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Technical Note

Project:	Daedalus Park Site, UXO Status		
To:	Homes and Communities Agency	**From:**	Campbell Reith Hill LLP
Cc:		**Reviewed:**	
File Ref:	**Pages:**	**Date:**	31/10/14
Subject:	UXO status of Daedalus Park Site		
Figures:	Figure 1: Site Location Plan		
	Figure 2: Recorded pipemine locations 1986		
	Figure 3: Recorded pipemine discovery and removal 1990		
Appendixes :	Entec desk study excerpt (2005), Email correspondence with DIO-EOC, Fellows International Review Letter (2012), HMS Deadalus Phase One Explosives Ordnance Risk Assessment ESG/05/047/F, HMS Daedalus Phase II & III Explosives Ordnance Risk Assessment ESG/06/047/F.		

Introduction

Detailed within this technical note is a summary of the historical surveys, intrusive work and clearance work relating to the Unexploded Ordnance (UXO) of the Daedalus Park Site, located to the east of the Waterfront (Figure 1).

Background

HMS Daedalus was a highly active Royal Naval Airbase and a legitimate target for air dropped ordnance during WWII. Other potential UXO sources include munitions storage and practice activities. In addition it has been reported that the base was historically used as a training facility for dropping practice bombs. Previously encountered munitions on airfield site include buried practice bombs, and buried airfield denial pipe mines.

Summary of Previous Surveys

Title	Issue date	Report type	Reference
HMS Daedalus Desk Study Land Quality Statement, WSP dws project number N1/05002.	May 1995	Desk study	(1)
HMS Daedalus, Land Quality Assessment, Phase One: Desk Study, Entec, DE project number 05002. (Draft report)	May 2005	Desk study	(2)
HMS Daedalus Phase One, Explosive Ordnance Risk Assessment, ESG-DLO, report number ESG/05/041/F	December 2005	Desk study	(3)
HMS Daedalus Phase II & III, Explosive Ordnance Risk Assessment, ESG-DLO, report number ESG/06/047/F	January 2007	Phase II & III	(4)
10756 Daedalus, Lee on the Solent – DLO Risk Assessment Document, Fellows International Limited.	March 2012	Review Letter	(5)

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Entec Phase 1 Desk Study (2005)[2]

The Entec Land Quality Assessment Phase One report provides a detailed history of UXO clearance works across the Daedalus site. It notes the installation of airfield denial pipe mines during WWII, their alleged full removal in 1947 before the discovery of a pipe mine in 1984, and further pipe mine discoveries in 1990 and 1996. Considering this, all UXO certificates associated with the site were withdrawn in 2004 by the Defence Logistics Organisation (DLO), now referred to as the Defence Infrastructure Organisation - Explosive Ordnance Clearance (DIO-EOC), over concerns about their completeness.

The desk study noted a bombing raid located to the south east of the Waterfront Zone on 16th August 1940, the area affected by the air raid is sketched close to the border of the Daedalus Park Site.

ESG – DLO Phase One Explosive Ordnance Risk Assessment, 2005[3]

The DLO commissioned an Explosive Ordnance Risk Assessment Phase One Desk Study in 2005 to document the relevant historical uses across the larger Daedalus site including, WWII bombing raids, pipe mine construction and mapped pipe mine locations. In regard to the Daedalus site the report concluded that the research had shown "little evidence of explosive contamination on the site, with the exception of a potential risk presented by airfield denial pipe mines laid during WWII". In relation to pipe mines, areas outside of the perimeter track including the Daedalus Park Site were considered **Very Low Risk**, and no further work was recommended or subsequently conducted.

The original location of airfield denial pipemines are noted on a plan dated 1986 (Figure 2). Additionally, pipemines previously located and cleared are noted on a plan dated 14th February 1990 (Figure 3). A number of pipemines were located along 'Line A' during this phase of clearance works, part of which is understood to have protruded onto the Daedalus Park Site.. The area of the Daedalus Park Site was not fully investigated for pipemines during this phase.

ESG – DLO Phase II & III Explosive Ordnance Risk Assessment, 2007[4]

The Phase II & III Explosive Ordnance Risk Assessment report provides details of the ferrous metal subsurface scan conducted across the airfield inside the perimeter track (but included small areas outside the perimeter track). Various pipe mines were located and removed from the airfield which was subsequently considered to result in a 'very low' risk of UXO in the area. During this phase of works various pipemines were encountered notably at locations 15 and 27 along Line A (see Figure 2). A small area of hardstanding outside Building 389 (covering pipemine locations 1 -5 on Line A) in the western part of the Daedalus Park Site was not effectively scanned, which was concluded as a **Low** risk of UXO occurrence in that area. This low risk assessment indicates that ordnance may be present but the receptor is insensitive to the source. As a result of redevelopment and removal of hardstanding, this risk assessment is considered likely to change.

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Further investigation into the history of the hardstanding area concluded that the concrete was first laid between 1954 and 1958. This suggests that it was possible for pipemines to have been laid during WWII, and that that it would have been possible for them to have been removed during the post WWII clearance works in 1947. The further investigation did not discover evidence to suggest that the area had been investigated during clearance works since concrete was laid.

It should be noted that the conclusions reached by the DLO reports are risk assessments only, and the assessments made do not constitute Explosive Free Certification which would identify the depth of clearance and any risk zones outstanding.

Consultation with DIO – EOD, 2014

The DIO-EOC have been consulted by CampbellReith on the subject of the withdrawal of the clearance certificates in 2004, to ascertain the nature of the concerns that led to the withdrawal of the 'Explosives Free Certificates' and to establish what future works would be necessary to reduce the risk to the site during redevelopment. This correspondence is appended to this technical note.

There were no historical certificates relating to the Daedalus Park Site.

Fellows International Limited (FIL) Review of available information, 2012

A critical review of the DLO Phase I, II & III reports was conducted by (FIL). The letter cited concerns over the scanning technique employed during previous works and the area covered. Notably the bulk of the Daedalus Park Site was outside of the area which was subject to non-intrusive and intrusive survey.

It was concluded that in the professional opinion of FIL, that a **'level of risk still exists on the HMS Daedalus, Lee-on-the Solent site from unexploded ordnance '** and that the site was not suitable for, or safe from, explosive hazard as a commercial redevelopment, notwithstanding residential developments without appropriate UXO clearance measures.

FIL have subsequently provided munitions contamination surveys for various site investigations, clearing areas for trial pits and downhole clearance for boreholes on the airfield, DIO site, East Junction and West Junction in addition to the recent archaeological trenching works and Phase II & III surveys of areas within Hangars West where allotments and public open spaces are proposed.

Conclusions and Recommendations

The Daedalus site has been subject to various historical searches and reports relating to the UXO status of the site. No valid Explosives Free Certificates exist for the Daedalus Park Site.

The area of Lee on Solent was a legitimate target during WWII therefore there is a residual risk of air dropped UXO in the area.

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Land which has undergone post WWII development can be assumed to be UXO free to the base of the foundations.

There is a theoretical risk of UXO beneath buildings constructed pre WWII. Air dropped munitions can enter the ground and pass through the ground until an impenetrable layer is reached. At this point the bomb may slow and show 'J' curve behaviour, or move horizontally. Based upon this UXO specialists consider there to be a theoretical risk of UXO beneath all buildings present during WWII.

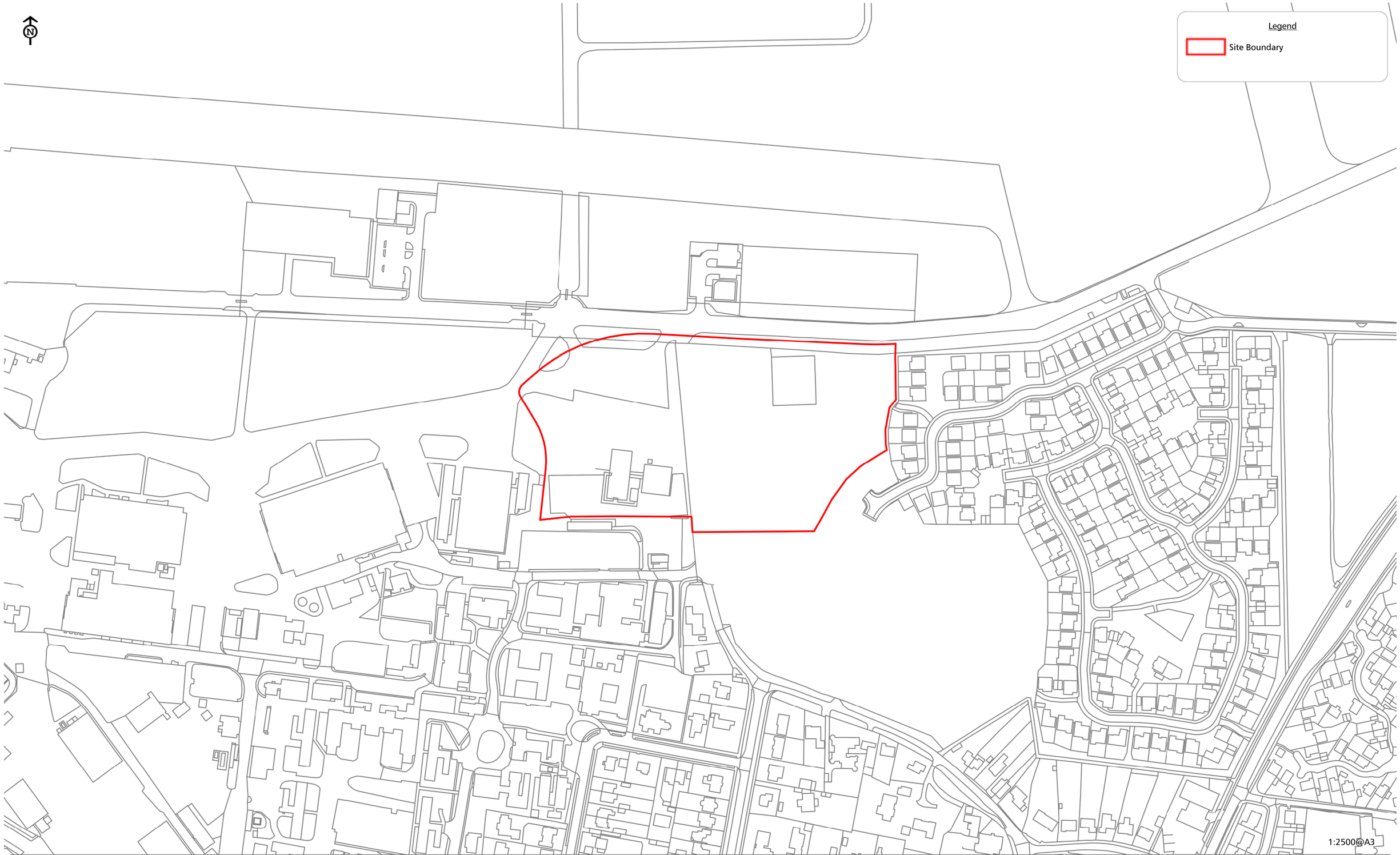
The presence of hardstanding during WWII will have reduced the chances of air dropped munitions entering the ground undetected, and will reduce the distance munitions would travel beneath the ground.

The pipemine locations (Figure 2) show a segment of pipemine Line A passing beneath the hardstanding area to the west of the Daedalus Park Site. This area has not been effectively scanned or intrusively investigated and therefore there is a risk of pipemines to be present.

Areas of the Daedalus Park Site which are not beneath buildings or hardstanding may be non-intrusively surveyed for UXO, which can provide sites with an 'Explosives Free Certificate'.

In the first instance subsurface scanning is conducted using both ferrous and non-ferrous metal detectors. The analysis of this data can be conducted by specialist bomb location software which identifies locations of 'anomalous' readings. These anomalous readings (if encountered) require intrusive investigation to characterise the nature of the anomaly, whether it be UXO or other subsurface contamination. Alternatively, it may be more cost effective to provide a UXO engineer to supervise any intrusive groundworks within the previously identified 'anomalous' areas.

Sites with significant physical obstructions or thick concrete slabs (similar to the concrete outside building 389) cannot be cleared in this way and either require the removal of the obstruction to allow a UXO subsurface clearance scan to be undertaken, or a watching brief would be required during groundworks when the site is brought forward for redevelopment.



Daedalus

Client: Homes & Communites Agency

Figure 1:
Daedalus Park Site Location

Scale: 1:2500@A3
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Contains Ordnance Survey data © Crown copyright and database right 2014
Job Number: 11575
Drawn by - Checked by: RC - DM
Drg No - Status/Revision: GIS068 - A
File location: O:\11500 - 11749\11575 R - Daedalus III\Workspaces \ (pdf in Outputs)
Date (Revision History): 30/10/2014 (A, First Issue, 30/10/14, RC)

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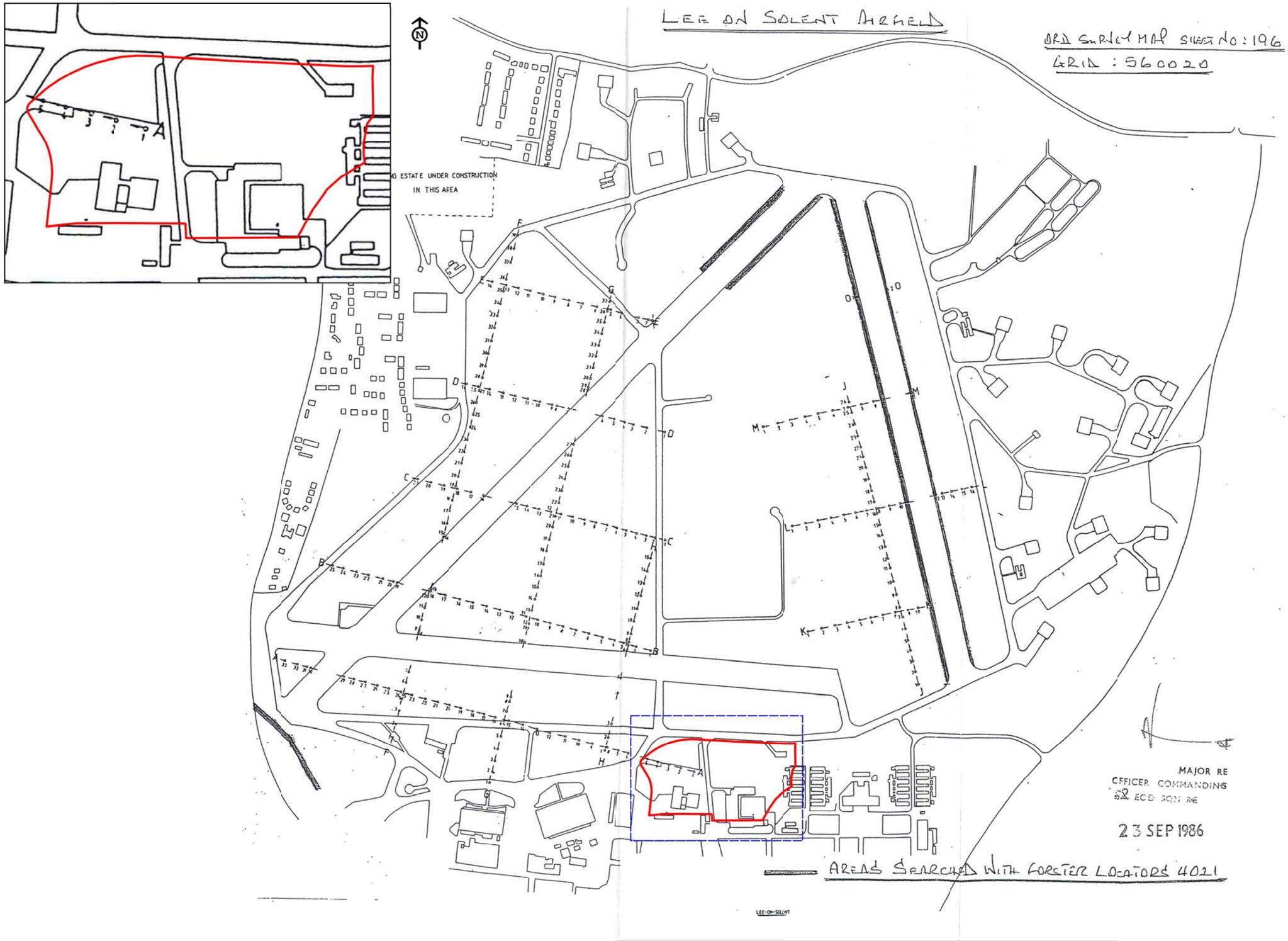

Not to Scale

Daedalus

Client: Homes & Communites Agency

Figure 2:
Recorded pipemine locations 1986

Scale: Not to scale
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Image extracted from: HMS Daedalus, Land Quality Assessment, Phase One: Desk Study, Entec, DE project number 05002. (Draft report), 18 May 2005.
Job Number:
Drawn by - Checked by: R
Drg No - Status/Revision: G
File location: C
Date (Revision History):

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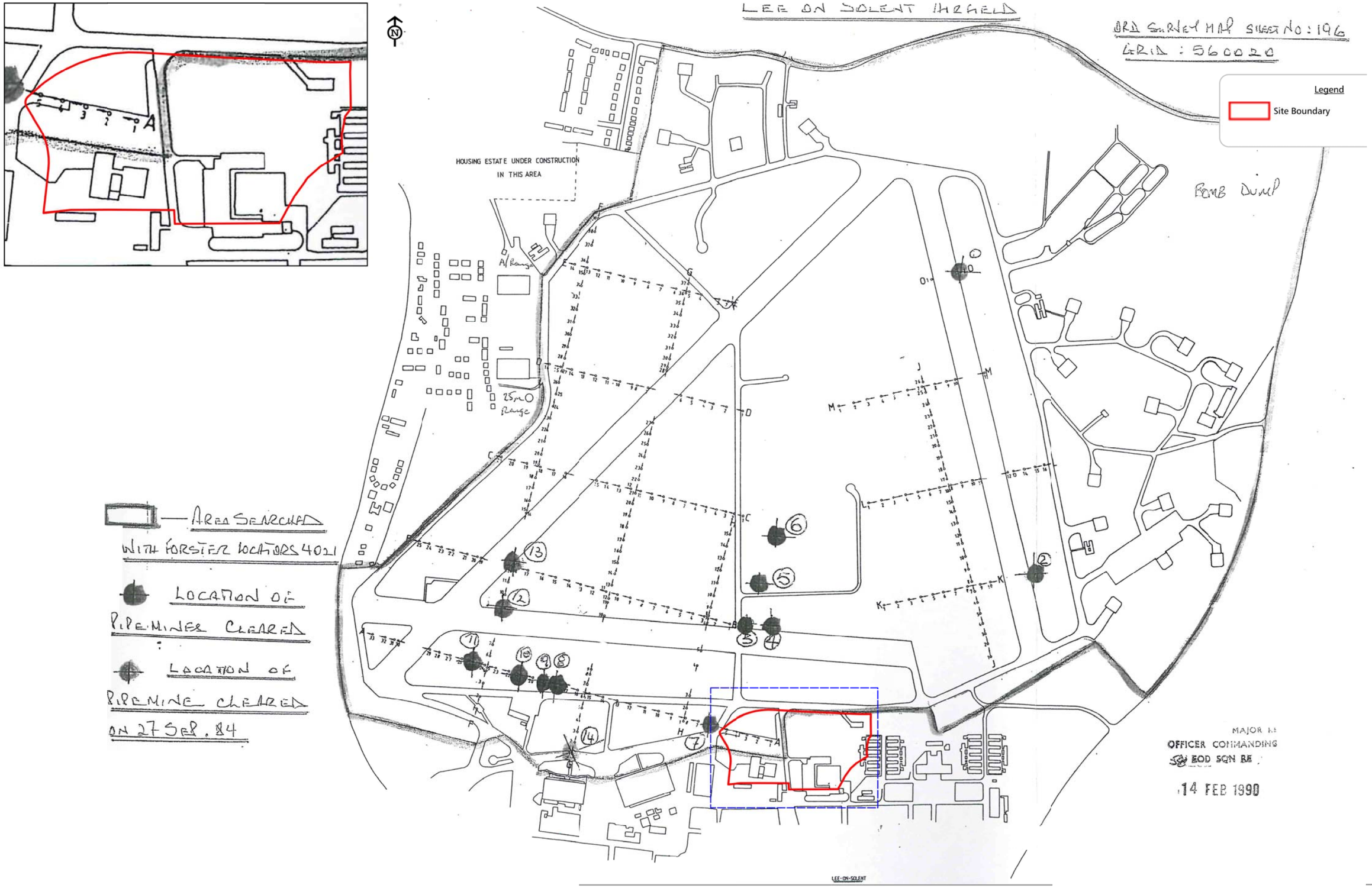

Not to Scale

Daedalus

Client: Homes & Communites Agency

Figure 3:
Recorded pipemine discovery and removal 1990

Scale: Not to scale
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Image extracted from: HMS Daedalus, Land Quality Assessment, Phase One: Desk Study, Entec, DE project number 05002. (Draft report), 18 May 2005.
Job Number:
Drawn by - Checked by: R
Drg No - Status/Revision: G
File location: C
Date (Revision History):

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Excerpt from the Entec Land Quality Assessment, Phase 1 (2005)

Historical aerial photographs indicate that there are areas within the site where disturbance of the ground has taken place, potentially resulting from disposal of waste materials. Notable locations include the following:

- Area within southeast corner of site adjacent to Building 221 (close to former incinerator);
- Localised areas of rubble deposition in NE of airfield (former ammunition storage area).

3.2.6 Asbestos Containing Materials

There are asbestos containing materials (ACMs) present at the site. An Asbestos Register has been compiled previously for the site (EWC, 1992), which identified ACMs at a large number of locations. The asbestos comprised predominantly white asbestos (chrysotile) in a variety of materials comprising roof sheets, eaves, gutters and rainwater pipes.

3.2.7 Explosive Ordnance/Residues

Historical site plans indicate that there were a number of buildings where there are potential ordnance issues. A plan of the site dated 1965 is included in Appendix B. Buildings with potential ordnance issues are summarised in Table 3.3.

Table 3.3 Buildings with Potential Ordnance Issues

Building No	Use
3	Held pyrotechnics for life rafts
6 & 7	Explosive Store
8	Explosive Store
14	Diving Store-Held Thunderflashes
15	Fire station ready use locker- held gas generators
16	Police tower –Held Pyrotechnics
18, 20 & 21	Explosive Store
73- Dunning Hangar	Bombed in WW2
87	Armoury Store- Held pyrotechnics
132	Held small arms ammunition
153, 154 & 155	Special Squadrons-held explosives
161	Small Arms Range
165	Naval Air Station classrooms- held pyrotechnics
313-319	Explosive Store
349	Pistol Range
363	303 Range
364	Firing Point for 303 Range

The use or storage of explosive ordnance at a location does not necessarily mean that these materials remain at the location or have been lost or disposed to ground.

There are a series of ordnance clearance and associated reports for the site. A summary of the clearance work conducted is presented below:

Table 3.4 Summary of Ordnance Clearance and Related Activities

Date	Location	Activity
1939-1943	Airfield	Pipemines Installed across airfield, 13 330 feet of pipe, 23 957lbs of Polar Blasting Gelatine. Array incomplete.
1947	Airfield	Clearance for Southern Command, full area searched, negative results, not all pipes found.
1984	South of Swann Hangar G1	Pipemine G1 recovered.
1985	Airfield	Clearance of selected areas adjacent to runways - Nil finds.
1986	North & East of Airfield	Clearance of Areas for Telegraph Poles (343, 344, 345).
		Area for fire fighting tanks (adjacent to 292, 332) - Nil finds.
1987	Entire Airfield	Clearance - Nil finds.
1990	Entire Airfield	Clearance Certificate for period 1984 to 89, 14 pipemines encountered- G1 detonated, and 13 excavated October 89.
1994		Clearance - Nil finds.
1996	Site 1 - Magazines 18 & 20 Site 2 - Ground Defence Exercise Area Site 3 Blg 162 Site 4 - Slipway Site 5 Fieldgun Training Area Site 6 - Around Dunning Hangar & 15 other buildings	Clearance - 13 fired bases found.

A summary of ordnance clearance activity is illustrated on Figure 5. There are no records of abandoned bombs at the site (33 Engineer Regiment correspondence, 8 October 2004). The explosive ordnance clearances and certification for this site has been reviewed by the Defence Logistics Organisation Ordnance Group in a desk study, which is ongoing and for which the report has not been available for review. All clearance certificates and risk assessments have been withdrawn from the site as DLO has concerns over their completeness, accuracy, and whether they are applicable for site disposal purposes. A new clearance review is underway (May 2005). Pipe mine plans for the site from 1943 are incomplete in two respects. Firstly, pipe mines have been located in areas not marked as mined; this may be mapping errors. Secondly, there are no mines marked on the northern most part of the airfield; this has been interpreted by DLO as indicating cancellation of the mining programme when the wartime invasion threat had receded.

3.2.8 Radioactive Materials

Historical site operations have been identified that have the potential to cause radioactive contamination.

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Email correspondence between CampbellReith and the Defence Infrastructure Organisation Explosive Ordnance Clearance (DIO-EOC).

20140729-EOC Risk Assessments - HMS Daedalus
DIO ODC-IPS EOC Offr(Swarbrick, Keith)
05/08/2014 14:07
To:
DIO ODC-LMS HMNB3 (Greaves, Philip Mr), DickenMaclean
Hide Details
From: "DIO ODC-IPS EOC Offr(Swarbrick, Keith)" <DIOODC-IPSEOCOffr@mod.uk>
To: "DIO ODC-LMS HMNB3 (Greaves, Philip Mr)" <DIOODC-LMSHMNB3@mod.uk>,
<DickenMaclean@campbellreith.com>

0 Attachment

image001.gif

Gentlemen

To clarify:

The DLO has since become Defence Equipment & Support (DE&S) and our group transferred to Defence Infrastructure Organisation (DIO), now known as DIO-EOC. The group now focuses on ordnance contamination and no longer deals with general land quality issues.

I was heavily involved in this issue at the time and can probably answer most of your questions on the subject.

1. The 2005 Entec report states that all clearance certificate were withdrawn due to DLO concerns. This is true (I withdrew them), however the reason for withdrawal was not explained in the Entec report. The certificates were withdrawn solely because of doubt as to the effectiveness of the search for WWII pipe mines. Extensive geophysical survey and intrusive investigations were conducted in 2006 and all identified mines were extracted.

2. The area of concern with regard to pipe mines is mainly outside of the proposed development area, however an area to the north of the proposed 'Waterfront Commercial' and the east side of 'Hangers West' does overlap. See ESG Phase II/III report for more details.

3. We have not issued clearance certificates since around 2004 as they implied an area was 100% clear of ordnance. The subsequent EORA was intended to give a full and open account of what research and clearance work had been undertaken and why, it also assessed the remaining levels of risk. Latterly we have refined the EORA inline with Construction Industry Guidance C681 – UXO A guide for the construction industry. The current ESG reports should provide sufficient information for the compilation of a detailed risk assessment as defined by C681.

4. UXO history is detailed in an earlier DLO-ESG report (ESG/05//041/F Dec 2007 Explosive Ordnance Risk Assessment – Phase I). I don't have an electronic copy of this available at the moment however please see the extracts below:

CONCLUSIONS
The aim of the explosive ordnance assessment Phase one desk study has been to identify and assess the risk from possible ordnance contamination to present and future site users at HMS Daedalus.

ESG has recognised that the redevelopment and future use of the site remains fluid, and with this in mind, proposes that the airfield site be regarded in two areas.

The first area, consisting of the technical area, accommodation area, hangars and grounds surrounding the perimeter track, are assessed as Very Low.

The second area, consisting of the runways and land contained within the perimeter track, is assessed as Medium. Recommendations are made in Section 6 for mitigating the risk. Implementation of these measures should result in a very low risk rating.

The risk posed by unexploded wartime bombs to estate management teams, contractors and other personnel involved in future excavations is assessed as Very Low. However it should be noted that the whole of the Gosport area was regarded as a legitimate military target and the possible presence of air dropped munitions still exists in the area. In this regard the risks associated with the site are judged to be no higher than the surrounding area.
Please advise any contractors that if for any reason they suspect they have come across an explosive ordnance item, to contact the local civilian police.

The risk to flora and fauna, buildings, services and controlled waters has been assessed as Very Low (see Annex K Explosive Ordnance Risk Assessment areas).

RECOMMENDATIONS

Based on the findings of the desk study and geophysical survey, and having carried out the preliminary risk assessment, the following recommendations are made for HMS Deadalus:

The explosive ordnance risk assessment study has found little evidence of explosive ordnance contamination on the technical and accommodation areas, hangars and the grounds surrounding the perimeter track. This also extends to the area known as Site 6 currently under development and subject to an earlier search (ref letter DLO/DSES/150/8/052 Annex J). In this respect no further actions are required in these areas.

