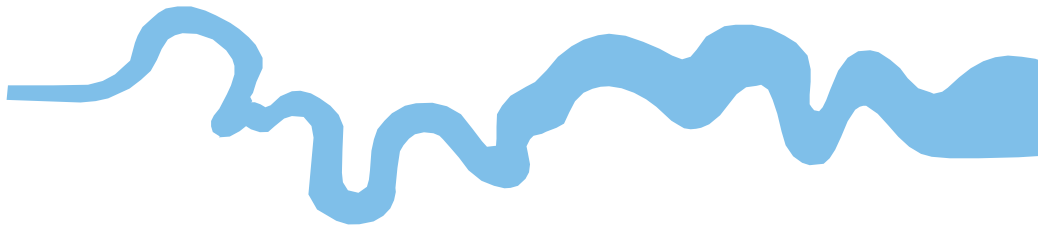


**T V A S**



**SOUTH WEST**

**Land at Westford Park Farm,  
Chard Junction, Dorset**

**Geophysical Survey (Magnetic)**

**by Nicolas Dawson**

**Site Code: WCJ18/65  
(ST 3378 0392)**

# **Land at Westford Park Farm, Chard Junction, Dorset**

## **Geophysical Survey (Magnetic) Report**

**For Aggregate Industries UK Ltd**

by Nicholas Dawson

Thames Valley Archaeological Services

Ltd

Site Code WCJ 18/65

**July 2018**

## Summary

**Site name:** Land at Westford Park Farm, Chard Junction, Dorset

**Grid reference:** ST 3378 0392

**Site activity:** Magnetometer survey

**Date and duration of project:** 10<sup>th</sup> to 12<sup>th</sup> July 2018

**Project manager:** Agata Socha-Paszkiwicz

**Site supervisor:** Nicholas Dawson

**Site code:** WCJ 18/65

**Area of site:** 11.9ha

**Summary of results:** The survey identified a small number of magnetic anomalies across the site, with those of archaeological potential being concentrated in the north and mid south fields. In the north field two circular linear anomalies and in the mid south field a system of weak positive linear trends all possibly represent buried cut features of archaeological origin.

**Location of archive:** The archive is presently held at Thames Valley Archaeological Services South West, Taunton in accordance with TVAS digital archiving policies.

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[www.tvas.co.uk/reports/reports.asp](http://www.tvas.co.uk/reports/reports.asp).*

Report edited/checked by: Steve Ford✓ 31.07.18 Tim Dawson✓ 31.07.18
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# **Land at Westford Park Farm, Chard Junction, Dorset A Geophysical Survey (Magnetic)**

by Nicholas Dawson

**Report 18/65a**

## **Introduction**

This report documents the results of a geophysical survey (magnetic) carried out at land at Westford Park Farm, Chard Junction, Dorset (NGR ST 3378 0392) (Fig. 1). The work was commissioned by Ms Joanne Baker of Aggregate Industries UK Ltd, Frome Area Office, Edwin Sims House, Vallis Road, Frome, BA11 3EG.

Planning permission is to be sought from Dorset County Council to extend Chard Junction Quarry onto neighbouring Westford Park Farm for gravel extraction.

The fieldwork was undertaken by Nicholas Dawson and Piotr Worbel, on the 10<sup>th</sup> to 12<sup>th</sup> July 2018 and the site code is WCJ 18/65. The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

## **Location, topography and geology**

The site is located 4.9km to the south-east of Chard and 6.8km north east of Axminster, close to the Dorset-Somerset border. It comprises an area of 11.9ha in a contiguous south to north row of fields on the lower west-facing slopes overlooking the floor of the Axe valley, the river's meanders coming within 60m of its west side. In addition, a proposed 530m-long haul road would link the east side of the site's north field to the existing quarry's grading facilities to the north-east (Fig. 2). The site lies at a height of between 60-70m above Ordnance Datum (aOD). Current land use of the field is for the most part pastoral land with one field of wheat crop.

## **Site history and archaeological background**

The archaeological potential of the site has been highlighted in the desk-based assessment (Tabor 2018). In summary the site lies in an area of moderate archaeological potential with recent fieldwork having revealed a number of sites of Bronze Age, Roman and medieval date as well as finds of lower Palaeolithic date. There are no known heritage assets within the site itself. However, one known heritage asset (a listed building) lies on its periphery. By analogy with known nearby sites, the site would have been well-situated for past settlement and

can be considered to have moderate archaeological potential for all post-glacial periods, probably increasing on account of the size of the site area.

