

Land off Lea Road and Sidgreaves Lane
Cottam Parkway
Archaeological Earthwork Survey, Level 1 - Assets 8 and 9
July 2023



Report

Archaeological earthwork survey, Level 1 - Assets 8 and 9

Site

Land off Lea Road and Sidgreaves Lane, Cottam Parkway

Client

Lancashire County Council

Planning Authority

Lancashire County Council

Planning Ref

LCC/2022/0049

Grid reference

SD 49185 3141

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Every effort is made to provide detailed and accurate information, however, Rocket Heritage & Archaeology Ltd cannot be held responsible for errors or inaccuracies within this report.

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Executive Summary

An analytical earthwork survey was carried out for Lancashire County Council in advance of the construction of the Cottam Parkway Railway Station between Lea and Cottam, to the northwest of Preston (NGR SD 4918 3141) – herein referred to as ‘the Scheme’. The survey was undertaken as part of a broader package of works required to mitigate potential impacts from the Scheme.

The aim of the survey was to create a record of ridge and furrow identified as Assets 8 and 9 in the Environmental Statement (Chapter 7) and noted as of ‘uncertain date’ and of low value. The assets are situated within a parcel of Post-medieval Enclosure (HLT 2).

The survey was undertaken by drone on 15 June 2023 using a Matrice 300 RTK UAV equipped with a 61MP Sony A7R IV payload for optimum data clarity. The survey was carried out with an active Real-Time Kinematic connection to ensure accurate data geolocation logging throughout.

The aerial survey was used to produce a photorealistic topographic map (2D) and 3D model. Point cloud data was processed to create geolocated hill shade views which were utilised to examine and interpret the topographic data. An interpretative plan and transects were then produced to provide a permanent record of the ridge and furrow prior to construction works.

The results from the survey may be further enhanced by the results of the intrusive fieldwork to be undertaken as part of the Scheme.

1. Introduction

- 1.1.1. This report presents the findings of an analytical earthwork survey carried out for Lancashire County Council in advance of the construction of the Cottam Parkway Railway Station between Lea and Cottam, to the northwest of Preston - herein referred to as 'the Scheme'.
- 1.1.2. The work was required in response to a condition proposed by LCC Archaeology for the Scheme (application ref. LCC/2022/0049) and the methodology was detailed in an approved Written Scheme of Investigation (WSI) (RHA Ltd 2023a).
- 1.1.3. The survey was commissioned by Lancashire County Council and was undertaken as part of a broader package of works required to mitigate potential impacts from the Scheme, which also incorporated a landscape survey (RHA Ltd 2023b). It should be noted that the landscape and earthwork survey are intrinsically linked and were recorded holistically to present a cohesive record of the site. The archaeological and historical background of the site has been detailed in other documents including the WSI and so has not been reproduced here.
- 1.1.4. Thirty-eight archaeological sites and findspots were identified within the Environmental Statement study area. This included four areas of ridge and furrow earthworks indicative of medieval and post-medieval farming techniques (Assets 8, 9, 27, 141).
- 1.1.5. The aim of the survey was to create a record of ridge and furrow identified as Assets 8 and 9 in the baseline desk-based assessment and Environmental Statement (Chapter 7) (LCC). Assets 8 and 9, both were noted as of 'uncertain date' and of low value and were situated within a parcel of Post-medieval Enclosure (HLT 2).

2. Location, topography and geology

- 2.1.1. The Scheme is located off Lea Road and Sidgreaves Lane to the west of Cottam, centred around NGR SD 4918 3141 (Figure 1). It is equidistant between Cottam and the village of Lea, and about 10km from Preston City Centre in Lancashire.
- 2.1.2. The Scheme is situated in a parcel of land approximately 14.5ha in area, and includes fields, wooded areas and existing network rail land.. The site is predominantly in agricultural use; bound by Lea Road to the east, the Cottam Link Road to the north, Sidgreaves Lane to the west and, beyond the Preston Fylde Junction to Blackpool North line, the Ashton and Lea Golf Course to the south.
- 2.1.3. The bedrock geology underlying the site is Sherwood Sandstone, a sedimentary bedrock that formed between 272.3 and 237 million years ago. The superficial deposits are Devensian Till, comprised of gravelly sandy silty clay (BGS).

3. Methodology

- 3.1.1. The survey and interpretation of the results were carried out in accordance with the scope of a Level 1 survey as defined by Historic

England's Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice (2017).

Data Capture

- 3.1.2. The survey was undertaken on 15 June 2023 by Josh Blackwell of Rotoris Ltd. The data was captured using a DJI Matrice 300 enterprise Unmanned Aerial Vehicle (UAV) equipped with a Sony A7R IV sensor (35mm lens) with a gimbal integrated Global Positioning System (GPS) device logging the orientation of the camera during capture. The UAV was connected to the local Real-Time Kinematic Positioning (RTK) Base station throughout all flights for accurate logging of aircraft geolocation throughout the mapping mission, such as aircraft altitude and orientation.
- 3.1.3. Seven Ground Control Points were placed and measured around the perimeter of the survey area along with two Check Points in the central portion of the survey area. The ground control and check points were measured using an Emlid Reach RX GNSS receiver, connected to the same local base station as the UAV via RTK. Each ground control and check point coordinate was then exported to a CSV file ready for post processing.
- 3.1.4. To capture the 2D deliverables, such as the GeoTIFF file/orthomosaic, the sensor was positioned 90 degrees down at all times, capturing the surface from directly above (from an approximate height of 65 metres). The image capture frequency was set to be carried out within the camera's parameters.
- 3.1.5. To capture the 3D deliverables and higher density point cloud, oblique missions were also carried out at the same altitude. Missions captured the same survey site at varying angles along predetermined flight paths with the sensor set at 45 degrees. This allowed for the facades, contours and features of the landscape to be captured more accurately and with more detail.
- 3.1.6. The ground control points and check points were then collected.

Post-Processing

- 3.1.7. The 2D deliverables were processed in the photogrammetry applications Pix4D Matic (no cloud processing), all images, ground control points and check points were imported into the programme and were allowed to carry out their initial processing stage. Once initially processed, the ground control points and check points were calibrated using the coordinates captured on site with the GNSS receiver. The drone image coordinates are converted from World Geodetic System 1984 (WGS84) to Ordnance Survey of Great Britain 1936 (OSGB36) in this step, all Global Navigation Satellite System (GNSS) captured coordinates are captured in OSGB36.
- 3.1.8. The 2D deliverables were then processed by the software once all data had been calibrated and verified to be without errors.
- 3.1.9. Once the orthomosaic (GeoTIFF) file and DSM had been processed, they were exported.
- 3.1.10. The data was checked for errors by the system comparing the check points against the ground control points for errors.

- 3.1.11. The 3D deliverables were processed in another desktop photogrammetry application better suited to 3D deliverables: Agisoft Metashape Professional. The same process was carried out, but the data was processed further to produce a 3D mesh and Textured mesh. This 3D model was then exported and uploaded to Nira.app portal for viewing (see link in bibliography).

Interpretation

- 3.1.12. The DSM file was imported by Rocket Heritage and Archaeology Ltd into Q Geographical Information Software. Hill shades were produced with various azimuths and altitudes. A hill shade with a Z-Factor of 1, a scale of 1, an azimuth of 0 and an altitude of 45 was primarily used for interpretation.
- 3.1.13. This data, in combination with the 3D model produced by Rotoris Ltd, were examined in detail to identify landscape features, such as ridge and furrow. The Profile Tool Plugin was used to create profiles to better understand the elevation of these features. Images of this data were then exported to be annotated in Inkscape.