In response to the potential presence of pipe mines, and further to the full instrumental survey carried out by ESG using the towed array detection system, it is recommended that selected objects identified by ESG as being of a possible explosive ordnance nature, should be extracted and examined (Phase 2 Extractions). This intrusive investigation work can be coordinated and carried out by ESG, with service support when necessary.

Please feel free to contract me for any further advice.

Regards,

Keith Swarbrick

Defence Infrastructure Organisation

Explosive Ordnance Clearance

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From: DIO ODC-LMS HMNB3 (Greaves, Philip Mr)
Sent: 29 July 2014 10:49
To: DIO ODC-IPS EOC Offr(Swarbrick, Keith)
Subject: 20140729-EOC Risk Assessments - HMS Daedalus

Hi Keith,

A number of years have passed since we were involved with the Daedalus project – I trust you are well.

Grateful if you could cast your eyes over the chain of e-mails below – Campbell Reith are working on behalf of the Homes & Communities Agency, the current owners of the Daedalus site (less the airfield). They are enquiring about EOC Risk Assessments affecting the three areas edged red on the attached plan. Following the last report prepared by Adrian P (ESG/06/047/F – Jan 2007), are you please able to confirm risk from ordnance within these areas is assessed as very low. There are no questions in respect of the 2007 report, they are just seeking clarification on whether the assertion made by Entec (second attachment) is correct, or whether this purely related to the airfield site?

Please call if any of this does not make sense!

Many thanks.

Kind regards,

Phil Greaves

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Land Management Services|
Defence Infrastructure Organisation|
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Website:www.mod.uk/dio/

From: DickenMaclean@campbellreith.com [mailto:DickenMaclean@campbellreith.com]
Sent: 29 July 2014 10:16
To: DIO ODC-LMS HMNB3 (Greaves, Philip Mr)
Subject: Re: Query on works conducted on HMS Daedalus

Hi Phil

We are undertaking a variety of different works in different areas of Daedalus, so actually it would be helpful if you could clarify the status of hangars west, waterfront and the northern part of hangars east as shown on the figure attached,

Kind regards

Dicken Maclean
Environmental Scientist

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From: "DIO ODC-LMS HMNB3 (Greaves, Philip Mr)" <DIOODC-LMSHMNB3@mod.uk>
To: <DickenMaclean@campbellreith.com>
Date: 29/07/2014 09:08
Subject: Query on works conducted on HMS Daedalus

Dicken,

Could you please forward me a plan showing all of the areas you wish me to investigate? I will then go to the Explosives Team for clarification.

KR

Phil Greaves

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Land Management Services|
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Mob:07990 790412|Fax: 023 92 722724|
Email:philip.greaves682@mod.uk
Website:www.mod.uk/dio/

From: DickenMaclean@campbellreith.com [mailto:DickenMaclean@campbellreith.com]
Sent: 28 July 2014 12:21
To: DIO ODC-LMS HMNB3 (Greaves, Philip Mr)
Subject: Re: Query on works conducted on HMS Daedalus

Thanks for sending that through, presumably comment 3. 'on behalf of the Ministry of Defence please inform the interested parties that search of the area is completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.' would suggest that we can't rely upon the findings?

That aside, I am interested in finding some backing behind the statement by the Entec report suggesting that all previous certificates had been withdrawn by the DLO, which i guess might be yourselves? Do you have any records of this?

Kind regards

Dicken Maclean
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From: "DIO ODC-LMS HMNB3 (Greaves, Philip Mr)" <DIOODC-LMSHMNB3@mod.uk>
To: <DickenMaclean@campbellreith.com>
Date: 28/07/2014 11:18
Subject: Query on works conducted on HMS Daedalus

Dicken,

I've managed to dig out all the previous clearance certificates issued – too much paperwork to scan and forward. As I mentioned in our conversation, the EO Risk Assessment only makes an assessment of the likely probability of ordnance being located in the searched areas – in this case, either very low or low. No guarantee can be given that the site is 100% clear of ordnance.

I attach one copy of a survey carried out in September 86, which I hope covers the area you are particularly interested in – if so, please confirm. I will then seek comment from the Explosives Team to ascertain the associated risk.

Kind regards,

Phil Greaves

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From: DickenMaclean@campbellreith.com [mailto:DickenMaclean@campbellreith.com]
Sent: 28 July 2014 09:55
To: DIO ODC-LMS HMNB3 (Greaves, Philip Mr)
Subject: Re: Query on works conducted on HMS Daedalus

Hi Phil

Thanks for your help on Friday.

I was wondering however if you could help me with another query.

I appreciate that the 2005 desk study report deems the outer area 'very low risk', however before our client passes on sections of the site, we need those areas to have explosives free certificates. I am aware that portions of the site have previously been cleared, however in a report written by Entec in 2005, noted that the DLO withdrew 'all clearance certificates and risk assessments'. Does that suggest that any details of areas cleared before 2005 should be deemed not to have been cleared? Specifically I am interested in the areas in hangars west cleared for telegraph poles in 1987.

Attached is a scan of the page of report i am referring to.

If you could shed any light on the matter that would be great.

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Environmental Scientist

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From: "DIO ODC-LMS HMNB3 (Greaves, Philip Mr)" <DIOODC-LMSHMNB3@mod.uk>
To: <DickenMaclean@campbellreith.com>
Date: 25/07/2014 10:49
Subject: Query on works conducted on HMS Daedalus

Hi Dicken,

I have in my possession a hard copy of the report, however, somewhat surprised at the request as this information has been provided on previous occasions. Happy to forward a further copy, but you may first wish to contact the Site Manager at Daedalus – Peter Seidenstucker – who should already have access to the information you require.

Kind regards,

Phil Greaves

Phil Greaves|Senior Estate Surveyor|
Land Management Services|
Defence Infrastructure Organisation|
Building 1/150 (PP19D)|Murrays Lane|
HM Naval Base|Portsmouth|Hampshire|PO1 3NH|
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Website:www.mod.uk/dio/

From: DIO ODC-LMS HMNB1 (Ogden-Haigh, Frances Mrs)
Sent: 24 July 2014 12:50
To: DIO ODC-LMS HMNB3 (Greaves, Philip Mr)
Subject: FW: Query on works conducted on HMS Daedalus

Phil

This looks like something you'll know a lot more about than me.

Frances Ogden-Haigh | Senior Estates Surveyor | Land Management Services|
| Defence Infrastructure Organisation |
1/150 Murrays Lane (PP19D) | HMNB Portsmouth | PO1 3NH
Civ: 023 9272 8624 | Mil: 9380 28624 | Fax: 023 9272 2724
Email: DIOODC-LMSHMNB1@mod.uk Website: www.mod.uk/dio/

From: DickenMaclean@campbellreith.com [mailto:DickenMaclean@campbellreith.com]
Sent: 24 July 2014 12:47
To: DIO ODC-LMS HMNB1 (Ogden-Haigh, Frances Mrs)
Subject: Query on works conducted on HMS Daedalus

Hello

I have been trying to get in contact with somebody from the DLO, which i understand no longer exists.

My enquiry relates to HMS Daedalus, and a report produced by the DLO and ESG (Environmental Science Group).

The report title is 'HMS Daedalus, Phase II & III Explosive Ordinance Risk Assessment, Reference: ESG/06/047/F, January 2007.

I was wondering if my query could be passed onto somebody who might be able to provide further details on the above report, and

also the UXO history of the site.

We are working on behalf of the Homes and Communities Agency, and are looking to find further details of the UXO status of the site for investigative works.

If somebody could get in touch with me by phone 01737784500 or by email that would be great.

Many thanks.

Dicken Maclean
Environmental Scientist

CampbellReith
consulting engineers

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[attachment "20140728 Lee-on-Solent Airfield.pdf" deleted by Dicken Maclean/CRH]

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CampbellReith
consulting engineers

Fellows International Limited, 10756 Daedalus, Lee on the Solent – DLO Risk Assessment Document, March 2012.

Fellows International Limited

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CAMPBELL REITH HILL LLP
Redhill

SLG	GC		DPMI
MFA	AGP	AD	SRB
LR	AKF	JB	TB

Job No.

Rec'd 13 APR 2012

Action:

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Letter		
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Fax		
Telephone		
Copied		

Campbell Reith Hill LLP
29 Linkfield Lane
Redhill
Surrey
RH1 1SS

For the attention of Tristan Tucker

FIL Ref: 1.5/964-12

12th April 2012

Dear Sirs

Daedalus Airfield

Further to the reference, enclosed herewith our Report of Proceedings (2 copies) on the Munitions Contamination Survey of Ground Investigation Locations recently conducted at the above-mentioned site, along with our invoice for this service.

Fellows International Limited appreciates the opportunity to have conducted this work. By virtue of our previous and current experience with munitions contamination and remediation services to major UK and International Companies, we are confident that it will meet the requirements totally to your satisfaction.

If any aspect of the report requires clarification, please do not hesitate to contact us.

Yours faithfully

Colin A Kidman. QGM.MSM.MIExpE
Operations Director

Fellows International Limited

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Fao: Rhyadd Watkins.

26th March 2012

Dear Sirs,

10756 Daedalus, Lee on the Solent – DLO Risk assessment Document.

1. Introduction.

Campbell Reith has commissioned Fellows International Limited to review the Environmental Science Group (ESG) of the Defence Logistics Organisation (DLO) Explosive Ordnance Risk Assessment of the old Royal Naval Air Station, HMS Daedalus, site at Lee on the Solent Hampshire.

1.1 Fellows International Limited (FIL) is recognised as one of the leading international companies specialising in the underwater and surface location and subsequent removal of unexploded ordnance from war-affected areas worldwide. (www.fellowsint.com).

1.2 With over five decades of 'hands-on' international experience in the munitions location and disposal disciplines, Fellows International Limited has built up a reputation for reliability, whatever the explosive hazard. In recognition of its commitment to quality the company was awarded the first ISO 900-2008 accreditation for bomb and mine disposal and is recognition by the United Nations, UK Ministry of Defence and NATO Maintenance and Supply Organisation.

1.3 The Lee on the Solent area was affected by German military action in the Second World War. In accordance with statistics gained through historic war records and research an average of 10% of all German bombs and 35% of incendiary devices dropped during the war malfunctioned and lay buried, unexploded in the ground.

1.4 Conducting a munitions contamination ground survey of the site employing electromagnetic monitoring devices capable of locating both ferrous and non-ferrous metals will locate individual targets and zones of risk that require further exploitation before any future intrusive engineering operations on site.

1.5 Following your request we are pleased to provide you with our assessment of the DLO document:

2. Executive Summary.

The executive summary states that a desk study was conducted and concluded that there was little evidence of explosive contamination on the site with exception of potential risk presented by airfield denial pipe mines. However a survey discovered 8 air dropped British practice bombs alongside the Airfield tower and a number of 10lb "expended bombs" on the site.

2.1 The focus of the survey seemed to be a relatively shallow magnetometer and radar survey for pipe mines with little or no consideration given for any deeper buried air dropped bombs, defensive shells and rockets.

2.2 FIL do not consider the risk associated with 10lb Practice Bombs to be "very low" as the majority of these, and the one illustrated in the DLO report at Annex H, contain a volatile phosphorous filling that can cause serious traumatic reaction on contact with exposed human body tissue and fire if in contact with combustible materials.

3. ESG - DLO Tasking. (Report No ESG/06/047/F)

The detection technology employed by DLO was magnetometry and ground penetration radar. Radar is not very effective below a 2m depth and the magnetometry will not detect any non-ferrous targets.

3.1 The depth of DLO instrument survey is not recorded anywhere in the report. National borehole statistics show that the impenetrable geological layer for a 50kg air dropped bomb in the area could be between 4 to 5m depth.

3.2 It would appear from the work description that the survey was conducted to investigate the presence of pipe mines at relatively shallow depths. Deeper buried ferrous and non-ferrous weapons could have been missed.

3.3 The main DLO Assessment Objective (Report No ESG/06/047/F Section 1.3 Page 1) was to "Determine the extent and quantity of the pipe mines within the airfield" etc. That indicates that a deeper survey for unexploded ordnance from defensive and enemy action was not undertaken – or – was only conducted to a shallow depth for ferrous weapons. Radar has a depth limitation of about 2m.

4. The DLO Explosive Ordnance Risk Assessment.

The |DLO document is an explosive ordnance risk assessment and is not, in our opinion, considered an "Explosive Free Certificate" in the format normally accepted by the UK-CIRIA C681 Guidelines or UN-IMAS (EOD) requirements giving the area cleared, depth of clearance and any risk zones remaining.

4.1 The DLO document states, "the risk from WW2 pipe mines and practice bombs is now assessed as very low". It does not cover German air dropped munitions or British defensive AA weapons.

4.2 We consider the area below the concrete hard standing outside of Building 389 to be at risk from possible explosive contamination. Technology is not yet available to investigate below the noise level of the steel reinforced concrete and procedures must be put in place to safeguard personnel if intrusive ground work is conducted in this area.

5. DLO Recommendations.

DLO state, "the site is suited for commercial development or more general use ---------- with the exception of the area covered by concrete north and adjacent to Building 398".

5.1 As the following have not been determined; or are not evident from the report; we do not consider the site suited, or safe from explosive hazard, for commercial development.

- The depth of target investigation over the whole site.
- The areas of the site not surveyed.
- The presence of any non-ferrous targets identified.
- The scope of works or depth of intrusive ground engineering operations for any intended development.

5.2 The DLO does state that the airfield came under enemy air raids and potential ordnance contamination from unrecorded wartime burials could exit. They advise care to be exercised and in the event of suspect items being discovered during any excavation works for the Police to be contacted. It does not make recommendations to remediate or remove the risk.. As a minimum an accredited EOD Engineer should conduct a munitions awareness briefing before any intrusive ground works commences.

6. FIL Conclusions.

Fellows International Ltd use a quantitative method of estimating the probability of encountering unexploded German air dropped munitions, taking into account bombing intensity, the extent of intrusive activity and other factors.

6.1 The first step is always to determine whether there is site-specific evidence that UXO exists at the site such as officially abandoned bombs. Then the likelihood of

undiscovered UXO remaining after WW11 is calculated and the likelihood of encountering UXO is determined by considering the extent of intrusive ground engineering activity associated with the project.

6.2 The intrusive or no-intrusive technology chosen for locating weapons is then determined by the depth of the impenetrable geological layer for an air dropped weapon on the specific site. FIL always employ detection equipment with specialist PC software capable of locating both ferrous and non-ferrous weapons on all UK sites.

6.3 The activities of the Home Guard and anti-aircraft defences has led to a general risk of uncovering unexploded ordnance during construction activities, particularly in the south of England. These are normally in the form of glass incendiary bombs housed in a wooded crate with, fortunately, a detectable metal identification plate on the lid.

6.4 There is no relevant industry good practice or guidance that dictates whether or not to take measures to minimise the risks associated with German air-dropped weapons on construction sites where there is no specific evidence of it being present.

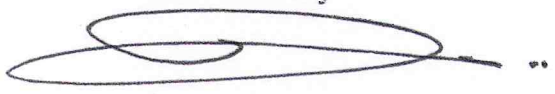
6.5 In the absence of such guidelines we have developed an approach to risk mitigation based on our unique experience of common practice in the industry and, more importantly, what could be considered 'reasonable practice' with reference to Part 1 of the Health and safety at Work Act 1974, s2 (1) and s3 (1). This approach aims to protect the safety of the employees and the public, and ensures that there is proportionality between the costs and benefits of risk reduction measures.

6.6 It is our professional opinion that based upon the comments above a level of risk still exists on the HMS Daedalus, Lee on the Solent site from unexploded ordnance.

6.7 We respectfully suggest that the outcome of this appraisal should be recorded in the health and safety risk assessment for the site. This will inform personnel that UXO has been identified as a potential hazard, but that the risk of harm occurring has been assessed as low to medium.

7 FIL have the technology and experience to locate and remediate all forms of munitions contamination on land and subsea sites.

Yours sincerely



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HMS Daedalus Phase One Explosive Ordnance Risk Assessment, December 2005, DLO – ESG, ESG Report Number ESG/05/041/F.

DLO

Defence Logistics Organisation

environmental science group

HMS DAEDALUS
PHASE ONE
EXPLOSIVE ORDNANCE RISK ASSESSMENT

ESG Report Number ESG/05/041/F
DEC 2005

INVESTOR IN PEOPLE

PHASE ONE

EXPLOSIVE ORDNANCE RISK ASSESSMENT

HMS DAEDALUS

HAMPSHIRE

Report Prepared for:
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Estate Advisor
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Report Reference:
ESG/05/041/F
Date:
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INTENTIONALLY

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EXECUTIVE SUMMARY

This explosive ordnance risk assessment covers the site formerly known as HMS Daedalus, the Royal Naval Air Station, Lee-on-Solent.

At the request of Defence Estates (DE), the Environmental Science Group (ESG), of the Directorate of Logistics Infrastructure, Safety and Security (DLISS) carried out a Phase One explosive risk assessment of HMS Daedalus. This was to enable DE to transfer ownership of the land and buildings and assist in the redevelopment of the site.

HMS Daedalus is a former air station, opened in 1916, and remaining the navy's leading flying training base well into the 1960's. The base suffered air attacks during WWII and played a leading role in the development of the hovercraft. Closed to service flying and engineering training in 1996, the site continues to operate with a civilian helicopter company providing coastal search and rescue facilities. The airfield is also used by the Hampshire Police flight and various commercial and sport flying operations.

To produce the ordnance risk assessment ESG conducted a desk study of existing civilian and naval records. This research has shown that there is little evidence of explosive contamination on the site, **with the exception** of a potential risk presented by airfield denial pipe mines laid during WWII.

These pipe mines were placed in a grid pattern across the exposed parts of the airfield (see Annex G for location). Although subject to post war and subsequent clearances, ESG could not find sufficient evidence to disregard their possible presence. ESG has carried out an instrumental survey of the area within the perimeter track and recommends an intrusive search (Phase Two) to investigate any suspicious readings. Until this is completed the airfield risk is deemed to be Medium.

ESG has also completed a search of the airfield site and buildings (surrounding the perimeter track), using current and historic plans. The results, in addition to the information gained from the desk study, indicate that the ordnance risk presented in these locations of HMS Daedalus and the land off site be assessed as very low. These areas are shown in Annex K.

This document has been prepared for the project sponsor Mr Phil Greaves, Estates Adviser, Defence Estates South West, HMNB Portsmouth, on behalf of Defence Estates. Feedback from the project sponsor or his staff is encouraged and questions regarding the report welcomed. ESG has expertise in various environmental areas including waste management, land remediation, environmental chemistry and environmental engineering. The group's core functions are:

- Land Quality Assessment
- Environmental Risk Assessment
- Demilitarisation of Land

Please contact ESG if you require environmental advice, information or any of the above services at the following address:

ESG
Spur 11
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1 INTRODUCTION

1.1 Tasking

The Environmental Science Group (ESG), of Directorate of Logistics Infrastructure, Safety & Security (DLISS), was tasked by Mr P. Greaves of DE South West on behalf of Defence Estates, to undertake a Phase One explosive ordnance risk assessment for the site formerly known as HMS Daedalus, to facilitate the transfer to civilian use and development within the area.

1.2 Site Location and Description

HMS Daedalus is located on the south-west side of the peninsular reaching out from Fareham to Gosport, between the towns of Lee-on-Solent and Stubbington, Portsmouth Harbour being 4 miles to the east. Access to the site is from the north, via Junctions 9 and 11, of the M27 (see Annex A). HMS Daedalus lies between the B3334 and B3385 (Map reference SU560010).

The airfield site covers an area of approximately 200 hectares, bounded to the south and west by residential properties. These dwellings have gardens backing onto the airfield perimeter fence to the west and onto the domestic/technical buildings to the south. The north and east sides are open to fields (see Annex B).

The airfield consists of three runways, laid out in a triangle and surrounded by the perimeter track. Two of the runways are closed but remain in good condition and may be used occasionally. The small hangars that border the perimeter track have been leased to companies for commercial and private aircraft operations, maintenance, storage and light engineering. All the airfield support systems remain in place: re-fuelling, lighting and fire services.

Two medium sized hangars on the east side are used by the search and rescue organisation (Bristows) and the navy's gliding club. Air traffic and ground control is administered by the Hampshire police flying unit and conducted from the old control tower. On weekends, and some weekdays, the airfield is active with sport aviation including gliding, model flying and light aircraft.

The southern part of the airfield is dominated by the large hangars, former technical buildings, officers' wardroom and residences, accommodation blocks, galleys, sick bay, parachute store, armoury, rifle range, motor transport yards and miscellaneous buildings covering an area of 70 hectares, which constitute the facilities at HMS Daedalus. This area has now been turned over to industrial uses.

The buildings, which are of pre-WWII construction and include the great type 'C' Dunning hangar, have been given over to projects and storage facilities. On the southern boundary, the Hovercraft Museum makes extensive use of the old WWI hangars and workshops for refurbishment and maintenance of their collection. These unique Admiralty type 'J' aeroplanes sheds date from 1917, and the first use of the site for seaplane operations. Access to the sea is by means of a concrete slipway crossing the main road to the beach.

Many of the smaller workshops and buildings are now occupied by light industrial enterprises with the exception of the historic buildings, namely:

Officers Wardroom – Designed in 1930 of Tudor appearance, this was constructed to reflect the importance of the station as the headquarters Coastal of the Fleet Air Arm.

Wykeham Hall – An imposing building dating back to 1895, this building is of significance to the Fleet Air Arm's history as it was requisitioned in 1917 and became Headquarters Flag Officer Naval Command in 1930.

Eagle Block – Headquarters of the coastal area and station offices, dating from 1930. The building is constructed with an internal steel shell.

Triumph Galley – A modern (for 1930's) dining hall and cookhouse for naval rating's.
Anson, Blake, Duncan and Cunningham Barracks – "E" Shaped barrack accommodation built in 1932-35, with steel reinforced roofs.

All the above are supported by English Heritage and their historical significance has been assessed.

1.3 Site History

1.3.1 The early years 1915-1939

HMS Daedalus is named after a Greek legend. Daedalus was a sculptor who, with his son Icarus, was imprisoned on the island of Crete by King Minos. This clever sculptor fashioned wings from feathers and wax and, together with his son, flew to freedom. However, Icarus was so enthralled by his new experience that he flew to close to the Sun. The wax in his wings melted and he plunged to his death.

The origins of naval aviation at HMS Daedalus go back to World War 1 and nearly emulated the fate of Icarus. The Admiralty, prior to the outbreak of war, had declared "Their Lordships are of the opinion that they (aeroplanes) would not be of any practical use to the naval service". Still, some junior officers, at their own expense, learned to fly. By the start of the war, the navy had 39 aeroplanes and 52 seaplanes.

Thus by 1915, this fledgling naval air service had won two VC's and was carrying out coastal patrols and attacks on enemy Zeppelin sheds. This rapid expansion was supported by increases in training establishments and the old Seaplane Training School at Calshot was supplemented by opening a temporary sub station at Lee-on-Solent.

The camp at Lee-on-Solent consisted of makeshift tented quarters for the men, with the officers being required to commute to local lodgings. The seaplanes were manhandled to the water from the beach and serviced in temporary canvas "Bessonnau" Hangars.

In 1917, the Admiralty decided to make the station more permanent and created a concrete slipway along with new hangars. However, the formation of the Royal Air Force on 1st April and the Armistice on 11th November 1918, led to the station becoming redundant.

Following WWI, peace and the creation of the RAF were disastrous for the naval air school. Lee closed within a year of the Armistice. The seaplanes were towed to Burlesdon and sold for scrap

and the camp was closed. Thus started a 20 year period in which the site would regenerate to become the home of the Royal Navy's own air arm.

In 1920, the responsibility for aviation lay firmly with the RAF, but the air force gave an opportunity for the navy to regain their control over maritime aviation when RAF observers mistook some fishing boats for battle ships during an exercise. This lack of knowledge introduced a requirement for naval observers within the RAF and a course was founded at the newly reopened airfield at Lee-on-Solent. By 1924 a fleet air arm (FAA) of the RAF was formed, consisting of 70% naval pilots and crew.

Through the 20's and 30's Lee-on- Solent became increasingly more predominant and important as a naval aviation school and administration site. In 1931, concrete runways, permanent hangars and accommodation applicable to the role that Lee-on-Solent was assuming were constructed. During this time Lee-on-Solent caught the world's attention when Flight Lieutenant Stainforth of the High Speed Flight (RAF), broke the world air speed record at 407.5 mph.

In 1938, Lee-on-Solent became the Head Quarters of coastal command responsible for three groups covering Scotland, East England, and Western England and the Irish Sea. Altogether this command controlled nineteen squadrons.

By now the large hangars and airfield played host to numerous navy squadrons as their shore station. On 24th May 1939, the station was released by the RAF to the navy and commissioned as HMS Daedalus.

1.3.2 World War II 1939-1945

With the rapid forces expansion prior to war, the naval aviation school gave way to allow HMS Daedalus to administer the formation of new squadrons. Crews based at HMS Daedalus trained for maritime operations, such as seaplane catapult launches from capital ships.
With the fall of France and the evacuation at Dunkirk, HMS Daedalus found itself in the front line of the Battle of Britain. The airfield was hastily fortified against air attack. Air raid shelters and trenches were dug, the buildings were painted with camouflage colours and machine gun sites were placed around the perimeter. On 16th August 1940, the airfield was attacked.
The raid started at 1500hrs and lasted five minutes. Fifteen enemy aircraft dropped 1000kg and 100kg bombs through the maintenance area destroying 42 aircraft and a further 80 aircraft were damaged. Tragically, seven personnel were killed with three more missing (see Annex F). Raids in the area continued until October and then the enemy turned their attention to London and the Blitz.

The airfield was expanded in 1942, with runway additions, new hangars and a small explosive area (Bomb Dump) on the eastern side (see Annex C). Also in response to a perceived threat of an enemy landing on the airfield, the Canadian Royal Engineers installed a web of Pipe mines across the grassy area of the airfield (see Annex G).

Squadrons continued to form and train at Daedalus throughout 1941 to 1943. One particular squadron, No 825, commanded by Lt/Cdr Eugene Esmonde DSO.RN., made the gallant attack against the German battleships Scharnhorst and Prinz Eugen in the Straits of Dover. All the aircraft were lost and Esmonde was awarded the VC.

In 1944, HMS Daedalus found itself in the front line again. However, this time it was in support of the D-Day invasion of France. RAF squadrons joined with FAA squadrons to form the 2nd Tactical air force to provide fighter cover for the invading forces. Together they flew 453 sorties - the highest number of offensive missions flown by any of the participating airfields.

As the war came to an end, HMS Daedalus remained a training airfield providing operational squadrons for aircraft carriers and naval air bases around the world. HMS Daedalus would remain in this role for the next forty years, pioneering the use of helicopters and hovercraft through to the jet era.

1.3.3 Post war and beyond

During the 1950's, HMS Daedalus remained a busy station. Home to three flag officers, namely air training, ground training and home, these posts were reduced as the navy's carrier force diminished. Still, HMS Daedalus provided a base for trials and evaluation teams, mobile aircraft repair, accident investigation and flight safety units, and No 781 squadron operated a multitude of aircraft types on transport and training.

Helicopter training commenced in 1955, and in 1959 the base was renamed HMS Ariel when it became home to the Air Electrical School that had moved from Worthy Down.

The base reverted back to HMS Daedalus in 1965. By this time the airfield was alive with navy jet fighters, helicopters and communication aircraft. The base also became home to the Hovercraft Trials Unit, who had been testing the large SR.N3 hovercraft at the site since 1962.

In 1970, the Air Mechanical engineering school moved to HMS Daedalus, providing training, support and development for FAA engineering personnel.

With the development of the vertical take-off Harrier, emphasis on aircrew training and jet operations moved to Yeovilton in Somerset, and gradually HMS Daedalus lost its eminence. Despite this, HMS Daedalus carried on operating search and rescue (SAR) helicopters, light trainer aircraft and VIP aircraft until 1988, the SAR role finally being taken over by civilian contractors.

HMS Daedalus, Lee-on-Solent was finally closed on 29th March 1996.

2 DESK STUDY

2.1 Objectives

An explosive ordnance risk assessment desk study was conducted to establish the Areas of Potential Concern (APC's) within the HMS Daedalus assessment area. Specifically, the aims and objectives of the desk study were;

- to assess the general likelihood of explosive ordnance contamination, and where possible identify the types of contaminants that may be present;
- to identify potential contamination distribution, depth, density, type and condition;
- to assess the findings in terms of risk to human receptors such as current site staff and people using the site in the future;
- to assess the findings in terms of risk, to the sites current and future buildings, and environmental receptors;
- to make recommendations for further investigation and risk mitigation.

