

# A358 Taunton to Southfields Dualling Scheme

Preliminary Environmental Information Report - Appendix 6.5 Geophysical Survey Report

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04/06/21



## **Geophysical Survey Report**

of

## A358 Taunton to Southfields Dualling

Taunton, Somerset

For

**Taylor Woodrow Civil Engineering** 

Magnitude Surveys Ref: MSST901

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## 1. Introduction

- 1.1. Magnitude Surveys Ltd (MS) was commissioned by Taylor Woodrow Civil Engineering to undertake a geophysical survey over a c. 236ha area of land between Taunton and Southfields, along the A358, south Somerset (ST 3429 1547).
- 1.2. The geophysical survey comprised hand-pulled cart-mounted and hand-carried GNSSpositioned fluxgate gradiometer survey. Magnetic survey is the standard primary geophysical method for archaeological applications in the UK due to its ability to detect a range of different features. The technique is particularly suited for detecting fired or magnetically enhanced features, such as ditches, pits, kilns, sunken featured buildings (SFBs) and industrial activity (David *et al.*, 2008).
- 1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David *et al.*, 2008), the Chartered Institute for Archaeologists (CIfA, 2020) and the European Archaeological Council (Schmidt *et al.*, 2015).
- **1.4.** It was conducted in line with a WSI produced by MS (Salmon, 2021).
- **1.5.** The survey commenced on 22/03/2021 and took 11 weeks to complete to date, with c154ha collected in that time.

## 2. Quality Assurance

- 2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society for Archaeological Prospection).
- 2.2. The directors of MS are involved in cutting edge research and the development of guidance/policy. Specifically, Dr Chrys Harris has a PhD in archaeological geophysics from the University of Bradford, is a Member of ClfA and is the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter has an MSc in archaeological geophysics and is a Fellow of the London Geological Society, as well as a member of GeoSIG (ClfA Geophysics Special Interest Group); Dr Kayt Armstrong has a PhD in archaeological geophysics from Bournemouth University, is a Member of ClfA, the Editor of ISAP News, and is the UK Management Committee representative for the COST Action SAGA; Dr Paul Johnson has a PhD in archaeology from the University of Southampton, is a Fellow of the Society of Antiquaries of London, has been a member of the ISAP Management Committee since 2015, and is currently the nominated representative for the EAA Archaeological Prospection Community to the board of the European Archaeological Association.
- 2.3. All MS managers, field and office staff have degree qualifications relevant to archaeology or geophysics and/or field experience.

## 3. Objectives

3.1 The objective of this geophysical survey was to assess the subsurface archaeological potential of the survey area.

## 4. Geographic Background

- 4.1. The survey area followed a linear route c. 14km long extending southeast from Taunton Gateway Park & Ride (J25 of the M5) to the junction of the A358 and the A303 east of Horton Cross (Figure 1). The survey area followed the current route of the A358, except for a c. 2km section between the M5 and Henlade where the route branched south of the current A358 (Figures 2-5). Gradiometer survey was undertaken across multiple fields under both arable cultivation and pasture. Across the survey area, a total of c.65.4ha could not be surveyed due for multiple reasons which include overgrown vegetation, the presence of farming equipment, unsafe ground conditions and restrictions to land access.
- **4.2.** Survey considerations:

Survey	Ground Conditions	Further Notes
Area		
 2774306	The survey area consisted of a	The Area was bound to the north, west,
	flat field with young cereal crop.	and south by hedgerows and trees. There was no physical boundary to the east. A telegraph pole was present in the south-east of the survey area.
2774305	The survey area consisted of a flat field with young cereal crop.	The Area was bound to the west, and south by hedgerows and trees. There was no physical boundary to the north or east.
2775301	The survey area consisted of an arable field that sloped downwards towards the centre from the north and south.	The Area was bound to the north and east by hedgerows, to the northeast by a wooden fence, and to the south by a wire fence and trees. There was no physical boundary to the west. Telegraph poles and associated overhead cables were present along the western boundary. A further telegraph pole was present in the centre-north of the survey Area, with associated cables running southwest to northeast.
2774302	The survey area consisted of an arable field that sloped downwards towards the east.	The Area was bound by the grass verge of the A48 to the northeast, and on all other sides by hedgerows. A small region in the east of the survey Area was waterlogged, and unsurveyable.
2774303	The survey area consisted of a flat field with young cereal crop.	The Area was bound on all sides by hedgerows, and additionally to the north and south by ditches. A busy road (the A358) lay immediately beyond the eastern boundary.
2774304	The survey area consisted of an arable field that sloped downwards towards the northwest.	The Area was unbound to the west, and was bound on all other sides by hedgerows. The Area was additionally bound to the north and south by ditches. A busy road (the A358) lay