Plate 1: Oblique aerial view of survey area (not to scale) (Rotoris Ltd 2023)

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4. Results

- 4.1.1. To the east of Sidgreaves Lane, modern fenced field boundaries overlaid ditched field boundaries that are orientated perpendicular to Sidgreaves Lane. The ditched boundaries separate smaller semi-regular strip fields and may pre-date the post-medieval enclosure.
- 4.1.2. Asset 8, is clearly visible within the survey area as two relatively narrow but pronounced strips of ridge and furrow, roughly east-west aligned. Area 1 measures approximately 193m by 50m with ridges between 4.5-5m in width, Area 2 is diagonally arranged and in total measures 122m from east to west and 86m from north to south, with only a small area 80m southwest to northeast by 35m northwest to southwest, lying within the scheme boundary.
- 4.1.3. The earthworks continue from Sidgreaves Lane until they meet a small watercourse at the east (Figure 4, Plate 2).
- 4.1.4. The ridge and furrow forming Asset 8 continues out of the Scheme boundary to both the east and north with Area 3 measuring 56m northwest to southeast 113m southwest to northeast. The ridge and furrow to the north becomes less visible north of the point at which it meets a modern post and wire fence, suggesting that differences in the methods of land management in the modern period have resulted in different levels of preservation i.e. traces are more ephemeral in heavily ploughed fields. The ridge and furrow to the east of the water course is on a northeast-southwest alignment and is narrower at 4-4.5m in width.
- 4.1.5. To the south of the canal, and east of Sidgreaves Lane are two broadly rectangular fields with an east-west field boundary marked by a quickset hedge. Visible in the northern field is Asset 9, an area of ridge and furrow within which a roughly circular marl pit, now flooded (Asset 10) is located. Within the site boundary the area of Asset 9 measures approximately 149m (east to west) by 48m (north to south). The asset extends beyond the Scheme boundary and in total is approximately 149m by 105m.
- 4.1.6. The ridge and furrow comprising Asset 9 is aligned east-west, and measures between 8.5-9.5m in width from furrow to furrow (Figure 5, Plate 3). The earthworks do not extend across the width of the field and are bounded to the west by a north-south aligned linear feature. Although no markers are visible in the hedges, the strong regular linear form of the boundary may be indicative of the route of a pipeline trench. The same sharp edged linear feature is present in the field to the south, with a dog leg formation.
- 4.1.7. To the east of this there are vaguely legible traces of ridge and furrow. In this area the furrows are more closely spaced, which may indicate a variation in date.
- 4.1.8. Transects across each asset show a ridge width of just under 0.5m within Asset 8 and a maximum ridge height of approximately 0.4m and a width of c10m and maximum height of approximately 0.5m within the western portion of Asset 9, with a less well-defined depth to the east (Figure 6). Maximum and minimum heights above OD are shown below:

- Profile 1: min 19.94m, max 21.15m
- Profile 2: min 21.88m, max 23.13m
- Profile 3: min 20.92m, max 21.69m
- Profile 4: min 20.12m, max 21.61m
- Profile 5: min 17.58m, max 19.69m
- Profile 6: min 17.81m, max 20.05m





Plate 2: Asset 8, looking north (Rotoris Ltd 2023). The watercourse marks the boundary of the survey area but ridge and furrow on a contrasting trend can be seen continuing to the west.



Plate 3: Aerial view of Asset 9, looking north (Rotoris Ltd 2023). The absence of ridge and furrow in the west and linear feature running north to south suggests the removal of an earlier field boundary. Asset 10, a flooded marl pit, can be clearly seen.

5. Conclusions

- 5.1.1. The areas of ridge and furrow earthworks noted in the survey overlap with areas yet to be investigated using both trial trench evaluation and strip, map and record techniques. Any further evidence that could potentially be used to provide definitive dating for the earthworks should be recorded appropriately during those investigations.

6. OASIS

- 6.1.1. An OASIS (Online AccesS to the Index of archaeological investigationS) form will be completed for the project. After validation by the Historic Environment Record (HER) the project report will become a publicly accessible document.

7. Copyright

- 7.1.1. Copyright in this project report will rest with RHA Ltd unless specific arrangements are made for its assignment elsewhere. Lancashire County Council Historic Environment Team (LCCHET) will have permission to use the report for the purposes of the HER. This may include provision of copies to third parties. Copyright of the written archive will be vested in the project archive repository at such a time that deposition is possible.



Sources

On-line

British Geographical Survey Geology Viewer (Accessed 11/04/2023) - <https://geologyviewer.bgs.ac.uk>

Rotoris Ltd 3D Model of the Site - <https://rotoris.nira.app/a/dz50-wutRPuBidlyQOxy1A/1>

Bibliographic Sources

Historic England, 2017, *Understanding the archaeology of Landscapes: A guide to good recording practice*.

Lancashire County Council (LCC), 2022a, *Cottam Parkway Railway Station Cultural Heritage Desk-Based Study*, unpublished report