2.2 Work programme

The desk study enables the investigation team to reconstruct as full a picture as possible of the past and present activities of the site so that APC's may be identified. This involved discussions with personnel, researching documents and conducting site visits. The specific scope of the work was as follows:

2.2.1 Discussions with the following personnel:

• Phil Greaves	Estates Advisor, Defence Estates
• Roger Beaumont	33 Engineers Regt. (EOD) Archives
• Dai Orton	33 Engineers Regt. (EOD) Archives
• Lt. Cdr. Justin Haynes	O/C Southern Diving Unit R.N, Portsmouth
• Peter Richards BEM	Served at HMS Daedalus 1941 to 1981
• P.C. Stefan King	Hampshire Police
• Jerry Shore	Fleet Air Arm Museum, Yeovilton
• Margaret Biskup	War Graves Commission

2.2.2 Review of the following documentary information

1. HMS Daedalus Historic Buildings Assessment, Final Report. Paul Francis, March 2003
2. HMS Daedalus Land Quality Assessment, Desk Study, No. N1/05002 WSP, 1994
3. Naval Aviation at Lee-on-Solent, published by Lt Cdr Mathew Thomas
4. Report of Search for Explosives at HMS Daedalus, ES350/97/41. Sept 97
5. Letter SC Z/22512/G (Ops) Pipe Mines Airfields, Removal. January 1947
6. Report on disposal of pipe mine, September 1984
7. Clearance of unexploded ordnance, 33 Engineers Regt (EOD), December 1985
8. Clearance of unexploded ordnance, 33 Engineers Regt (EOD), September 1986
9. Clearance of unexploded ordnance, 33 Engineers Regt (EOD), March 1987
10. Clearance of unexploded ordnance, 33 Engineers Regt (EOD), February 1990
11. Clearance of unexploded ordnance, 33 Engineers Regt (EOD), November 1994
12. Air raid report 17th August 1940, M016320/40, Public Records Office

13. Air raid report 22nd August 1940, M016925/40, Public Records Office
14. Air raid report 10th October 1940, M020386/40, Public Records Office
15. Air raid report 23rd May 1944, ADM 1/15772, Public Records Office
16. Hampshire Airfields in the Second World War, Robin J Brooks
17. Lee-on-Solent airfield Canadian Pipe Mines, Mc/T/AF/5
18. Layout of pipe mines, No 921, November 1942
19. Schedule of loading, No 921a November 1942
20. WO 199/2154 Instructions for maintenance of Mk. Naughton pipe mines
21. HMS Daedalus site plan POR 165/04
22. HMS Daedalus site plan circa 1940's/50's
23. Lee-on-Solent site plan 1918
24. Lee-on-Solent site plan 'A' ,1931, AM.1254/31
25. Lee-on-Solent site plan 'B' ,1931, AM.1255/31
26. Lee-on-Solent site plan 'C' ,1931, AM.1256/31
27. Lee-on-Solent site plan 1937
28. Lee-on-Solent site plan 1941 and 1943
29. Lee-on-Solent site plan 1944
30. Lee-on-Solent site plan 1973
31. ADM199/110 Enemy raids naval establishments 1939-42 Public Records Office
32. ADM199/111 Enemy raids naval establishments 1940-41 Public Records Office
33. HO198/56 Bomb plots 12th Aug 1943 – 28th May 1944 Public Records Office
34. Entec Phase Two, Land Quality Assessment, Fig 1 Proposed exploratory hole locations.

2.2.3 Site Walkover

This consists of an unescorted reconnaissance of the site using maps dated from the 1940's onwards. Buildings previous and existing are located along with their associated uses; topographical abnormalities are observed and boundaries are noted.

2.3 Results of the Work Programme

2.3.1 Discussions with the following personnel:

2.3.1.1 Mr Phil Greaves Estates Advisor HMS Daedalus

Mr Greaves was able to provide the ESG team with details of former naval personnel who had served at HMS Daedalus. He was unaware of any explosives ordnance being stored, processed or disposed of within the assessment area at the present time or since the closure of the site.

2.3.1.2 Mr Roger Beaumont 33 Engineers Regt (EOD) Archive Manager

Information supplied by the archive's manager, identified that there were no records of abandoned bombs within HMS Daedalus or the Lee-on-Solent area. He also provided extensive information appertaining to the pipe mine removal operations and previous EOC tasks.

2.3.1.3 Mr Dai Orton 33 Engineers Regt (EOD) Archive Manager

Mr Orton provided specific information on pipe mines and their potential threat.

2.3.1.4 Lt Cdr Justin Haynes O/C Southern Diving Unit, RN Portsmouth

Lt Cdr Haynes confirmed that the Southern Diving Unit do not hold records of any explosive ordnance related incidents in the Lee-on-Solent area.

2.3.1.5 Mr Peter Richards Former employee 1940 to 1981

Mr Peter Richards, a former aircraft engineer, was accompanied by his brother Gordon, a former ground electrician and also an ex-employee. Peter remembers the wartime bombing raids and gave accounts of life on the base and the working activities within. Of particular interest was the placing of a submarine target alongside the main runway that was used for inert practice bombing.

Sited in the centre of the airfield was the former Milvill farm. This was used to store anti-aircraft shells for the aerodrome defence batteries.

After the war, a large amount of equipment (not of an ordnance nature) was buried on the site between the taxiways east of the end of runway 017 (see annex D). It is thought that this was done to avoid Lend/Lease payments to the Americans.
Over the years there were many aircraft accidents on the airfield but they were all recovered or removed.

From 1960 onwards the role of Daedalus became less operational and the explosive area fell into disuse. The metal doors were removed and the buildings used by the resident farmer for feed storage. Eventually they were deemed unsafe and demolished around 1970.

2.3.1.6 P.C. Stefan King Hampshire Police

P.C.King contacted members of the Hampshire Police to request information or stories involving explosives, explosions or related incidents in the HMS Daedalus area. Reports only referred to the work undertaken by the Royal Engineers who were involved in pipe mine removal (See Section 2.5).

2.3.1.7 Mr Jerry Shore Assistant Curator Fleet Air Arm Museum

Mr Shore provided information on the activities on site and in the engineering school.

2.3.1.8 Ms. Margaret Biskup War Graves Commission (WGC)

Information was requested from WGC on air crash fatalities at HMS Daedalus with regard to potential aircraft burials on site. No records exist.

2.3.2 Review of documents

ESG's research of the available documentary information has focused on the following main areas:

- Storage, processing, or disposal of explosive ordnance in buildings and open areas from WWII until the present day, concentrating on actual building use within the Explosive Ordnance Risk Assessment study area.
- The deliberate placement of demolition charges within the airfields boundaries.
- History of ordnance use at the site.
- Examining the potential risk of UXBs within the study area.

Examination of maps, plans and other documents on building use since the formal closure of HMS Daedalus has not uncovered any evidence of, processing or disposal of explosive ordnance at the site. Small quantities of pyrotechnics (Day/Night, Mini flares, marker floats) are kept by the Police air wing and Search and Rescue organisations in their aircraft. Items removed for servicing are kept in a locked box by the respective organisation.

Prior to this, activities relating to the use of explosive items consisted of use in the support of wartime flying activities, and from 1960 onwards, ordnance kept on site was limited to pyrotechnics, small arms ammunition and aircraft systems related explosive devices. e.g. ejection seats, fire bottles and engine starter cartridges.

The use of high explosive munitions at the site terminated at the end of WWII. Associated buildings such as the bomb dump, torpedo workshops and the guided weapons bay were reallocated to non-ordnance related uses during the 1950's. The former bomb dump area was eventually demolished during the early 1970's (see Annex D).

Records made by the Canadian Royal Engineers in 1942 showed the extensive nature of the layout of the underground pipe mines across the site and the associated potential residual hazard. Ordnance clearance reports revealed that further mines had been discovered subsequent to the Canadian clearance in 1946.

The airfield was attacked and bombed on at least three occasions during WWII.

2.3.3 Risk of UXBs

Many of the documents, books and papers reviewed refer to the bombings of WWII on the naval base and give details of buildings damaged and casualties incurred, both in and around the technical area:
- 16th August 1940. The raid started at 1500hrs, with approximately 15 enemy aircraft involved (Annex E). The raid caused extensive damage and loss of life. The bombs fell in the technical area and damaged the main hangars and accommodation blocks.
- 8th October 1940. The raid started at 1850hrs. Three enemy aircraft attacked, approaching from the south, over the Solent. They were engaged by the anti aircraft batteries of HMS Daedalus. The aircraft dropped their bombs west of Stubbington lane (Annex E). The lead aircraft and port wingman then turned left and steered away to the south. The starboard aircraft turned right and was seen to be hit by the anti aircraft batteries. Trailing smoke, the aircraft flew 20 miles north east and subsequently crashed near Emsworth.
- 23rd May 1944. The raid started at 00.50. An enemy aircraft dropped a stick of three 250kg bombs on the northern end of the airfield (Annex E). A nissen hut was destroyed, another damaged, office windows were blown out and telephone lines broken.

2.3.4 Site Walkover

Site walkovers were conducted in November 2004 and January 2005 to assess the current airfield layout and to compare the findings with previous uses recorded on old site maps. Noted has been the removal of the explosive storage area and small arms firing range.

2.4 Areas of Potential Concern

The desk study has highlighted a period of WWII in which the airfield experienced the biggest upheavals and rapid changes. During this period, the airfield was subjected to enemy bombing on at least three occasions, the bombs falling in the areas occupying the hangar and technical buildings to the south west and to the northern accommodation area. There are no records of unexploded bombs.

Furthermore, in 1942 the airfield was laid with a matrix of airfield denial mines in accordance with War Office instructions (see Section 2.5 Airfield denial pipe mines).
Following the end of WWII operations, HMS Daedalus followed the routines of a service training establishment. Armament equipment and explosive ordnance were stored to support the flying activities and for ground defence. There is little evidence of any operational flying or training using heavy munitions.

With reference to the available maps the following buildings and structures associated with ordnance have been identified as APC's:

AREAS OF POTENTIAL CONCERN	COMMENTS
Armoury	Brick built building housing station armament administration, small arms servicing and storage. Live ammunition not normally kept in weapon servicing areas, building disused cleared Sept 97, ES 350/97/41, see Annex J.
Explosive Area	Traversed area for the storage of high explosives. Buildings and traverses removed, some evidence of access roads remain. Entec document, sect 2.2.2 NO.34 identifies the site as the 'former aircraft breaking area' and' 'fire training area' and has been subject to intrusive investigation by them.
Danger buildings	Traversed buildings with low explosive content required for pyrotechnics and ammunition. Buildings marked non-maintained, cleared Sept 97, ES 350/97/41, see Annex J.
Guided weapons workshop	Servicing bays for test and maintenance. Explosives generally removed for servicing and not stored on premises. Building currently used by gliding club for storage. No evidence to suggest any ordnance present
Torpedo workshop	Building formerly used for torpedo maintenance. Explosives generally removed for servicing and not stored on premises. Currently used by private company. No evidence of ordnance
Small arms range and stop butts	A 25 Yard range for small arms and stop butts for aircraft gun testing. Little trace remains sites cleared by Royal Engineers in Nov 1994, see Annex J.
Ground defence structures	Concrete bunkers, emplacements, weapons pits or guard towers. No structures existing
Guard room	Local defence weapons kept. Building empty cleared Sept 97, ES350/97/4.
Area 6, School of Aviation Engineering	Inert munitions kept for training, possibility of discarded inert ordnance.
Pipe mines	Laid in 1943 and subject to clearance post WW2. Further mines discovered on subsequent operations.

2.5 Airfield denial pipe mines

In accordance with a War Office order, all airfields 10 miles from the coast and within enemy flying range were to be mined to deny their use to the Germans. The task was given to No.1 Canadian (S) Tunnelling Company, Royal Engineers, who commenced work in 1942. The task was completed by 1943 and subsequently the installations are referred to as Canadian pipe mines.

The mines are laid in a cross pattern at 90 degrees to each other and cover the grassed areas between the runways, and in some cases, under the runways (see Annex G Pipe mine layout). They consisted of iron pipes, between 30 and 60 feet long, buried just under the surface and extending downwards at an angle of 10 degrees to a depth of 2 meters (see Annex H Pipe mine construction). The mines are then linked together by detonator cord, which are then initiated by

time pencils (a device used by army engineers containing an initiator, delay and detonator), for demolition of the airfield.

The mines were filled with Polar Blasting Gelatine (PBG), which is referred to in the U.K. as Gelignite. This inexpensive commercial explosive was probably selected because of its blasting properties and its use in civil engineering. Invented by Alfred Nobel in 1875, Gelignite consists of collodion-cotton, a type of gun cotton, dissolved in nitro-glycerine and mixed with wood pulp and sodium nitrate. The addition of a small quantity of Glycol lowers the freezing temperature of the explosive increasing its operating range, thus it is known as Polar Gelignite.

War Office files held by the Public Records Office express concern by wartime service personnel regarding the safe maintenance and removal of the mines. In particular, is the tendency for PBG to revert and release nitro-glycerine, rending the mines more hazardous to the personnel employed to maintain them. In fact, such was the concern that many installations were not charged with explosive.

In 1946, the Canadian Royal Engineers carried out a clearance operation at HMS Daedalus to remove the mines (see Annex J Previous EOC certificates). This task was carried out with reference to the pipe mine sketch maps, but without instrumental assistance. The start point for the mines was misunderstood, and as a result some were overlooked and remained undetected. With the transfer of former RAF and Naval airfields into civilian roles, the need to remove this potential risk resulted in the Royal Engineers being tasked to carry out clearance operations to some 30 former airfields (see Annex I Pipe mine photographs).

These operations, carried out in 1980's, used hand held ferrous location instruments and the use of robotically controlled excavators to safely expose the mines. The pipes were then cut into two metre lengths using high velocity explosive charges. The explosive filling (if not exploded from the cutting operation) was then washed from the pipe using low pressure water and removed for demolition. The remains of the pipe and the washing water were then demolished on site.

Successive searches carried out at HMS Daedalus by the Royal Engineers revealed a total of 14 mines that had not been removed by the Canadians. Of these, 5 were unrecorded on the pipe mine sketch maps and 2 were found to contain explosives. The remainder, although empty, all contained residue nitro-glycerine sufficient to cause an explosion and to create a health hazard to the engineers, who suffered from nitro induced head aches.

The Royal Engineers searched the area in the immediate vicinity of the suspected pipe mine rows, as indicated on the Canadian sketch maps, using handheld locators. However, they were unable to search the entire airfield due to the manpower required. A system has since been developed that uses modern towed array locators too quickly, easily and efficiently search large areas of land (see 3.2 Metal detection equipment).

3 VISUAL SEARCH & INSTRUMENTAL INVESTIGATION

3.1 Methodology

3.1.1 Objectives

The objective of this phase of the operation is to further investigate specific APC's identified at the desk study stage by carrying out instrumental investigations across areas of the site considered to present a risk of ordnance contamination. Additionally, although not classified as specific APC's, it is prudent to visually search some site buildings. This methodology used for these investigations are as follows:

Area 6, School of Aviation Engineering

- Hand held magnetometer search and extraction of ferrous targets over selected areas.
- Visual search of the open areas and buildings.

Pipe Mines

- Multi-cat towed array magnetometer survey for large areas – predominantly the airfield.

Armoury and Guard Room.

- Visual inspection.

Small arms range and Ground defence structures.

- Visual inspection.

Danger buildings and former Explosives area.

- Visual inspection.

Guided weapons workshop and Torpedo workshop.

- Visual inspection.

Metal Detection Equipment

The equipment used by ESG for the instrumental searches consists of Foerster Ferex 4032 API Locator and Data Logger. A technical overview is provided below.

3.1.2 Foerster Ferex 4.032 API

The Foerster Ferex 4.021 Locator is a land based ferrous metal locator, which enables an operator to evaluate the ferrous contamination in a pre-determined area. (see figure 1)

The system operates by detecting variations within the earth's magnetic field. The Ferex will indicate plus and minus poles of ferromagnetic objects (most projectile ordnance will contain some ferrous material). Geometry and strength of the detected poles enable the experienced user to determine location, depth and size of an object.

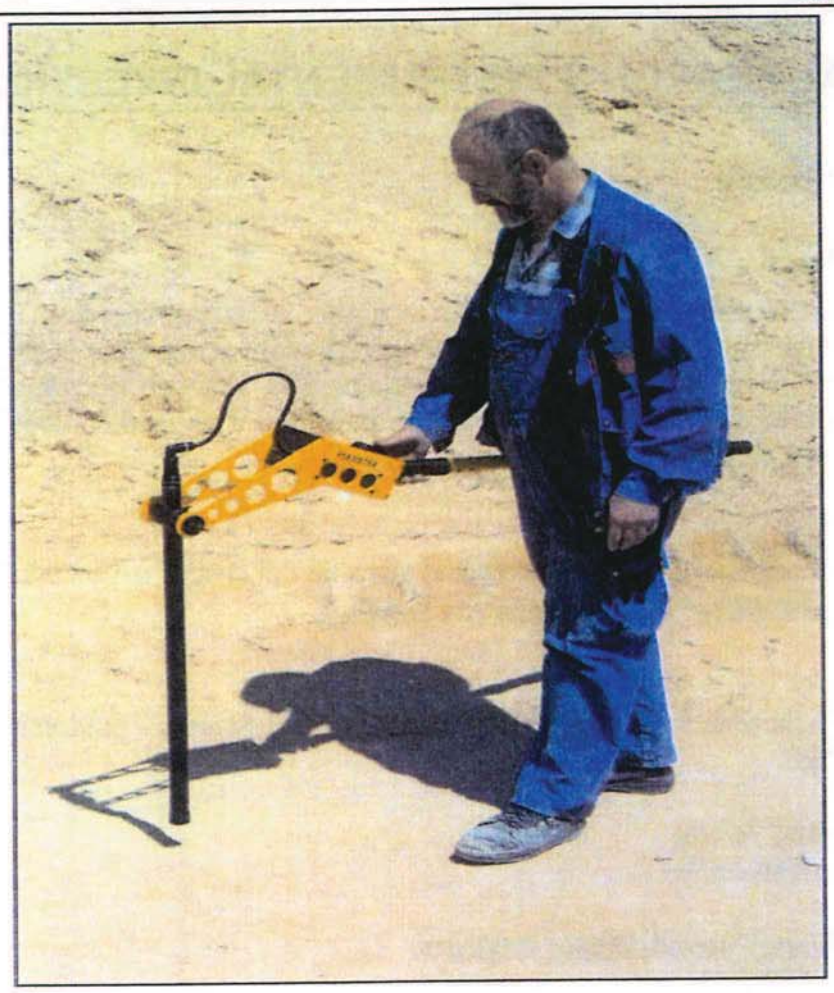

Figure 1 Operator using a Ferex 4.032 API (Single probe)

3.1.3 Foerster Ferex 4.032 Data Logger & Multi-Cat towed array

The Foerster Ferex 4.032 data logger & Multi-Cat towed array system is a ferrous metal locator system employing magnetometers and satellite navigation to search for all ferrous items in a pre-determined area. It uses either a single probe or up to four probes contained within a towed array. Operators use a laptop computer to record and evaluate the nature of site contamination prior to conducting remediation.

3.1.3.1 Multi-Cat towed array

The photograph in figure 2 shows the Multi-Cat 4 probe array connected to the vehicle. In the background, the GPS base station that provides an accurate fix data to the towing vehicle via a radio link can be seen. The operation requires the array to be towed over the survey area logging the data received from the probes. This information is coupled to the GPS positions to provide an accurate map of the locations of ferrous objects in the ground. The accuracy of the system is measured down to 2 centimetres.



Figure 2 Multi-Cat towed array system in operation

3.2 Search task personnel

These search procedures involved the following trained personnel conducting visual, and instrument searches as documented.

Mr John Bolland	Senior Land Quality Assessor (Ordnance)	ESG3a
Mr Adrian Pearce	Land Quality Assessor (Ordnance)	ESG3a1
Mr John Swanborough	Land Quality Assessor (Ordnance)	ESG3a2

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4 ENVIROMENTAL RISK ASSESSMENT

4.1 General

The Phase One risk assessment relies primarily on research that has been conducted to evaluate the sites history and the use of the site with regards to ordnance issues. This is supplemented by observations made during the site reconnaissance and information obtained from site personnel and records. This preliminary risk assessment is thus, primarily, based only on the potential presence of explosive ordnance in the assessment area, and is made in the absence of findings from intrusive investigations. Section 5 gives a general summary of perceived risks to the receptors and recommendations to minimise risks.

4.2 Source-Pathway-Receptor

Contamination may present an environmental risk by a variety of pathways to one or more targets which, in turn, vary in importance depending on the site's environmental setting and current and/or proposed use. The established source-pathway-receptor model is used as follows:

Hazard (Source): In this risk assessment the hazard term is confined to explosive ordnance and energetic materials. The risk considered is that related to a detonation or deflagration. The magnitude of the hazard is related to the Net Explosive Quantity (NEQ) and the fragmentation characteristics of the explosive ordnance. Whilst certain energetic materials may have toxic properties the toxicity risk is considered in more detail in the exposure assessment undertaken within a site Land quality Assessment.

Pathway: This is the route by which the hazard reaches a sensitive receptor. In this assessment it is considered as the mechanism by which the energy in the ordnance is transferred harmfully to the receptor. It is related to both the accessibility of the ordnance and the ease of initiation.

Receptor: The most sensitive receptor is that of human health. Minor risks to ecology and built structures also exist at a very much lower level.

The ranking system detailed below is used in the following to determine the likelihood of the linkage of a hazard to a sensitive receptor being established through a recognised pathway.

LIKELIHOOD	DESCRIPTION
Very Low:	Ordnance or pathway is considered absent/unlikely, making linkage incomplete.
Low:	Ordnance and pathway may be present but receptor insensitive to source.
Medium:	Current evidence indicates that an ordnance linkage is likely to be present or an initiating event may trigger a pathway e.g. initiation or detonation during excavation which will impact the receptor.
High:	Ordnance linkage considered being present and the receptor is likely to be exposed to ordnance of a particularly hazardous nature and amount.
Very High	Ordnance linkage considered to be present and receptor highly likely to be exposed to ordnance of a particularly hazardous nature and amount.

4.3 Human health risk

For humans, the following direct pathways may be identified affecting those presently on site or those that may be on site in the future:

- direct contact with an ordnance item;
- dermal contact with explosive/ ordnance related toxic materials;

- inhalation of explosive/ ordnance related toxic materials in gaseous/vapour form or in dusts;
- contact with explosive/ ordnance related toxic materials to the eyes;

In addition there are indirect pathways affecting third party property, individuals or the general environment:

- contact from the blast wave and or flying debris created by an ordnance item initiation;
- airborne (wind) movement of contaminated dusts or gas clouds.

5 PRELIMINARY RISK ASSESSMENT AND RECOMMENDATIONS

This preliminary environmental risk assessment was conducted to assess the environmental risks arising from the operational activities of HMS Daedalus. The following tabulated risk assessment and proposed remediation strategy is based on the evidence collected during the first stage of the EOC (ordnance) and is made in the absence of findings from intrusive investigations.

5.1 Environmental Assessment

The table below indicates the assessment of current risk associated with each source-pathway-receptor linkage and the residual risk that will result from remediation of each hazard.

KEY TO RISK DESCRIPTIONS:

Very Low:	Ordnance or pathway considered absent/unlikely, making linkage incomplete.
Low:	Ordnance and pathway may be present but receptor insensitive to source.
Medium:	Current evidence indicates that an Ordnance linkage is likely to be present or an initiating event may trigger a pathway e.g. initiation or detonation during excavation which will impact the receptor.
High:	Ordnance linkage considered being present and the receptor likely to be exposed to Ordnance.
Very High:	Ordnance linkage considered to be present and receptor highly likely to be exposed to Ordnance of a particular hazardous nature and quantity.

Source		Receptor	Pathway	Current Risk	Actions undertaken	Residual Risk
Location	Hazard					
Pipe Mines	Explosive items, explosive residues	Maintenance staff/ construction workers, site personnel.	Detonation.	Med	Conducted a full instrumental search of the known and unknown mined areas within the airfield perimeter. See Section 6 Recommendations for further investigation	Med

Source		Receptor	Pathway	Current Risk	Actions undertaken	Residual Risk
Location	Hazard					
Former explosive storage area	Explosive items	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search around the area once occupied by the Explosive storage buildings. Subsequently used as a fire training area and aircraft breaking yard.	Very low
Unexploded wartime bombs	Explosive items	Visitors Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a search of records	Very low
Area 6, School of aviation engineering	Explosive items	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual and limited instrumental search of the buildings and area.	Very low
Former firing range	Discarded small arms ammunition	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search	Very low

Source		Receptor	Pathway	Current Risk	Actions undertaken	Residual Risk
Location	Hazard					
Armoury	Explosive items	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search	Very low
Danger buildings	Explosive items	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search	Very low
Guided weapons workshop	Explosive items	Visitors Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search	Very low
Torpedo workshop	Explosive items	Maintenance staff/ construction workers, site personnel.	Contact with ordnance	Very low	Conducted a visual search	Very low

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6 RECOMMENDATIONS FOR FURTHER INVESTIGATION

Based on the findings of the desk study and geophysical survey, and having carried out the preliminary risk assessment, the following recommendations are made for HMS Deadalus:

The explosive ordnance risk assessment study has found little evidence of explosive ordnance contamination on the technical and accommodation areas, hangars and the grounds surrounding the perimeter track. This also extends to the area known as Site 6 currently under development and subject to an earlier search (ref letter DLO/DSES/150/8/052 Annex J). In this respect no further actions are required in these areas.

In response to the potential presence of pipe mines, and further to the full instrumental survey carried out by ESG using the towed array detection system, it is recommended that selected objects identified by ESG as being of a possible explosive ordnance nature, should be extracted and examined (Phase 2 Extractions). This intrusive investigation work can be coordinated and carried out by ESG, with service support when necessary.

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7 CONCLUSIONS

The aim of the explosive ordnance assessment Phase one desk study has been to identify and assess the risk from possible ordnance contamination to present and future site users at HMS Daedalus.

ESG has recognised that the redevelopment and future use of the site remains fluid, and with this in mind, proposes that the airfield site be regarded in two areas.

The first area, consisting of the technical area, accommodation area, hangars and grounds surrounding the perimeter track, are assessed as Very Low.

The second area, consisting of the runways and land contained within the perimeter track, is assessed as Medium. Recommendations are made in Section 6 for mitigating the risk. Implementation of these measures should result in a very low risk rating.

The risk posed by unexploded wartime bombs to estate management teams, contractors and other personnel involved in future excavations is assessed as Very Low. However it should be noted that the whole of the Gosport area was regarded as a legitimate military target and the possible presence of air dropped munitions still exists in the area. In this regard the risks associated with the site are judged to be no higher than the surrounding area.
Please advise any contractors that if for any reason they suspect they have come across an explosive ordnance item, to contact the local civilian police.

The risk to flora and fauna, buildings, services and controlled waters has been assessed as Very Low (see Annex K Explosive Ordnance Risk Assessment areas).

