

**Archaeological Groundtruthing of Lidar Survey –
Strawberry Hill Wood**



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Miner2Major
The Real Sherwood Forest



**HERITAGE
FUND**

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Cover image: General view of the site

District: Mansfield Civil Parish: Mansfield

Grid reference for centre of site:

E 458077 N 360332

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Written By	Read by	Signed off	Report date
EG	US	US	2021

1.0 Introduction

Enhanced Lidar data was commissioned through the Miner to Major (M2M) National Lottery Heritage Fund project in early 2021. Prior to this the resolution of Lidar data available for the project area was largely 1m; the new data is 0.16m resolution and has revealed a wealth of new features beneath the cover of woodland, and enhanced the digital visibility of previously-known features.

Pockets of this data have been scrutinised as part of the M2M project and groups of volunteers have been used to relate features seen on the Lidar data to earthworks on the ground. This was done under archaeological supervision.

The Strawberry Hill Heath Nature Reserve is managed by Nottinghamshire Wildlife Trust. The woodland, and Strawberry Hill in particular, appear on various historic maps and the 1m data suggested there was archaeological potential in the woodland. The new survey data has revealed a number of features that were labelled and then checked on-the-ground by volunteers. This process is generally known as ‘groundtruthing’.

A total of 18 features (or groups of features) of interest were identified from the Lidar data. Groundtruthing, combined with the desk-based research presented here, has provided interpretations for some of those features. A total of 10 new records (1 source, 1 event, 1 monument, 7 elements) were created for the Nottinghamshire HER as a result of this work.

The groundtruthing surveys took place on 5th August and 1st September 2021.

2.0 Site Location



Fig. 1: Map showing the location of Strawberry Hill Heath Nature Reserve. Site is outlined in red. (© OpenStreetMap contributors)

Strawberry Hill Heath is located approximately 1.3 miles NNW of Rainworth, and around 2.5 miles east of the centre of Mansfield. It is accessed via the Rainworth bypass known as Jubilee Way (A617). The former Rufford and Mansfield colliery sites are a short distance away to the east and north respectively, and to the west is an area of extensive quarrying that is being replaced by development. The former Ransom Hospital was located a short distance to the east, the site of which is now a business park.

For much of its existence the site was located on high ground centrally between the valleys of Vicar Water (to the north) and Rainworth Water (to the south), though the topography has been dramatically altered by the various mineral extraction activities and it is difficult to understand historic lines of sight and how visible the hill itself would have been within the historic landscape.

The bedrock geology is Chester Formation Sandstone and the British Geological Survey records no superficial deposits.



Fig 2: General aspect of the nature reserve. Although it has differences across it the general environment features birch and mature oak woodland on acidic sandy soils broken by areas of heath.

3.0 Archaeological and Historical Background

Strawberry Hill has been a significant feature in the landscape since at least Medieval times and it appears, under different names, on numerous historic maps as well as Medieval perambulation documents. It sits on the historic boundary between the land of the abbots of Rufford and the land of the King's manor of Mansfield. It has strong associations with Ratcher Hill, a short distance to the west, and the name 'Elmsley' that appears on many of the 20th century maps. Strawberry Hill may be the 'Abbott's Hemslou' or 'Hemslowe' mentioned in a 13th century perambulation of the lands of Rufford (p217, White, 1904)

The Belvoir Map (possibly dating to the late 14th century) and the 1637 Bunting map of the Rufford Estate also mention Elmsley in various spellings suggesting that there are actually two Elmsleys: one belonging to the king and one to the 'abbot'. This would fit with Strawberry Hill and Ratcher Hill sitting as they do either side of, and equidistant to, that boundary between Mansfield and Rufford's historical extent. The Belvoir map is difficult to understand geographically but it does list both 'Abotte ymyslowe' and 'Kyngg ymmislow'. The name is interesting; the latter 'hlaw' element references a hill or burial mound in Old English. There are certainly references in the perambulations to hills being raised as boundary markers, and therefore an acknowledgement that some of these landscape features may have had older anthropogenic origins. The first element is uncertain but it may be from a personal name as Professor Ekwall suggests (such as the 'Immi' of Immingham), a lost landscape feature, or potentially even a reference to Ymir, the two-fold hermaphroditic 'first being' from Norse theology. It would not be an isolated reference to Norse theology in the placenames of North Nottinghamshire and the duality of the being Ymir would be reflected in the two significant boundary-marker hills.