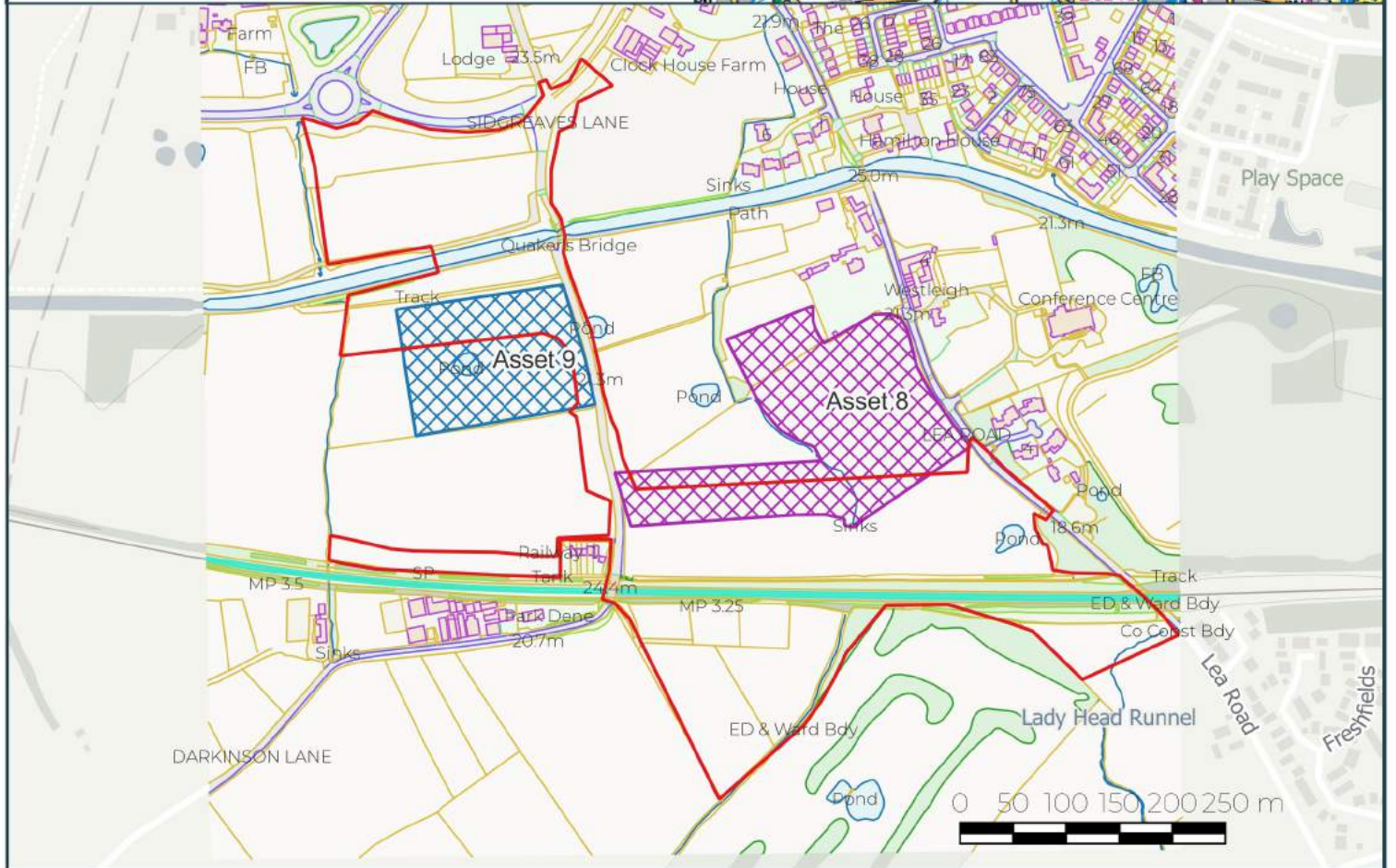
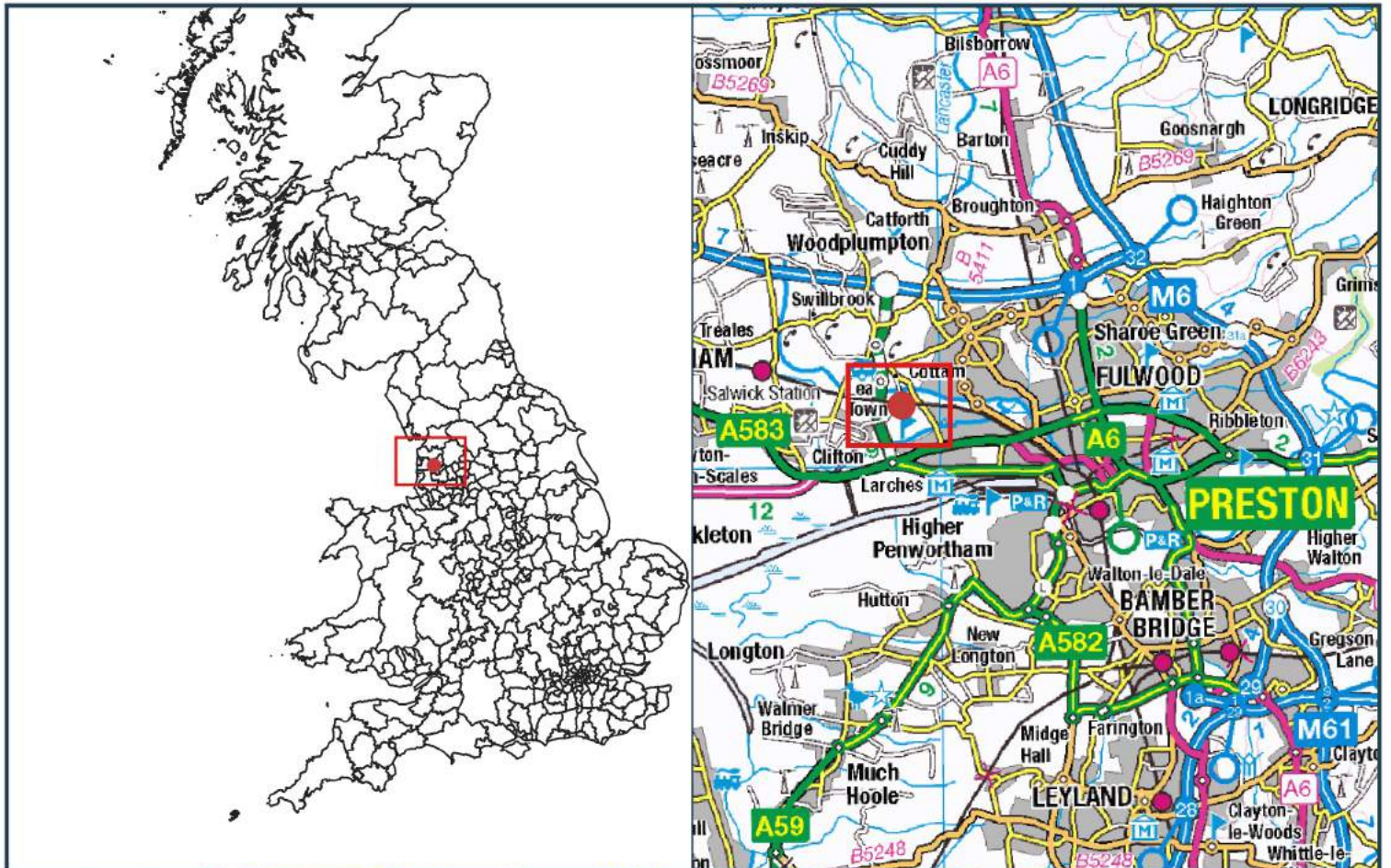
Lancashire County Council (LCC), 2022b, *Cottam Parkway Railway Station Environmental Statement*, Volume 2: Main Statement, Chapter 7: Cultural Heritage, unpublished report

RHA Ltd, 2023a, *Land off Lea Road and Sidgreaves Lane – Cottam Parkway: Written Scheme of Investigation*

RHA Ltd, 2023b, *Land off Lea Road and Sidgreaves Lane, Cottam Parkway, Historic Landscape Recording, Level 1 – HLT1 and 2*



Appendix 1: Figures



Title:
Figure 1: Location Plan
Address:
Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston