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ANNEXES

ANNEX A

SITE LOCATION

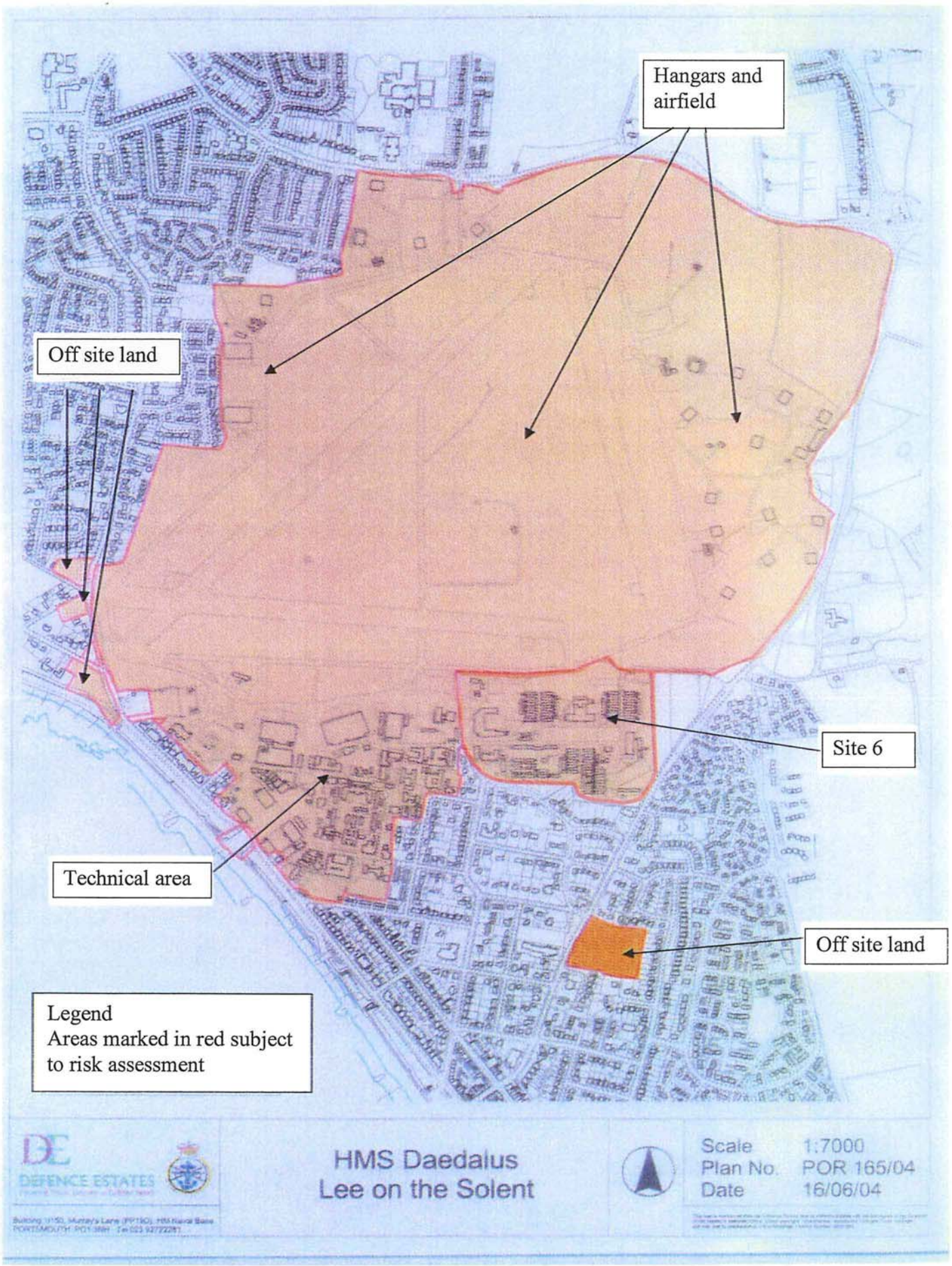
HMS Daedalus location



ANNEX B

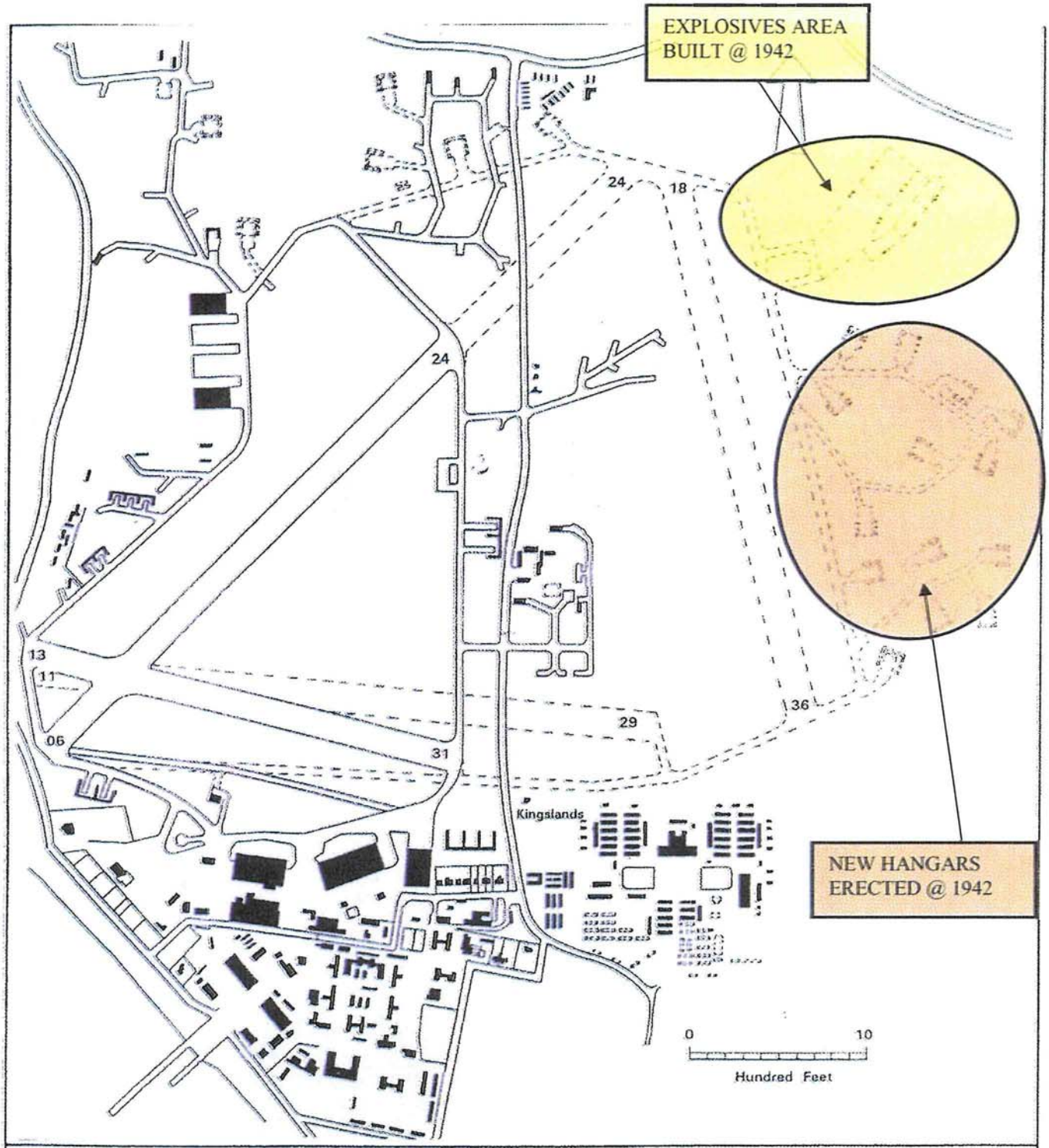
PHASE ONE E.O.R.A. SITE BOUNDARIES

HMS Daedalus site boundary and areas included in this Phase 1 risk assessment



ANNEX C

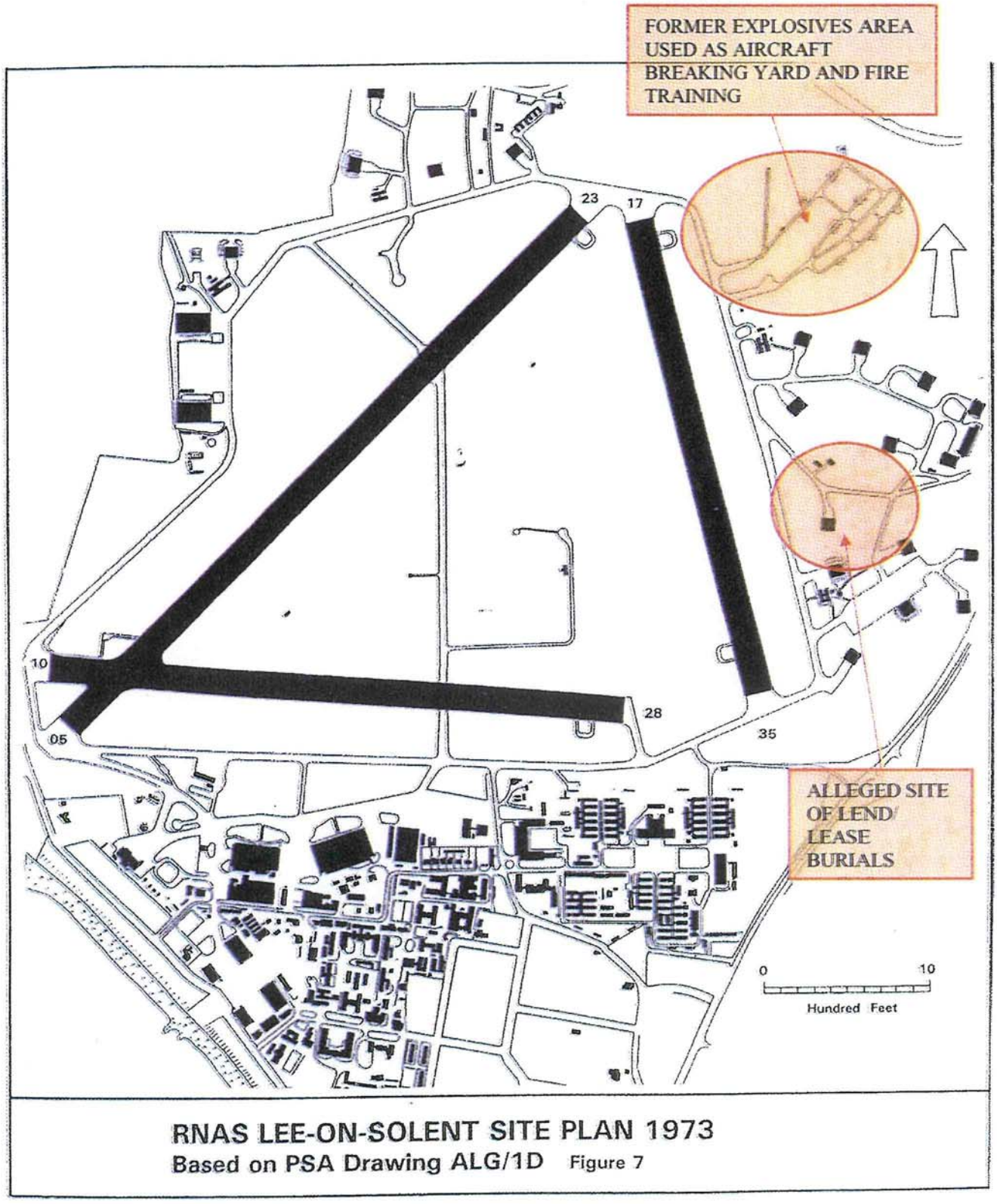
SITE MAP 1941-1943



RNAS LEE-ON-SOLENT SITE PLAN 1941 and 1943
Showing Runways as at 1941 (solid line) and 1943 Runway Layout (broken line) Figure 6

ANNEX D

SITE MAP 1973

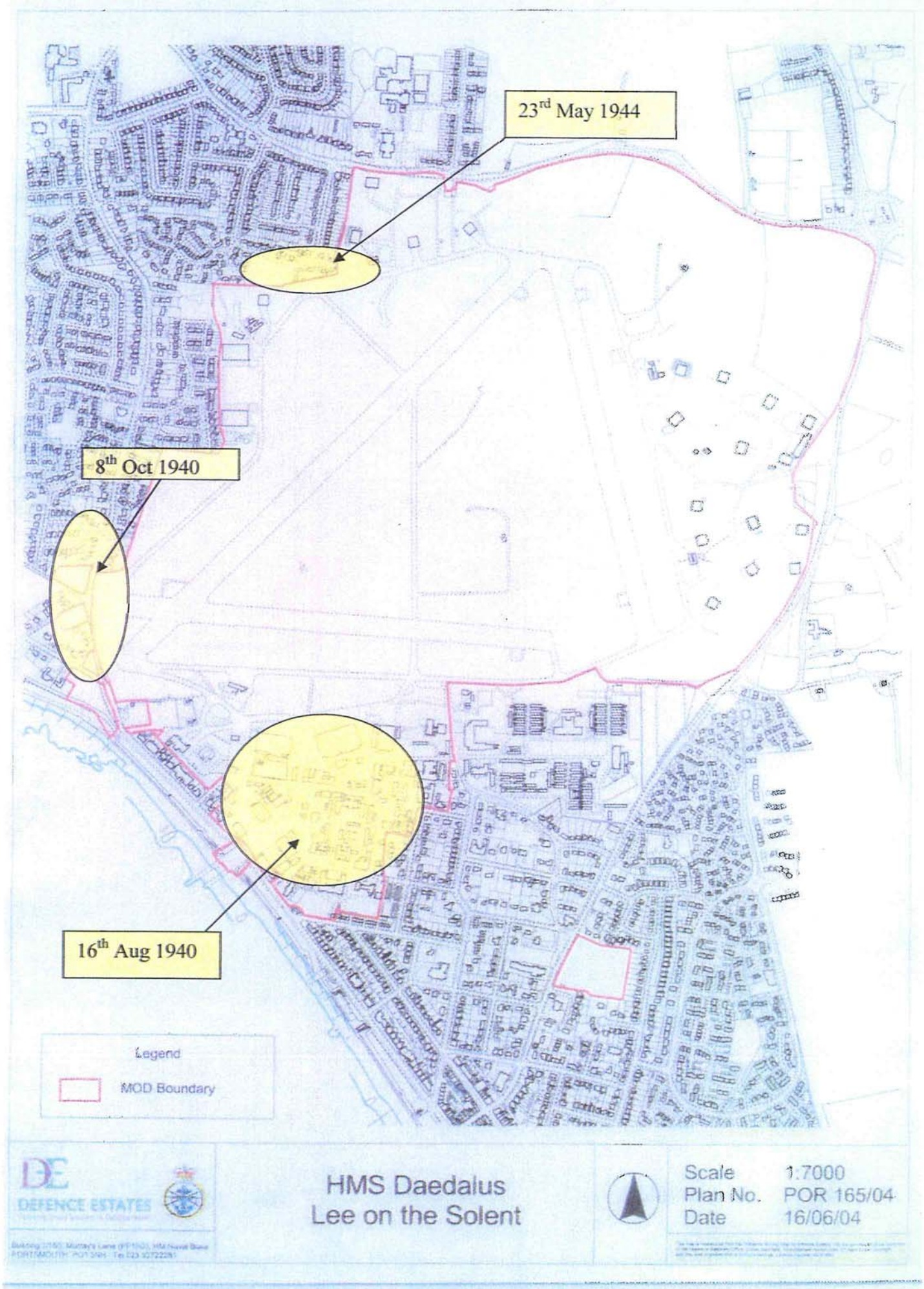


RNAS LEE-ON-SOLENT SITE PLAN 1973
Based on PSA Drawing ALG/1D Figure 7

ANNEX E

WW II ENEMY AIR RAID BOMB PLOTS

World War 2 Bombing raids at HMS Daedalus, recorded areas for the fall of bombs. No unexploded bombs reported.



ANNEX F

WWII RAID REPORTS
(Public Records Office)

R.A.N.A.S.
1517/40

CONFIDENTIAL.

REPORT ON THE BOMBING ATTACK ON R.N. AIR STATION, LEE-ON-SOLENT, ON 16th AUGUST, 1940.

FROM: THE COMMANDING OFFICER, R.N. AIR STATION, LEE-ON-SOLENT.

DATE: 17th August, 1940. No. 8319/406A.

TO: THE REAR ADMIRAL, NAVAL AIR STATIONS.

The following report on the bombing attack on the R.N. Air Station, Lee-on-Solent, on 16th August, 1940, is submitted.

2. Air Raid Message "Yellow" was received at 1240 and Air Raid Warning "Red" at 1250. All Passive and Active Defence parties were closed up at 1259

3. Enemy aircraft started to dive on the aerodrome at 1304 and at 1305 the first bomb was dropped. The enemy aircraft were engaged by the Western and Southern defences. The armoured car reports that they are confident that they obtained a considerable number of hits on a Junkers 87. The machine guns mounted in the Air Watch Office (Sea) also report that they obtained hits.

4. It is thought that about 15 enemy aircraft attacked the Station.

5. On the first bomb being dropped, telephone communications were seriously interrupted and all lighting failed.

6. All the bombs were dropped between 1305 and 1308. In all nine 1,000 lb. bombs and at least 22 smaller bombs were dropped.

7. At about 1309 all fire parties were turned out and some of the trenches cleared in order to deal with the fires.

8. The following fires were started by the bombing :- the "A" type hangar, the "C" type hangar, "D" hangar and Clothing Store, A.R.S. hangar, a petrol bowser on the aerodrome and some dispersed aircraft.

9. The fire main had been broken in two places, outside the Air Watch Office (Land) and outside the Sick Bay. No water was therefore available from the fire main while these breakages were being located. Hoses were accordingly rigged to the sea, and to a bomb crater on the aerodrome that was filling with water. The fires in "D" hangar and the Clothing Store were attacked by the hoses rigged to the sea, and water supplied by a fire tender and booster pump. The fire in the "A" type hangar was attacked by hoses rigged from the bomb crater. Aircraft in these hangars were on fire and efforts were made to save some of the aircraft in the hangars by removing them and by localising the fires. These efforts failed in the case of the "A" type hangar but the fire in A.R.S. was got under control and six aircraft rescued.

10. Many aircraft were on fire in the "C" type hangar and petrol tanks were exploding at short intervals. It was not possible to remove aircraft from this hangar but those stowed outside were removed to a safe distance.

11. Owing the breakdown in the telephone system a car was sent to telephone to "St. Vincent" and "Collingwood", together with Fareham and Lee fire stations to ask for assistance.

12. Both "St. Vincent" and "Collingwood" sent medical assistance and "St. Vincent" in addition a fire party. These medical parties and the fire party rendered the most valuable assistance. The fire party from "St. Vincent" worked magnificiently and were largely instrumental in preventing fires from spreading.

..... 13....

13. The A.F.S. from Gosport, Lee and Fareham arrived promptly on the request for assistance being received. These services also rendered the utmost assistance and made the quickest possible use of the water available. The knowledge of fire fighting displayed and the speed with which they got their appliances into action was altogether admirable. Unfortunately Ayton, A.F.S., Fareham No; 176 was injured by falling debris and removed to R.N. Hospital, Haslar.

14. A large bomb dropped immediately in front of the Sick Bay and wrecked the building, so that all casualties had to dealt with by the emergency Sick Bay in the block opposite the Guard Room. These casualties were dealt with expeditiously and sent to Haslar Hospital. A list of casualties is attached as enclosure No. 1.

15. The casualties to aircraft are unfortunately heavy, 42 being destroyed. Enclosure No. 2.

16. The destroyed aircraft consisted mainly of those in the Storage Hangar, consisting floatplanes and aircraft under modification and repair, those in A.R.S. under repair and 13 Proctors in the "A" type hangar.

It has been the practice to keep the Proctors under cover owing to the deterioration they suffer when stowed in the open.

16 aircraft of the total destroyed were under repair.

9 floatplanes and 13 Proctors were also in the hangars and 4 aircraft were destroyed outside the hangars.

17. The casualties to personnel occurred chiefly in the vicinity of the Air Watch Office (land), where armed parties were in the trenches but with no overhead cover. Two 1,000lb bombs dropped in this immediate vicinity. These trenches are in the process of being provided with overhead cover.

18. A report on the damage sustained by Motor Transport vehicles is attached as enclosure No. 3.

19. A separate report as to the damage to Station buildings will be submitted in due course.

20. The lessons learnt from this attack are as follows :-

(a) as many men as possible should be in shelters with overhead cover;

(b) the desirability of having a sea suction in order that an alternative water supply may be readily available.

21. Police authorities have been informed concerning civilian casualties and all action taken by them to inform next-of-kin.



CAPTAIN.

CONFIDENTIAL.

ENEMY AIR ATTACK - LEE-ON-SOLENT.

FROM: THE COMMANDING OFFICER, R.N. AIR STATION, LEE-ON-SOLENT.

DATE: 10th October, 1940. No. 10365/406A.

TO: THE REAR ADMIRAL, NAVAL AIR STATIONS.

The following report of a low bombing and machine gun attack on this Station, which took place at 1850 on Tuesday, 8th October, 1940, is submitted.

2. The "Yellow" warning was received at 1844 followed by the "Red" warning at 1846. A few minutes later three enemy bombers were seen approaching this Station from a S.S.E. direction. These aircraft were Heinkel 111's and were flying in very close V formation at about 70 feet. They crossed the Southern boundary of the Station at the Slipway and were then steering North.

3. Fire was opened on these aircraft by the two Southern machine gun posts, each post firing 140 rounds. The enemy aircraft returned this fire. There is no doubt that these aircraft were repeatedly hit by the two Southern machine gun posts. The two Hispano 20 m.m. guns mounted on the cliff also engaged the enemy. Unfortunately the Eastern gun jammed after firing one round, but the Western gun fired 22 rounds, and the crew are confident that they obtained hits. The two machine gun posts on the West side of the aerodrome opened fire on the enemy aircraft as soon as they came in sight as did four posts on the North side. These guns are manned by a detachment of the 8th Hampshire Regiment.

4. While the enemy were over the aerodrome they were engaged by the two Hispano 20 m.m. guns which are situated, one in the North West corner and one on the Eastern side of the aerodrome. Unfortunately the gun in the North West corner jammed after firing one round. The other gun fired 39 rounds and the crew are confident that they obtained hits.

5. The two 12-Pdr. guns of the 107th A.A. Battery, Royal Artillery, had little opportunity of bringing their guns to bear, owing to the low altitude of the enemy aircraft. They did, however, fire 5 rounds one of which was seen to burst very close to one enemy aircraft.

6. The starboard wing aircraft was seen to drop its bombs over the aerodrome. It is thought that the leading aircraft also dropped its bombs here too, as 28 bombs in all fell on the aerodrome in nearly a straight line. The port wing aircraft dropped its bombs West of Stubbington Lane.

7. The leading aircraft and the port wing aircraft turned to port after dropping their bombs, but the starboard wing aircraft turned to starboard and came under more fire. This aircraft was last seen steering a North Easterly course with smoke coming from the fuselage. News was subsequently received that a Heinkel 111 had crashed North of Emsworth.

8. Twelve bombs in all were dropped West of Stubbington Lane, including two in a house in Stubbington Lane. These two bombs did not explode, nor did two more which fell in a field nearby. These unexploded bombs have now been rendered safe by the demolition party of this Station assisted by a Bomb Disposal officer from Portsmouth.

/...9. All the bombs

9. All the bombs dropped were of 50 kilogrammes fitted with No. 25 fuses. The craters made in the aerodrome and adjacent field were very small, averaging 6 feet in diameter and 18 inches to 2 feet deep.

The aerodrome was rendered serviceable by the prompt work of the Royal Engineer detachment by 1645 on Wednesday, 9th October, 1940.

10. No damage was done to aircraft or buildings and there were no casualties.

11. The lessons learned from this attack are as follows :-

(a) The importance of a proportion of guns being manned day and night, as warning of a raid, as in this case, may only be given a few minutes before an attack.

(b) Little damage is to be expected from bombs of the kind used on this occasion.

(c) The great importance of correct maintenance of the Hispano 20 m.m. guns.

11. The two jams are now being investigated and it is thought that they were due to worn gas check washers. The muzzle attachments of these guns are now removed to improve the recoil action.

11 OCT 1940

CAPTAIN.

R.A.N.

0389/44

ENEMY AIR ATTACK ON SHORE ESTABLISHMENT - REPORT.

FROM: THE COMMODORE, R.N. BARRACKS, HER ON SOLENT.

DATE: 23rd May, 1944. LEE No. 295.

TO: THE FLAG OFFICER, NAVAL AIR STATIONS.
(Copy to:- The Commander-in-Chief, Portsmouth).

The following report in accordance with O.A.F.O.587/40, paragraph 4, is submitted :-

a. 0050 on the 23rd May, 1944. Weather - South-West Wind Force 2. Hazy, Cloud Stratus three tenths, base 2500 feet.

b. Circumstances of the attack not known. Green flares were used by aircraft. No moon.

c. Type of attack High Explosive Bombs.

d. One stick of three bombs, estimated to be 250 Kilo S.C. Bombs was dropped at 0050 near the North-West Corner of the R.N. Air Station, one dropping in the air-field. Bombs were of impact fuse.

e. Damage caused :-

1. (i) One Nissen Hut used by 9th Royal Marine A.A. Company for accommodation was completely demolished. One Nissen Hut used by 1st Royal Marine A.A. Company, slightly damaged.

(ii) Mains type Hangar damaged by splinters. Doors cannot be closed. Second Mains type Hangar damaged by splinters and glass blown out.

(iii) Four Seafires, one badly damaged, three slightly damaged.

(iv) Northern Squadron office block, used by 885 Squadron - windows and doors blown out, telephone and power cables cut.

(v) Two Nissen Huts used by 886 Squadron as offices, slightly damaged and telephone cables cut.

(vi) Two dispersed Motor Transports - superficial damage.

2. Casualties to personnel :-

The following casualties were sustained and admitted to R.N. Hospital, Haslar, at 0330 :-

Po/x 107712	Corporal Markey	J.L.S.	Serious
Po/x 112332	L/Cpl. Crawford	C.W.	Dangerous
RX 5619	Marine Dennis	W.G.	Serious
Po/x 100639	Marine Swinburne	E.H.	Not Serious
Fly/x 102896	Marine Barber	Cyril.	Not Serious

The next of kin of those on the Dangerous Case List and Serious Case List have been informed by Commandant, Royal Marine Barracks, Eastney. Five minor casualties are being treated in the Station Sick Quarters.

f. Enemy Aircraft were not visible, no rounds fired by Light Anti-Aircraft defence.

M. 1239
1944

g. No remarks

h. No special assistance required.

k. It is not considered that the war effort of this Establishment is in any way affected, other than damage to aircraft, and Reports on these aircraft [redacted] will be forwarded.

MILITARY BRANCH
31 MAY 1944
ADMIRALTY

SENIOR FLAG OFFICER
24 MAY 1944
NAVAL AIR STATIONS

E. C. Thornton

COMMODORE.

AQ/B.

III

3777
ROMAS No. 3777/1269/1 ✓

The Secretary of the Admiralty.
(Copy to:- The Commodore,
R.N.Barracks, Lee-on-Solent.)

Forwarded.

Lee-on-Solent.
26th May 1944.

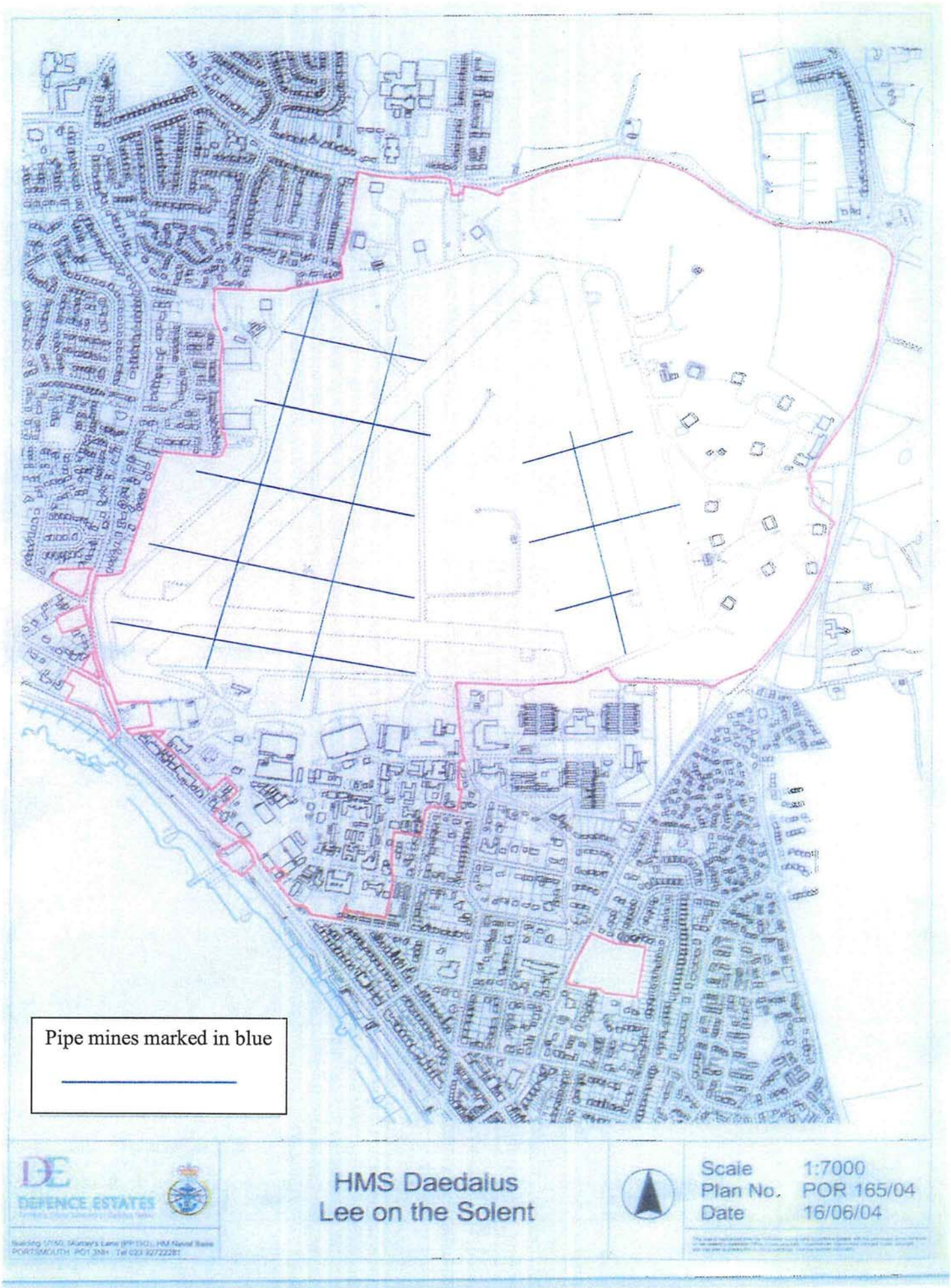
for FLAG OFFICER
NAVAL AIR STATIONS.