No known investigations have been carried out to establish if the hills are entirely natural, artificially enhanced, or potential burial mounds, and Ratcher Hill has been removed by historic quarrying with nothing of note reported.

The 1637 map shows 'Packman's Road' running north-south to the east of Strawberry Hill. It is difficult to trace the course of this road now, but it does appear on Sanderson's 1835 map, and appears to be a routeway of considerable age. Several other features can be picked up from the historic mapping including an east-west routeway that links Bilsthorpe to Mansfield and a number of boundary stones, and boundary marker trees such as the Crosse Way Oke (1637).

A short distance to the west is Lindhurst which was an important timber-producing wood of Sherwood which had its own keeper. The Scheduled moated site at Fountaindale may have been the residence of this keeper. The Duke of Portland built a hunting lodge at Lindhurst around 1760.

To the east is the deserted village of Inkersall where the monks of Rufford constructed a large dam.

The hill and surrounding area may have been 'gentrified' by the Welbeck Estate sometime in the mid 1800's, and this likely included the provision of the circular walkway around the hill itself along with extensive planting of Sessile oak. The circular walk does not appear on Sanderson's 1835 map but is present by the 1st Edition OS mapping.

The woods may have been used for army training activities in the earlier 20th century, and the 1m Lidar hints at some possible areas of trenching.

There are no HER records for the Nature Reserve and records for the surrounding area are incredibly scarce, and no known archaeological work has previously been carried out on the site. The scarcity of records is likely a result of the extensive mineral extraction activities which were carried out before archaeological considerations were drawn into the planning process. There is a wealth of documentary evidence that indicates Strawberry Hill was once a significant landscape feature and way-marker.