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		immediately beyond the eastern boundary.
244075	The survey area consisted of a flat pasture field.	The Area was bound on all sides by hedgerows, and additionally to the north and east by wire fences. Some small regions in the north-east of the survey area were unsurveyable due to vegetation and a small pile of metal debris.
458061	The survey area consisted of a flat pasture field.	The Area was bound to the north and west by hedgerows, and to the south by an electric fence. Three small regions were unsurveyable due to animal sheds.
458062	The survey area consisted of a pasture field that sloped downwards to the southwest.	The Area was bound to the west by trees, and on all other sides by electric fences. Two small piles of metal debris were present near the northern boundary.
458063	The survey area consisted of a pasture field that sloped downwards to the southwest.	The Area was bound to the north by an electric fence, and on all other sides by hedgerows. A small pile of metal debris, and a wire fenced animal pen were present in the south of the Area. A pond surrounded by trees was present in the
3249973	The survey area consisted of a flat field with young cereal crop.	east of the survey area. The survey area was bound on all sides by hedgerows. A river ran along the southern boundary.
785701	The survey area consisted of flat overgrown grassland.	The survey area was bound to the east by a hedgerow and by tress on all other sides.
785702	The survey area consisted of flat overgrown grassland.	The survey area was bound by a hedgerow to the east, by trees to the northwest and by a stream to southwest. A pond was located in the west corner of the survey area.
785703	The survey area consisted of a arable field with young crop.	The survey area was bound by fencing and a stream to the north, by woodland to the west, by a stream to the east and by no physical boundary to the south.
785771	The survey area consisted of an arable field with young crop that sloped towards the south.	The survey area was bound by hedges to the north and west and by no physical boundary to the south and east. An area of deep mud was not surveyed in the east of the survey area.
785772	The survey area consisted of an arable field with young crop that sloped towards the southwest.	The survey area was bound by fencing to the east, by hedgerows to the north and south and by no physical boundary to the west. A wooden road sign was

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		located in the centre of the eastern boundary.
785773	The survey area consisted of an arable field with young crop that sloped towards the west.	The survey area was bound by fencing to the north and east, by a hedgerow to the south and by no physical boundary to the west.
78716	The survey area consisted of a flat pasture field	The survey area was bound by trees to the north, west and south and by not physical boundary to the east. A grass mound was located along the western boundary that was not surveyed. Sheep were located within the survey area during survey.
787131	The survey area consisted of a pasture field that sloped slightly to the northwest.	The survey area was bound by hedgerows to the north, west and south and by a stream to the east and fencing to the southeast.
787132	The survey area consisted of a flat arable field with young crop.	The survey area was bound by a hedgerow to the south, north and west and by no physical boundary to the east.
787133	The survey area consisted of a flat arable field with young crop.	The survey area was bound by a woodland area to the east, a hedgerow to the south and by no physical boundary to the north and west.
78714	The survey area consisted of a flat arable field with young crop.	The survey area was bound on all sides by hedgerows.
787135	The survey area consisted of a flat arable field with young crop.	The survey area was bound by a hedgerow to the southwest, south and east, by a stream to the north and by no physical boundary to the west. A tree was located in the centre of the survey area.
78562	The survey area consisted of a flat arable field with young crop.	The survey area was bound by a stream to the south and north, by fencing and trees to the west and by no physical boundary to the east. Several trees were located throughout the survey area and were not surveyed.
446681	The survey area consisted of a flat field with young cereal crop.	The survey area was bound on all sides by hedgerow and trees
446682	The survey area consisted of a flat field with young cereal crop.	The survey area was bound on all sides by hedgerow and trees
446683	The survey area consisted of a flat field with young cereal crop.	The survey area was bound to the north and east by hedgerow and trees. There was no physical boundary to the south and west.

1584681	The survey area consisted of a pasture field that sloped downwards towards the southeast.	The survey area was bound to the east, south and west by hedgerow and wire fencing. There was no physical boundary to the north.
1584682	The survey area consisted of a pasture field that sloped downwards towards the southeast.	The survey area was bound on all sides by hedgerow and wire fencing.
1584683	The survey area consisted of a pasture field that sloped downwards towards the southeast.	The survey area was bound on all sides by hedgerow and wire fencing.
1584684	The survey area consisted of a flat pasture field.	The survey area was bound to the north by hedgerow and wire fencing and farm buildings to the north. Hedgerow and wire fencing also bounded the survey area to the east and wire fencing to the
		west. There was no physical boundary to the south. A section in the east was not surveyed due to the presence of farm equipment.
1584685	The survey area consisted of a flat pasture field.	The survey area was surrounded by hedgerow and wire fencing. A section in the southeast corner was not surveyed due to the presence of farm equipment.
1584686	The survey area consisted of a flat pasture field.	The survey area was bound by hedgerow and wire fencing to the east, south and northwest. Farm buildings were located along the southwestern border. There was no physical boundary to the north. A section along
		the western boundary was not surveyed due to the presence of farm equipment.
786212	The survey area consisted of a flat field with young cereal crop.	The survey area was bound to the east, south and west by hedgerow and trees. There was no physical boundary to the north.
786211	The survey area consisted of flat, overgrown arable land.	The survey area was bound to the north, south and west by hedgerow and trees and a ditch to the east. A main road was located beyond the southwestern boundary.
78633	The survey area consisted of a flat with young cereal crop.	The survey area was bound by trees to the north and hedgerow to the south and west. There was no physical boundary to the east.
786601	The survey area was a flat field with crop.	The survey area was bound to the north by hedgerow and trees and the south by hedgerow. There was no physical boundary to the west.