## **Methodology**

### Sample interval

Data collection involved the traversing of the survey area along straight and parallel lines using two cart-mounted Bartington Grad601-2 fluxgate gradiometers. Even coverage was achieved with the use of regularly spaced markers at the ends of traverses and the real-time positional trace plot. Readings were taken at 0.25m intervals along traverses 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating east to west zig-zag orientation across the survey area. The upper central field and the route of the haul road were not surveyed at this stage due to the presence of crops in the fields.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to  $10^{-9}$  Tesla, the SI unit of magnetic flux density.

### Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both English Heritage (2008) and the Chartered Institute for Archaeologists (2002, 2011, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using two dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometers mounted upon a Bartington non-magnetic cart. A two-wheeled lightweight structure pushed by hand, the cart consisted a bank of four vertically-mounted Bartington Grad601-2 magnetic sensor

tubes at 1m apart and a Trimble Geo 7x centimetre edition GPS. Readings were collected by two Bartington Grad601-2 loggers and collated using MLgrad601 software on a Linx 12x64 tablet running Windows 10 mounted at the rear of the cart. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

The Trimble Geo7x centimetre edition GPS system with centimetre real-time accuracy was used to tie the cart traverses into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data. Data gathered in the field was positioned using the MultiGrad601 logging software and processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

<b>Process</b>	<b>Effect</b>
Clip from -1.80 to 2.20 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by interference of metal objects within the survey area.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 3) with the processed data then presented as a second figure (Fig. 4), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 5). Anomalies are shown as colour-coded lines, points and polygons.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 2.16.2 and exported again in .PNG format in order to present them in figure templates in

Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

## **Results**

### Upper North Field

A small number of magnetic anomalies were recorded across this field (Figs. 3 and 4), the two which stand out the most being bands of positive and negative readings. One runs east west across the centre of the field the second runs across the north-west corner of the field. These are likely caused by geology and correspond to changes in slope within the field. While magnetic noise along field boundaries was increased greatly by the presence of active electric fencing, a particularly large area of magnetic disturbance is located in the north-west corner of this survey area [Fig. 5: 1]. This is likely related to the presence of a Second World War pillbox located with the field boundary and a metal farm gate next to it. Towards the centre of the field [3] and to the north-east corner of the survey area [2] are two semicircular weak positive linear anomalies. Both are approximately 20m in diameter and both have a similar orientation and may indicate the presence of buried archaeological features. A number of magnetic spikes are spread throughout the field, these most likely represents buried ferrous objects or agricultural debris.

### Mid South Field

As with the previous field a small number of magnetic anomalies were recorded. These include a number of magnetic disturbances around the edge of the field likely caused by the electric fencing or metal gates. In the north-east corner an area of strong positive and negative readings suggests a feature of geological origin. Toward the centre of the field's northern edge running north-east to south-west runs a weak positive anomaly [4] approximately 25m in length. To the south of this, though on a slightly different orientation lie a series of weak positive linear anomalies [5] that appear related to one another. In total there are five positive linear anomalies: three running north-east to south-west and two at right angles to this running north-west to south-east, which may represent buried ditches of archaeological interest. The lengths range from approximately 70m to 10m. A number of magnetic spikes representing either agricultural debris or buried ferrous objects were located across the field.

### Lower South Field

No magnetic anomalies of interest were identified within this field (Figs. 3 and 4), only the usual scatter of magnetic spikes indicating buried ferrous objects or agricultural debris and magnetic disturbance cause by the pump house on the west edge of the survey area (Fig. 5).

### **Conclusion**

The survey was successfully completed across three of the four fields, with the mid north field and the route of the haul road not being surveyed due to the presence of crops in the fields. Of the fields surveyed the northernmost field and the mid south field both produced anomalies with archaeological potential. In the north field it is the two circular linears [2] and [3] that may have archaeological origins. In the mid south field it is the 25m long linear anomaly [4] and the system of weak positive linear anomalies [5] that have potential.