4.0 New Lidar Data

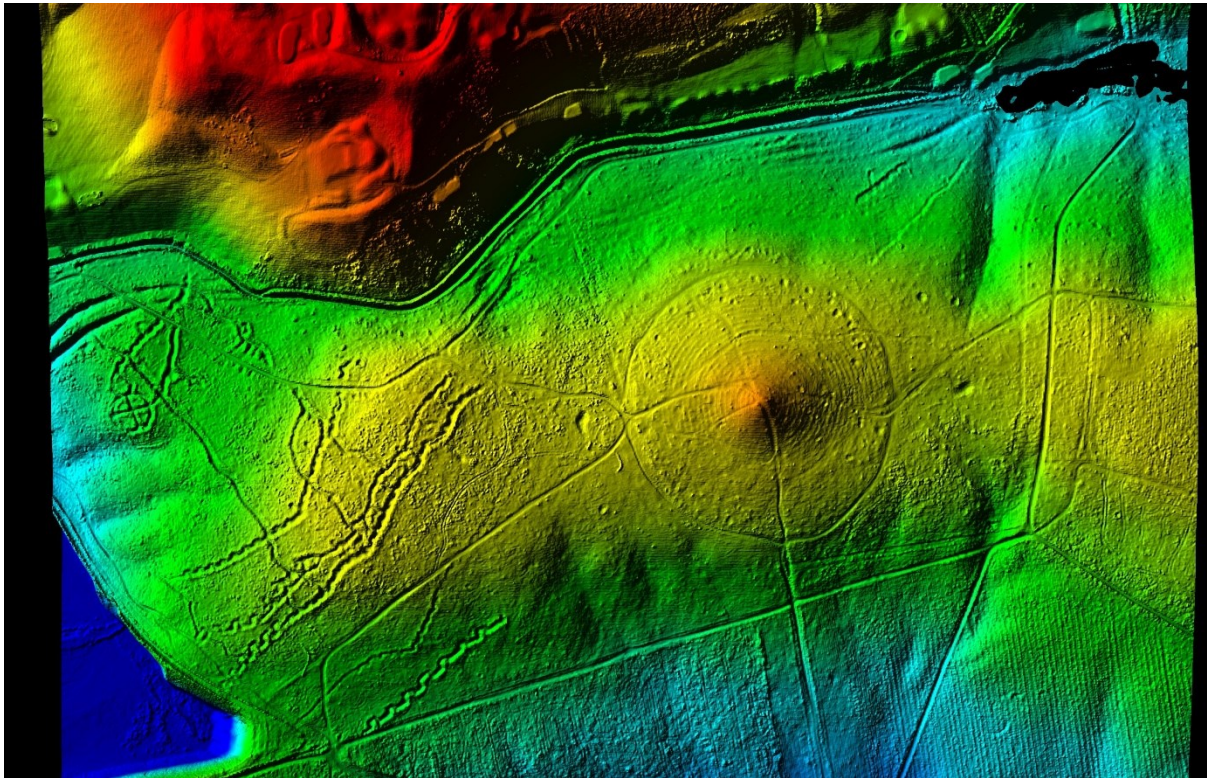


Fig. 3: Lidar data at 0.16m resolution showing the Nature Reserve. The orange area is the highest point on Strawberry Hill, and the blue areas are the lowest-lying land. Light is cast across the image from the north-west.

The new survey data has a resolution of 0.16m and in the digital terrain model (DTM) form has remotely revealed a host of earthwork features beneath the tree cover and on the heathland areas (see Fig 3). Some of those features can be identified by simple comparison to modern mapping and represent modern pathways through the woodland. Map regression has been used to identify those that are likely modern in origin and those have not been subjected to groundtruthing.

The data clearly shows the topography of the site and the anomalous nature of the hill itself. The boundary between the lands of Rufford and the land of the king would have been in the valley to the west, and if Ratcher Hill had been similar in form the pair would have been obvious features in the landscape if they were clear of trees.

Another feature that can clearly be picked up on the Lidar data is the 20th century ridge-and-furrow that was done in advance of forestry planting. This also has been excluded from the groundtruthing survey though it seems that there are different phases of planting.

Once the obvious modern features had been identified and assessed the remaining features could be numbered. Some of these have been grouped together into areas, especially those features that from the Lidar data appear to represent WWII training activities within the woods (see areas 12-18 in Fig 5 below).

Aside from the WWII training trenches one of the most striking features is a braided hollow way running east-west across the northern edge of the site (areas 5 and 10 in Fig 4 below). There are also several subtler features (such as 4, 6 and 8).

Table 1 below shows the numbered features accompanied by a brief description of their form or possible interpretation based on the Lidar and DBA.

01	Apparent north-south Holloway on eastern edge near parish boundary
02	Hollow on east side of mound
03	Mound in centre of woods with holloways and circular pathway
04	East-west ditch south of mound
05	Series of possible holloways in the north of the wood
06	North-south Holloway skirting the west of the mound
07	Hollow on the west of the mound
08	Ne-sw Holloway on the NW side of the mound
09	NW-SE short Holloway
10	Deep holloways in NW, perhaps continuation of 05
11	Short stretch of Holloway in west
12	Area of WWII training in west with circular feature and trenches
13	Probable area of WWII training
14	Area of WWII trenching with 3 rows of linked trenches
15	Area of WWII trenching with 2 linked trenches
16	Area of ammo pits on the NE of the mound
17	Probable are of WWII trenching with 2 parallel trenches
18	Two pits

Table 1: Features/areas identified from Lidar for groundtruthing survey.