78	36602	The survey area consisted of a flat field with crop.	The survey area was bound to the north, east and south by hedgerow and trees. There was no physical boundary to the west.
59	9859	The survey area consisted of a flat pasture field.	The survey area was bound to the north, east and south by harrow and trees. There was no physical boundary to the west. A section of the northern area was not surveyed due to the presence of a manure pile.
32	247293	The survey area consisted of	The survey area was bound to the
	-	young cereal crop on land that sloped downwards towards the centre.	north, east and south by hedgerow and trees and a farm track to the west. A main road was located beyond the eastern boundary and a minor road beyond the southern boundary.
	247292	The survey area consisted of young cereal crop on land that sloped downwards towards west.	The survey area was bound to the north, east and south by hedgerow and trees. There was no physical boundary to the west. A main road was located beyond the eastern boundary
78	3561	The survey area consisted of a flat arable field with no crop, but which had been worked. There was a small slope upwards located in the southern corner.	The survey area was bound on all sides by hedgerow and trees. A metal gate was located in the northeast corner. A main road was located beyond the southwestern boundary.
78	36422	The survey area consisted of a flat pasture field.	The survey area was bound by hedgerow and a ditch to the north, trees and a ditch to the south, and hedgerow, trees and a wooden fence to the west. There was no physical boundary to the east. A main road lay beyond the western boundary. A pylon was located in the southeast and northwest corners.
78	36423	The survey area consisted of a flat pasture field.	The survey area was bound by hedgerow and wire fencing to the north, hedgerow and a ditch to the south and hedgerow and trees to the west. There was no physical boundary to the eat. A pylon was located in the southeast corner and in the northeast of the survey area with overhead power lines connecting the two.
78	36531	The survey area consisted of a flat field with young crop.	The survey area was bound to the north by hedgerow and the south and west by hedgerow, trees and wooden fencing. There was no physical boundary to the east.

786532	The survey area consisted of a flat field with young crop.	The survey area was bound to the north and south by hedgerow, and the west by hedgerow, trees and a wooden fence. There was no physical boundary to the east. A stream ran northeast- southwest across the northern half of the survey area with the area to the north not being surveyed due to the presence of steep and uneven ground.
786603	The survey area consisted of a flat field with young crop.	The survey area was bound to the north and west by hedgerow, trees and woodland, and the south by hedgerow. There was no physical boundary to the east. An area to the north was not surveyed due to the presence of a log
786421	The survey area consisted of a grass pasture field that sloped downwards towards the west.	pile and sheds. The survey area was bound to the north by a ditch and trees, and the west by hedgerow, trees and a wooden fence. There was no physical boundary to the east. A wooden fence ran east-west across the northwest of the survey
78562	The survey area consisted of a flat pasture field with trees.	area. The survey area was bound to the east by a metal gate and the south and west by hedgerow and trees. A drain ditch also bounded the survey area to the southeast. There was no physical boundary to the north. A main road lay beyond the southern boundary and a ditch beyond the wester.
78712	The survey area consisted of a flat arable field that had no crop, but which had been worked.	The survey area was bound by hedgerow, trees and a drain ditch to the south and a metal gate to the west. There was no physical boundary to the north and east.
78706	The survey area consisted of a pasture field with trees that sloped downwards towards the northwest.	The survey area was bound to the north, south and west by hedgerow and trees. There was no physical boundary to the east. A driveway ran across the north of the survey area in a northeast- southwest direction. A main road lay beyond the southwestern boundary and a drainage ditch beyond the southeastern boundary.
443681	The survey area consisted of a pasture field that contained a former pond. The pond was contained by four banks. The area beyond the banks sloped	The survey area was bound to the north by a ditch with hedgerow to the east, south and west.