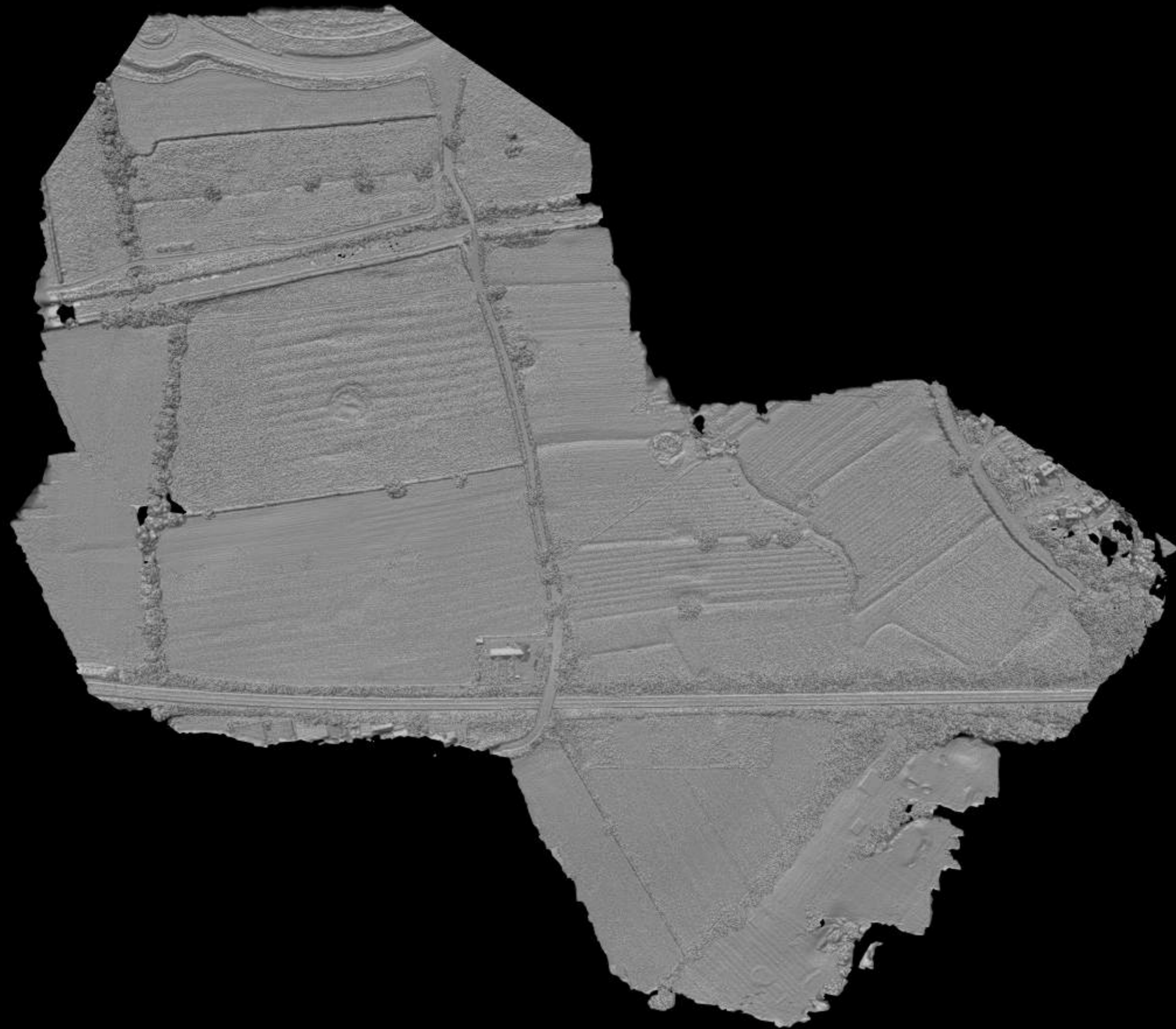


Figure 2: Screen Capture of 3D Model of Lidar Data
Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston
Contains LIDAR Data © Rotoris Ltd



