Report on Sea Vixen Debris at Flat Tor Pan (Broad Down), Dartmoor National Park

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1 Introduction

1.1 The Dartmoor Mires Project is a pilot scheme, co-ordinated by Dartmoor National Park Authority (DNPA), to explore the feasibility of restoration of degraded blanket bog on Dartmoor. The restoration sites are located within Dartmoor's North Moor and include an area known for the purpose of the project as Flat Tor Pan (Broad Down). A military aircraft crash site (MDV 105346) is located in the northwest corner of the restoration area at Flat Tor Pan (Broad Down).

1.2 On 31 May 1965, a Sea Vixen, from Royal Navy 776 Squadron, crashed on the site during a training flight. The pilot and his observer ejected safely before the plane crashed. Much of the plane fuselage was subsequently removed from the site by the MoD (Tony Robinson in communication with Jane Marchand, DNPA Senior Archaeologist) but a relatively small quantity remains dispersed across the bog surface to the south of the pond, which now marks the site of the crash. The debris is visible as widely dispersed clusters of mostly small pieces of twisted metal with some wire. To date, the majority of the fuselage has been found within an area measuring 100m north-south by 55m east-west, approximately 60m south of the pond. It is likely that further Sea Vixen debris survives within the peat in the restoration area to the south of the pond.

1.3 The metal amongst the debris, which mainly comprises of aluminium alloy, interferes with the Ministry of Defence Unexploded Ordnance(UXO) survey. It was necessary to carry out UXO survey of the two hydrological monitoring enclosures prior to the installation of the monitoring equipment in late February 2012. The UXO survey was carried out in February 2012. As the Sea Vixen wreckage is protected under the 'Protection of Military Remains Act 1986' recovery of the aircraft debris was carried out under Licence No. 1762, which was issued to the project retrospectively. This survey led to the investigation of suspected UXO and therefore the recovery of some aircraft debris from the larger hydrological monitoring enclosure. UXO survey of the entire restoration area will need to be carried

out prior to restoration work commencing during autumn 2014. This survey and certainly the restoration work are likely to result in the exposure of Sea Vixen debris that survives within the peat matrix.

2 Site location and topography

2.1 The site at Flat Tor Pan (Broad Down) (OSGR SX613812) is located on an area of relatively flat upland in northern Dartmoor, 3.6km northwest of Postbridge and 220m south of Flat Tor, in the parish of Dartmoor Forest (Fig. 1). The restoration boundary encompasses an area of high quality blanket bog and covers approximately 23 ha (Fig. 2). The site is bounded to the northwest by Flat Tor, to the southwest by the West Dart River, to the southeast by an elevated ridge and to the northeast by a tributary of the East Dart River. The two hydrological monitoring enclosures are located within the northwest quadrant of the site (Fig. 3).

3 Work carried out to date

3.1 Walkover Survey

On 19 December 2011 the footprints of the two hydrological monitoring enclosures, which measured 80m by 25m and 20m by 25m, were systematically field-walked at 5m intervals by the author. The field surface of each was closely examined for Sea Vixen debris, which was identified at four locations within and beyond the enclosure footprints. Once identified each cluster or piece of debris was numbered, photographed *in situ* and their exact locations recorded using differential GPS. In the interests of health and safety it was necessary to remove the debris recorded on the field surface within the enclosures prior to the UXO survey (SV 1 and 2).

3.2 MoD UXO Survey Watching Brief

An archaeological watching brief of the MoD UXO survey of the hydrological enclosures was undertaken by the author on 14th February 2012. The MoD team systematically walked the enclosures and under archaeological supervision investigated areas which gave readings for

suspected UXO. As a result, Sea Vixen fuselage was uncovered at three locations within the larger enclosure (SV3-5).

3.3 Recording

A methodology for recording and recovering the fuselage was agreed with the DNPA Senior Archaeologist. The location of each piece or cluster of debris was recorded using deferential GPS, photographed *in situ* and numbered sequentially (Fig. 4). The debris, recovered from the site, was bagged, tagged according to its numbering and is presently stored at the DNPA offices until a more permanent arrangement is made with the MoD.

3.4 In April 2012, Bernard Steed, from Harrowbeer Interest Group and Royal Navy Air Engineer Capt. Alan Sturgeon (rtd), who worked with Sea Vixen aircraft in the Royal Navy attempted to identify the debris where possible. Unfortunately, only two pieces were identifiable as the remaining debris consists of small pieces of twisted metal. The identifiable pieces are discussed in Section 5 below.