5.0 Groundtruthing Survey

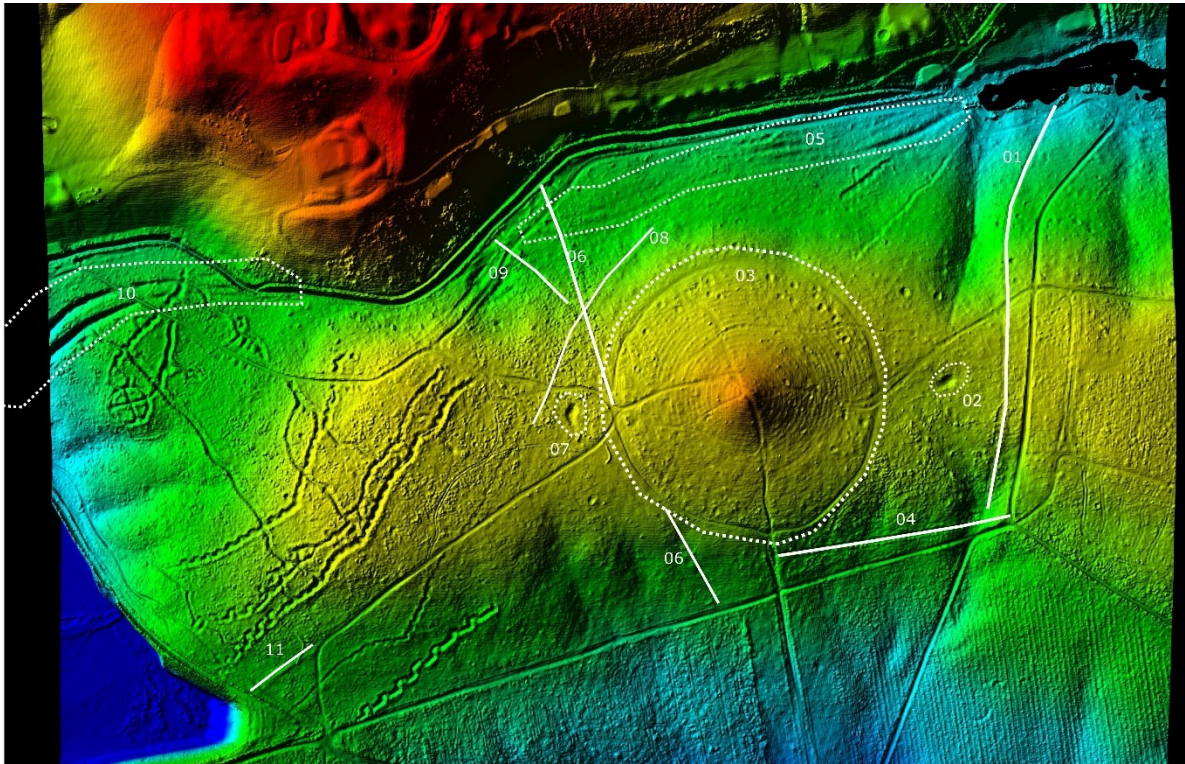


Fig. 4: Features 1-11 identified on the Lidar data.