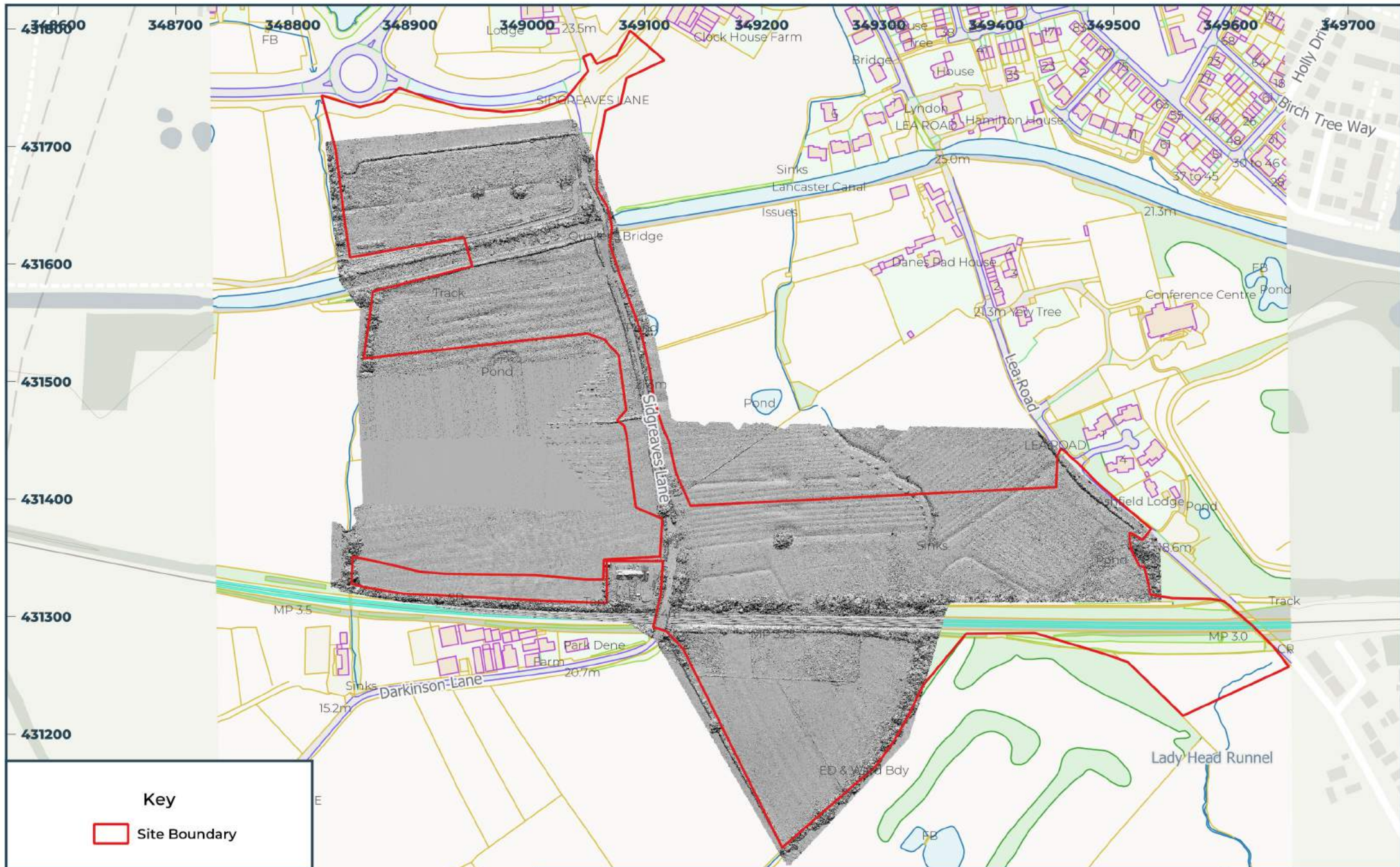


Figure 3: Hillshade of Digital Surface Model

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

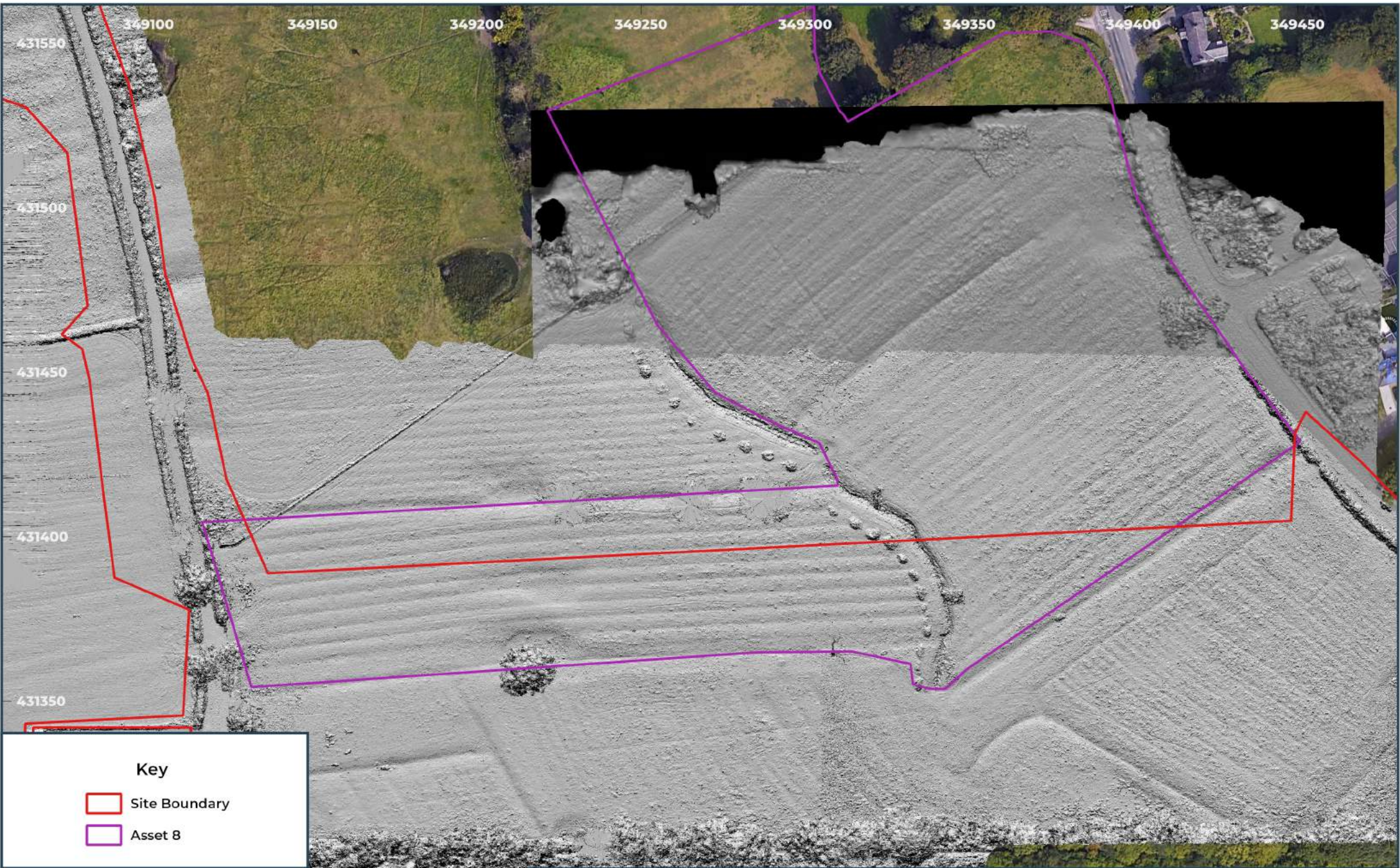
Contains OS Data © Crown Copyright Mastermap and Open Zoomstack 2023
 Contains LiDAR Data © Rotoris Ltd
 Hillshade produced with the following specifications: Scale: 1, Z-Factor: 1, Azimuth= 0 degrees (North), Altitude= 45 degrees



0 25 50 75 100 125 150 m



1:7000 @ A4



Key

- Site Boundary
- Asset 8

0 10 20 30 40 50 m

1:2500 @ A4

Figure 4: Asset 8 Hillshade
 Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

Contains LiDAR Data © Rotors Ltd 2023
 Contains Satellite Imagery © Google Earth 2023