4 Historical Background to the Sea Vixen

4.1 The Royal Navy 766 Squadron Sea Vixen that crashed into the bog at Flat Tor Pan (Broad Down) on 31 May 1965 was based at the Royal Navy base at Yeovilton in Somerset (Plate 1). The crash occurred during a training flight and there were no fatalities as the pilot, Derek Cottrill and his observer Roy Kenward ejected safely (Plate 2). The crater created by the crash is now the site of a substantial pool (Figure 5, Plate 3). The majority of the larger parts of the fuselage were removed by the military during several clearance operations as the fuselage came to the surface (Tony Clark in comm.). A relatively small amount of debris remains visible on the bog surface, though it is likely that more debris survives sub-surface, within the restoration area, to the south of the pond.

5 Sea Vixen debris

5.1 The Sea Vixen debris was recorded at four locations during the walkover survey in December 2011. Two areas, SV1 and SV2, were located within the larger enclosure, while SV6 and SV7 are located, in proximity to each other, to the southeast of the larger hydrological monitoring enclosure. A further three clusters of debris were uncovered during the UXO survey. In total, the debris was recorded at seven separate locations, numbered SV1 to SV7 and is described below (Fig. 4). The majority of the metal was identified by Capt. Alan Sturgeon (retired) as being composed of aluminium alloy.

5.2 SV1, identified during the walkover survey, is composed of a piece of plastic wire and a small fragment of twisted metal with small perforations along its length (Plate 4).

5.3 SV2, also identified during the walkover survey, is composed of a small thin strip of metal (Plate 5).

5.4 SV3 was uncovered during the MoD UXO survey. This cluster of debris was located below the field surface and was composed of a long strip of metal with a series of rivets along its length, suggesting that it functioned as a join for two large metal plates and was possibly part of the wing or boom (Plate 6). The second large piece identified by Capt. Alan Sturgeon (rtd.) is a possible wheel arch (Plate 7). A total of nine smaller fragments were also recovered within this cluster. One fragment has a partial serial number which appears to read 'ROWA 1708 AND'. The grey paintwork of the Royal Navy is visible on both of these pieces as well as on some of the smaller fragments of metal within SV3.

5.5 SV4 was uncovered during the MoD UXO survey. The larger piece was identified as being a high quality steel possible hydraulic jack. The smaller piece is a small fragment of metal (Plate 8).

5.6 SV5 was also uncovered during the MoD UXO Survey and is composed of a strip of perforated and twisted metal and two tiny fragments of metal, all of which were corroded (Plate 9).

5.7 SV6 is located 31m east of the southeast corner of the large enclosure. It is composed of a cluster of debris comprising small fragments of metal and wire strewn across an area measuring approximately 2m by 1.5m (Plate 10). This cluster of debris was not recovered so it remains *in situ*.

5.8 SV7 is located 11m to the southeast of SV6. This cluster of debris was initially recorded during the walkover survey carried out in December 2011, when approximately one fifth of the cluster was removed from the site (Plate 11). It is composed of a cluster of small fragments of metal and wire spread over an area measuring approximately 2.2m by 1.2m. A total of sixteen small fragments of metal were removed from the site (Plate 11).

6 Future restoration work and UXO survey

6.1 Restoration work at Flat Tor Pan (Broad Down) is scheduled for August 2014. It is expected that UXO survey will be carried out while restoration work is being undertaken though it may be necessary to carry out the survey prior to on site works commence.

6.2 The following methodology for the recording of Sea Vixen debris has been agreed with Jane Marchand, DNPA Senior Archaeologist. Each cluster of recovered debris will be recorded as follows:

- location recorded using a differential GPS;
- photographed, *in situ*, where possible;
- numbered and bagged accordingly (if necessary to remove from site);
- stored at the National Park offices until the MoD decide where the debris will be stored permanently;
- the results of survey and removal of debris/artefacts will be outlined in a report with accompanying photographs and maps showing their original location. The report will be added to the Historic Environment Record (HER) for Dartmoor.

7 Bibliography

Bellamy, D. 2011, *Sea Vixen Crash Site*, Available: http://www.davebellamy.co.uk/index.php?MF=Views/photo.php?Ref=26127981314225 [Accessed12 December 2013].

de Havilland Sea Vixen, 2012, wiki article, <http://en.wikipedia.org/wiki/De_Havilland_Sea_Vixen> [Accessed 12 December 2013].