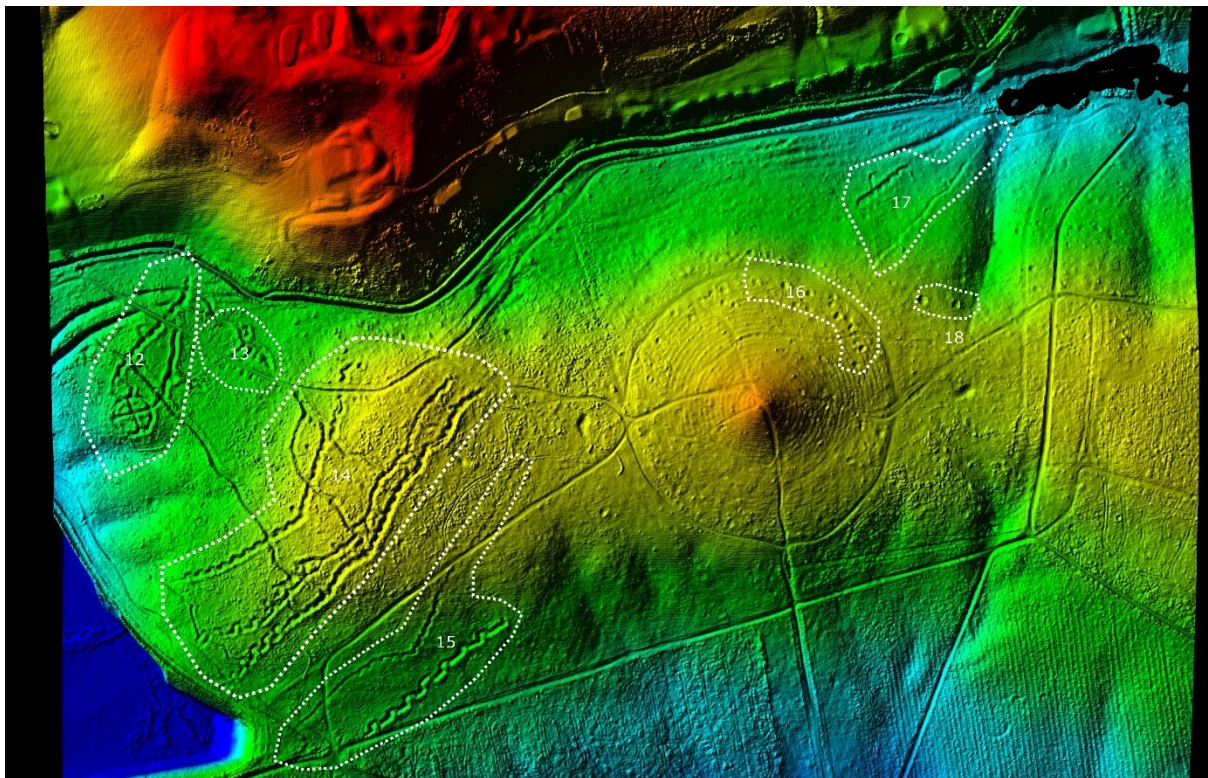


Fig. 5: Features 12-18 identified on the Lidar data.

The groundtruthing survey was carried out over two days (5th August and 23rd September 2021). The weather on both days was dry and clear, with bright sunshine on the September date. The vegetation was high for the August session, and while it had started to die back by September it was still a hinderance to visibility. The work was carried out by volunteers and a member of staff from Nottinghamshire Wildlife Trust under archaeological supervision by NCC archaeologist.

Each feature noted on the Lidar was located on the ground with the assistance of phone gps and mapping. The feature was described by the volunteers and the centre point of the feature or area was marked using the app What Three Words so that the location could be double checked back in the office. A interpretation was offered for each feature where possible. The ground cover meant that it was not possible to confirm or examine all of the features at this time. These could be revisited later in the year once the bracken has died back, or after woodland management activities have cleared undergrowth from relevant areas.

New information was inputted to the HER and new records created for the woodland. The results of the survey can be seen in Table 2 below, which also lists the new HER records that were created for each feature, area or group of features.

Features in the western half of the Reserve are predominantly military in origin and are part of successive or contemporaneous training activities for trench warfare. Many classic features of the trench warfare system are apparent including the classic zig-zag plan and communication lines dug to connect parallel trench sets. A specialist in the history of this type of warfare would probably be able to provide more precise interpretations for some of the features. Features 12-18 all appear to have been created as a result of military training exercises and this represents a significant collection of earthworks relating to 20th century wartime activity which is characteristic to many of the woodlands in the Dukeries area.



Fig 6: One of the deep hollow ways recorded under feature 10. This feature is much easier to identify and from the Lidar data.

Former pathways are evident across the rest of the Reserve and these are likely to be of varying ages. The most significant of these hollow ways is recorded as features 05 and 10. These are sections of deeply eroded 'U' shaped hollow ways that almost certainly represent a Medieval routeway between Mansfield and Bilsthorpe, which passes by Inkersall on the north side of the dam. This appears on the 1637 map of the Rufford Estate drawn by Bunting. Given the significance of the hill here in the landscape historically it is possible that some of the other recorded hollow-ways may have significant age to them.