Key

- Site Boundary
- Asset 8
- Broad Ridge and Furrow
- Narrow Ridge and Furrow

0 10 20 30 40 50 m



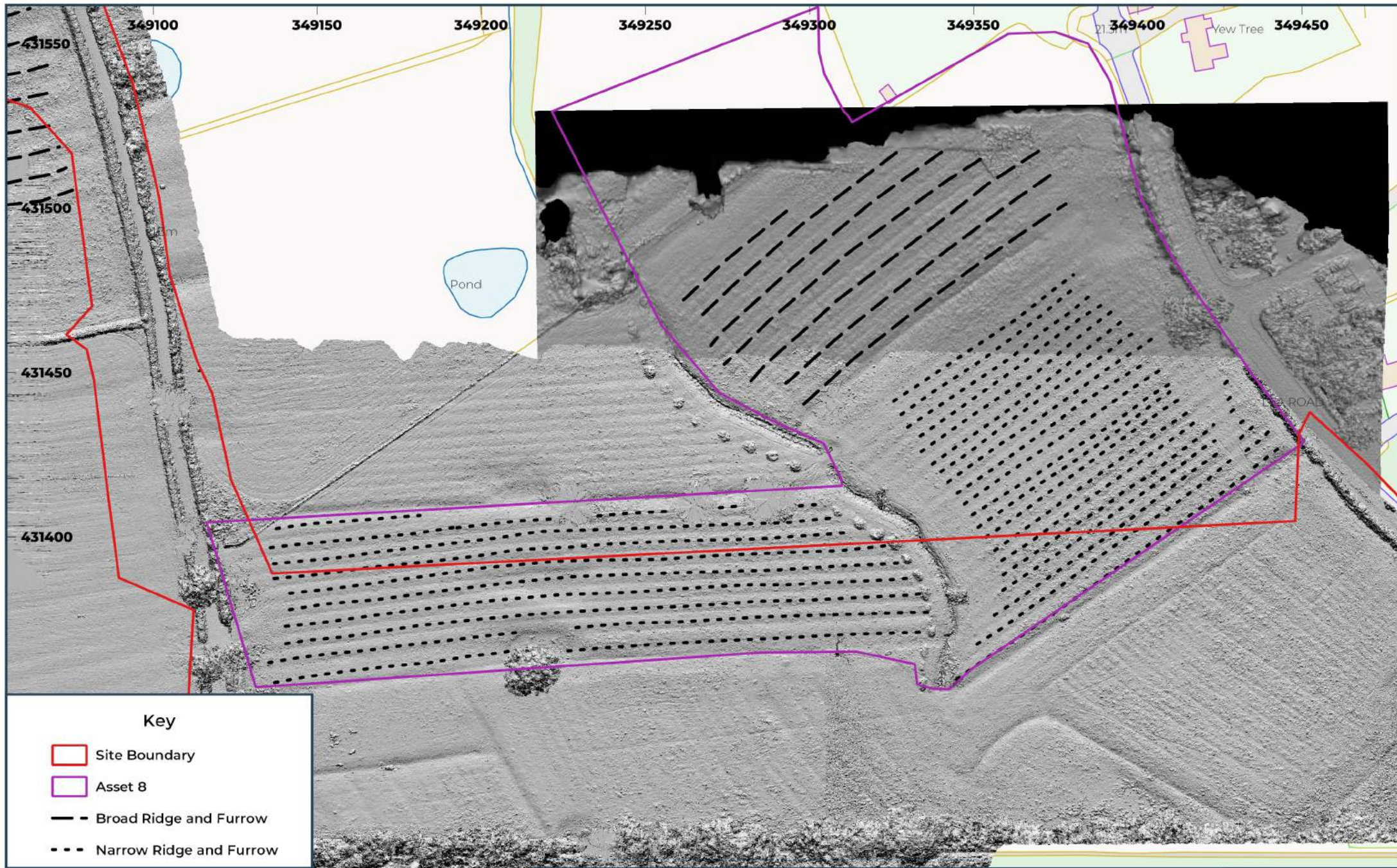
1:2500 @ A4

Figure 5: Asset 8 Landscape Interpretation

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

Contains OS Data © Crown Copyright, Mastermap 2023





Key

- Site Boundary
- Asset 8
- Broad Ridge and Furrow
- Narrow Ridge and Furrow

0 10 20 30 40 50 m



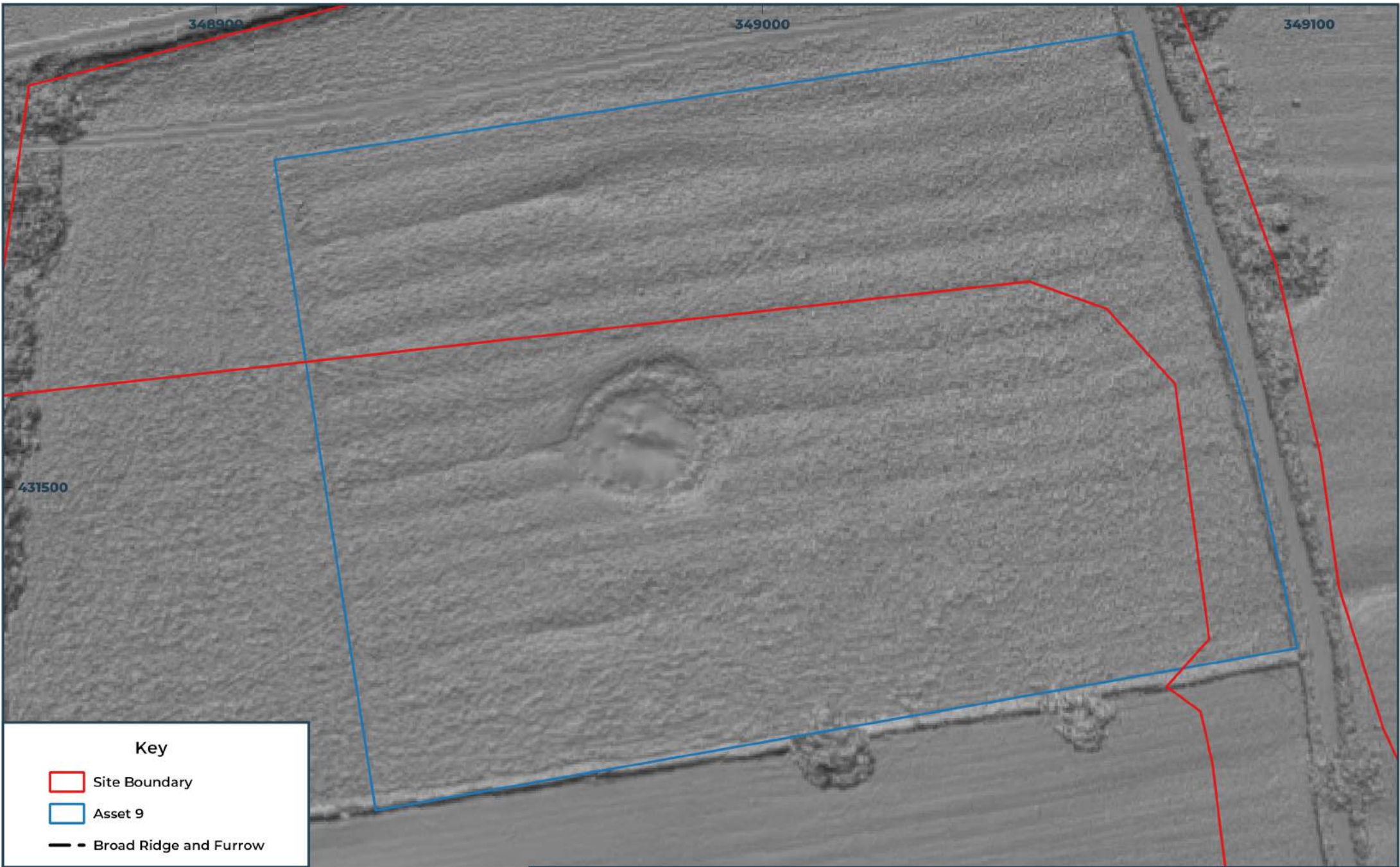
1:2500 @ A4

Figure 6: Asset 8 Earthworks Survey




Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

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Contains LIDAR Data © Rotoris Ltd