CENTRAL
29 MAY 1944

ANNEX G

PIPE MINE LAYOUT

Pipe mine layout - representative only



ANNEX H

PIPE MINE CONSTRUTION

Pipe mine construction as advised by 33 Engineers Regt (EOD). The drawing is from their records circa 1942.

5-MAY-2005 15:12 From:EOC GROUP 01223203630 To:01225 467257 P.2/8

TYPICAL PIPEMINE LAYOUT

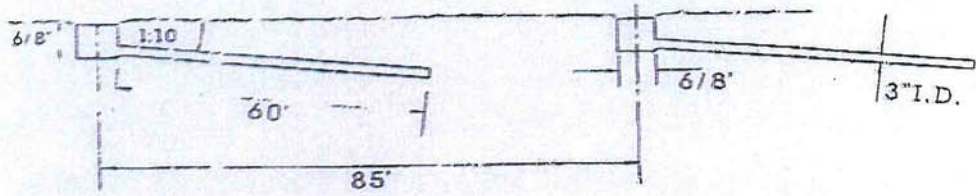


FIG 1

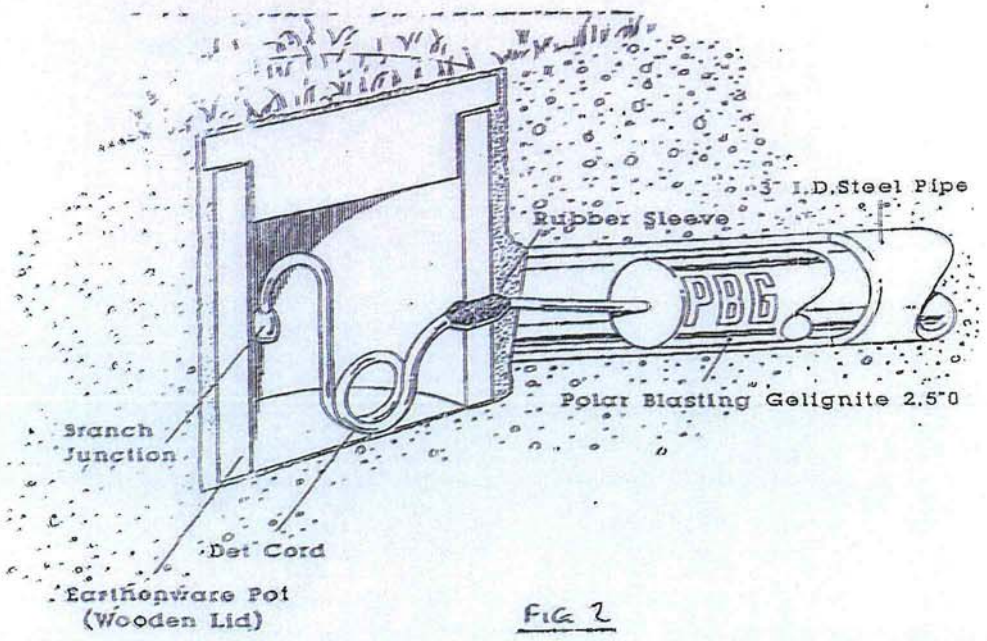


FIG 2

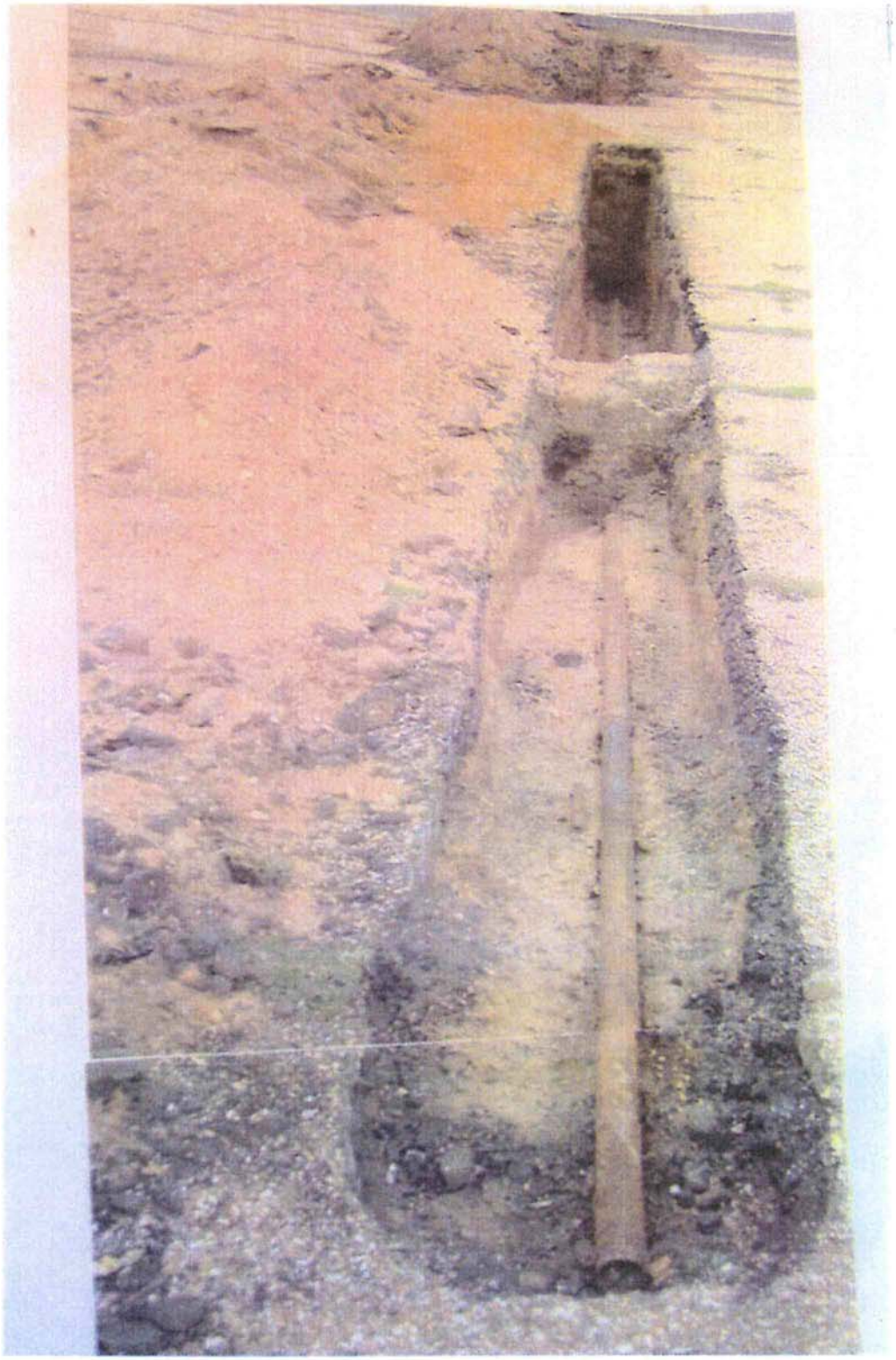
ANNEX I

PIPE MINE PHOTOGRAPHS

This picture shows Royal Engineers inspecting a pipe mine during excavation in 1981.
(Photograph courtesy of Mr J.Swanborough)



Exposed pipe mine, pictured during clearance operation (photograph courtesy of 33 Engineers Regt. (EOD)



Polar Blasting Gelatine (PGB), as removed from the pipe casing. Photograph courtesy of 33 Engineers Regt. (EOD)



ANNEX J

PREVIOUS EOC CERTIFICATES

PIPE MINE CLEARANCE
9TH JANUARY 1947

34 (1)

Salisbury 2241 Ext 43

Subject:- Pipe Mines Airfields

SC Z/22512/G(Ops)
9 Jan 47

To:- The Commander-in-Chief,
PORTSMOUTH ( )(2)

The Principal Officer,
6 Region, READING (3)

From:- Southern Command

Enclosed herewith are copies of the Army Commanders Clearance Certificate together with Sketch Maps relating to the clearance of Canadian Pipe Mines from LEE ON SOLENT NAVAL AIR Station, IOW.

BGS,
Southern Command.

SALISBURY
MB

Copy to:- War Office (DBD)
A&H District
RE)
Lands) Less Sketch Map

CHIEF ENGINEER
10 JAN 1947
SOUTHERN COMMAND

RESTRICTED

Date: 9 Jan 47

Serial No: A3

CERTIFICATE

OF THE

REMOVAL OF DANGEROUS MILITARY DEFENCE WORKS

Type of Dangerous Defence Work	Pipe Mines (Airfields)
Location	LEE ON SOLENT Airfield IOW
Military Reference	OS Map 1" to 1 mile Sheet 142, Ref 992214 Lines A-O
Civil Reference	See attached sketch map for approximate size and location in relation to local villages roads and landmarks

REPORT FOR TYPE II CERTIFICATE

I have carefully studied the minefield records of the above area. These records were compiled from the reports of the Officers engaged in the work of laying mines. They are accurate only in so far as the circumstances permitted when the minefield was laid.

I have compared the records with the detailed report of the Engineer Officer responsible for clearing this area and I am of the opinion that all pipe mines found within the mined area as shown on the Record Plan have been removed, and those portions of the mined area, in which pipes are shown on the Record Plan, but have not been found, have been searched with a detector with negative results. I am of the opinion, therefore, that the whole area can now be considered as safe.

Lieut-General,
Commanding-in-Chief,
Southern Command.

PIPE MINE CLEARANCE
26TH SEPTEMBER 1984

(29)

REPORT ON DISPOSAL OF PIPE MINE

No 21 AT LEE ON SOLENT ON 26th AND 27th SEP 84

BY SGT J SAWYERR RE

1. On the 25th of Sept 84 I was tasked by my OC Maj G E Ward with the render safe and disposal of pipe mine No 21 at HMS DAEDALUS Lee on Solent. The task was to be completed ASP as the pipe mine was holding up construction of a runway.

2. All men and equipment were assembled at HMS DAEDALUS by midday on the 26th Sep 84. Work began immediatly on breaking the concrete up on the old runway which covered the pipe mine. Whilst this was going on the remainder of the section taped up some three hundred windows which it was thought might be susceptible to blast damage.

3. The RSP used was to deal with the pipe mine in situ as it was judged unwise to try to tow the pipe mine away to a place further from the buildings for the following reasons:

a. The head of the pipe was lying in the wrong position to allow room to tow the pipe mine out of the trench.

b. To move the pipe mine to an area further away from the buildings would have entailed towing it over concrete runways, a risk I was not prepared to take.

c. It was found on investigation that all the grassed areas around the site had perry matting approx 6" below the surface. Therefore digging another trench would have been both difficult and expensive to repair.

4. Having explained my RSP to the base First Lieutenant and explained the reasons for it he concurred and agreed that damage to some windows was the lesser of the evils. At 1600hr when the area had been cleared and cordoned, work went ahead with the uncovering of the pipe mine, this was completed in approx two hours.

The following morning at 0600hrs the cutting of the pipe mine took place, on investigation about 3 ft of the pipe around the earth plug was found to have high ordered. The pipe itself was found to have 30 cart 2½" X 12" long at the longer end. These were water flushed out and removed to a safe site and disposed of by burning. These were water flushed out and removed to a safe site and disposed of by burning. The empty pipes then had cordtex detonated in them to prove them safe to handle, half a pound of PE4 was also detonated in the flushing water to ensure no residue of nitroglycerine remained. This having been completed the trench was backfilled and the site cleared by 1030hrs 27th Sep. Approx 22 windows were found to be smashed or cracked. The explosion reports are attached at annex A.

On return to Lodge Hill Camp a verbal report was given to OC 49 sqn (EOD)

J SAWYERR
SGT RE

04 OCT 84

Senior Estate Surveyor
Property Services Agency
Room 614, Brunel House
The Hard
Portsmouth PO1 3DS

33 Engineer Regiment (EOD)
Lodge Hill Camp
Chattenden
Rochester
Kent
ME3 8NZ

Medway 44555 Ext 681

Date: 4 Oct 84

WEEKLY RETURNS - DEMOLITIONS

Herewith information regarding demolitions carried out in ~~Portsmouth~~ ..... during the week ending ~~28 Sep 84~~ ..

LOCATION	MAP REFERENCE	DESIGN OF MISSILE	NUMBER OF MISSILES DESTROYED	a. WEATHER b. WIND DIRECTION	DATE & TIME	DAMAGE REPORT
HMS DAEDALUS Lee on Solent ~~Hants~~	196/ 558015	Pipemine	70 ft	a. Dry b. Light W	27 Sep 84 0600 hrs	22 broken windows in ~~the MOD~~ Establishment. Report attached.
"	"	Controlled Explosion		a. Dry b. Light W	27 Sep 84 0713 hrs	

Major RE
for Commanding Officer

/BAS

EXPLOSIVE ORDNANCE CLEARANCE
CONSTRUCTION OF NEW DRAINS
13TH DECEMBER 1985

34

33 Engineer Regiment (EOD)
Lodge Hill Camp
Chattenden
Rochester
Kent
ME3 8NZ

Army: Chattenden Military)
GPO: Medway (0634) 44555) Ext 672

Ref: 34/HANTS/60

To: SENIOR ESTATE SURVEYOR
PROPERTY SERVICES AGENCY
BRUNEL HOUSE ROOM 614
42 THE HARD
PORTSMOUTH PO13DS

Date: 13 Dec 85

CLEARANCE OF UNEXPLODED EXPLOSIVE ORDNANCE

LEE ON SOLENT AIRFIELD, GOSPORT, HANTS

1. Clearance of Unexploded Explosive Ordnance at the above location was completed on 22 NOV 85

2. Clearance Certificate is forwarded together with a plan appropriately marked.

3. On behalf of the Ministry of Defence please inform the interested parties that search of the area is completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.

4. Interested parties:

COMMANDER
HMS DAEDALUS
LEE ON SOLENT
HANTS
PO13 9NJ

Major RE
for Commanding Officer

Encls

Copy to:

HQ Engr Sp
HQ SE DISTRICT District
MOD (Lands) Chessington
MOD DS6
/BAS

CERTIFICATE OF CLEARANCE OF EXPLOSIVE MATERIALS AND OTHER DANGEROUS SUBSTANCES (DCI (General) S18/1974)

Location: LEE ON SOLENT AIRFIELD, GOSPORT, HANTS

Map Reference: ORD SURVEY MAP No 196 GRID 560 020 District: SOUTH EAST

Date(s) of search: 18 NOV 85 -22 NOV 85

1. The site in respect of which this certificate is shown coloured/~~verged~~ RED on the plan attached hereto.

2. There being no record of knowledge of explosives ~~having been~~ used or stored either by MOD or other users ~~on the site~~/areas marked _____ it is certified ~~that the site~~/areas have been subject to a thorough visual ~~search~~.

3. ~~Records show~~/It is known ~~that~~ explosives have been used ~~and~~/or stored on the ~~site~~/areas marked RED

a. An instrument search has been carried ~~o~~ut. of areas marked red.

b. An instrument search ~~is unnecessary~~ was impossible and a visual search only has been carried out. of areas markedblue.

Signature: P M Evans

13 DEC 1985 Major RE for CO 33 Engr Regt (EOD)

~~c. Search requirements are beyond the capability of the Unit. The~~ site/areas have not been searched: (Indicate areas not searched)

The matter has been referred to _____ with a request that search requirements be carried out and a further certificate completed.

4. The Site/area indicated _____ ~~has been used exclusively for living quarters and has not been searched.~~

5. No/~~the following~~ explosives or other dangerous substances have been recovered. ~~They have been removed and/or destroyed in accordance with current regulations~~. SEE ANNEX A ATTACHED.

~~6. In addition, as far as practical, it has been ascertained that:~~

a. No oil, gas, chemicals or other dangerous substances are buried or stored within the curtilage of the site and the ground has not been contaminated by such substances.

b. (1) There is no record or knowledge of hazardous radioactive materials being used or stored on the site either by MOD or other users.

or (2) All buildings/areas in which radioactive materials have been used or stored have been monitored and have been certified as free ~~from radioactive contamination.~~

~~c. There appear to be no defects in any building which could/would constitute a danger to life or limb.~~

d. There is no known hazard within the curtilage of the site, which ~~could~~/would constitute ~~a danger to life~~ or limb.

7. Any other comments:

A lane 20m wide along the proposed new drainage system was searched with Forster Locators 4021. The unsearchable areas were marked on the site and the PSA representative informed.

no items of explosive origin were found.

Signature: [signature]

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

13 DEC 1985

8. Comments of MOD Sponsor Directorate:

NB: Delete in applicable clauses of paras 2 to 5 and 6b, as appropriate.

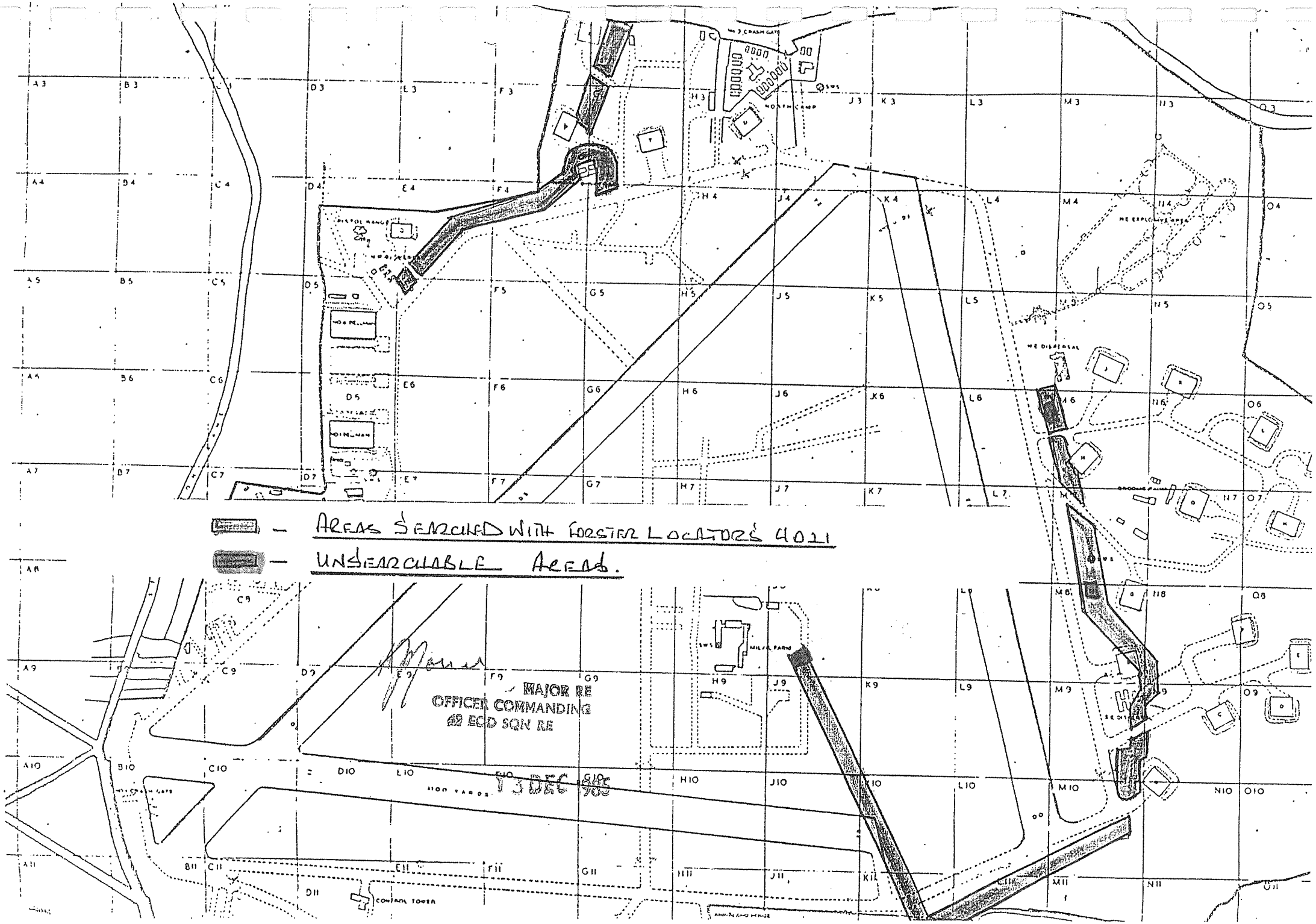
Annex A to 34/HANTS/60

PARTICULARS OF UXOs FOUND

NIL

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

13 DEC 1985


— AREAS SEARCHED WITH FORSTER LOCATORS 4021
— UNSEARCHABLE AREAS.
MAJOR RE
OFFICER COMMANDING
42 ECD SQN RE
13 DEC 85
CONTROL TOWER

EXPLOSIVE ORDNANCE CLEARANCE
INSTALLATION OF CABLES
23RD SEPTEMBER 1986

40

33 Engineer Regiment (EOD)
Lodge Hill Camp
Chattenden
Rochester
Kent
ME3 8NZ

Army: Chattenden Military) Ext 672
GPO: Medway (0634) 44555)

Ref: 34/HANTS/60

To: SENIOR ESTATE SURVEYOR

PROPERTY SERVICES AGENCY

BRUNEL HOUSE ROOM 614

42 THE HARD

PORTSMOUTH PO1 3DS

Date: 23 SEP 86

CLEARANCE OF UNEXPLODED EXPLOSIVE ORDNANCE

LEE-ON-SOLENT AIRFIELD, GOSPORT, HANTS.

1. Clearance of Unexploded Explosive Ordnance at the above location was completed on 10 SEP 86.

2. Clearance Certificate is forwarded together with a plan appropriately marked.

3. On behalf of the Ministry of Defence please inform the interested parties that search of the area is completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.

4. Interested parties:

COMMANDER
HMS DAEDALUS
LEE-ON-SOLENT
HANTS
PO13 9NJ

Major RE
for Commanding Officer

Encls

Copy to:

HQ Engr Sp
HQ S EAST District
MOD (Lands) Chessington
MOD GS SEC1

CERTIFICATE OF CLEARANCE OF EXPLOSIVE MATERIALS AND OTHER DANGEROUS SUBSTANCES (DCI (General) S18/1974)

Location: LET ON SOLENT AIRFIELD, GOSPORT, HANTS

Map Reference: OS MAP 196 GR 560020 District: SOUTH EAST

Date(s) of search: 09 Sep 86 - 10 Sep 86

1. The site in respect of which this certificate is shown coloured/~~verged~~ RED on the plan attached hereto.

2. ~~There being no record of knowledge of explosives having been used or~~ stored either by MOD or other users on the ~~site/areas~~ marked _____ it is certified that the ~~site/~~areas have been subject to a thorough visual ~~search~~.

3. ~~Records show/~~it is known that explosives have been used ~~and~~/or stored on the ~~site~~/areas marked RED

a. An instrument search has been carried out.

b. ~~An instrument search is unnecessary and a visual search only has been carried out.~~

23 SEP 1986 Signature _____
Major RE for CO 33 Engr Regt (EOD)

c. ~~Search requirements are beyond the capability of the Unit.~~ The site/areas have not been searched: (Indicate areas not ~~searched~~)

_____

The matter has been referred to _____ with a request that ~~search~~ requirements be carried out and a further certificate completed.

4. ~~The~~ Site/area indicated _____ ~~has been used exclusively for living quarters and has not been searched~~.

5. No/~~the following~~ explosives or other dangerous substances have been recovered. ~~They have been removed and/or destroyed in accordance with current regulations~~. ~~SEE ANNEX A ATTACHED~~.

6. ~~In addition, as far as practical, it has been ascertained that~~:

a. No oil, gas, chemicals or other dangerous substances are buried or stored within the curtilage of the site and the ground has not been contaminated by such substances.

b. (1) There is no record or knowledge of hazardous radioactive materials being used or stored on the site either by MOD or other users.

or (2) All buildings/areas in which radioactive materials have been used or stored have been monitored and have been certified as free ~~from radioactive contamination~~.

c. ~~There appear to be no defects in any building which could/would constitute a danger to life or limb.~~

d. There is no known hazard within the curtilage of the site, which ~~could~~/would constitute a danger to life or limb.

7. Any other comments:

The areas which are required for the installation of IRFIS and HT cable were marked on the ground by PSA using pickets and searched by the team from this unit with Forster Locators 4021. No items of explosive origin were found. All scrap found was removed. The work consisted of searching:

a. Electrical feeder trench 100 m long by 3 m wide.

b. IRFIS - lane 200 m long by 3 m wide on both sides of the main runway.

c. Sonar equipment - Lane the full length of the runway 2 m wide on both sides.

Dated 23 SEP 1986 Signature:

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

8. Comments of MOD Sponsor Directorate:

NB: Delete in applicable clauses of paras 2 to 5 and 6b, as appropriate.

Annex A to 34/HANTS/60

PARTICULARS OF UXOs FOUND

NIL

23 SEP 1986

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

LEE ON SOLENT AIRFIELD

ORD SURVEY MAP SHEET NO: 196

GRID : 560020

HOUSING ESTATE UNDER CONSTRUCTION
IN THIS AREA

MAJOR RE
OFFICER COMMANDING
62 ECD SQN RE

23 SEP 1986

AREAS SEARCHED WITH FORSTER LOCATORS 4021

LEE-ON-SOLENT

EXPLOSIVE ORDNANCE CLEARANCE
INSTALLATION OF EMERGENCY WATER TANKS
9TH MARCH 1987

33 Engineer Regiment (EOD)
Lodge Hill Camp
Chattenden
Rochester
Kent
ME3 8NZ

Army: Chattenden Military)
GPO: Medway (0634) 44555) Ext 681

Ref: 34/Hants/60

To: Senior Estate Surveyor
Property Services Agency
Brunel House, Room 614
42 The Hard
Portsmouth PO1 3DS

Date: 9 Mar 87

CLEARANCE OF UNEXPLODED EXPLOSIVE ORDNANCE

LEE-ON-SOLENT AIRFIELD, GOSPORT, HANTS.

1. Clearance of Unexploded Explosive Ordnance at the above location was completed on 26 Feb 87.

2. Clearance Certificate is forwarded together with a plan appropriately marked.

3. On behalf of the Ministry of Defence please inform the interested parties that search of the area is completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.

4. Interested parties:

Commander
HMS DAEDALUS
Lee-on-Solent
Hants
PO13 9NJ

Major RE
for Commanding Officer

Encls

Copy to:

HQ Engr Sp
HQ South East District
MOD (Lands) Chessington
MOD GS Sect I

CERTIFICATE OF CLEARANCE OF EXPLOSIVE MATERIALS AND OTHER

DANGEROUS SUBSTANCES (DCI (General) S18/1974)

Location: Lee-on-Solent Airfield, Gosport, Hants.

Map Reference: Ord Survey Map Sheet No 196 District: South East
Grid 560020

Date(s) of Search: 23 Feb - 26 Feb 87

1. The site in respect of which this certificate is shown coloured/~~verged~~ Red on the plan attached hereto.

2. ~~There being no record of knowledge of explosives having been used or stored either by MOD or other users on the site/areas marked~~ _____ ~~it is certified that the site/areas have been subject to a thorough visual search~~.

3. ~~Records show~~/it is known that explosives have been used ~~and~~/or stored on the ~~site~~/areas marked Red.

a. An instrument search has been carried out.

b. ~~An instrument search is unnecessary and a visual search only has been carried out~~.

26 MAR 87 Signature: _____

Major RE for CO 33 Engr Regt (EOD)

~~c. Search requirements are beyond the capability of the Unit. The site/areas have not been searched: (Indicate areas not searched)~~.

_____

~~The matter has been referred to~~ _____
~~with a request that search requirements be carried out and a further certificate completed~~.

4. ~~The site/area indicated~~ _____
~~has been used exclusively for living quarters and has not been searched~~.