### **References**

- BGS, 2004, *British Geological Survey*, 1:50,000, Sheet 326/340, Solid and Drift Edition, Keyworth
- CI/A, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading
- CI/A, 2011, *Standard and Guidance: for archaeological geophysical survey*, Reading
- CI/A, 2014, *Standard and Guidance: for archaeological geophysical survey*, Reading
- English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)
- NPPF, 2012, *National Planning Policy Framework*, Dept Communities and Local Government, London
- Tabor, R, 2018, 'Land at Westford Park Farm. Chard Junction, Dorset: An Archaeological Desk-Based Assessment', Thames Valley Archaeological Services unpubl rep 18/65, Taunton



## Appendix 1. Survey and data information

### Programme:

Name: TerraSurveyor  
Version: 3.0.33.10

### Raw data

#### South Fields

Filename: cj1\_raw.xcp  
Description: Imported as Composite from: cj1.xyz  
Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 503899.965447318, 5630900.99192155 m  
Southeast corner: 504154.245447318, 5630585.35192155 m  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1.00 m spacing.  
Dummy Value: 32702

Source GPS Points: 158535

#### Dimensions

Composite Size (readings): 1956 x 2428  
Survey Size (meters): 254 m x 316 m  
Grid Size: 254 m x 316 m  
X Interval: 0.13 m  
Y Interval: 0.13 m

#### Stats

Max: 107.44  
Min: -109.75  
Std Dev: 4.41  
Mean: -0.07  
Median: -0.07  
Composite Area: 8.0261 ha  
Surveyed Area: 4.0639 ha

#### North Field

Filename: cj2\_raw.xcp  
Description: Imported as Composite from: cj2.xyz  
Instrument Type: MLgrad Import  
Units:  
UTM Zone: 30U  
Survey corner coordinates (X/Y):  
Northwest corner: 504040.493070478, 5631133.21106786 m  
Southeast corner: 504176.213070478, 5631001.52106786 m  
Direction of 1st Traverse: 90 deg  
Collection Method: Parallel  
Sensors: 2 @ 1.00 m spacing.  
Dummy Value: 32702

Source GPS Points: 61959

#### Dimensions

Composite Size (readings): 1044 x 1013  
Survey Size (meters): 136 m x 132 m  
Grid Size: 136 m x 132 m  
X Interval: 0.13 m  
Y Interval: 0.13 m

#### Stats

Max: 104.44  
Min: -109.69  
Std Dev: 5.99  
Mean: -0.23  
Median: 0.10  
Composite Area: 1.7873 ha  
Surveyed Area: 1.4274 ha