The circular path around the hill itself appears to be a construction of the Welbeck Estate perhaps as gentrification of the landscape. The circular feature doesn't appear on Sanderson's map of 1835 but is evident by the County Series mapping.

Some of the features evident on the Lidar imagery actually represent current woodland management works, including brash fences made from undergrowth clearance works. Figure 7 shows two such features, which were confirmed on the ground.

There are two additional features that are temporary and non-archaeological but do represent contemporary usage of the woodland and may leave traces in due course. One is a small off-grid shelter made of locally sourced materials and traditional skills. The other is an unofficial shrine set up in memory of a local motorcyclist who lost his life in tragic circumstances. While these are not yet archaeological features it is worth taking it as a lesson on the variety of human activity that can be present in unexpected places.

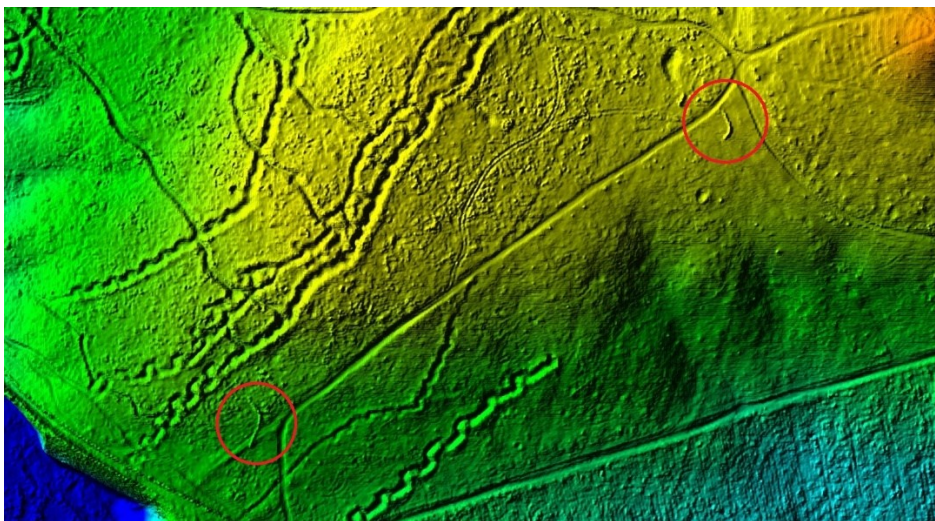


Fig 7: Modern woodland management practices visible on the Lidar data and confirmed on the ground.

Feature	Decription	HER record
01	Not located. Would recommend returning when the vegetation has died back further.	
02	An ill-defined hollow area that might be the result of small-scale extraction or a watering hole for deer.	
03	Features on the top of the hill. The area is defined by a circular trackway approximately 190m in diameter. This represents the area of highest contours within the reserve and is the hill for which the reserve is named. There is evidence of forestry ploughing in concentric rings from the top of the hill. Several paths cross the hill which would be a significant feature in the landscape if the area were less-wooded. It is not clear if there has been any anthropogenic alteration to the top of the hill to make it more prominent, and there is a great deal of modern disturbance on the summit. This includes burning, erosion and ground disturbance. There is evidence of dirt-bike tracks being made in the wider area, some of which represent the features visible on the Lidar data. The path approaching the hill from the south is a hollow way, but it is not clear whether this is of any considerable age. The geology is very sandy and it wouldn't take much for a path to erode and become hollow. Some of the indistinct circular hollows seen on the Lidar have the same form as a charcoal hearth when seen on the ground. It is possible this area has been used for charcoal burning at some point in its history. A cluster of pit features in the NE part of the hill are recorded separately (see 15).	MNT27663
04	A shallow straight ditch running approximately east-west. It is approximately 1.2m broad across the top. It may be a former pathway or as a result of terracing due to fencing.	
05	Braided 'U' shaped hollow ways in the northern part of the Reserve. Approximately 6m wide across the top and running east-west. This appears to be part of a Medieval routeway that linked Mansfield to Inkersall and Bilsthorpe. The route is evident on the 1637 map of the Rufford Estate drawn by Bunting. Spoil from the colliery has destroyed a section of this route.	MNT27662
06	Appears to be two sections of hollow way, but difficult to access to confirm.	
07	This feature was in an area that had been fenced off for protection of Nightjars so was not investigated.	
08	Not located. Would recommend returning when the vegetation has died back further.	
09	Not located. Would recommend returning when the vegetation has died back further.	
10	Double hollow ways, very deep and 'U' shaped. These are a continuation of feature 05. At this point they are extremely deep-cut features, which may be as a result of the slope and the soft geology. They are so large as to be seen on most of the aerial photography despite the tree cover. See 05 for more details.	MNT27662