Key

-  Site Boundary
-  Asset 9
-  Broad Ridge and Furrow

0 10 20 30 40 m



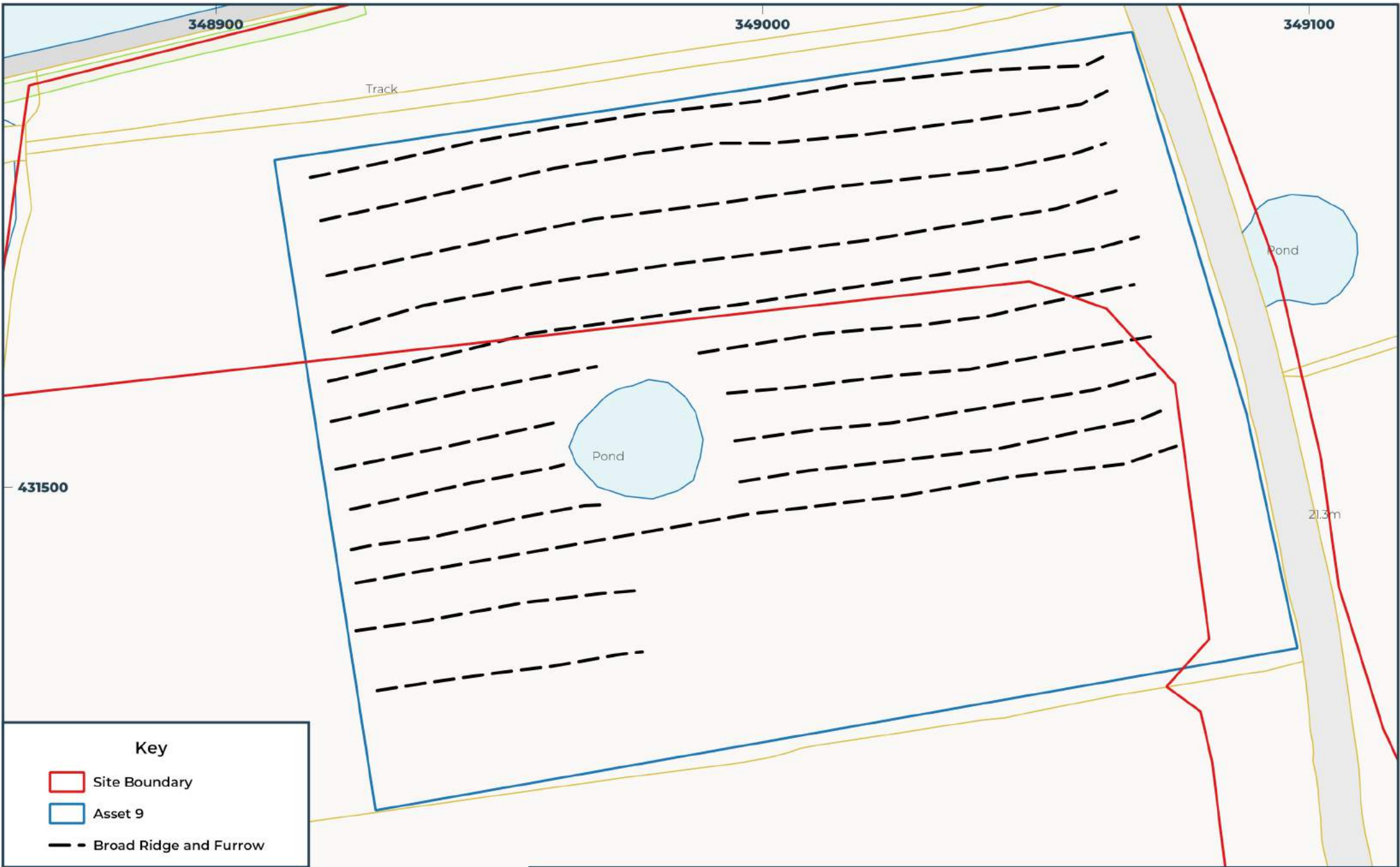
1:1500 @ A4

Figure 7: Asset 9 Hillshade

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

Contains LiDAR Data © Retoris Ltd





Key

- Site Boundary
- Asset 9
- - - Broad Ridge and Furrow

0 10 20 30 40 m



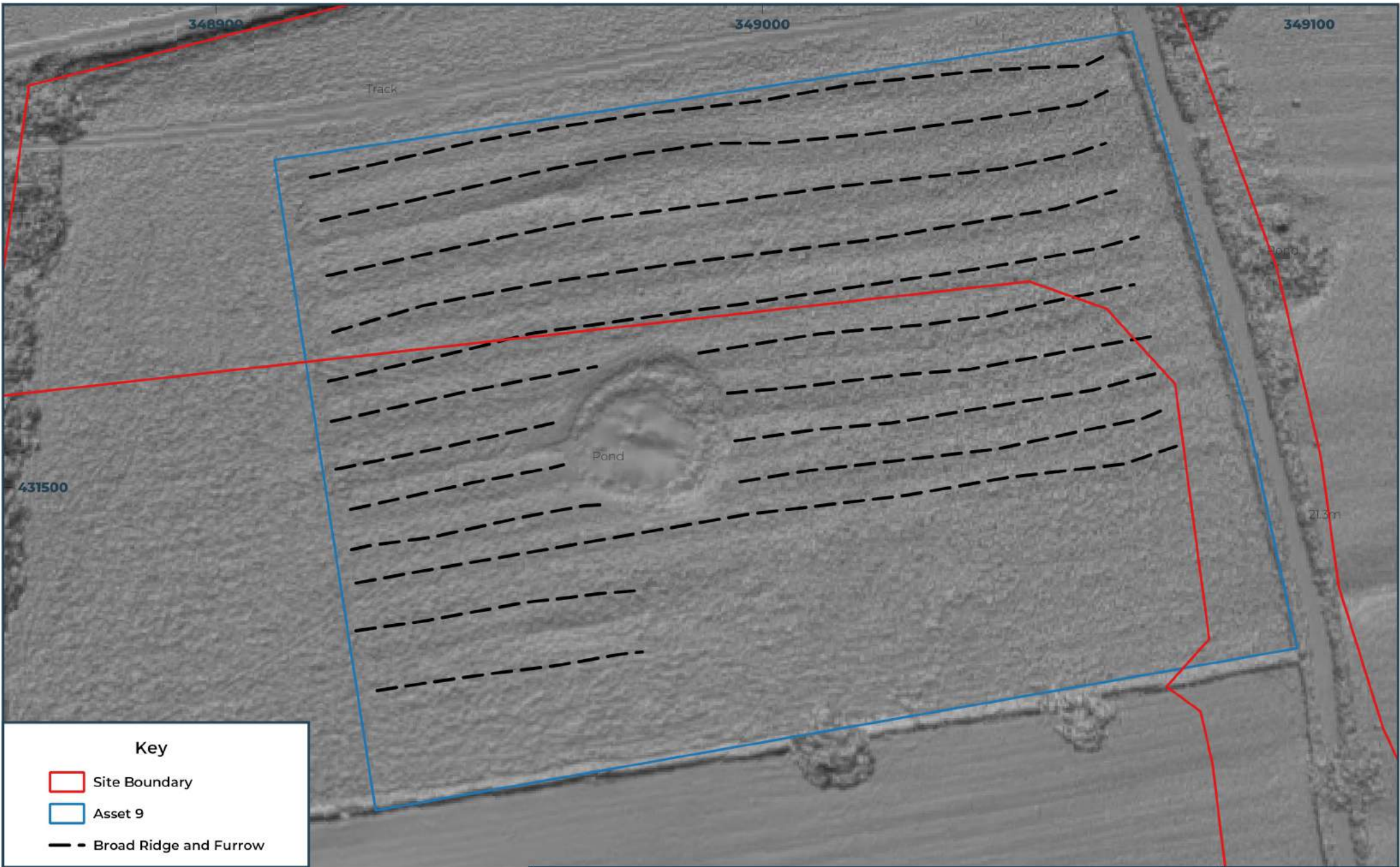
1:1500 @ A4

Figure 8: Asset 9 Landscape Interpretation

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

Contains OS Data © Crown Copyright/L. Mastermap 2023





Key

- Site Boundary
- Asset 9
- Broad Ridge and Furrow

0 10 20 30 40 m



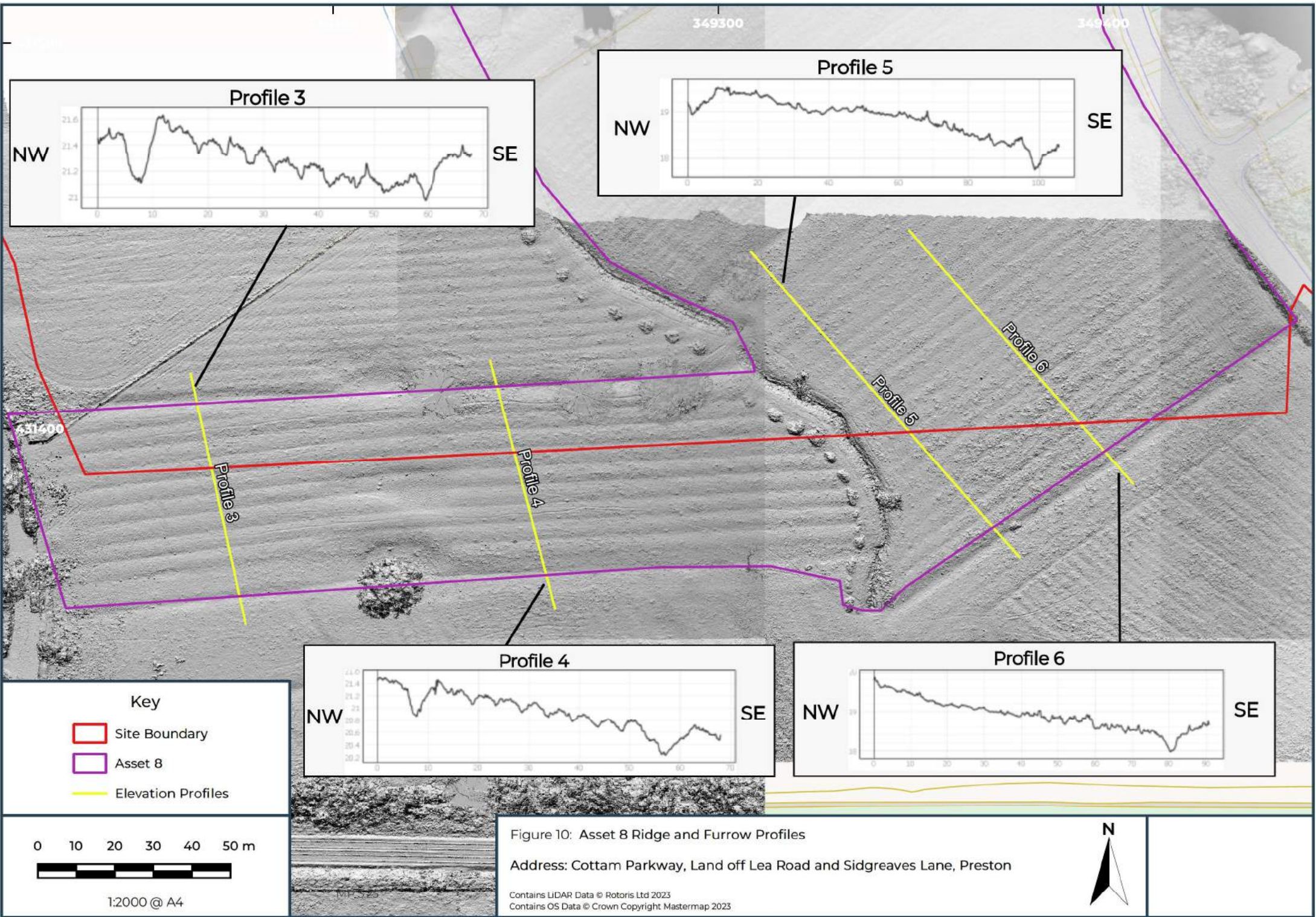
1:1500 @ A4

Figure 9: Asset 9 Earthworks Survey

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