### Processed data

#### South Fields

Stats  
Max: 2.41  
Min: -2.00  
Std Dev: 0.51  
Mean: -0.01  
Median: 0.00

#### GPS based Proce6

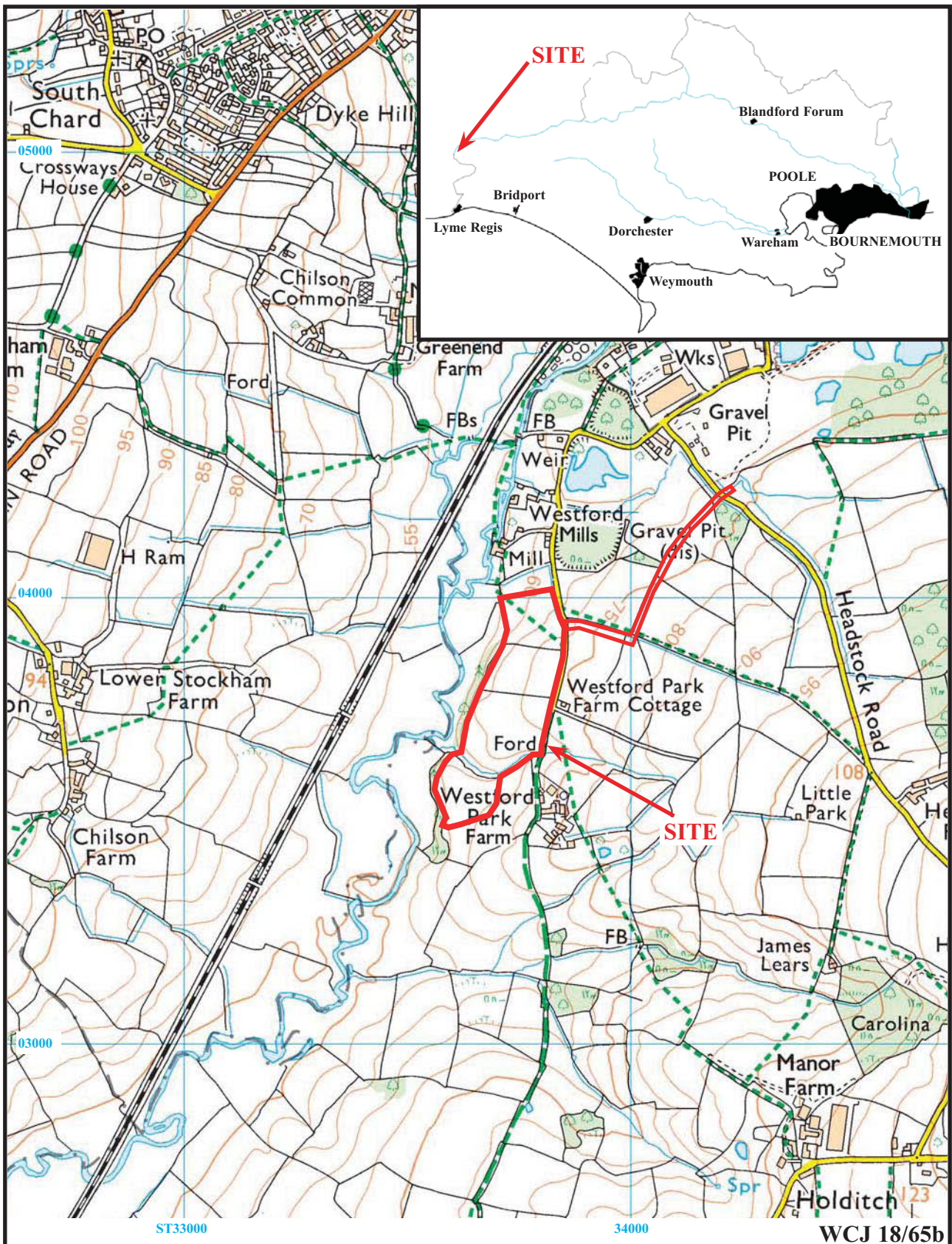
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- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Despiking Threshold: 1 Window dia: 3
- 5 Clip at 3.00 SD
- 6 Clip from -1.80 to 2.20

#### North Field

Stats  
Max: 2.41  
Min: -2.00  
Std Dev: 0.62  
Mean: -0.01  
Median: 0.00

#### GPS based Proce6

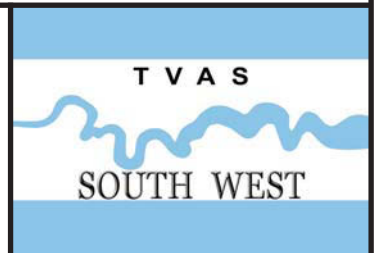
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- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Despiking Threshold: 1 Window dia: 3
- 5 Clip at 3.00 SD
- 6 Clip from -1.80 to 2.20