Fyfe, R. 2011 *Broad Down, Dartmoor. Ground Penetrating Radar Survey.* Unpublished Report, School of Geography, Earth and Environmental Sciences, University of Plymouth.

8 Figures

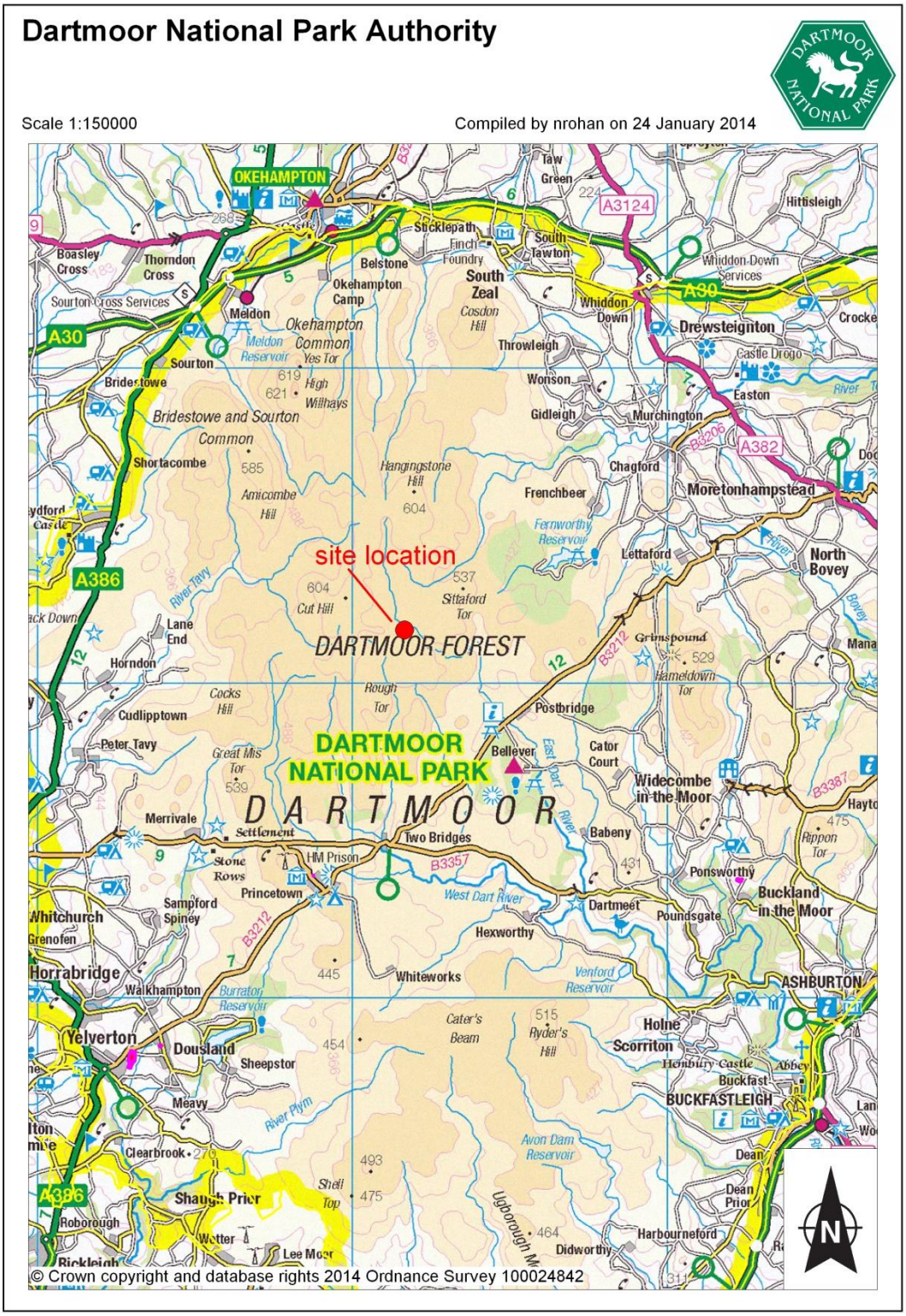

Figure 1 Flat Tor Pan (Broad Down) site location within Dartmoor National Park (outlined in yellow).