	downwards away from the	
	former pond.	
356105	The survey area consisted of a flat grass pasture field.	The survey area was bound to the east, south and the west by hedgerow and a fence. There was no physical boundary to the north. Overhead power lines ran adjacent to the southern boundary.
443682	The survey area consisted of a grass pasture field that sloped downwards towards the east.	The survey area was bound to the north and west by hedgerow, the east by trees and the south by hedgerow and a fence. A farm shed was located in the southwest corner.
123410	The survey area consisted of a grass pasture field that sloped downwards towards the east.	The survey area was bound on all sides by hedgerow and a wooden fence.
59340	The survey area consisted of a grass pasture field that sloped downwards in the southeast towards the southeast corner.	The survey area was bound to the north, east and west by hedgerow. Hedgerow and a wire fence bounded the survey area to the south and southwest.
64126	The survey area consisted of a flat arable field.	The survey area was bound on all sides by hedgerow with a ditch to the east. A metal gate was located in the centre of the northern boundary.
44373	The survey area consisted of an arable field that sloped downwards from the east out towards the eastern and western boundaries.	The survey area was bound to the northeast, south and southwest by hedgerow. There was no physical boundary to the north, east and northwest.
44365	The survey area consisted of flat arable field with tall crop.	The survey area was bound to the east south and west by hedgerow. There was no physical boundary to the north.
44374	The survey area consisted of a flat pasture field with trees.	The survey area was bound on all sides by hedgerow, with a ditch beyond the northern boundary. Overhead powerlines ran adjacent to the western boundary. One building and two areas of concrete were located in the south- eastern corner.
593434	The survey area consisted of a pasture field that sloped downwards towards the northeast.	The survey area was bound to the east and west by hedgerow and to the south by hedgerow and a metal fence. There was no physical boundary to the north.
593432	The survey area consisted of a pasture field with trees that sloped downwards towards the northeast.	The survey area was bound to the east and west by hedgerow and to the south by hedgerow and a metal fence. There was no physical boundary to the north.
593431	The survey area consisted of a pasture field with trees that sloped downwards towards the northeast.	The survey area was bound to the east and west by hedgerow and to the south by hedgerow and a metal fence. There was no physical boundary to the north

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		A tunnel was located in the centre o the southern boundary.
59858	The survey area consisted of a flat pasture field.	The survey area was bound to the nort and east by hedgerow. There was no physical boundary to the south an west. A main road lay beyond the northern boundary.
443684	The survey area consisted of a flat pasture field.	The survey area was bound on all side by hedgerow with a ditch beyond th eastern boundary. A metal gate wa located in the centre of the souther boundary.
5834303	The survey area consisted of a pasture field that sloped downwards towards the northwest.	The survey area was bound on all side by hedgerow, trees and a metal fence A metal gate was located in the centr of the eastern boundary.
317669	The survey area consisted of an arable field with young crop that had a slight slope down towards the southeast.	The survey area was bound by trees t the east and hedgerow to the south an west. There was no physical boundar to the north.
3176691	The survey area consisted of a pasture field that sloped towards the southwest.	The survey area was bound by trees t the southwest, by hedgerows to th southeast and northwest and by n physical boundary the northeast
3176692	The survey ar <mark>ea consis</mark> ted of a pasture field that sloped towards the southwest.	The survey area was bound by hedge to the south, east and southwest, b wire fencing to the west and by n physical boundary to the north.
1981161	The survey area consisted of flat grass pasture field.	The survey area was bound by trees an a dyke to the north and hedgerow an a wire fence to the east. There was n physical boundary to the south an west.
198116	The survey area consisted of a flat grass pasture field.	The survey area was bound on all side by a wire fence along with by trees an a dyke to the north, trees to the eas and hedgerow to the south and wes An area of burning was located in th northeast of the survey area alon northern boundary.
257417	The survey area consisted of a flat arable field with young crop. The northern section consisted of tall grass.	The survey area was bound to the nort and northwest by hedgerow and th east by hedgerow and a ditch. Ther was no physical boundary to the sout and southwest.
85982	The survey area consisted of a grass pasture field that sloped steeply down towards southeast.	The survey area was bound to th north, east and south by brambles an a wire fence. The west was bounded b a wire fence. Sections of the surve area were not surveyed due to th presence of brambles.

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232489	The survey area consisted of a flat grass pasture field.	The survey area was bound by hedgerow and a wooden fence to the northeast and hedgerow and a metal fence to the southwest. The survey area was bound by hedgerow to the northwest. A telegraph pole and overhead power lines ran adjacent to the northwest boundary. A wooden fence sectioned off the northwest corner of the survey area. Compacted ground that formed a footpath ran from the northwest boundary towards the opposite corner with a branch heading towards the southeast boundary. A service cover was located in the centre of the survey area. A campfire was located in the northeast of the survey area.
324337	The survey area consisted of a flat arable field.	The area was bound to the north by trees and a ditch, to the west by a hedgerow and a wooden fence, to the east by a hedgerow and a wire fence, and to the south by a hedge. Two rows of metal posts were present in the south of the survey area, running east to west.
443683	The survey area consisted of a flat overgrown pasture field.	The survey area was bound by a stream to the north and east and by hedgerows to the south and west.
71103	The survey area consisted of a flat pasture field.	The survey area was bound on all sides by wire fencing and hedgerows.
3243371	The survey area consisted of a flat arable field. A section in the southeast sloped downwards towards the west.	The survey area was bound on all sides by hedgerow along with a fence along the southern and western borders. A hedge sectioned off an area in the south. In the east of southern section was an area of elevated ground. Powerlines ran across the south of the survey area. A shed and debris was located along the eastern boundary.
201892	The survey area consisted of an arable field with young crop that sloped towards the southwest.	The survey area was bound by hedges to the north, east and south and by no physical boundary to the west. Power lines crossed the survey area in the west, in a southeast-northwest orientation.
324729	The survey area consisted of a ploughed arable field with young crop.	The survey area was bound by trees to the northeast and southeast and by no physical boundary to the northwest and southeast.