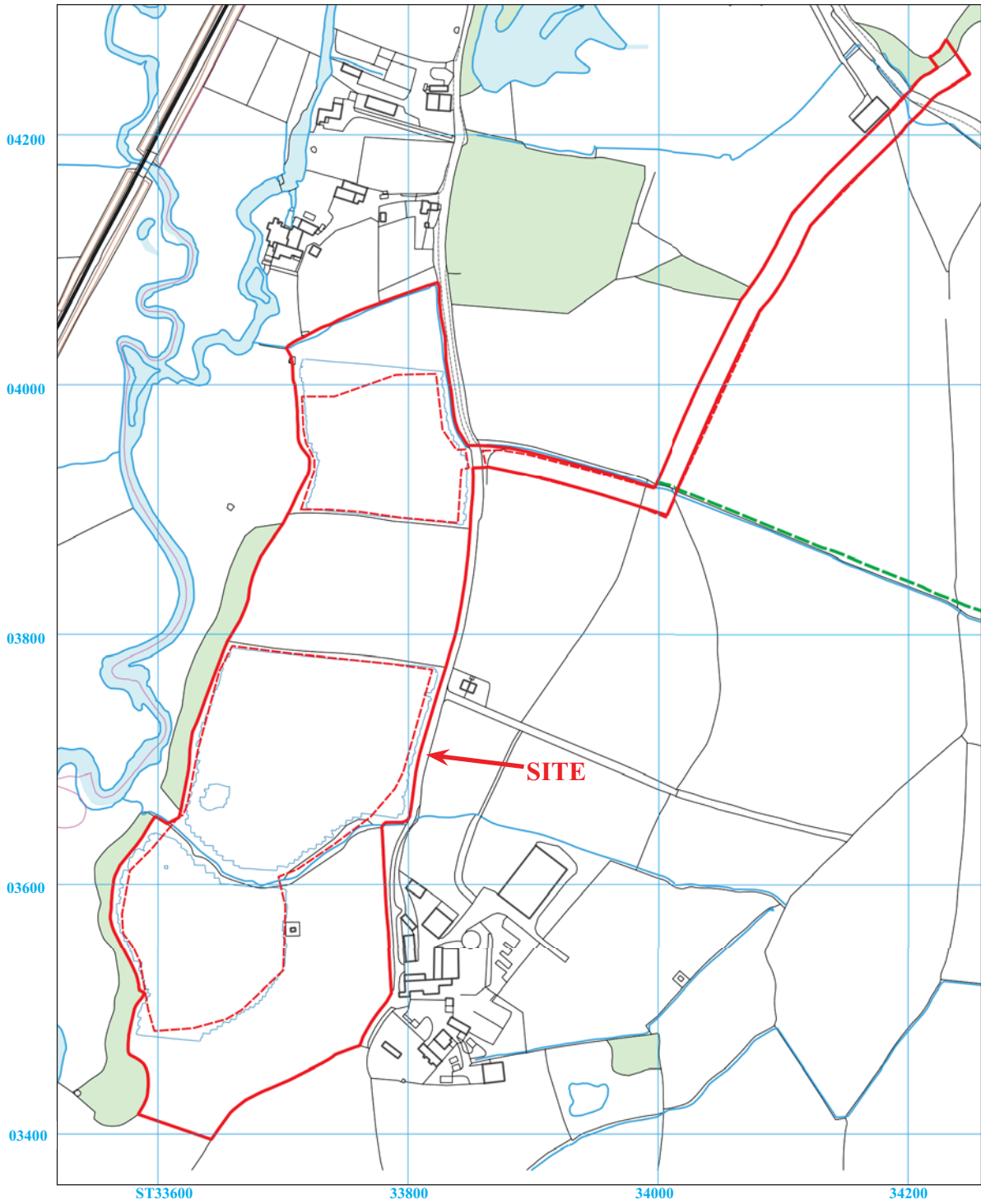


**Land at Westford Park Farm,  
Chard Junction, Dorset, 2018  
Geophysical Survey (Magnetic)**

Figure 1. Location of site in relation to Chard Junction and within Dorset.