Contains LiDAR Data © Retoris Ltd 2023





Key

- ▭ Site Boundary
- ▭ Asset 8
- ▭ Elevation Profiles

0 10 20 30 40 50 m

1:2000 @ A4

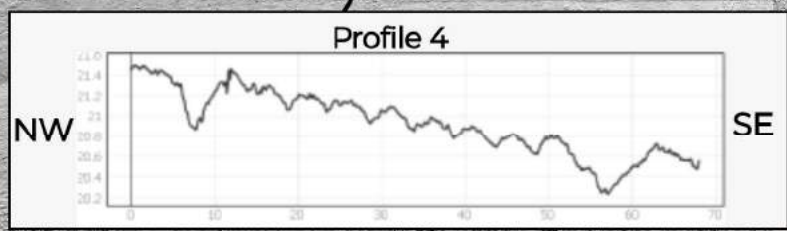
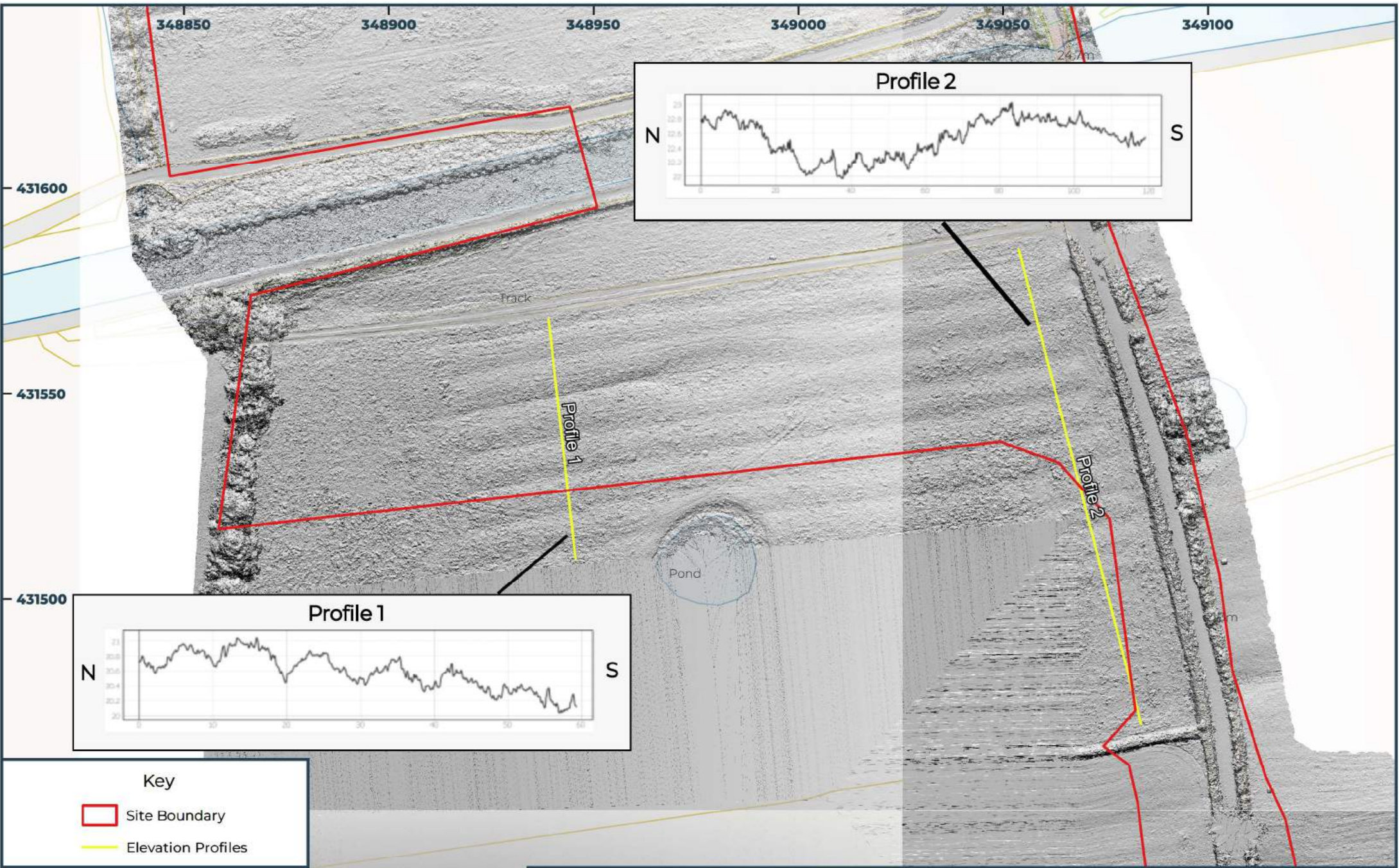


Figure 10: Asset 8 Ridge and Furrow Profiles
 Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

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 Contains OS Data © Crown Copyright Mastermap 2023





Key

- Site Boundary
- Elevation Profiles

0 10 20 30 40 50 m

1:2000 @ A4

Figure 11: Asset 9 Ridge and Furrow Profiles

Address: Cottam Parkway, Land off Lea Road and Sidgreaves Lane, Preston

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Contains LiDAR Data © Rotoris Ltd 2023