5. No/~~the following~~ explosives or other dangerous substances have been recovered. ~~They have been removed and/or destroyed in accordance with current regulations~~. SEE ANNEX A ATTACHED.

6. ~~In addition, as far as practical, it has been ascertained that~~:

~~a. No oil, gas, chemicals or other dangerous substances are buried or stored within the curtilage of the site and the ground has not been contaminated by such substances~~.

~~b. (1) There is no record or knowledge of hazardous radioactive materials being used or stored on the site either by MOD or other users~~.

~~or (2) All buildings/areas in which radioactive materials have been used or stored have been monitored and have been certified as free from radioactive contamination~~.

~~c. There appear to be no defects in any building which could/would constitute a danger to life or limb.~~

d. There is no known hazard within the curtilage of the site which ~~could~~/would constitute a danger to life or limb.

7. Any other comments:

Three small areas required for siting of telegraph poles and firefighting water tanks were searched with Forster Locators 4021. No items of explosive origin were found except screw anchorage pins and pickets.

6 MAR 1987 Signature: _____

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

8. Comments of MOD Sponsor Directorate:

NB. Delete inapplicable clauses of paras 2 to 5 and 6b as appropriate.

ANNEX A TO 34/Hants/60

PARTICULARS OF UXOs FOUND

NIL

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

6 MAR 1987

PIPE MINE CLEARANCE
14TH FEBRUARY 1990

(24)

33 Engineer Regiment
(Explosive Ordnance Disposal)
Lodge Hill Camp
Chattenden
ROCHESTER
Kent
ME3 8NZ

Chattenden Mil)
Medway (0634) 44555) Ext 2681

34/HANTS/60

Ministry of Defence
Defence Land Agent
Brunel House
The Hard
PORTSMOUTH
PO1 3OS

14 Feb 90

CLEARANCE OF UNEXPLODED EXPLOSIVE ORDNANCE

LEE-ON-SOLENT AIRFIELD, GOSPORT, HANTS.

1. Clearance of Unexploded Explosive Ordnance at the above location was completed on 23 Oct 89.

2. Clearance Certificate is forwarded together with a plan appropriately marked.

3. On behalf of the Ministry of Defence please inform the interested parties that search of the area is completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.

4. Interested parties: Commander, HMS DAEDALUS
Lee-on-Solent, Hants.
PO13 9NY

Major RE
for Commanding Officer

Encls:

Copy to:

HQ UKLF Engr Branch
HQ South East District
MOD (Lands) Chessington
MOD GS Sect 1

D6/C

AREA FOR TELEGRAPH POLES

AREA FOR FIRE FIGHTING TANKS.

CONTROL TOWER.

AREA FOR FIREFIGHTING TANKS

AREAS 100% 4021
LOCATOR SEARCHED
23-26 FEB 87

MAJOR RE
OFFICER COMMANDING
EOD SQN RE

6 MAR 1987

HMS DAEDALUS, LEE-ON-THE-SOLENT

CERTIFICATE OF CLEARANCE OF EXPLOSIVE MATERIALS AND OTHER DANGEROUS SUBSTANCES (DCI (General) S18/1974)

Location: LEE-ON-SOLENT AIRFIELD, GOSPORT, HANTS.

Map Reference: Ord Survey Sheet 196 Map Series Grid 560020 District: South East

Date(s) of Search: See Para 7a

1. The site in respect of which this certificate is shown ~~coloured~~/verged Red on the plan attached hereto.

2. ~~There being no record or knowledge of explosives having been used or stored either by MOD or other users on the site/areas marked~~ it is certified that the site/areas have been subject to a thorough visual search.

3. ~~Records show~~/it is known that explosives have been used ~~and~~/or stored on the site/~~areas~~ verged Red

a. An instrument search has been carried out.

~~b. An instrument search is unnecessary and a visual search only has been carried out.~~

Signature:

14 FEB 1990

Major RE for CO 33 Engr Regt (EOD)

~~c. Search requirements are beyond the capability of the Unit. The site/areas have not been searched~~: (Indicate areas not searched)

~~The matter has been referred to with a request that search requirements be carried out and a further certificate completed.~~

4. ~~The site/area indicated has been used exclusively for living quarters and has not been searched.~~

5. ~~No~~/the following explosives or other dangerous substances have been recovered. They have been removed ~~and~~/or destroyed in accordance with current regulations. SEE ANNEX A ATTACHED.

6. ~~In addition, as far as practical, it has been ascertained that:~~

~~a. No oil, gas, chemicals or other dangerous substances are buried or stored within the curtilage of the site and the ground has not been contaminated by such substances.~~

~~b. (1) There is no record or knowledge of hazardous radioactive materials being used or stored on the site either by MOD or other users.~~

~~or (2) All buildings/areas in which radioactive materials have been used or stored have been monitored and have been certified as free from radioactive contamination.~~

D.6/C

~~c. There appear to be no defects in any building which could/would constitute a danger to life or limb~~.

d. There is no known hazard within the curtilage of the site, which ~~could~~/would constitute a danger to life or limb.

7. Any other comments:

Progressive search of the Lee-on-Solent airfield, now under the control of HMS DAEDALUS, has been carried out since February 1984. The whole area was searched with Forster Locators 4021. The located pipemines were dealt with as follows - one pipemine detonated on 27 Sep 84 and and the remaining 13 excavated and removed during the period 16 Oct - 23 Oct 89.

7a.

3 Jul 84 - 13 Jul 84	18 Jan 88 - 22 Jan 88
20 Aug 84 - 30 Aug 84	8 Feb 88 - 11 Mar 88
26 Sep 84 - 27 Sep 84	21 Mar 88 - 1 day
18 Nov 85 - 22 Nov 85	7 Sep 88 - 19 Sep 88
9 Sep 86 - 10 Sep 86	22 Nov 88 - 24 Nov 88
23 Feb 87 - 26 Feb 87	16 Oct 89 - 23 Oct 89

14 FEB 1990 Signature:

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

8. Comments of MOD Sponsor Directorate:

NB. Delete in applicable clauses of paras 2 to 5 and 6b, as appropriate.

D6/C

PARTICULARS OF PIPEMINES LOCATED AND REMOVED

SER	ROW	NUMBER OF PIPEMINE	LENGTH	LOADED FULL/EMPTY
1	O	2	210 ft	Empty. Believed to be used for electrical cables.
2	Not recorded	Not numbered on loading plan	30 ft	Empty
3	Not recorded	Not numbered on loading plan	70 ft	Empty
4	Not recorded	Not numbered on loading plan	50 ft	Empty
5	Not recorded	Not numbered on loading plan	50 ft	Empty
6	Not recorded	Not numbered on loading plan	35 ft	Empty
7	A	6	30 ft	Empty
8	A	18	35 ft	Empty
9	A	19	51 ft	Empty
10	A	21	52 ft	7 x Cartridges of PBG flushed and burned off
11	A	26	30 ft	Empty
12	F	9	70 ft	Empty
13	F	13	51 ft	Empty
14	G	1	70 ft	30 Cartridges demolished on 27 Sep 84

Total Pipemines removed - 14

14 FEB 1990

Major RE
for Commanding Officer
33 Engineer Regiment (EOD)

D6/C

LEE ON SOLENT IN AREA

GRID SURVEY MAP SHEET NO: 196

GRID : 560020

HOUSING ESTATE UNDER CONSTRUCTION IN THIS AREA

BOMB DUMP

A/ Range

25m Range

AREA SEARCHED WITH FORSTER LOCATORS 4021

LOCATION OF PIPEMINES CLEARED

LOCATION OF PIPEMINE CLEARED ON 27 SEP. 84

MAJOR M
OFFICER COMMANDING
EOD SQN RE

14 FEB 1990

LEE-ON-SOLENT

EXPLOSIVE ORDNANCE CLEARANCE
SMALL ARMS RANGE
28TH NOVEMBER 1994

33 Engineer Regiment
(Explosive Ordnance Disposal)
Carver Barracks
WIMBISH
Nr Saffron Walden
Essex
CB10 2YA

MOD Network:
Wimbish (765) Ext 3705
Civil: 0223 203705

34/Hants/60

See Distribution 28 November 1994

CLEARANCE OF UNEXPLODED EXPLOSIVE ORDNANCE
HMS DAEDALUS, LEE-ON-THE-SOLENT, HAMPSHIRE

1. Clearance of Unexploded Explosive Ordnance at the above location was completed on 13 October 1994.

2. Clearance Certificate is forwarded, together with a plan appropriately marked.

3. On behalf of the Ministry of Defence, please inform the interested parties that a search of the area has been completed. Under no circumstances must the actual clearance certificate be issued to private landowners or contractors.

4. Interested parties:
The Captain
HMS DAEDALUS
Lee-on-the-Solent
Hampshire PO13 9NY
(FAO Property Manager)

W M RUSH
Major
for Commanding Officer

Enclosure:

1. Clearance Certificate for HMS DAEDALUS

Distribution:

External:

Action:

Defence Land Agent Portsmouth

Information:

HQ UKLF for SO3 (EOD)
HQ Southern District
Defence Lands Service
The Captain, HMS DAEDALUS

CERTIFICATE OF SEARCH FOR CLEARANCE OF EXPLOSIVE MATERIALS AND OTHER DANGEROUS SUBSTANCES

Location and Map Ref: HMS DAEDALUS
OS Sheet 196 GR 5501

District: Southern

Date(s) of search: 13 Oct 94

1. The sites in respect of which this certificate is given are shown coloured/~~verged~~ BLUE and GREEN on the attached plan.

Explosives

2. ~~There being no record or knowledge of explosives having been used or stored, either by MOD or other users, on the site/areas marked _____, it is certified that the site/areas has/have been subject to a thorough visual search.~~

3. Records show/it is known that explosives have been used and/or stored on the site/areas marked BLUE and GREEN.

a. An instrument search has been carried out.

b. ~~An instrument search is unnecessary and a visual search only has been carried out.~~

c. ~~Search requirements are beyond the capability of the unit. The site/areas has/have not been searched.~~

(Indicate areas not searched)

~~The matter has been referred to _____ with a request that a search be carried out and a further certificate completed.~~

4. ~~The site/area indicated _____ has been used exclusively for living quarters and has not been searched.~~

5. No/~~the following~~ explosives or other dangerous substances (including special wastes) have been recovered. ~~They have been removed and/or destroyed in accordance with current regulations (see Annex A attached).~~

Other Potential Dangers

6. In addition, as far as practicable, it has been ascertained that:

a. ~~No oil, gas, chemicals or other dangerous substances are buried or stored within the curtilage of the site and the ground has not been contaminated by such substances.~~

b. (1) ~~There is no record or knowledge of hazardous radioactive materials being used or stored on the site either by MOD or other users~~

or

(2) ~~All buildings/areas in which radioactive materials have been used or stored have been monitored and have been certified as free from radioactive contamination.~~

c. ~~There appear to be no defects in any building which could/would constitute a danger to life or limb.~~

d. There is no known hazard within the curtilage of the site, which could constitute a danger to life or limb.

7. ~~A potential danger was _____ situated at the position marked _____. The advice of _____ was sought and the following action taken _____ to their satisfaction. (Summarize details in attachment if necessary.) All reasonable steps have been taken to minimize physical hazards, level floors, fill voids, remove or make safe machinery and cut off access to potentially dangerous places and to prevent unauthorized entry.~~

8. ~~A potential danger is _____ situated at the positions marked _____. Clearance is not practical on grounds of _____. The following action has been taken to minimize the risk _____ _____. The following limitations on future use are recommended _____.~~

9. Any other comments:

HMS DAEDALUS is due to close on 31 March 1996, with the site being handed over by 31 July 1996 to Defence Land Services for disposal.

The airfield was subjected to an Op CRABSTICK clearance in 1989, resulting in the location and removal of 14 pipemines and the issue of a Clearance Certificate.

The sites of a 25m small arms range and an aircraft cannon test firing range were identified as being outside the area of the 1989 clearance, but within the boundary of the land to be alienated. It is these two sites which are covered by this Clearance Certificate.

Both sites were spot checked with a Forster 4021 locator on

setting 03, using the Union Jack method. Items of domestic scrap were recovered but no items of ordnance.

Date: 28/11/94

Signature:

Name: W M RUSH
Major
for Commanding Officer
33 Engineer Regiment (EOD)

10. Comments of MOD Sponsor Directorate.

Note: Delete inapplicable clauses of paras 2 to 9 as appropriate.

~~ANNEX A To~~
~~RECCE REPORT~~
~~Dated 13 OCT 94~~

HOUSING ESTATE UNDER CONSTRUCTION
IN THIS AREA

LEE - on - the - SOLENT
AIRFIELED
HMS DAEDALUS

BACCC
28 NOV 1994
22 HQ SQN (EOD)

Signature: _____
Name: W M RUSH
Major
for Commanding Officer
33 Engineer Regiment (EOD)

KEY

BOUNDARY OF AREA SEARCHED IN 1989

LOCATION OF PIPEMINES CLEARED IN 1989

LOCATION OF 25m RANGE

LOCATION OF AIRCRAFT TEST FIRING RANGE

TECHNICAL SITE
CERTIFICATE OF SEARCH FOR EXPLOSIVES
4TH JULY 1996

MINISTRY OF DEFENCE
DGFS (OP), CESO(N), ES350c,
Room 70, Block B, Ensleigh, Bath. BA1 5AB.
Telephone: Bath (01225) 467584 Fax: Bath (01225) 467034

CERTIFICATION OF SEARCH FOR EXPLOSIVES

1 ES350 were requested by the Property Manager Mr J Hutt, to carry out a search for explosives of areas within HMS Daedalus. These were identified as follows: Site 1 (Open ground between Mags 18 & 20), Sites 2 & 3 (Ground Defence Firing Ranges), Site 4 (The grassed area outside Bldg 162), Site 5 (The Slipways, Site 6 (The Football Training Area) Site 7 (The grassed areas surrounding the Dunning Hangar). The Dwelling from 87 to 92 Bldg. Buildings 3, 6, 7, 14, 15,16, 18, 20, 73, 87, 153, 154, 155, 161 and Rooms 19, 20 & 22 within Bldg 165.

2 On researching the historical usage of these areas it was established from verbal evidence that that there was a possibility that the buildings could have explosive contamination and that munitions might be present either in the buildings and/or on the land.

Source of information:
Mr J Hutt, Property Manager
Employees stationed at HMS Daedalus

3 As a result of this evidence the following inspections were conducted:
Visual examination.
Thorough search.
Metal detection
Chemical Testing

4 The following techniques were used:
'Sweeping' using Fisher M-Scope 1266-X Metal Detector
'Sweeping' using Schonstedt Model GA - 72Cd Magnetic Locator

5 The following ordnance were discovered:
Site 1: 8 Fired Bases (Ex Cartridge Signal 1")
Site 2: 5 Fired Bases (Ex Cartridge Signal 1")

6 Method of disposal: Disposed of IAW TIAD 5118

7 The supervision of the site and monitoring of the task was carried out by Explosive Ordnance Disposal Officers:
Mr Steve Tully (ES350c) John Bolland (ES350c1) & Andrew Rees (ES350c2)
from the 4th to the 27th of Sept 1995, and from 2nd to the 3rd of July 1996, inclusive.

8 This certifies that the land is cleared, as far as reasonably practicable, from explosive ordnance contamination.

Signed [signature] Date 4th July 1996

SITE 6
EXPLOSIVE ORDNANCE RISK ASSESSMENT
4TH FEBRUARY 2005

Our ref: DLO/DSES/ 150/8/052
Your ref: D/DE/SW/2506/122
1st Nov 2004

Defence Logistics Organisation

Date: 04 February 2005

Mr P.Greaves
DE South West.
Building 1/150, Post Point 19D
Murrays Lane
HM Naval Base
Portsmouth
PO1 3NH

SITE 6, HMS DAEDALUS. EXPLOSIVE ORDNANCE RISK ASSESSMENT

1 Further to our site visit on 13th & 14th December 2004, I can confirm that we have now completed our investigation of Site 6, HMS Daedalus.

2 An ordnance focused desk study was conducted by ESG, this established the area had been primarily used for Accommodation and Training and that no munitions related work took place there. Furthermore, that according to the reports held by the Public Records Office of three enemy air raids made on Lee on Solent, the area covered by Site 6 apparently escaped any damage or indications of air dropped munitions.

3 In addition to the desk study findings, an instrumental search was carried out on specific areas within the site including target extraction and a visual search was conducted of the accessible land. No ordnance was discovered during this operation.

4 Buildings still standing were deemed unsafe for visual searches.

5 It should be noted that the whole of the Gosport area was regarded as a legitimate military target and the possible presence of air dropped munitions still exits in the area. However the risks associated with the site in this respect are judged to be no higher than the surrounding area.

6 Please advise contractors that if for any reason they suspect they have come across an explosive ordnance item to contact the Civilian and MoD Police. If they require advice from ESG, they can contact John Bolland on: 01225 467117 or 07814 528076

7 An Explosive Ordnance Risk Assessment Certificate for the area will be included in the HMS Daedalus Report. If we can be of further assistance please do not hesitate to contact us.

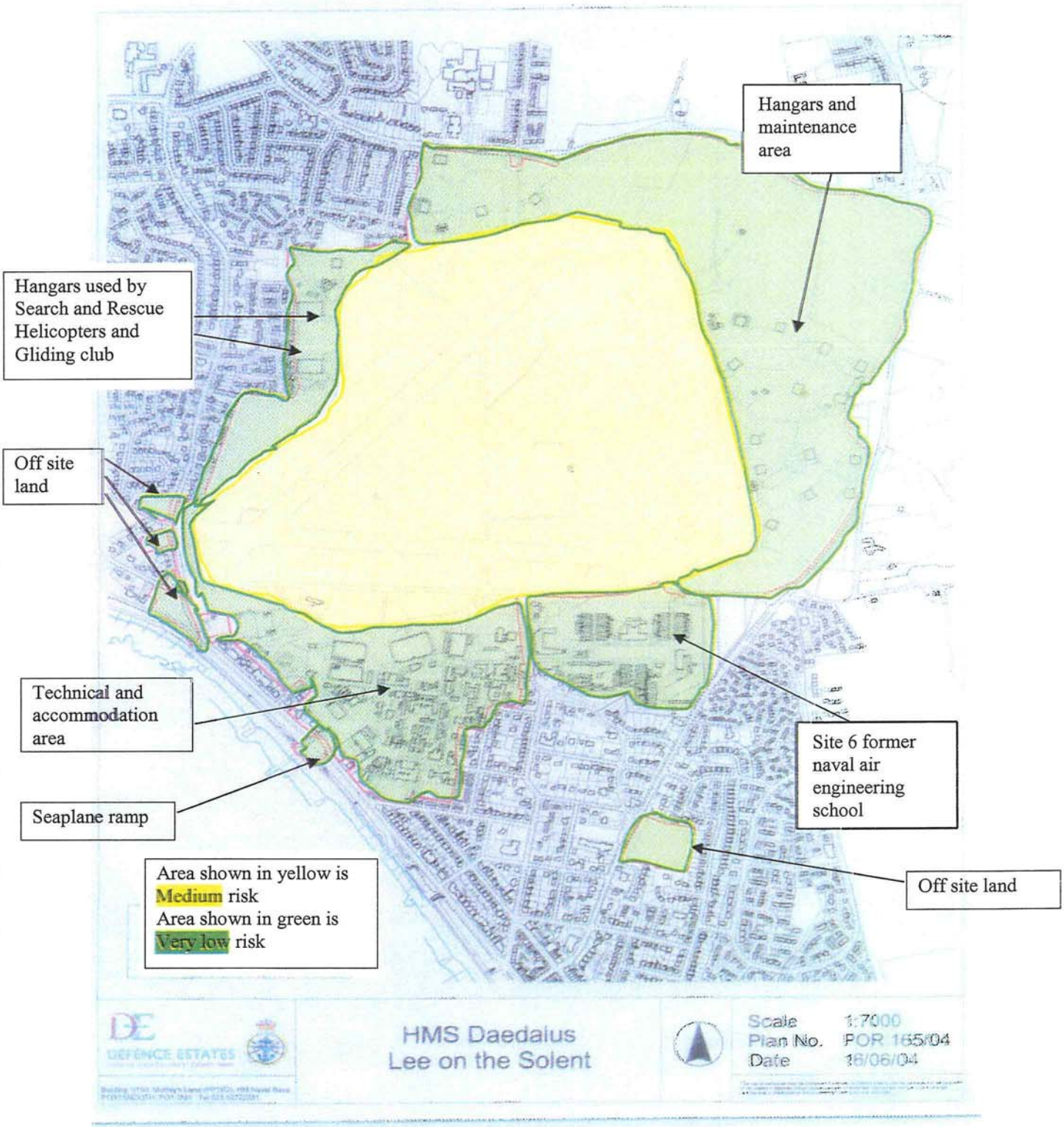
Adrian Pearce.
Land Quality Assessor (Ordnance)

Environmental Science Group
Spur 11, Dyrham, Ensleigh, Bath, BA1 5AB
Tel: 01225 468531 Military: 9355 68531 Fax: 01225 467257

ANNEX K

EXPLOSIVE ORDNANCE RISK ASSESSMENT AREAS

Risk areas at HMS Deadalus



Raven House
29 Linkfield Lane
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Surrey
RH1 1SS

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E: redhill@campbellreith.com

CampbellReith
consulting engineers

HMS Daedalus Phase II & III Explosive Ordnance Risk Assessment, January 2007, ESG Report Number ESG/06/047/F.

HMS DAEDALUS

PHASE II & III
EXPLOSIVE ORDNANCE RISK ASSESSMENT

ESG Report Number ESG/06/047/F
January 2007

INVESTOR IN PEOPLE

PHASE II & III

EXPLOSIVE ORDNANCE RISK ASSESSMENT

HMS DAEDALUS

HAMPSHIRE

Report Prepared for:
Mr P. Greaves
Estate Advisor
Defence Estates South West
Building 1/150
HM Naval Base
Portsmouth
HANTS
PO1 3NH

Report Reference:
ESG/06/047/F
Date:
JAN 2007.

Project Written by:
Adrian Pearce
Land Quality Assessor (Ordnance) .....

Project Manager:
Keith Swarbrick
Senior Land Quality Assessor (Ordnance) .....

Project Principal:
Roger Tollervey
CSci, Cchem, MRSc, MSc Dip (Exp Ord)
Head of ESG .....

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This document has been prepared for Mr. Philip Greaves, Defence Estates. Feedback from the project sponsor or his staff is encouraged and questions regarding the report welcomed. ESG has expertise in various environmental areas including waste management, land remediation, environmental chemistry and environmental engineering. The group's core functions are:

Land Quality Assessment

Environmental Risk Assessment

Demilitarisation of Land

Please contact ESG if you require environmental advice, information or any of the above services at the following address:

ESG

Spur 11

Dyrham

Ensleigh

Bath BA1 5AB

Tel: 01225 467572/467117

Fax: 01225 467257

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EXECUTIVE SUMMARY

At the request of Defence Estates (DE), the Environmental Science Group (ESG), of the Directorate of Logistics Infrastructure, Safety and Security (DLISS) carried out a Phase I Explosive Ordnance Risk Assessment (EORA), of the site known as HMS Daedalus. This was to enable DE to transfer ownership of the land and buildings and assist in the redevelopment of the site.

To produce the EORA, ESG conducted a desk study of existing civilian and naval records (Report No ESG/05/041/F Dec 05). This research has shown that there is little evidence of explosive contamination on the site, **with the exception** of a potential risk presented by airfield denial pipe mines laid during WWII.

These pipe mines were placed in a grid pattern across the exposed parts of the airfield (see Annex C for location) and although subject to post war clearances, ESG could not find sufficient documentary evidence to disregard their possible presence. As a result ESG carried out an instrumental survey and intrusive search within the perimeter track (Phase II). This investigation discovered the presence of one confirmed live pipe mine and nineteen further mines of undetermined explosive content. ESG in cooperation with 33 Engineer Regiment (EOD), then coordinated the removal and disposal of these mines.

The risk from pipe mines on this site has now been assessed as very low, with the exception of a small area of concrete hard standing to the South where the risk is considered low. Whilst it is unlikely that there may be mines beneath this concrete, geophysics scans have not proved conclusive due to the reinforcing and density of the concrete. Careful consideration should be given to this area should a future decision be made to remove it (Chapter 6 Recommendations).

From the Magnetromety scans conducted in Phase II; ESG identified and removed eight expended air dropped British practice bombs located in a small clutch alongside the airfield control tower. Further samples corresponding to the same magnetic signature were excavated across the airfield, but no more practice bombs were located. The risk associated with these items is assessed as very low.

An EORA for HMS Daedalus, is contained in Chapter 7

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J CONCRETE AREA ADJACENT TO BUILDING 389

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1 INTRODUCTION

1.1. Tasking

The Environmental Science Group (ESG) of the Directorate of Logistics Infrastructure, Safety and Security (DLISS) was tasked by Mr Phillip Greaves, Defence Estates, (Project Sponsor) to undertake an Explosives Ordnance Risk Assessment (EORA) for the former naval airfield, known as HMS Daedalus, Lee-on-Solent.

1.2. Background Information

The instrumental search carried out by the ESG in Phase I referenced ESG/05/041/F, identified the potential presence of WW2 pipe mines and recommended that selected objects identified by ESG, as being of a possible explosive ordnance nature, should be extracted and examined (Phase II extractions).

On 29th March 2006, whilst carrying out these investigations the ESG team uncovered a live pipe mine (subsequently confirmed by 33 Engineer Regiment (EOD)) in a position unrecorded on the 1942 pipe mine maps. Further investigations revealed the presence of up to twenty potential pipe mines. During this period, the remains of a small number of expended 10lb practice bombs were discovered.

1.3. Assessment Objectives

The aims and objectives of the Phase II and III assessment were as follows:

Determine the extent and quantity of the pipe mines within airfield and assist the Army Bomb Disposal team in identifying and locating all potential targets.

Assist and advise Army Bomb Disposal, (tasked with EOD) so far as practicable in matters of ordnance contamination within the boundaries of HMS Daedalus airfield.

Advise and assist Defence Estates and local authorities with regard to the planning and effects of the clearance operation within the Daedalus area.

Record and collate the EOC proceedings, rescan the areas affected by the removal of ordnance and produce the final risk assessment report.

1.4. Work Programme

To enable EOC/EOD operations to be conducted on a structured basis and to assist the Bomb Disposal team in planning, calculating safety distances and for ease of reporting, the individual pipe mines (hence referred to as targets) require to be identified, numbered and marked on a map.

Work programme requirements	
1	Carry out geophysics study of the extremities of the confirmed pipe mine lanes using multi-cat logging system and hand towed array (ref sect 2.5 Metal detection equipment)
2	Use Ground Penetrating Radar (GPR) to confirm targets and determine length and depth (ref sect 2.5 Metal detection equipment)
3	Remove Summerfield tracking to allow magnetometer search of known pipe mine lanes.
4	Confirm targets are pipe mines by intrusive investigation
5	Determine live or potential status with endoscope CCTV inspection camera
6	Record location of pipe mines using Global Positioning System (GPS)
7	Removal and demolition of pipe mines (Army Bomb Disposal)
8	Carry out Quality Assurance scans over removed pipe mines to ensure no further live ordnance present
9	Produce explosive ordnance risk assessment for the HMS Daedalus site

2 SITE DESCRIPTION

2.1 General

HMS Daedalus is located on the south-west side of the peninsular reaching out from Fareham to Gosport, between the towns of Lee-on-Solent and Stubbington, Portsmouth Harbour being 4 miles to the east. Access to the site is from the north, via Junctions 9 and 11, of the M27 (see Annex A). HMS Daedalus lies between the B3334 and B3385 (Map reference SU560010).

The airfield site covers an area of approximately 200 hectares, bounded to the south and west by residential properties. These dwellings have gardens backing onto the airfield perimeter fence to the west and onto the domestic/technical buildings to the south. The north and east sides are open to fields (see Annex B).

The airfield consists of three runways, laid out in a triangle and surrounded by the perimeter fence and track. Two of the runways are closed but remain in good condition and may be used occasionally, the third is the main runway numbered 05/24. The small hangars that border the perimeter track have been leased to companies for commercial and private aircraft operations, maintenance, storage and light engineering. All the airfield support systems remain in place: re-fuelling, lighting and fire services.

Two medium sized hangars on the east side are used by the search and rescue organisation and the Royal Navy's gliding club. Air traffic and ground control is administered by the Hampshire police flying unit and conducted from the old control tower. On weekends, and some weekdays, the airfield is active with sport aviation including gliding, model flying and light aircraft.

The southern part of the airfield is dominated by the large hangars, former technical buildings, officers' wardroom and residences, accommodation blocks, galleys, sick bay, parachute store, armoury, rifle range, motor transport yards and miscellaneous buildings covering an area of 70 hectares, which constitute the facilities at HMS Daedalus. This area has now been turned over to industrial uses.

