Act 2018 "DPA")?	YES	NO
1	<i>"Personal data" means any information relating to an identified or identifiable natural person ('data subject'). An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person. Any video or audio recordings of participants is considered to be personal data.</i>	☐	☒
	If YES, provide a description of the data and explain why this data needs to be collected:		
2	<i>(this box should expand as you type)</i>		
	Does it involve special category data (as defined by the GDPR)?	YES	NO
3	<i>"Special category data" means sensitive personal data consisting of information as to the data subjects' – (a) racial or ethnic origin, (b) political opinions, (c) religious beliefs or other beliefs of a similar nature, (d) membership of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) physical or mental health or condition, (f) sexual life, (g) genetics, (h) biometric data (as used for ID purposes),</i>	☐	☒
	If YES, provide a description of the special category data and explain why this data needs to be collected:		
4	<i>(this box should expand as you type)</i>		

	Will data from the research activity (collected data, drafts of the thesis, or materials for publication) be stored in any of the following ways?	YES	NO
5	Manual files (i.e. in paper form)?	☐	☒
6	University computers?	☐	☒
7	Private company computers?	☒	☐

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8	Home or other personal computers?	☐	☒
9	Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☒	☐
10	"Cloud" storage or websites?	☒	☐
11	Other – specify:	☐	☒
12	For all stored data, explain the measures in place to ensure the security of the data collected, data confidentiality, including details of backup procedures, password protection, encryption, anonymisation and pseudonymisation: Company PCs can only be accessed on site. Company laptops can only be accessed by their owner; they have a private bitlocker that only the owner knows the password for. The company uses onedrive, but it can only be accessed on work computers. <i>All data will be kept in password protected cloud storage on the University Office 365 system which will not be shared. Audio/visual data will be transcribed and would be shown to participants to check accuracy of reporting. Any USB sticks used to store or transfer data will be password protected. All participants will be given a unique identifier to ensure confidentiality and this list will be kept securely in the password protected folder.</i> <i>(this box should expand as you type)</i>		

Data Protection			
	Will the research activity involve any of the following activities:	YES	NO
13	Electronic transfer of data in any form?	☒	☐
14	Sharing of data with others at the University outside of the immediate research team?	☐	☒
15	Sharing of data with other organisations?	☐	☒
16	Export of data outside the UK or importing of data from outside the UK?	☐	☒
17	Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☒	☐
18	Publication of data that might allow identification of individuals?	☐	☒
19	If YES to any question, please provide full details, explaining how this will be conducted in accordance with the GDPR and Data Protection Act (2018) (and/or any international equivalent): Information will be sent via email or MS Teams between people carrying out tasks involved in the project. Said people may be contacted via email or phone. <i>All data will be encrypted and kept in password protected cloud storage on the University Office 365 system which will not be shared. Any USB sticks used to store or transfer data will be password protected. All data transfers will be encrypted and password protected. All participants will be given a unique identifier to ensure confidentiality and this list will be kept securely in the password protected folder. The data will be stored until the completion of the project and then deleted. In accordance with the DPA2018, participants will have the right to ask to see what data is held relating to them, and this data will be deleted immediately if the participant requests this, in which case the data will not be used in the project.</i> <i>(this box should expand as you type)</i>		
20	List all who will have access to the data generated by the research activity: Project lead Supervisor Anyone who may carry out a task to produce data, such as 3D scanning team <i>(this box should expand as you type)</i>		

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21	List who will have control of, and act as custodian(s) for, data generated by the research activity:	
	Project lead Supervisor <i>(this box should expand as you type)</i>	
22	Give details of data storage arrangements, including security measures in place to protect the data, where data will be stored, how long for, and in what form.	
	Electronic documents and data will be stored on private work computers and private work onedrive system for length of project. <i>All data will be encrypted and kept in password protected cloud storage on the University Office 365 system which will not be shared. Any USB sticks used to store or transfer data will be password protected, and will be reformatted at the end of the project in order to destroy the data. The data will be stored until the completion of the project and then deleted.</i> <i>(this box should expand as you type)</i>	
22	Confirm that you have read the UWTSD guidance on data management (see https://www.uwtsd.ac.uk/library/research-data-management/)	☒
23	Confirm that you are aware that you need to keep all data until after your research has completed or the end of your funding	☒

SECTION I: Declaration

The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants. In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice which is published on the website: https://www.uwtsd.ac.uk/research/research-ethics/		
1	Signature of applicant: Jordan Hayston	Date: 29/03/2023
2	Director of Studies/Supervisor:	Date:
3	Signature:	

FOR INTERNAL USE ONLY:

Ethical approval given		
1	Signature of assessor:	Date:
2	Name:	

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3	Role:	
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Characterisation and Preparation for the Renovation or Demolition of a Potentially Contaminated Explosives Building

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

55/100

Intro / Aim & Objectives (150 words) 156		
<i>Project title. Identification of a specific problem to be investigated. Well-defined aims and SMART objectives.</i>	20	8
<i>Explaining why this project is worth doing. Discussion of what the project needs to do to be a success.</i>		
<i>Description of any deliverables that will be produced at the end of the project</i>		
The title is not very clear; should it be: <i>Characterisation and preparation of potentially explosive contaminated buildings for the renovation or demolition?</i>		
The problem to be investigated is very clearly identified but there is no explanation why this project is worth doing		
The aims are stated but the objectives are not SMART		
There is no discussion of what the project needs to do to be successful.		
No deliverables are mentioned in Introduction,		
Background to the Project / Literature Review (450 words) 340		
<i>Description of how the work to be done in the project relates to the work identified in the literature review. Discussion of any ethical issues raised by the project Identifying what has already been done within the field. Topic familiarity. Brief literature review using appropriate sources – 6-8 journal papers and book chapters rather than just websites. Selection of relevant models & concepts.</i>	20	8
Literature is limited to the organizational		

reports; no books nor journal articles The background is more like an introduction. You must find some literature that describes a similar situation and analyse other authors' approaches.		
Project Design (200 words) 228		
<i>Clear statement of which development methods are to be used and why they are appropriate.</i> <i>A clear statement of which tools are to be used and why they are appropriate.</i> <i>A clear description of how data collected will be analysed</i> The selection of methods and tools proposed for this project is described and justified but data analysis is missing	30	20
Resources / Planning (200 words) 118		
<i>List of any deliverables. Clear diagram showing both timing and resource use. Completed ethics form.</i> <i>Limited and relevant appendices</i> No list of deliverables provided The Gantt chart is not easy to follow. It would be useful to include the key milestones. The Ethic Form is included in the submission.	15	9
Document Presentation		
Correct spelling. Grammar and punctuation. The flow of narrative/fluency. Coherence. Word processed. Correct use of referencing with bibliography. Strict word limit for main text – 1000 words.	15	10

Mostly correct spelling and good grammar and punctuation make this project plan fluent and easy to read. Use Grammarly or Editor for further improvement. IEEE referencing format used with confidence. Strict adhesion to the word limit not only for the entire project plan but also for the individual sections Table of content included		
TOTAL	100	55

PAGE 1

PAGE 2

PAGE 3



Comment 1

maybe you could show pictures here?



Comment 2

what would be the risk of reusing contaminated building?

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13

PAGE 14

PAGE 15

PAGE 16