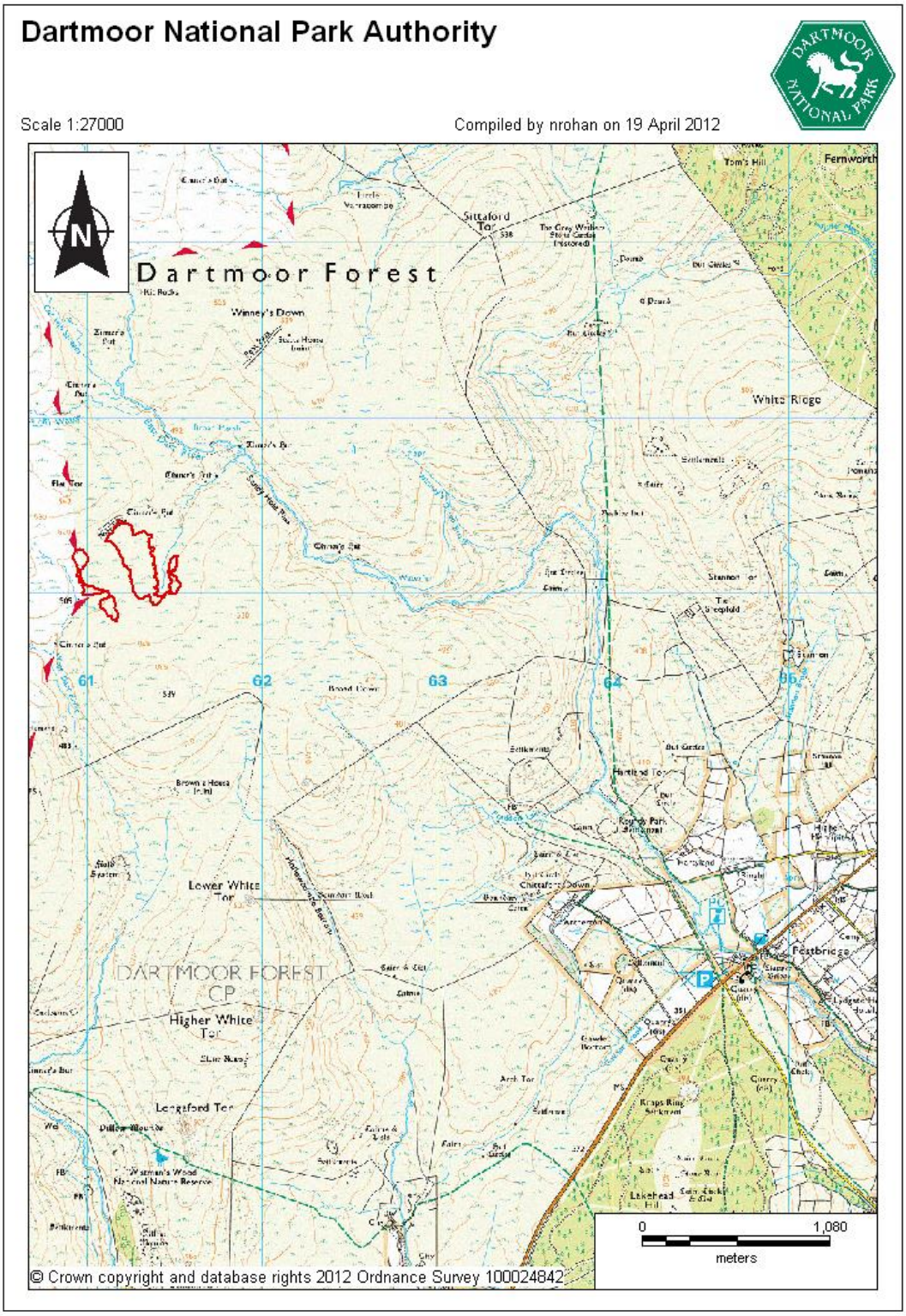

Figure 2 Site location map showing restoration areas on Flat Tor Pan (Broad Down) outlined in red.