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00042	The survey area consisted of a flat arable field with young crop.	The survey area was bound by hedges to the west, north and south and by no physical boundary to the east.	
000421	The survey area consisted of a flat arable field with young crop.	The survey area was bound by hedges to the west, north and south and by no physical boundary to the east.	
00035A	The survey area consisted of a flat pasture field.	The survey area was bound by hedge to the east and south and by no physic boundary to the west. A tree was located in the northeast of the surve area.	
00032	The survey area consisted of a flat pasture field.	The survey area was bound by a ditch to the north and hedgerows on all other sides. A cluster of trees was located in the centre of the survey.	
000321	The survey area consisted of a flat pasture field.	The survey area was bound by trees to the north and by hedgerows on all other sides. A burnt pile of debris was located in the north corner of the survey area.	
123409	The survey area consisted of an arable field with crop that sloped slightly down towards the east and west from a flat centre.	The survey area was bound by trees to the east and west and a fence and hedgerow to the south. There was no physical boundary to the north.	
155736	The survey ar <mark>ea consis</mark> ted of a flat pasture field.	The survey area was bound by hedgerow and a fence to the north and west, and a fence to the east. There was no physical boundary to the south.	

- 4.3. The underlying geology comprises mudstone of the Branscombe Formation northwest of West Hatch. Between West Hatch and Stewley this is replaced by interbedded sandstone and limestone of the Blue Lias Formation, and to the southeast the bedrock is mudstone of the Charmouth Formation, save for a small portion of the survey area around Ashill which comprises calcareous mudstone of the Belemnite Marl Member.
- 4.4. Superficial deposits across much of the northern half of the survey area (north of Hatch Beauchamp) consist of colluvial diamicton, while the rest of the route primarily overlies head deposits of gravel, or bands of alluvium containing clay, silt and sand where the survey crosses waterways (British Geological Survey, 2021).
- 4.5. Soils along the northern third of the route (north of Hatch Beauchamp) mainly comprise slightly acid loamy and clayey soils with impeded drainage. Along the centre of the route, between Hatch Beauchamp and Ashill, this gives way to lime-rich loamy and clayey soils with impeded drainage. From Ashill to Horton Cross, the soils are slowly permeable, seasonally wet, slightly acid, but base-rich, loamy and clayey. Smaller bands of loamy and clayey floodplain soils with naturally high groundwater are recorded all along the route, including just north of Horton Cross, around Hatch Green, and north of Henlade (Soilscapes, 2021).

## 5. Archaeological Background

- 5.1. The following is a summary of a Preliminary Environmental Information Report produced by Highways England (20XX), supported by the Historic Environment Record (HER), and provided by Taylor Woodrow Civil Engineering.
- 5.2. Prehistoric: An archaeological evaluation at Hort Bridge c.585m south of Area 787131 located evidence of late Bronze Age activity which included a spread of burnt flint. Worked flint was also recovered by fieldwalking in Area 59342 in advance of the construction of the Ashill Bypass. Prehistoric pottery and what is believed to be human bone was also located around Area 201892. Archaeological excavations in advance of the Park and Ride facility were conducted in 2007 and again in 2008-9. The 2007 excavation recorded 14 ditches interpreted to be field boundaries and enclosures. Worked flint was recovered from a ditch dating to the late Neolithic or early Bronze Age along with pottery from late Bronze Age or early Iron Age. Bone from domesticated animals were also recorded. The 2008-9 excavation recovered remains of at least 5 large roundhouses and three possible rectilinear post-built structures that ranged in date from late Bronze Age to the late Iron Age. Associated gullies, pits, postholes and a spread of burnt stones were also recorded. Evidence of a field system along with a sherd of late Iron Age or Roman pottery was recorded during the development of the retail park at Hankridge c.693m northeast of Area 1981161. A possible prehistoric circular enclosure was identified by aerial photography c.419m south of Area 1981162.
- 5.3. **Roman:** In advance of the construction of the Park and Ride to the north of the survey area, a ditch containing a small number of animal bones and Roman pottery was recorded. The 2007 Park and Ride excavation recorded pottery in one ditch dating to the Romano-British period. The 2008-9 excavation found evidence of Romano-British occupation, including roof and hypocaust tile, along with field systems dating to this period. A Romano-British cemetery was excavated and found to contain 30 inhumation burial and three possible cremations dating from the 2nd-4th centuries AD.
- 5.4. **Early Medieval:** During the 2008-9 Park and Ride excavation, a large, post-built aisled rectangular structure was excavated. It was dated to the early medieval period by a single sherd of pottery. Medieval pottery has also been recorded adjacent to Area 786423 and in Area 785703 along with a rubbish pit.
- 5.5. **Medieval and Post-Medieval:** A large number of features, buildings and historic landscape features have been recorded within the survey area and date to the medieval and post-medieval period. This mostly comprises of historic field boundaries with a number being recorded through aerial photography and LiDAR analysis as part of the Blackdown Hill National Mapping Programme. Ditches and earthworks that align with recorded former field boundaries have been noted in the HER as occurring in Areas 785703, 787131, 78562 and 3243371. The HER notes possible unmapped field boundaries in Areas 324337, 3243371, 2774301, along with a few in the area surrounding the fields in the north of the survey area. Evidence of ridge and furrow cultivation has been recorded in the north of the survey area c.883m south of Area 787313, and the other east of Ashill and includes Areas 44373 and 44371. The park associated with Hatch Park lies along the path of the survey area, but no areas have been surveyed that