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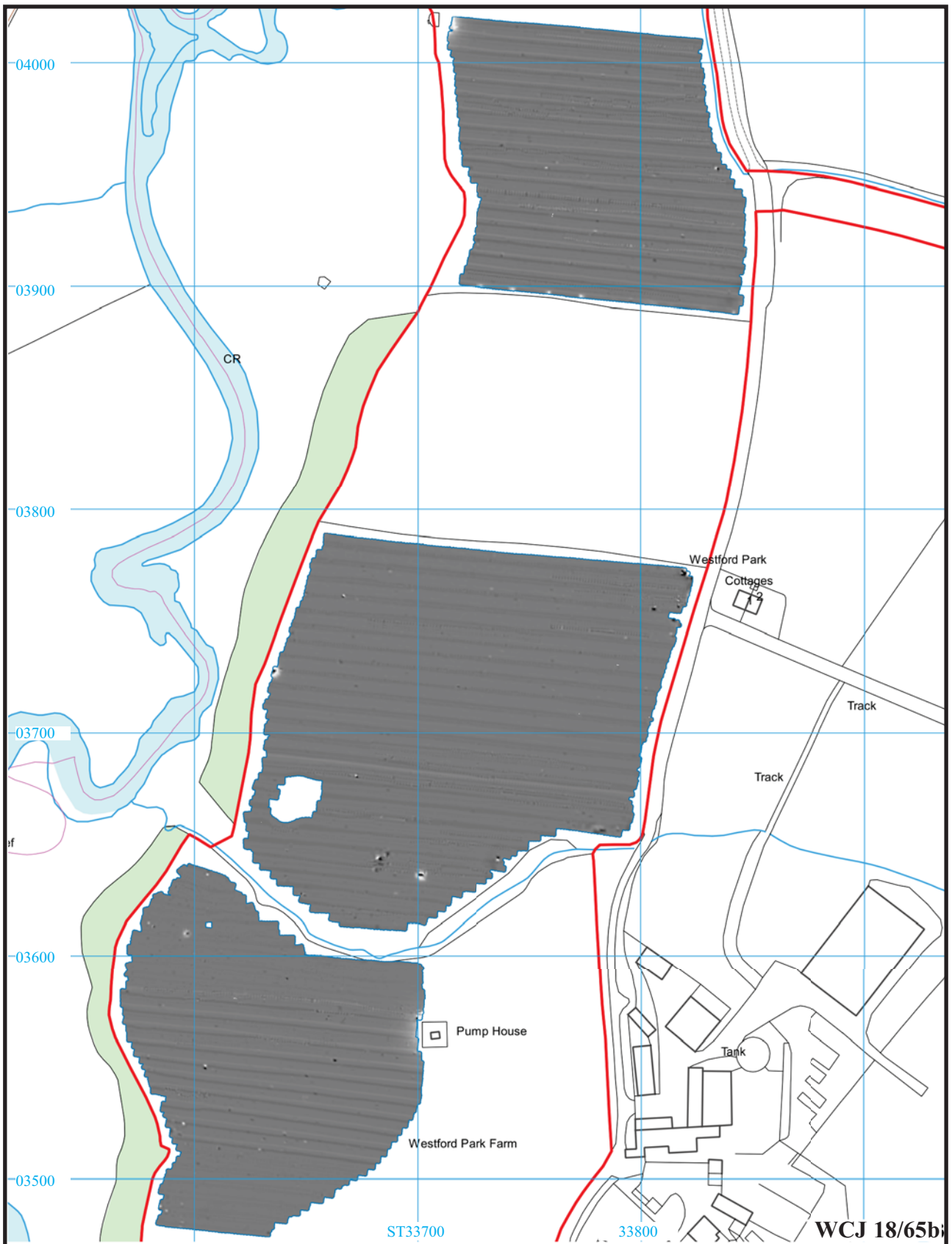
WCJ 18/65b



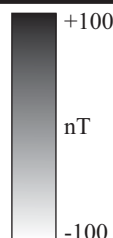
**Land at Westford Park Farm,  
Chard Junction, Dorset, 2018  
Geophysical Survey (Magnetic)  
Figure 2. Detailed location of site.**