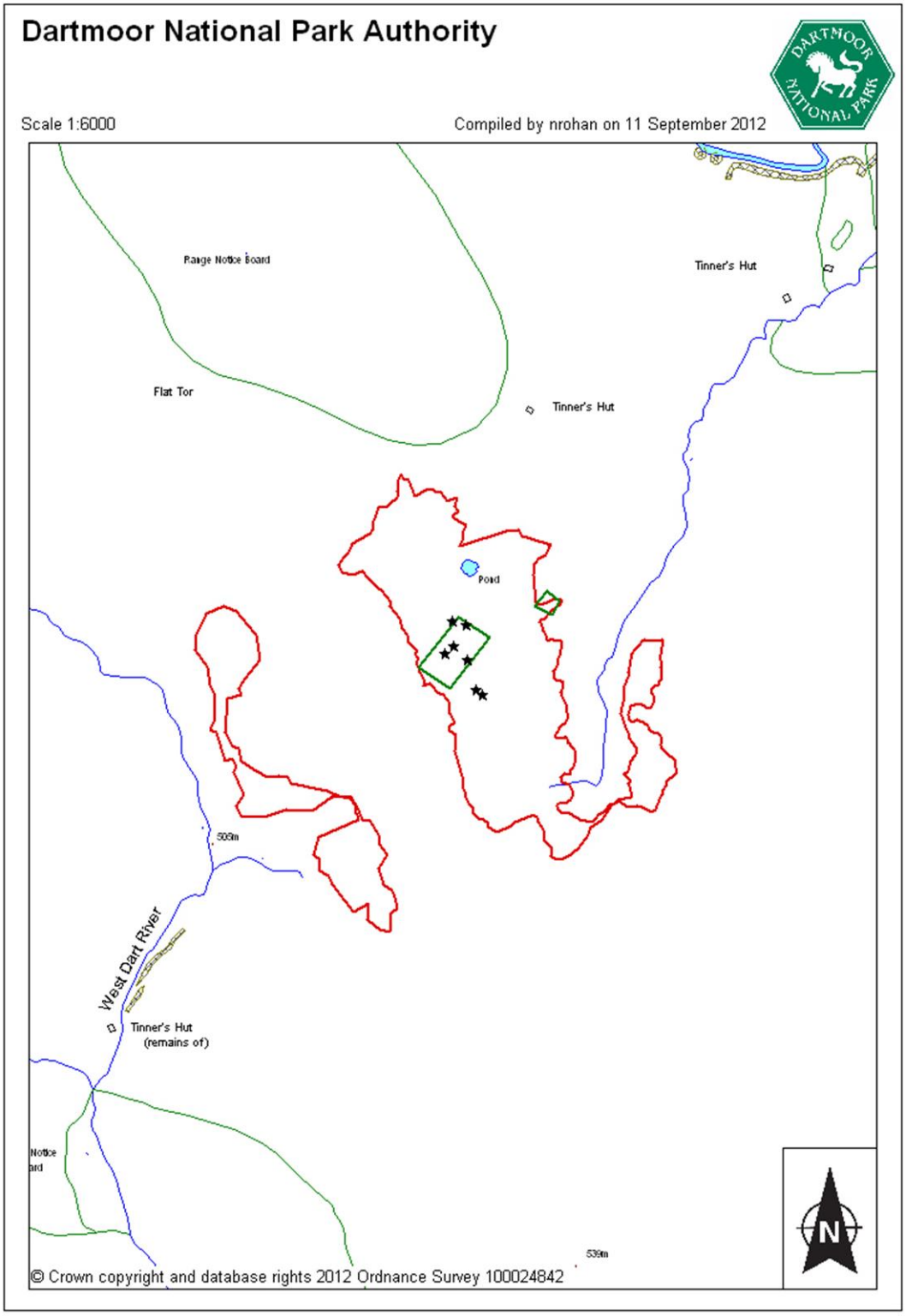

Figure 3 Restoration areas (in red) on Flat Tor Pan (Broad Down) and hydrological monitoring enclosures (in green) in relation to Sea Vixen debris locations (stars).