fall within its boundaries. Area 85982 lies just outside of the Park's boundaries. The central and southern area of the survey area broadly falls within what was once the Neroche Forest, a royal hunting ground. In the south of the survey area ahead of the Ashill Bypass construction and around the Jordan's land, several probable medieval earthworks were identified and interpreted as former field boundaries, tentatively seen as evidence for a deserted medieval settlement. At Blackbrook Business Park c.170m west of the survey area, a scatter of medieval pottery was recorded during a preliminary evaluation.

- 5.6. Modern: The Blackdown Hills National Mapping Project also noted earthworks that are believed to be extraction pits, some of which correspond with the 1st Edition OS Map. These have been located in Areas 3243371, 317669 and c.157m west of 2774301. Fishponds were also recorded as being adjacent to Area 317669. Sections of a possible medieval road have been identified surrounding the Jordan's house and 215m west of Area 3176692. An 18th century tunrpike road is recorded as running through the survey area, broadly following the path of the survey area but does not fall within areas that have been surveyed. The path of the Taunton to Chard railway also follows the path of the survey area with a section in Area 317669 falling into the survey area considered. The Taunton Stop Line was constructed through the area. Defences included pillboxes, anti-tank defences, road blocks and other structures. A searchlight was located at Bickenhall and a heavy anti-aircraft battery near Haydon and a military camp at Hatch Park.
- 5.7. **Undated:** A now levelled mound north of Blackbrook Bridge in the north of the survey area, along with another mound near Bickenhall are of unknown date. Also of unknown date are a possible ditch and trackway, an enclosure at Blackbrook Inn, removed for construction of the Business Park. A cropmark enclosure has been noted on the HER as being in the southeast of Area 44371 with no indication as to a possible date. A tentative interpretation was made due to the anomaly possibly being the result of agricultural practises as it is noted as being 'aligned on the current field boundaries'.

## 6. Methodology 6.1.Data Collection

- 6.1.1. Magnetometer surveys are generally the most cost effective and suitable geophysical technique for the detection of archaeology in England. Therefore, a magnetometer survey should be the preferred geophysical technique unless its use is precluded by any specific survey objectives or the site environment. For this site, no factors precluded the recommendation of a standard magnetometer survey. Geophysical survey therefore comprised the magnetic method as described in the following section.
- 6.1.2. Geophysical prospection comprised the magnetic method as described in the following table.
- 6.1.3. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

- 6.1.4. The magnetic data were collected using MS' bespoke hand-pulled cart system and handcarried GNSS-positioned system.
  - 6.1.4.1. MS' cart and hand-carried system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multichannel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.
  - 6.1.4.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.
  - 6.1.4.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were collected by traversing the survey area along the longest possible lines, ensuring efficient collection and processing.

#### 6.2.Data Processing

6.2.1.Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to the EAC and Historic England guidelines for 'minimally enhanced data' (see Section 3.8 in Schmidt *et al.*, 2015: 33 and Section IV.2 in David *et al.*, 2008: 11).

<u>Sensor Calibration</u> – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen *et al.* (2003).

<u>Zero Median Traverse</u> – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

<u>Projection to a Regular Grid</u> – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

<u>Interpolation to Square Pixels</u> – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

#### 6.3. Data Visualisation and Interpretation

6.3.1.This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the upper and/or lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images of the gradient and total field at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figures 42,

45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99, 102, 105, 108, 111, 114, 117, 120, 123, 126, 129, 132, 135, 138, 141& 144). XY trace plots visualise the magnitude and form of the geophysical response, aiding anomaly interpretation.