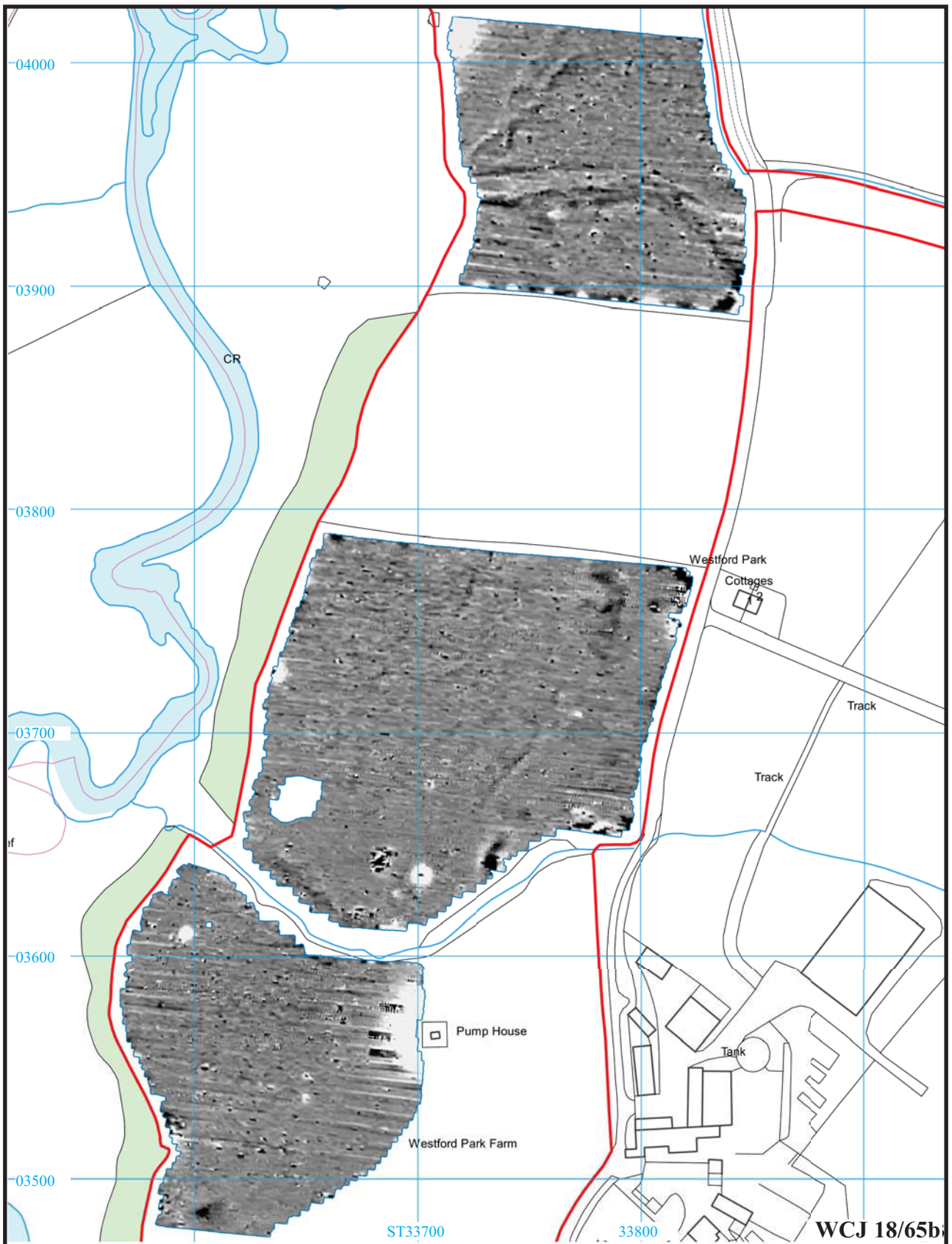
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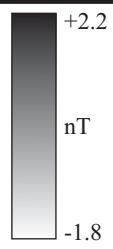


**Land at Westford Park Farm,  
Chard Junction, Dorset, 2018  
Geophysical Survey (Magnetic)**  
Figure 3. Plot of raw gradiometer data.





**Land at Westford Park Farm,  
Chard Junction, Dorset, 2018  
Geophysical Survey (Magnetic)**  
Figure 4. Plot of processed gradiometer data.