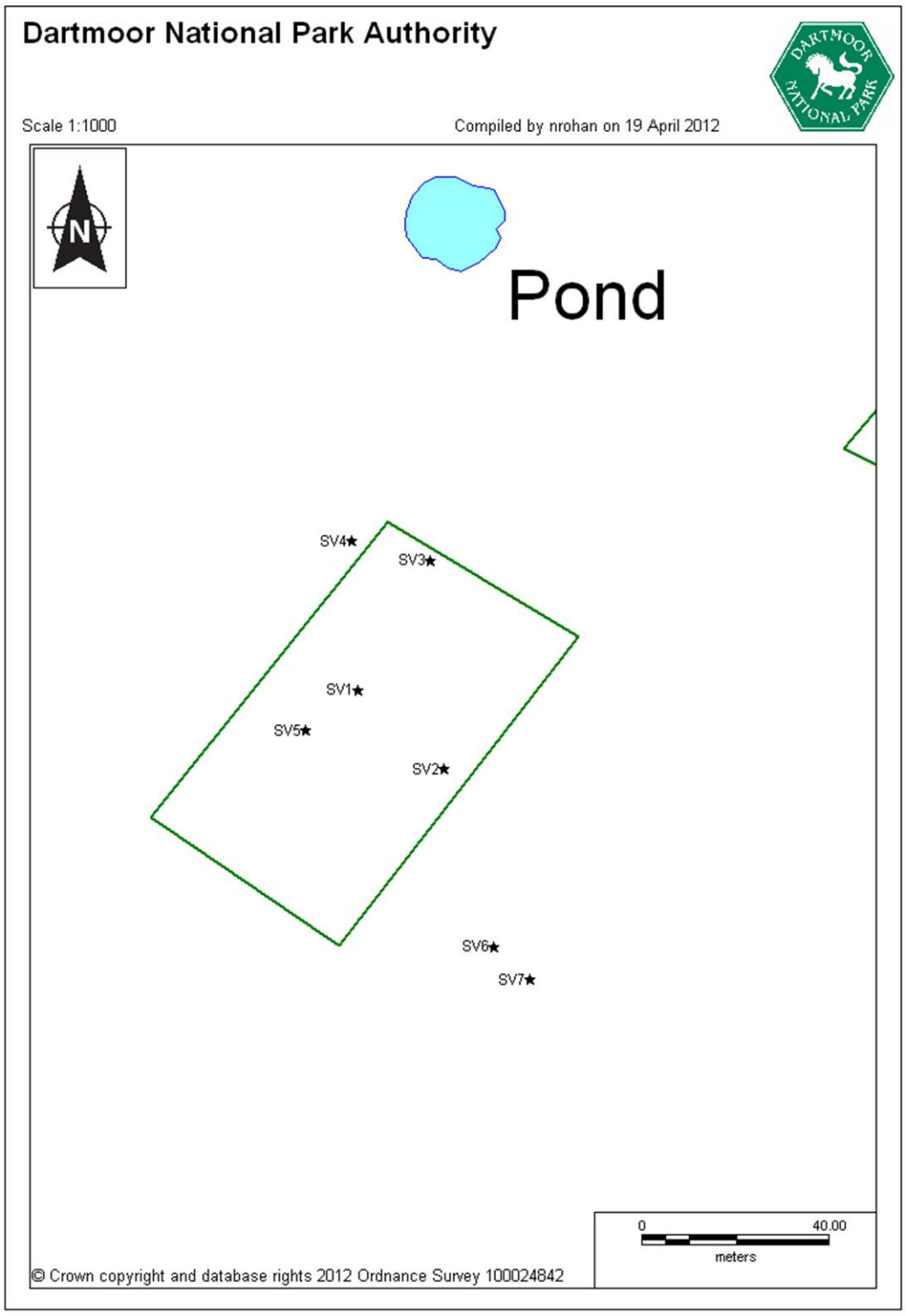

Figure 4 Sea Vixen debris locations in relation to hydrological monitoring enclosure and the crash site (Pond).