2.2 Areas of potential concern (APC's)

APC's from the magnetometer scans were identified as following:

Target No	Targets identified and numbered with reference to the WW2 Canadian Pipe mine maps (see Annex C and E for positions)
Unrecorded mine between C16/C17	Camera showed pipe to be empty for first 46ft, unable to proceed further assume up to 10ft of live charges remaining (Approx 30lbs of explosives at 2.3m below surface)
G29	Camera showed pipe to be empty for first 6ft, unable to proceed further assume up to 34ft of live charges remaining (approx 90lbs of explosives at 0.8m below surface)
A27	Camera showed pipe to be empty for first 39ft, top of pipe was fitted with a collar indicating that one section had been extracted. Believe camera was at the end of the pipe, may contain explosive residue (2.5m below surface)

Target No	Targets identified and numbered with reference to the WW2 Canadian Pipe mine maps (see Annex C and E for positions)
F2	Top of this mine is under the taxiway mine plan indicates it is 48ft long and loaded with 92.5lbs of explosives 0.6m below surface. Unable to confirm status of this mine
F4	Too deep to dig by hand believed to be last 3 sections of pipe mine treat as live (approx 90lbs of explosives at 1.0m below surface)
F6	Top of pipe was fitted with a collar indicating that one section had been extracted. Unable to use camera due to soil blocking pipe, assume up to 30ft of live charges remaining (approx 90lbs of explosives at 1.0m below surface)
Unrecorded mine between F6/F7	Completely hidden under tarmac approx 70ft long assume live (approx 150lbs of explosives at 0.6m below surface)
G6	Unable to expose by hand digging mine plan indicates it is 60ft long and loaded with 125.5lbs of explosives at 1.0m below surface
G9	Unable to expose by hand digging mine plan indicates it is 60ft long and loaded with 125.5lbs of explosives at 1.0m below surface
A15	Unable to expose by hand digging mine plan indicates it is 48ft long and loaded with 92.5lbs of explosives at 1.0m below surface
Unrecorded mine between G9/G10	Complete fully loaded pipe mine, not on original mine plan. Geophysics indicate it is approx 60ft long (approx 120lbs of explosives at 0.6m below surface)
Unrecorded mine between H4/H5	Camera showed pipe to be empty for 35ft before losing visibility in water, unable to proceed further assume up to 10ft of live charges remaining (Approx 30lbs of explosives at 1.8m)
H5	Completely buried under new runway, mine plan indicates 60ft long and loaded with 125.5lbs of explosives at 0.6m below surface
H6	Completely buried under new runway, mine plan indicates 70ft long and loaded with 149lbs of explosives at 0.6m below surface
L11	Completely buried under runway unable to access (assume 100lbs of explosives at 0.6m)
L12	Completely buried under runway unable to access (assume 100lbs of explosives at 0.6m)
M10	Completely buried under runway unable to access (assume 100lbs of explosives at 0.6m)
M11	Completely buried under runway unable to access (assume 100lbs of explosives at 0.6m)
H0	Top of pipe just under surface but closed over therefore unable to investigate further, (assume 100lb of explosives at 0.3m below surface)
F1	Completely buried under tarmac estimated to be 20ft in length (assume 50lbs of explosives at 1.0m)
H3	Scan obscured by airfield sign. (assume 50 feet and 100lbs of explosives)
Area 5	10lb Practice bombs (see Annex H for airfield location)
Concrete area adjacent to Building. 389	In addition to the pipe mines revealed in the Magnetromety scans the concrete area forward to Building 389 was subjected to both Magnetromety and GPR (radar) scans

2.3 Site work

The objective of the clearance operation was to address the specific APC's identified from the magnetometer survey and to conduct sufficient intrusive investigation of the APC's to establish the risk, status and condition of the ordnance.
The intrusive stage of the site investigation and remediation was conducted between 1st February and 8th June 2006.

2.4 Personnel

The search procedures involved the following trained personnel conducting visual and instrument searches of the land and buildings for Explosive contamination:

Mr. K. Swarbrick	Senior Land Quality Assessor (Ordnance).
Mr. J. Bolland	Senior Land Quality Assessor (Ordnance).
Mr. J. Swanborough	Land Quality Assessor (Ordnance).
Mr. A. Pearce	Land Quality Assessor (Ordnance).
Miss. H. Lennox	Land Quality Assessor (Ordnance).

2.5 Metal Detection Equipment

Foerster Ferex 4.021 Locator

The Foerster Ferex 4.021 Locator is a land based ferrous metal detector, which enables an operator to evaluate the ferrous contamination in a pre-determined area using a single probe.





Foerster Ferex 4.032 Data Logger, API & Multi-Cat Towed Array

The Foerster Ferex 4.032 data logger & Multi-Cat Towed Array which both use satellite navigation is a land based metal locator, which records all ferrous items in a pre-determined area using either single probe or up to a total of four probes, enabling operators using a laptop computer to evaluate the nature of site contamination prior to conducting remediation.

Multi-Cat Towed Array



ESG advanced 4 Meter Towed array system.

ESG have developed a 4 meter wide magnetometer towed array system specifically to cover large open areas. Data gathered can then be analysed using a software system capable of providing discerning target information. ESG is currently the only organisation with this capability in the UK.



Mala Geoscience CPU 11 Ground Penetrating Radar (GPR)

Ground penetrating radar is the general term applied to techniques which employ radio waves, typically in the 500 to 1000 MHz frequency range, to locate and map buried structures and features. A major difficulty in EOC operations is to determine whether contamination is due to ordnance or benign objects. Certain sites may present a high proportion of erroneous targets. In particular it is difficult to determine whether an area contains one object or several close together. Used in conjunction with the magnetometer survey the GPR can provide corroboration of the targets size, shape and position in the ground.

Mala Ground Penetrating radar in operation



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3 GENERAL

The confirmation of potential contamination in the Phase II section of an Explosive Ordnance Clearance Assessment programme primarily builds on the assessment of the desk study, which for this site was completed in December 2005 (ESG Report No ESG/05/041/F).
This section assesses the main contaminants in terms of source description, pathway and sensitive receptor or target and is particularly important in understanding the comments made in the recommendations section

3.1 Source-Pathway-Receptor

Contamination may present a human health and ecological risk by a variety of pathways to one or more targets, which, in turn, vary in importance depending on the site's environmental setting and current and/or proposed use. The established source-pathway-receptor model is used as follows:

Hazard (Source): The hazard term is confined to explosive ordnance and energetic materials. The risk considered is that related to a detonation or deflagration. The magnitude of the hazard is related to the Net Explosive Quantity (NEQ) and the fragmentation characteristics of the explosive ordnance. Whilst certain energetic materials may have toxic properties the toxicity risk is considered in more detail within the site Land quality Assessment.

Pathway: This is the route by which the hazard reaches a sensitive receptor. In this assessment it is considered as the mechanism by which the energy in the ordnance is transferred harmfully to the receptor. It is related to both the accessibility of the ordnance and the ease of initiation.

Receptor: The most sensitive receptor is that of human health. Minor risks to ecology and built structures also exist at a very much lower level.

The ranking system detailed below is used in the following to determine the likelihood of the linkage of a hazard to a sensitive receptor being established through a recognised pathway.

Very Low: Ordnance or pathway is considered absent/unlikely, making linkage incomplete.

Low: Ordnance and pathway may be present but receptor insensitive to source.

Medium: Current evidence indicates the possible presence of ordnance and an initiating event may trigger a pathway e.g. initiation or detonation during excavation which will impact the receptor.

High: Ordnance linkage considered being present and the receptor is likely to be exposed to ordnance of a particularly hazardous nature and amount.

Very High: Ordnance linkage considered to be present and receptor highly likely to be exposed to ordnance of a particularly hazardous nature and amount.

3.2 Human Health Risk

This report relates only to the risk from direct contact with ordnance or explosive material by members of the public and site related personnel leading to an energetic event. However there exists a hazard to the bomb disposal teams as a result of exposure to the explosive filling; Polar Blasting Gelignite (PBG). Prolonged exposure can result in a form of severe Nitro induced headaches, similar to those experiencing migraine attacks. Physical handling of the explosive will also cause Dermatitis to the skin.

For humans, the following health risk may be identified as affecting those on or around the site as a result of openning a pathway:

1 Contact from flying debris and/or the blast wave created by initiation of an ordnance item.

3.3 Environmental Assessment

Table 4.4.1 below indicates the assessment of current risk associated with each source-pathway-receptor linkage and the residual risk that will results from remediation of each hazard.

KEY TO RISK DESCRIPTIONS:

Very Low:	Ordnance or pathway is considered absent/unlikely, making linkage incomplete.
Low:	Ordnance and pathway may be present but receptor insensitive to source.
Medium:	Current evidence indicates the possible presence of ordnance and an initiating event may trigger a pathway e.g. initiation or detonation during excavation which will impact the receptor.
High:	Ordnance linkage considered being present and the receptor is likely to be exposed to ordnance of a particularly hazardous nature and amount.
Very High:	Ordnance linkage considered to be present and receptor highly likely to be exposed to ordnance of a particularly hazardous nature and amount.

Table 4.4.1: Pollutant Linkage Relationship (Conceptual Model)

	Source		Receptor	Pathway	Initial Risk	Remedial Actions undertaken	Current Risk
	Location	Hazard					
Human Health	HMS Daedalus airfield (see Annex E for locations)	Pipe mines	Building contractors, site personnel and persons living adjacent to the airfield.	Contact via intrusive works	Medium	The Pipe mines were removed by personnel of 33 Engineer Regiment (EOD). The metal pipes were removed from site for scrap	Very Low
Human Health	Airfield site	Practice bombs	Building contractors, site personnel and persons living adjacent to the airfield.	Contact via intrusive works	Low	Sample targets corresponding to the magnetic profile of the practice bombs were extracted. No further bombs found (see Section 4.3)	Very Low

	Source		Receptor	Pathway	Initial Risk	Remedial Actions undertaken	Current Risk
	Location	Hazard					
Human Health	Concrete hard standing adjacent to Bld.389	Potential presence of pipe mines	Persons utilising the concrete area (parking vehicles, container storage etc)	Pathway restricted by presence of concrete	Low	Further desk studies, GPR and Magnetromety scans, concrete/hardcore depth and analysis of aerial photographs from 1942 show that the potential for mines being present is less than previously thought.	Low

	Source		Receptor	Pathway	Initial Risk	Remedial Action to be taken	Residual Risk
	Location	Hazard					
Human Health	Concrete hard standing adjacent to Bld.389	Potential presence of pipe mines	Building contractors, site personnel removing concrete layer	Contact via intrusive works	Medium	Concrete only to be removed under EOC control and supervision (see Chapter 6 Recommendations)	Very Low

4 ORDNANCE REMEDEATION OPERATIONS

4.1 Explosive Ordnance Clearance

Phase II corroboration of the suspected ordnance at HMS Daedalus commenced at the beginning of April 2006; by ESG. Initially this involved further magnetometer scans of the airfield including the areas thought to be outside the pipe mine areas. ESG personnel carried out intrusive investigations on any suspected targets revealed on the magnetometer data images.

Targets that were found to be pipes were then subjected to ground probing radar to determine their angle in the ground. The majority of pipe mines are laid at an angle of approximately 5 degrees. This allows 2ft for the pot end which contains the initiating device (in this case time pencils see annex D) and allows a gentle descent to 6 feet from a mine length of up to 70 feet
.
To complete the scanning task three large areas of Summerfield tracking were removed by mechanical excavator under supervision by ESG personnel (see Annex F) Summerfield tracking consists of 12mm wire strops, held just under the surface of a grassed area by steel bars, pinned with steel pickets overlaid with wire mesh. This was laid during WW2 probably to provide a hardened edge to avoid manoeuvring aircraft becoming stuck in the soft ground. As a result of removing the tracking one further mine was confirmed.

ESG made determined attempts to scan the concrete area in front of building 389, which according to the Canadian mine layout plans may have harboured an undetected mine. Using both radar and magnetometer techniques and advanced analysis software, it was not possible to detect the presence of any mines. Further desk study was made to mitigate the risk and this is covered in section 4.5

The ESG team also attempted to determine the explosive content of the individual mines with the use of a video/inspection camera inserted into the pipes. This was successful in parts as some of the pipes were empty (but still retaining traces of explosive) while some were clogged with soil and impenetrable. Thus being undetermined they were assumed to be charged.

ESG were requested to determine the shallow edge of the mines for later EOD risk assessment. This information was passed to Qinetiq Farnborough to calculate the EOD safety distances.

During this period from April to September representatives from all the Military and Civil services involved in the removal of the mine met at Daedalus. These included the Maritime Coastal Agency, Police Air Wing, Hampshire Police, Hampshire County Council, local residents, Daedalus stakeholders (local businesses on site) airfield operator. These meetings coordinated the entire evacuation of the area, traffic control and cordon implementation, with particular regard paid to both local residents and site users.

4.2 Disposal of Ordnance

The disposal operation; carried out under the heading of Operation Crabstick, commenced on 25th September by a detachment of Royal Engineers from 33 Engineer Regiment EOD.

A Police cordon was initiated at 09:30 on the Monday morning, which was to last until 16:00. Local residents had been informed of the work and one of the largest evacuation of people since WW2 was started. Residents not wishing to be removed from their houses were allowed to remain indoors. Police activity was increased to provide security for empty properties.

The Police cordon included flights from the Police Air Wing and a Police launch patrolling the Solent adjacent to the site.

The content of the mines; PBG is regarded as too unstable to excavate using manned machinery. The mines were to be excavated using the latest telemetrically remote controlled excavators (see Annex G).

The first mines to be dealt with were in row H. Camera inspection had shown that these mines were empty of main filling and although they may still contain traces of explosives they presented a lower hazard which would allow the Engineers to familiarise themselves with their new equipment.

The procedure for removal followed these general lines.

1. Marking out using GPS. The shallow end could then be identified in some cases by careful removal of the soil by hand.
2. Remote excavators then dig down to the mine placing the soil on one side.
3. On contact with the mine inspection and verification is made by CCTV link.
4. Confirmation is followed by removal of the soil from both sides of the mine.
5. The mine is then cut into 10 foot strips using CLC (Charge Linear Cutting).
6. The cut pipes are then inspected for explosive content and washed through with water.
7. The pipes are then threaded through with Detonating Cord and subjected to a controlled explosion sufficient to destroy any explosive residues.
8. The scrap pipe is then recovered.
9. Finally the water used to flush the explosive is destroyed by a controlled explosion

Scrap pipe recovered from the operation was removed by the Royal Engineers.

Following the removal of the mines, ESG carried out further Magnetromety scans over the positions occupied by the mines to verify their total removal.

4.3 Removed Ordnance

Target No.	Item Found	Explosive content	Remarks
Unrecorded mine between C16/C17	50 feet shallow end only 300 cm from surface.	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 23rd Oct. 06.
G29	20 feet shallow end only 300 cm from surface.	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 23rd Oct. 06.
A27	40 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.
F2	30 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.
F4	40 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.
Unrecorded mine between F6/F7	70 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.
F6	30 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.
G6	20 feet shallow end East under Peri-track	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 2nd Oct. 06.
G9	30 feet shallow end South, consists of two layered pipes.	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 2nd Oct. 06.
A15	30 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 2nd Oct. 06.
Unrecorded mine between G9/G10	60 feet shallow end South	Filling complete.	Filling had expanded with indications of exudation, crystallisation and rust impregnation. (See photo Annex G) mine destroyed in situ 3rd Oct 06.

Target No.	Item Found	Explosive content	Remarks
H3	30 feet shallow end South.	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 25th Sept. 06.
Unrecorded mine between H4/H5	40 feet shallow end South	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 25th Sept. 06.
H5	60 feet shallow end South	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 25th Sept. 06.
H6	60 feet shallow end South	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 25th Sept. 06.
L11	Clay pipe, 1 meter below surface of runway	Very low/traces	Item found not consistent with pipe mine construction. No evidence of explosives, left in situ. 24th Oct. 06
L12	Clay pipe, 2 meters below surface of runway	Very low/traces	Item found not consistent with pipe mine construction. No evidence of explosives, left in situ. 24th Oct. 06
M10	Clay pipe, 1 meter below surface of runway	Very low/traces	Item found not consistent with pipe mine construction. No evidence of explosives, left in situ. 24th Oct. 06
M11	Clay pipe, 2 meters below surface of runway	Very low/traces	Item found not consistent with pipe mine construction. No evidence of explosives, left in situ. 24th Oct. 06
H0	40 feet shallow end South	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 25th Sept. 06.
F1	40 feet shallow end East	Very low/traces	Mine inspected with camera, cut, removed and destroyed. 9th Oct. 06.

4.4 Practice bombs

Using information gathered in the airfield scanning, ESG were able to identify and subsequently extract a total of over 200 targets selected from the airfield. The results are shown in the table below (see area map in Annex H)

Target area	Quantity of targets	Quantity identified as practice bombs	Condition of targets
Area 1 adjacent to SRA hangar	60 targets	No practice bombs found, targets consist of scrap	Scrap
Area 2 north of runway 05/23	40 targets	No practice bombs found, targets consist of scrap	Scrap
Area 3 east of runway 17/35	80 targets	No practice bombs found, targets consist of scrap and playing field markers	Scrap
Area 4 west of runway 17/35	nil targets	No intrusive work carried out	N/A
Area 5 south of runway 10/28	nil targets	No intrusive work carried out	N/A
Area 6 north of runway 10/28	40 targets	Small clutch of 10lb. Practice bombs found during Phase II. No further bombs found	Expended

4.5 Concrete Area in front of Building 389

As described in section 2.2. (APC's) the concrete adjacent to building 389 was subject to Magnetromety scanning and GPR (radar) survey. Initially this space was deemed to be outside the area of concern, but with the discovery of pipes no. 27 and 15, within the A line (see Annex C) further investigation was judged to be required.

The area was re-scanned using the towed array system and the results analysed using the advanced Geosoft Oasis Montaj geophysical software package. The Montaj software allows the geophysicist to apply filters to the raw data removing the 'noise' associated with broken or made ground (concrete) and to highlight any abnormalities present. The results indicated that there is likely to be reinforcing steel within the concrete. This layer acts as a magnetic screen, shielding any potential targets. However there are clear patches lying within the projected line of the pipe mines and these do not indicate the presence of pipes/services.

The area was then subjected to further GPR. This run was made north/south, in effect cutting across any potential pipes. Illustrations created by the GPR software in 3D, did not display the 'hyperbola' associated with a buried object, but did show the presence of a trench line (disturbed ground) running north/south across the projected line A.

Examination of the concrete showed the layer to be 15cm to 18cm thick, with an hard core base of 0.5 meter. (The shallow ends of the pipe mines found have been exposed at between just below the surface and up to 0.5 meter in depth).

Further investigations were made to discover the uses of the hard standing from 1942 until the closure of HMS Daedalus. This involved a further search of archive records and aerial photographs leading to the following chronological history for the area.

The following aerial photographs of HMS Daedalus were reviewed at the National Monuments Records Office, Swindon on 15th September 2006, to establish at which period in time a concrete section north of Building 389 was laid.

Photo index no.	Date taken	Area under study
RAF/HLA/554	11th June 1942	Area grassed used for aircraft parking
RAF/106G/UK/867	30th Sept 1945	Area grassed
RAF/3G/TUD/UK/163	20th April 1946	Area grassed
RAF/540/1346	13th July 1954	Area grassed
F 22 0084		
F 21 0092		
RAF/58/2743	23rd March 1959	
OS/69258	11th June 1969	Area concreted
F 347		
F 348		
F 349		
F 361		
OS/79038	01st June 1979	Area concreted with Bldg 389
F 001		
F 079		
F 080		

As a result of this desk research coupled with review of a 1958 aerial photograph of HMS Daedalus made by Jan Keohane (Fleet Air Arm Museum) it can be assumed that the concrete section north of building 389 was first laid between July 13th 1954 and 1958:

The implications of the desk study suggest that:

- It was possible that pipe mines were laid in this area as per the1942 pipe-mine plan, as the concrete base was not present at this time.
- The area was clear for the Canadians to have removed these pipe-mines during their clearance operations in 1947
- 33 Engineer Regt (EOD) as part of their pipe-mine disposal programme during the 1980,s would not have conducted a search for pipe-mines under the concrete.

To summarise

- The area was laid to grass during the period that the pipe mines were laid and the area was accessible in 1946 for the Canadian engineers to remove the mines.
- The area was subjected to excavation works during the 1950's and 1960's to a depth of 0.5 meter.(that is below the shallow end depth of a pipe mine)
- Instrumental scans using Magnetromety and radar, cutting across the projected pipe mine track, have not indicated the presence of buried objects.

5 CONCLUSIONS

The Phase I Desk Study identified the potential for pipe mines to remain at HMS Daedalus and although there have been previous clearances the ability to carry out a large scale Magnetromety search of the airfield has only been available within the recent past. This technology is currently limited to the ESG within the U.K.

The original pipe mine plan recorded 265 mines laid in 13 rows. The Royal Engineers cleared a total of fourteen mines from 1984 to 1989 under Operation Crabstick, of which nine matched the map layout and five were found to be unrecorded. Of the twenty one mines found by ESG, four mines did not correspond to the plan. Anecdotal theories suggest there may have been a second team of engineers, who were tasked to 'fill in' any gaps left, and that these were not recorded on the plans.

Of the all the mines discovered at HMS Daedalus, including those of previous operations, three have been found to contain explosives. One exploded whilst being removed, the second was successfully removed and the most recent was destroyed in situ as it was too unstable to remove. Each of these mines presented a considerable risk to anyone coming into accidental contact. The removal of these mines has reduced the risk to that of Very Low. The scanning operation has covered the airfield site within the boundaries of the perimeter track and areas adjacent (see Annex B & F), providing a high level of assurance against the discovery of any further objects that may be mistaken for pipe mines.

A small number of expended air dropped 10 lb practice bombs were discovered on the airfield in front of the Control Tower, coinciding with accounts that a submarine mock up was placed on the airfield and small bombs dropped possibly as a show for a visiting dignitary.
These practice bombs are made up from a solid steel body which houses a simple striker device (see Annex H). On contact with the ground the striker is driven into a Detonator 'Burster' which ignites the filling of smoke and flash powder (Pyrotechnic). The effect is to create a flash and dense white smoke to be seen by air and ground observers. If the device fails to explode the light casing holding the smoke/flash powder may rupture allowing moisture to dissolve the filling and this may also be the case with corrosion after so many years. This type of device is not of a high explosive nature and the threat to persons operating excavating equipment is low, however the Detonator Burster contains a small quantity of very energetic material and will cause injury if tampered with. Anyone finding the remnants of these devices should call the local police.

Using information gathered in the airfield scanning, ESG used software to analyses the airfield for further targets using the practice bombs magnetic profile. In excess of 250 targets were extracted and no further evidence of routine practice bombing was found. This small cluster may be treated in isolation and the risk from practice bombs is that of Very Low

The concrete area adjacent to Building, 389 (see Annex J) has been subjected to non-intrusive instrumental searches, further desk studies, examination of aerial photographs and the composition of the hard standing examined. Although this has failed to detect the presence of any mines, ordnance contamination cannot be totally discounted, consequently with the concrete in place restricting any ordnance pathway the area is risk assessed as Low (see section 6.0 Recommendations)

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6 RECOMMENDATIONS

The site is suited for continued development or more general use as determined by planning considerations with the exception of the area covered by concrete north and adjacent to Building 398 (see Annex J).

This area corresponds to the line taken by the pipe mine row A. (see Annex C). Careful consideration should be given to this area should a future decision be made to remove the concrete and it is strongly recommended that advice be sort to mitigate any ordnance hazards prior to commencing. In this respect the current risk assessment is given as Low however should intrusive work be carried out this assessment would move to Medium (see Chapter 3 sect 3.1 for definition).

It should be noted, that the Phase I report highlighted the risk from airfield pipe mines and that the Phase II & III remediation work has been undertaken to remove these potential risks only. The airfield; as a former wartime site has been subjected to enemy air raids and potential ordnance contamination from unrecorded wartime burials As such, care must be taken during any excavation work carried out on the airfield and contractors should be advised to contact the local police if they unearth any suspicious objects.

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7 EXPLOSIVE ORDNANCE RISK ASSESSSMENT

MINISTRY OF DEFENCE
Environmental Science Group (ESG)
Directorate of Logistics Infrastructure, Safety & Security (DLISS)
Dyrham, Ensleigh, Bath, BA1 5AB
Telephone: 01225 467572 Fax 01225 467257

EXPLOSIVES ORDNANCE RISK ASSSESSMENT

HMS DAEDALUS

1. ESG were requested to provide an explosive ordnance risk assessment for the site formerly known as HMS Daedalus, Lee-on-Solent, Hampshire.

2. Documentary information, suggested that the area was contaminated with explosive ordnance, (ESG Phase 1 desk study ESG/05/041/F Dec 05) subsequently a full Magnetromety survey was conducted which established the presence of airfield denial pipe mines laid during WW2.

3. The mines were removed and destroyed by 33 Engineer Regiment (EOD), during the period 25th September to 27th October 2006. A post operation Magnetromety inspection of the pipe mine positions was carried out by ESG confirming their removal.

4. The explosive ordnance survey was carried out by the following ESG personnel.

Mr Keith Swarbrick	Snr. Land Quality Assessor
Mr John Bolland	Snr. Land Quality Assessor
Mr John Swanborough	Land Quality Assessor
Mr Adrian Pearce	Land Quality Assessor
Miss Hilary Lennox	Land Quality Assessor

Following the explosive ordnance remediation and intrusive searches carried out on the airfield at HMS Daedalus, the risk from WW2 pipe mines and practice bombs is now assessed as very low. In addition the concrete area adjacent to Building 389 has been re-examined and consequently to further desk study of records and instrumental intrusive scanning, is now assessed as low.