11	Not located. Would recommend returning when the vegetation has died back further.	
12	Unusual set of deep trenches that are probably all part of the military trench training activities. Two approx. sw-ne trenches lead to a circular trench with a cross of smaller works in the centre. The circular feature sits on a promontory of land which drops away sharply on the south side. A nw-se trench appears to link this set of trenches to the ones recorded under 14. Undergrowth made it difficult to establish much more about these trenches or possible relative dating. Part of it intersects with one of the deep hollow ways recorded under 10.	MNT27659
13	Not located. Would recommend returning when the vegetation has died back further.	
14	The ground cover in this area is very dense so it was difficult to examine the trenches in much detail. Where they were visible from the footpath they appear to be deep-cut features of at least 1m set in parallel rows with communication lines between them. They appear to feature the characteristic zig-zag shape. There is probably a lot more information could be gathered from this well-preserved set by a specialist when there is less ground cover.	MNT27658
15	Two parallel trenches of differing construction. The most southerly one is well-defined in shape and form, whereas the one to the north appears to be much rougher. These are in reasonably open woodland and not too difficult to access. They are part of the wider landscape of 20 th century military training activity.	MNT27657
16	Area of activity relating to military training. There are lots of small pits across an area to the north and north-east of the hill. They range in size from approximately 1x0.4m to 3x4m. They may represent ammo stores or dugouts.	MNT27660
17	Two parallel ditch features that may be related to the 20 th century military training activities. These are less well defined than other trenches on the site but run in the same orientation.	MNT27661
18	Not located. Would recommend returning when the vegetation has died back further.	

Table 2: Results of the groundtruthing survey combined with data from the DBA and map regression.

6.0 Conclusions and Advice

The high-resolution Lidar data is extremely useful for identifying archaeological features within woodland or heathland. The quality of the data is such that many of the features can be confidently interpreted without necessarily needing to see the features on the ground, although a site visit will provide further information, some of which may not be evident from the digital data. Combining high-resolution Lidar data with map regression and a DBA can clearly provide new information on the archaeological resource particularly of wooded areas.

In the case of Strawberry Hill Heath Nature Reserve the HER has been enhanced with new information on the archaeological resource of the site. A number of hollow ways survive within the woodland, one set of which is clearly a well-used Medieval routeway that went out of use some time in the post-Medieval period. There is also a well-preserved set of practice trenches from army training activities from the earlier 20th century. This is part of a wider landscape of war that is characteristic of this part of Nottinghamshire, as many of the large estates turned over some of their land to military usage.

With regard to the groundtruthing survey; relating features on the lidar to a particular location in the woods is tricky. It works best if at least some of the volunteers have a good working knowledge of the area to be surveyed and the pathways through it. It also works best if the volunteer surveyors also have access to OS maps or Google Earth (and therefore data signal on their phones) in order to relate themselves to features on the ground. It should also be noted that interpretation of features, and also to some extent the identification of them, are subjective activities and level of experience will play a factor in how confidently this can be carried out.

The survey has enhanced our knowledge of the presence and significance of archaeological features within the woodland and has resulted in new information for both Nottinghamshire Wildlife Trust and the HER.

References

White, R, 1904, The Dukery Records, Thornton Press