- 6.3.2.Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historical maps, LiDAR data, and soil and geology maps. Google Earth (2021) was also consulted, to compare the results with recent land use.
- 6.3.3.Geodetic position of results All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF) respectively. Figures are provided with raster and vector data projected against OS Open Data.

### 7. Results 7.1.Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible, an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports, as well as reports from further work, in order to constantly improve our knowledge and service.

#### 7.2.Discussion

- **7.2.1.The geophysical results are presented in combination with satellite imagery and historical** maps (Figures 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37 & 39).
- 7.2.2.The geophysical survey was successfully carried out over c.154ha, c. 65.4ha could not be surveyed due overgrown vegetation, farming equipment and/or unsafe ground conditions as well as restrictions to land access. The survey has detected anomalies of archaeological, agricultural, modern and undetermined origins. Features relating to near surface superficial variations have been identified, corresponding with changes in topography or land use, appearing as diffuse bands of widespread noisy zones of colluvial and or alluvial material (see section 4.3, 4.4 & 4.5). The survey has generally responded well to the environment of the survey area, although magnetic disturbance from modern activity is present at the edges of the survey areas as a result of extant boundaries, the A358, as well as buried services. Other areas of disturbance have been attributed to metal posts in the ground that were noted at the time of survey.
- 7.2.3. Three areas of possible archaeological activity have been identified. A curvilinear anomaly in Area 2774303 has been interpreted to be an enclosure. The anomaly is situated close to a known area of archaeological occupation (see section 5.2 & 5.3) The enclosure could be a part of the wider occupation of the landscape by the people living in the settlement. In addition, a sub-rectangular enclosure has been identified in Area 44371. This enclosure lies in proximity to a cropmark enclosure noted on the HER database (53514). With no further detail than this sub-note it is difficult to make a confident interpretation as to the date or function of the feature. In addition, both anomalies have a similar magnetic signal and morphology to the natural background making it hard to accurately determine an origin from their morphology alone. A further area of enclosures has been identified in Area 201892 with nine linear anomalies creating a pattern of sub-divisions within the area. Prehistoric pottery and what is believed to be human bone were found to the south of the survey area. While it is not possible to make a confident conclusion based on this evidence alone, as the identified anomalies may still relate to agricultural activity, a tentative 'possible archaeological' interpretation has been ascribed.

- 7.2.4.Numerous linear anomalies have been identified across the survey area. These anomalies correspond with former field boundaries, trackways and other such features recorded on the 2<sup>nd</sup> Edition OS Map (Figures 13 & 37). A driveway recorded on both historical mapping and modern satellite imagery has also been detected (Figure 37). In addition, several anomalies have been detected that have been interpreted to be unmapped former field boundaries, although many of these do not align with those detected as part of the Blackdown Hill National Mapping Programme (see section 5.5) (Figure 27). A zone of enhanced material contained within a former field has been identified in Area 787135, suggesting a prior difference in land use to the surrounding area (Figures 37 & 39). Ridge and furrow cultivation along with multiple modern ploughing regimes and drainage features have also been identified within the survey area (Figures 76, 77, 97 & 98). These anomalies reflect the extensive historical and modern land management and cultivation of the survey area.
- 7.2.5.An area of enhanced magnetic material has also been found to align with the route of a railway recorded on historical mapping (Figure 11) (see section 5.6). The magnetic signal is likely from the associated ballast.
- 7.2.6.Anomalies possibly relating to burning have been recorded within the survey area. These anomalies are believed to be related to waste disposal, campfires, and agricultural activities (see section 4.2), rather than higher temperature production processes such as kilns or ovens.
- 7.2.7.Anomalies of undetermined classification have been identified within the results. It is difficult to determine whether these anomalies are the result of natural or anthropogenic processes. This is due to factors such as their relatively isolated locations, ephemeral magnetic signals, and/or undefined morphology of the anomalies. An archaeological origin cannot be ruled out for any of these anomalies, particularly as some are in proximity to recorded areas of archaeological activity and anomalies identified as possibly archaeological in origin, but they may equally be of recent (agricultural) or natural origin.

#### 7.3.Interpretation

#### 7.3.1. General Statements

- 7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.
- 7.3.1.2. **Data Artefact** Data artefacts usually occur in conjunction with anomalies with strong magnetic signals due to the way in which the sensors respond to very strong point sources. They are usually visible as minor 'streaking' following the line of data collection. While these artefacts can be reduced in post-processing through data filtering, this would risk removing 'real' anomalies. These artefacts are therefore indicated as necessary in order to preserve the data as 'minimally processed'.
- 7.3.1.3. **Ferrous (Spike)** Discrete dipolar anomalies are likely to be the result of isolated pieces of modern ferrous debris on or near the ground surface.