WCJ 18/65b

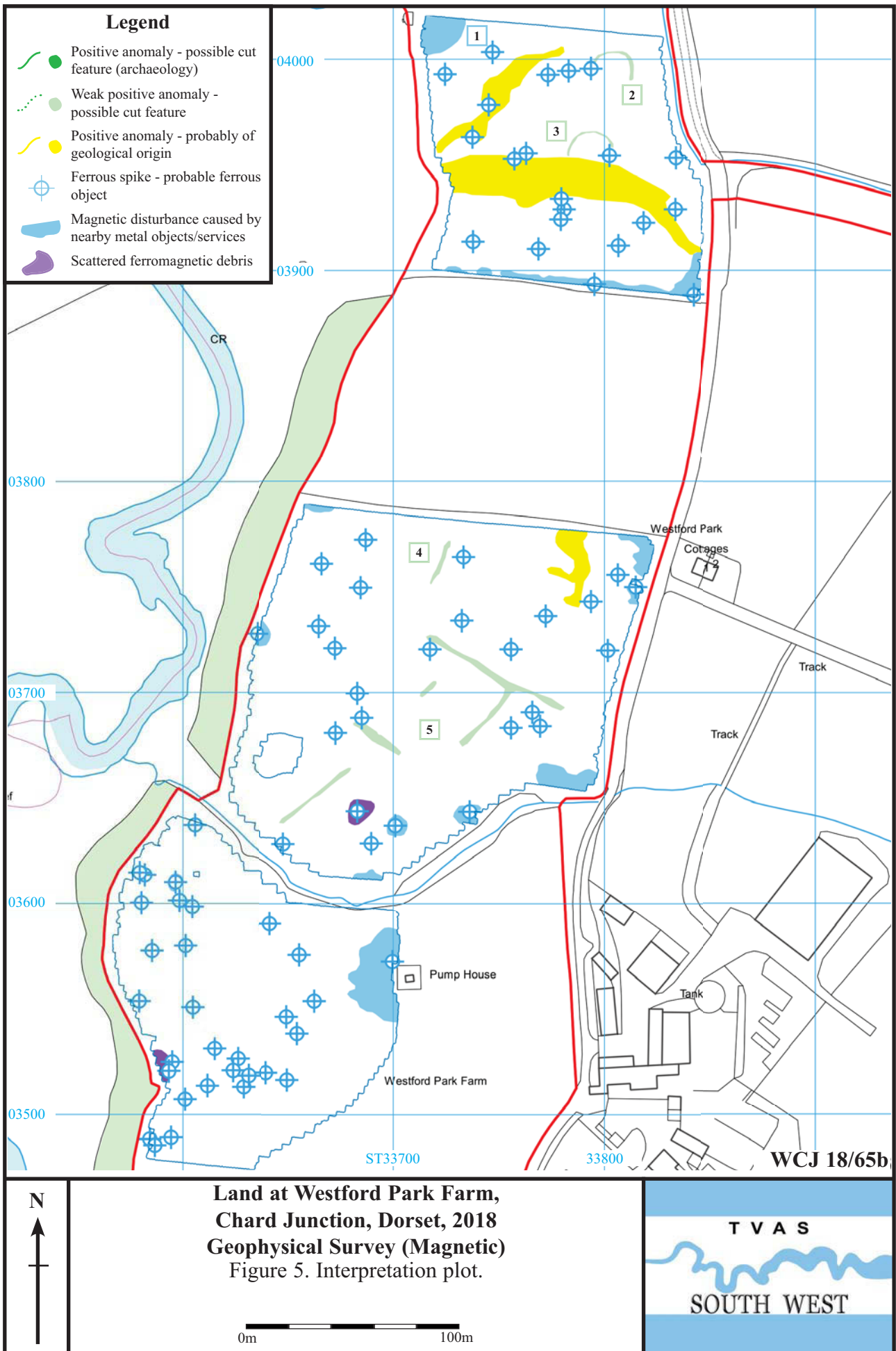




Plate 1. North field, looking north west from south east entrance.



Plate 2. Mid south field, looking south west from north east entrance



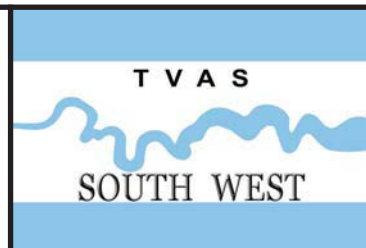
Plate 3. South field, looking north west from south east entrance.



Plate 4. Pillbox within North Field, looking west.

WCJ 18/65b

**Land at Westford Park Farm,  
Chard Junction, Dorset, 2018  
Geophysical Survey (Magnetic)**  
Plates 1 to 4.

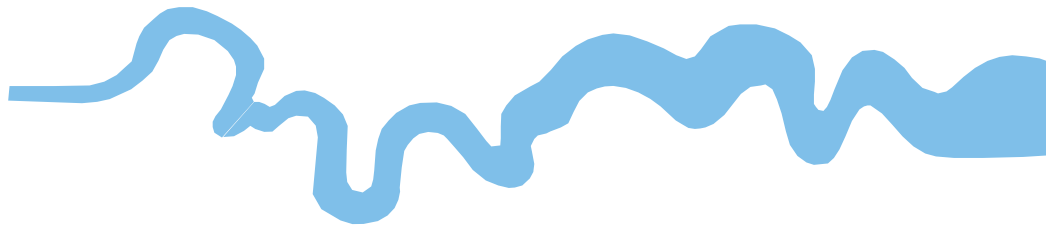


## TIME CHART

	Calendar Years
Modern _____	AD 1901
Victorian _____	AD 1837
Post Medieval _____	AD 1500
Medieval _____	AD 1066
Saxon _____	AD 410
Roman _____	AD 43 AD 0 BC
Iron Age _____	750 BC
Bronze Age: Late _____	1300 BC
Bronze Age: Middle _____	1700 BC
Bronze Age: Early _____	2100 BC
Neolithic: Late .....	3300 BC
Neolithic: Early .....	4300 BC
Mesolithic: Late .....	6000 BC
Mesolithic: Early .....	10000 BC
Palaeolithic: Upper .....	30000 BC
Palaeolithic: Middle .....	70000 BC
Palaeolithic: Lower .....	2,000,000 BC







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