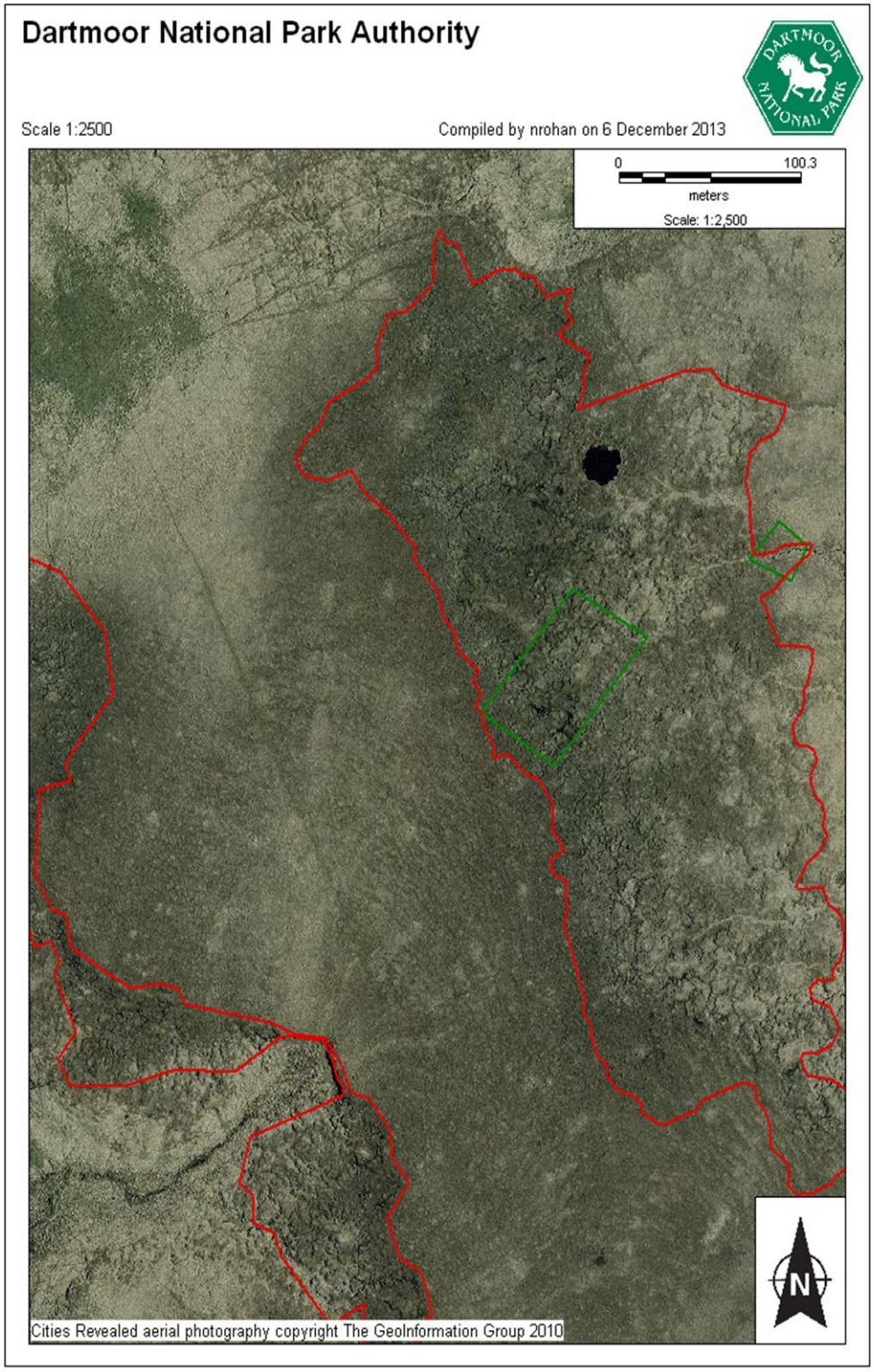

Figure 5 Sea Vixen crash site (visible as pond in top right corner) in relation to hydrological monitoring enclosures (green) and restoration area (in red) on aerial photograph taken in 2010.

9 Plates

Plate 1 Royal Navy Sea Vixen that crashed on Flat Tor Pan (Broad Down), taken the year before the crash (photo courtesy of Pilot Derek Cottrill via www.davebellamy.co.uk).

Plate 2 Pilot Derek Cottrill and his observer Roy Kenward after ejecting from the Sea Vixen on Flat Tor Pan (Broad Down) (photo courtesy of Derek Cottrill via www.davebellamy.co.uk).

Plate 3 The crash site the day after the Sea Vixen aircraft crash taken by Royal Navy 766 Squadron's recovery team (photo courtesy of Derek Cottrill via www.davebellamy.co.uk)

Plate 4 SV1, scale 20cm.

Plate 5 SV2, scale 20cm.

Plate 6 SV3 part of main wing or boom, scale 1.70m

Plate 7 Remaining debris recorded within SV3, scale 1m.

Plate 8 SV4 Possible steel hydraulic jack (left) and piece of aluminium alloy.

Plate 9 SV5, scale 40cm.

Plate 10 SV6 *in situ*, looking east scale 2m.

Plate 11 SV7 debris *in situ*, scale 1m.

Plate 12 SV7 debris recovered from site, scale 1m.