Signed Date

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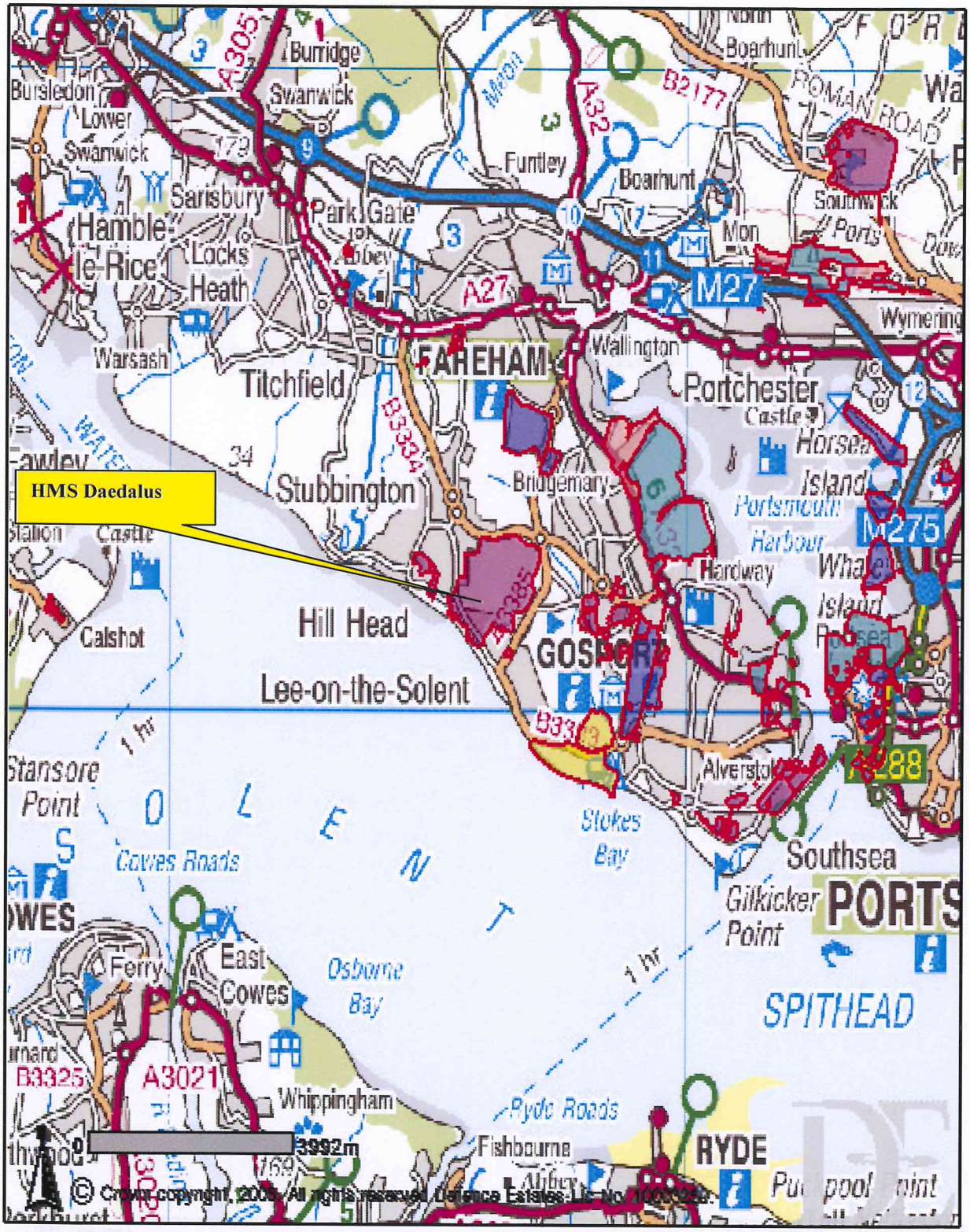
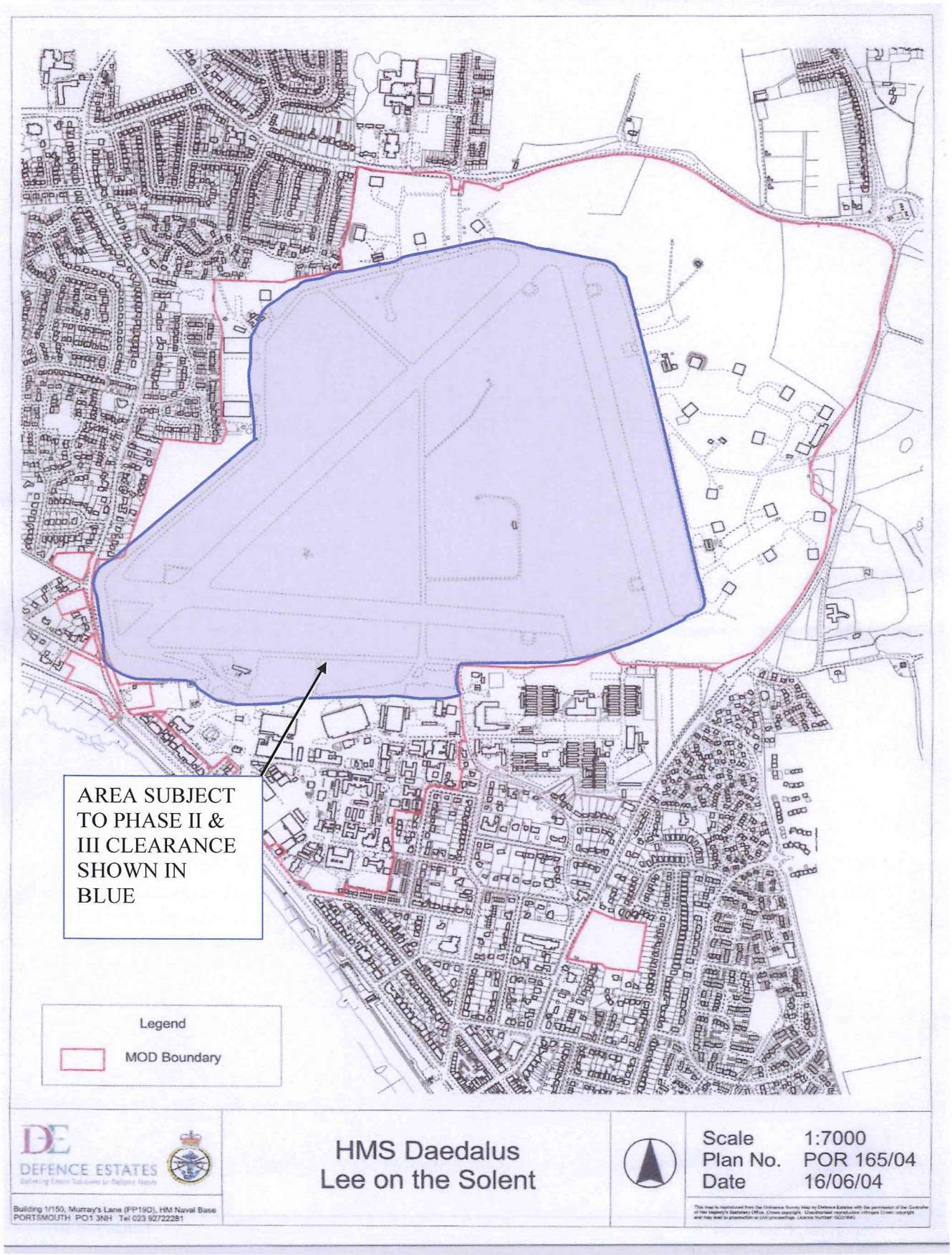
ANNEX A
SITE LOCATION

Site location



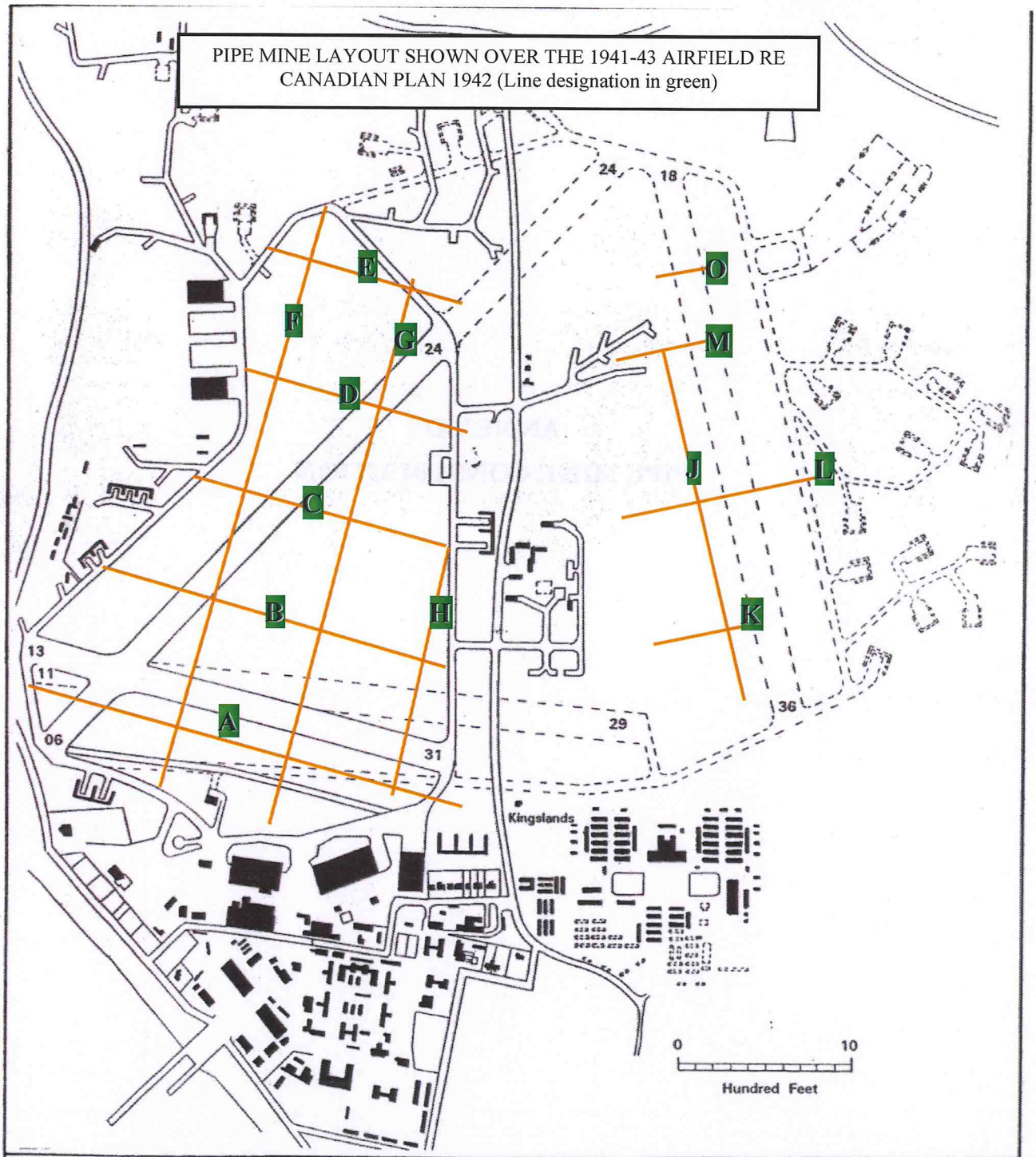
ANNEX B
PHASE II & III SITE BOUNDARIES

AREA SUBJECTED TO PHASE II & III CLEARANCE



ANNEX C

1941-42 MAP WITH CANADIAN PIPE MINE POSITIONS



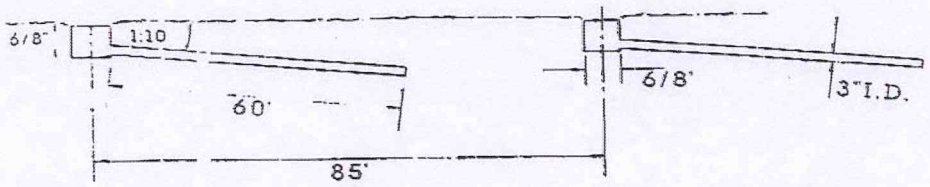
RNAS LEE-ON-SOLENT SITE PLAN 1941 and 1943
Showing Runways as at 1941 (solid line) and 1943 Runway Layout (broken line) **Figure 6**

ANNEX D
PIPE MINE CONSTRUCTION

PIPE MINE CONSTRUCTION AS ADVISED BY 33 ENGINEERS REGT. (EOD) (From their drawings dated 1942)

5-MAY-2005 15:12 From:EOC GROUP 01223203630 To:01225 467257 P.2/8

TYPICAL PIPEMINE LAYOUT



Fired by a Time Pencil (see next page)

FIG 1

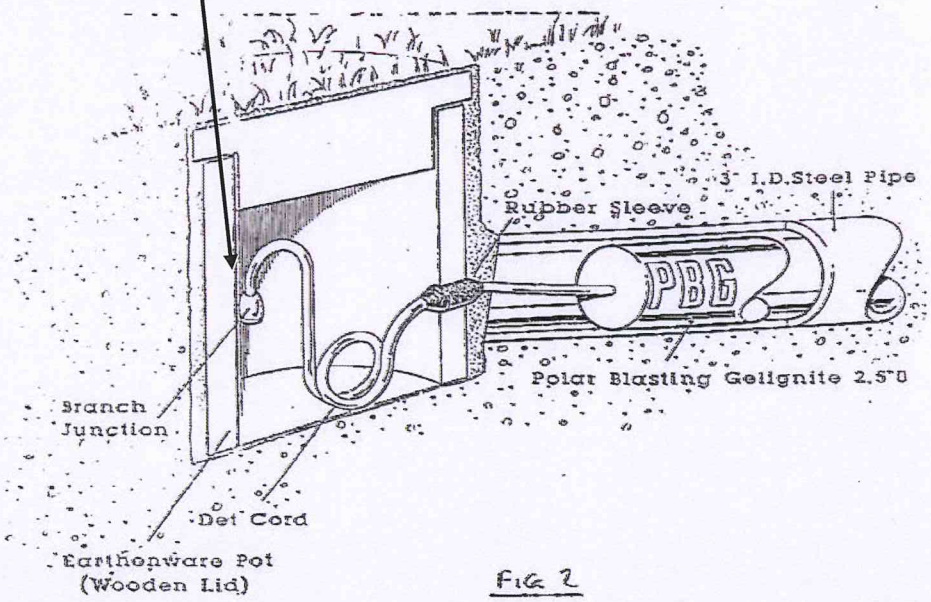


FIG 2

ANNEX E
DISCOVERED PIPE MINES

ANNEX F

EXPLOSIVE CLEARANCE OPERATION PHOTOGRAPHS AND SCANS

REMOVAL OF SUMMERFIELD TRACKING BY ESG STAFF AT HMS DAEDALUS JULY 2006

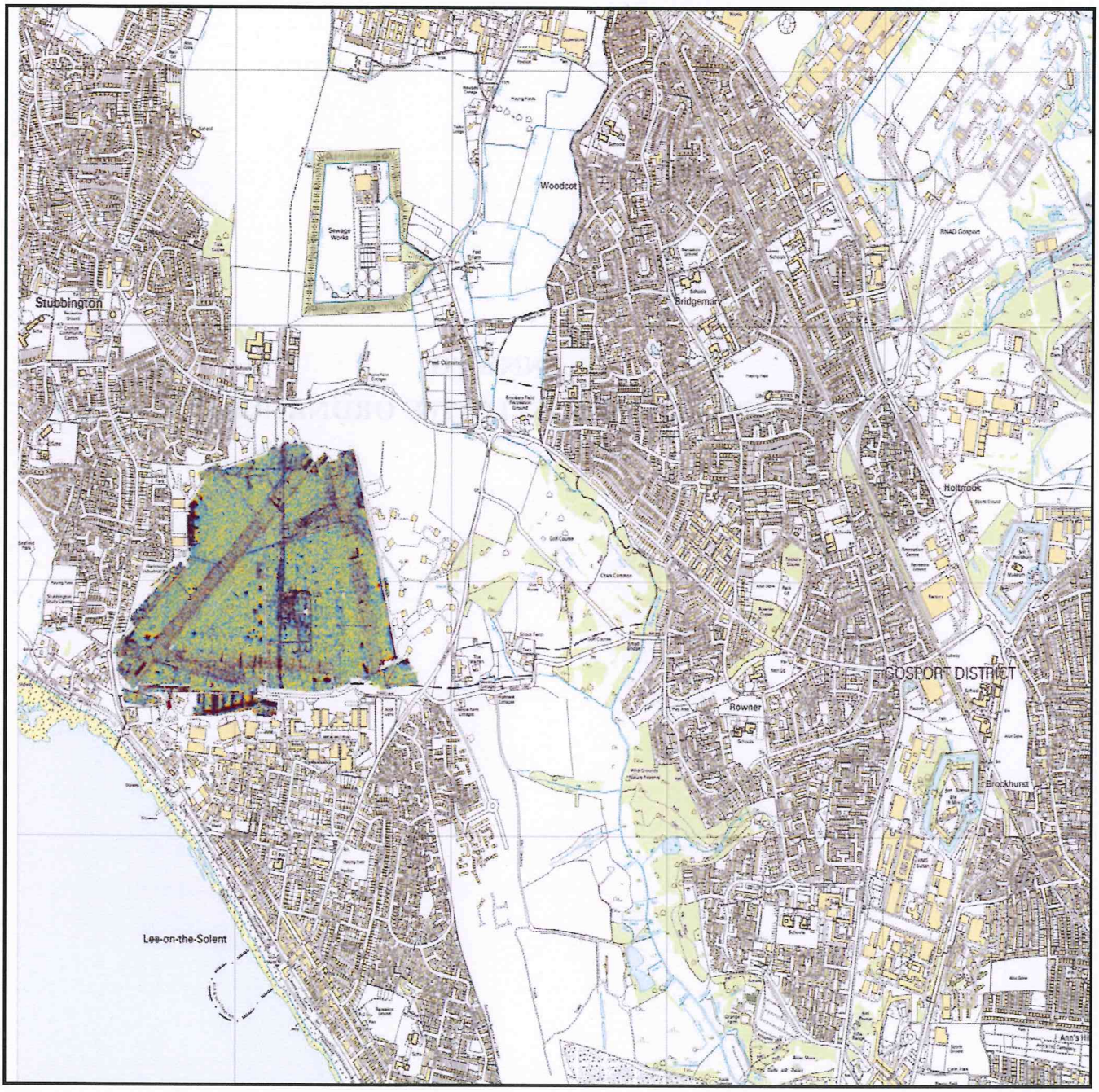


ESG STAFF INVESTIGATING ANOMALITIES AT HMS DAEDALUS AIRFIELD





SCANNED AREA OF HMS DEADALUS AND SURROUNDS



ANNEX G
PHOTOGRAPHS OF THE EXPLOSIVE ORDNANCE DISPOSAL



Environmental Science Group
Explosive Ordnance Risk Assessment Phase II & III
HMS Daedalus

DLO
Defence Logistics Organisation

RADIO/ROBOTICALLY CONTROLLED EXCAVATORS USED BY THE ROYAL ENGINEERS TO EXPOSE THE PIPE MINES



Report No: ESG/06/047/F
Project No: ESG/150/8/052

January 2007

Environmental Science Group
Explosive Ordnance Risk Assessment Phase II & III
HMS Daedalus

DLO
Defence Logistics Organisation

EXCAVATING AND EXPOSING A PIPE MINE IN FRONT OF DUNNING HANGAR



Report No: ESG/06/047/F
Project No: ESG/150/8/052

January 2007

EXPOSED PIPE MINE (UNRECORDED MINE IN LINE WITH H1 REFERED TO AS H0 ADJACENT TO EAST END OF THE DUNNING HANGAR)



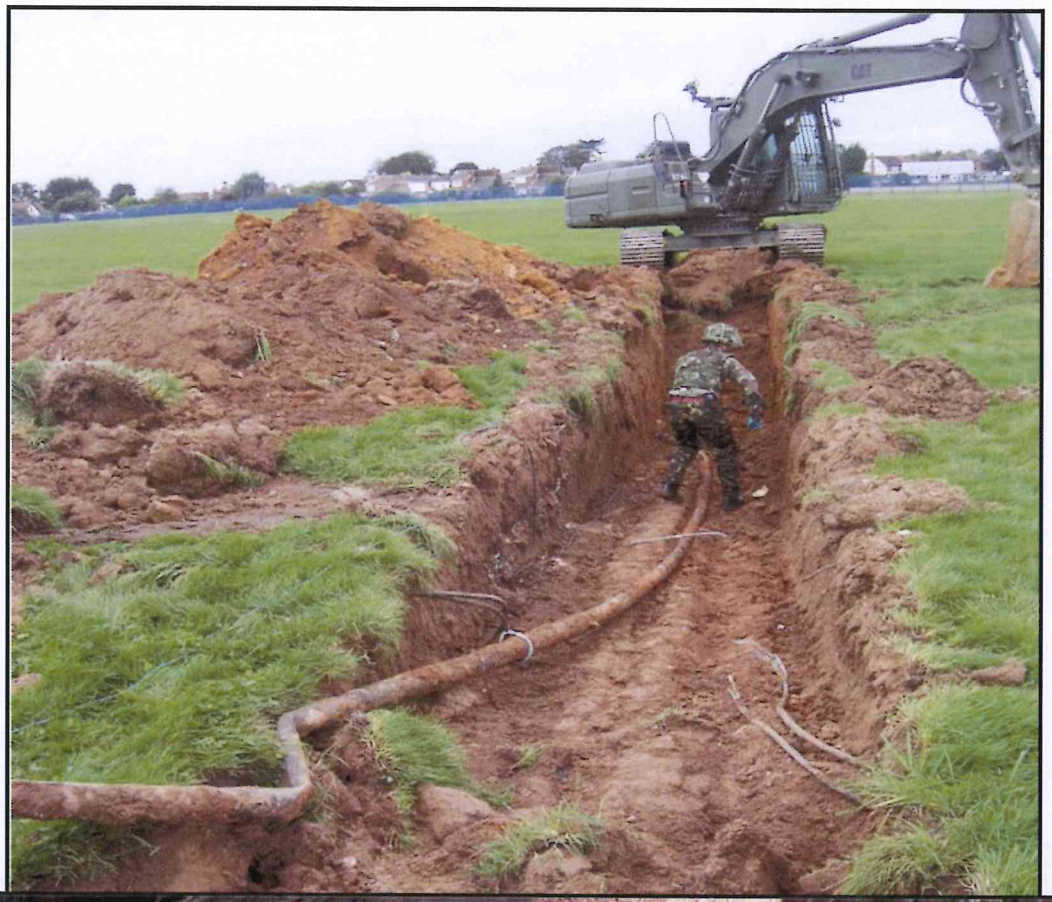
THE PHOTOGRAPHS SHOW THE CONTENTS OF MINE G9/G10, POLAR BLASTING GELEGNITE AND THE SUBSEQUENT DEMOLISION BY THE ROYAL ENGINEERS





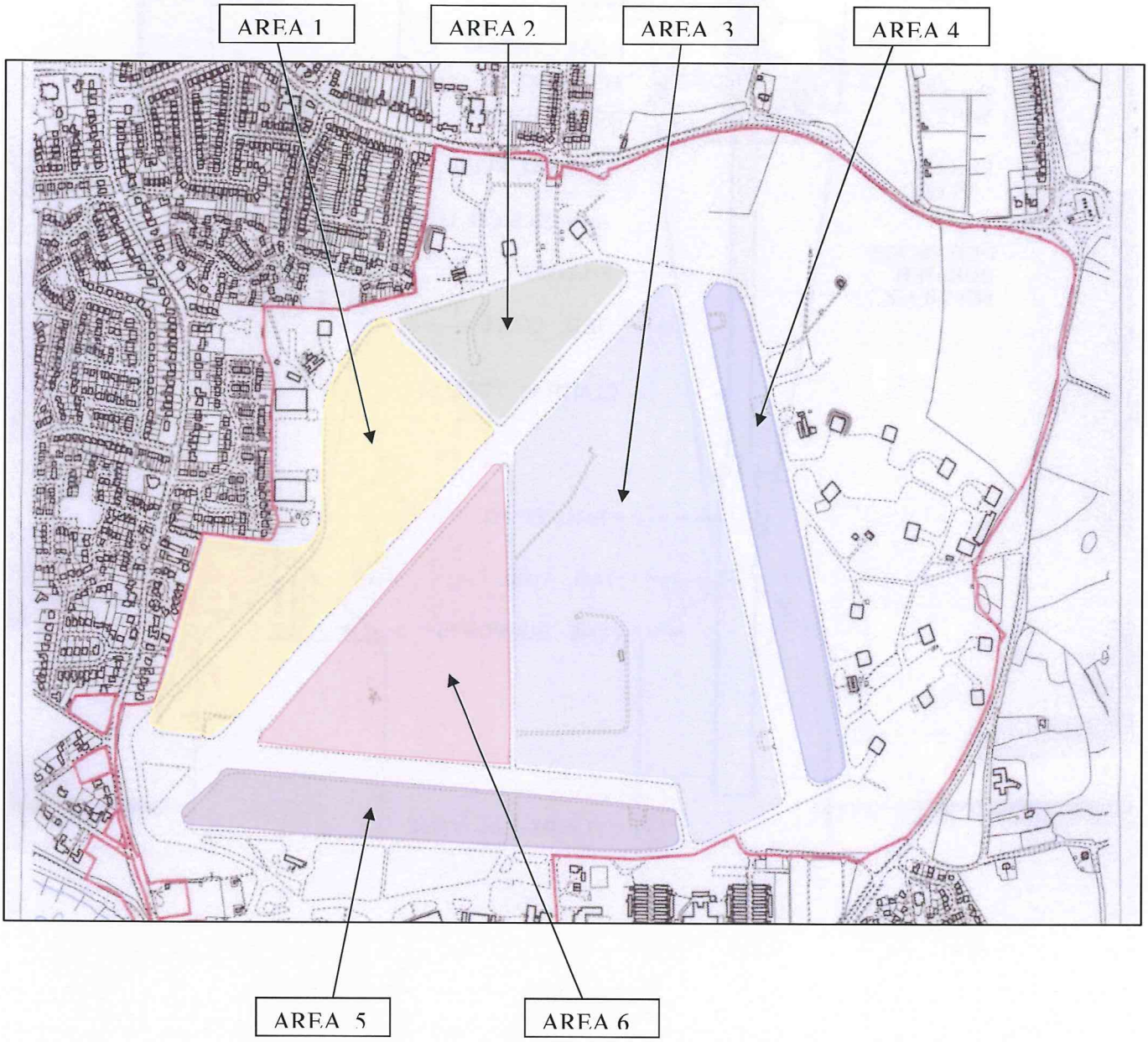
ANNEX H
AREAS SEARCHED FOR PRACTICE BOMBS

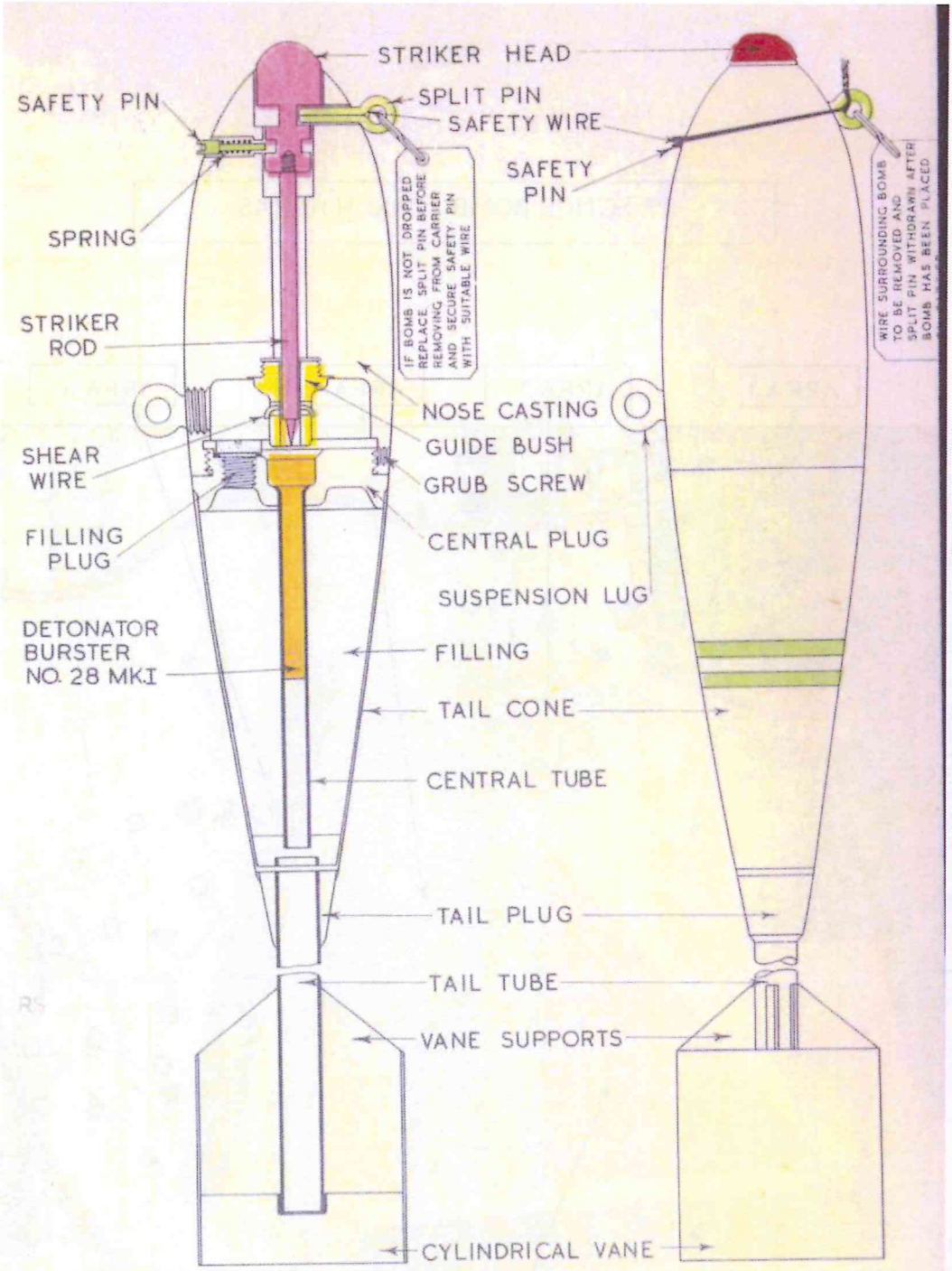
TOTALLY EXPOSED PIPE MINE PRIOR TO LINEAR CUTTING ALSO SHOWN THE FORWARD TIP

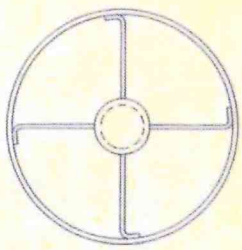




PRACTICE BOMB SEARCH AREAS







END VIEW OF CYLINDRICAL VANE

PRACTICE BOMB 10 LB. MARK I

ANNEX J
CONCRETE AREA ADJACENT TO BUILDING 389

environmental science group
ENVIRONMENT & SAFETY

VIEWS OF THE CONCRETE HARDSTANDING ADJACENT TO BUILDING 389



POSITION OF CONCRETE HARDSTANDING IN ADJACENT TO BUILDING 389



CONCRETE COVERED AREA ADJACENT TO BUILDING 389