- 7.3.1.4. Ferrous/Debris (Spread) A ferrous/debris spread refers to a concentration of multiple discrete, dipolar anomalies usually resulting from highly magnetic material such as rubble containing ceramic building materials and ferrous rubbish.
- 7.3.1.5. **Magnetic Disturbance** The strong anomalies produced by extant metallic structures, typically including fencing, pylons, vehicles and service pipes, have been classified as 'Magnetic Disturbance'. These magnetic 'haloes' will obscure weaker anomalies relating to nearby features, should they be present, often over a greater footprint than the structure causing them.
- 7.3.1.6. **Undetermined** Anomalies are classified as Undetermined when the origin of the geophysical anomaly is ambiguous and there is no supporting contextual evidence to justify a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally distinct from those caused by ferrous sources.

#### 7.3.2. Magnetic Results - Specific Anomalies

- 7.3.2.1. Possible Archaeology (Weak) Located within Area 2774303 is a curvilinear anomaly with a weak positive magnetic enhancement, which is suggestive of an infilled ditch [2774303a] (Figure 64). The magnetic signal as well as the morphology suggest an anthropogenic origin. The anomaly also lies beyond the boundary of an area of notable archaeological occupation (see section 5.2 & 5.3). However, a link to this area of occupation cannot be ruled out. Another anomaly with a possible archaeological origin is present in Area 44371 [44371a] (Figure 115). The signal is weaker and more disjointed, creating a possible sub-rectangular shape. The anomalies are not visible on historical mapping and satellite imagery, nor do they interact with known field boundaries or features observed at the time of survey. Anomaly [44371a] does lie within close proximity to a noted cropmark although it is difficult to determine if [44371a] results from the same feature the HER is referring to (see section 5.7).
- 7.3.2.2. Possible Archaeology (Weak) Several linear and curvilinear anomalies have been detected within Area 201892 [201892a]. These anomalies display a weak positive magnetic signal, typical of a ditch that has been infilled, suggesting an anthropogenic origin (Figure 100). The anomalies have been ascribed a 'Possible Archaeological' category for a number of reasons. Firstly, the placement of the subdivisions formed by the anomalies do not keep with the character of the neighbouring field boundaries. This implies that the anomalies may predate the available historical mapping. Secondly, the magnetic signal of the anomalies is similar to what would be expected of an anomaly with archaeological origins, in that the anomalies have a weak magnetic enhancement and are slightly diffuse around the edges. Thirdly, the anomalies are located close to an area where prehistoric pottery and what is believed to be a human bone were discovered. A more confident interpretation cannot be made as the northern part of the anomaly appears to follow the orientation of the road to the north (Figure 25). This suggests a possible relationship to the road and thus a more recent origin. In

addition, the magnetic disturbance produced from nearby buried material prevents a full understanding of the anomalies' extent.

- 7.3.2.3. Agricultural (Strong & Weak) A curvilinear anomaly has been identified in the north of Area 78561 [78561a] (Figure 142). The anomaly has a strong positive magnetic enhancement and corresponds with the boundary of a copse of trees recorded on historical mapping (Figure 37). In addition, in the north of Area 78706, two curvilinear anomalies have been detected that display a weak positive magnetic signal [78706a]. These anomalies correspond with an extant driveway that is also recorded on historical mapping and satellite imagery (Figure 37). However, the faint magnetic enhancement and slight misalignment could suggest that the driveway's path has shifted over time or was made using similar material to the background geology.
- 7.3.2.4. Agricultural (Strong, Weak & Zone) Numerous anomalies have been identified that correlate with historical field boundaries, trackways and public footpaths recorded on the 2<sup>nd</sup> Edition OS Map (Figures 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37 & 39). The magnetic signal of these anomalies varies, with some appearing very strongly in the plots while others are much fainter or appear as a diffuse spread of material. The variation of the magnetic enhancement of these anomalies is due to the different type of field boundary used, such as a fence or a hedge, different materials used to consolidate paths and tracks, or a difference in the methods used in the removal of the field boundaries.
- 7.3.2.5. Agricultural (Weak) Several anomalies have been detected that display a similar magnetic signal to those interpreted as mapped former field boundaries [1981161a, 257417a, 00032a, 00042a & 59340a] (Figures 7, 17, 23 & 27). However, these anomalies do not correlate with any field boundary recorded on historical maps. Due to the similar magnetic enhancement and the orientations that appear to fit well as subdivisions of the extant fields, the anomalies have been interpreted as unrecorded historic field boundaries.
- 7.3.2.6. Agricultural (Weak) A linear anomaly with a weak magnetic enhancement has been identified in the southeast of Area 201892 [201892b] (Figure 103). This anomaly, while in close proximity to anomalies identified as 'Possible Archaeology', has been interpreted as agricultural in origin due to a number of drains appearing to converge towards [201892b], with agricultural trends running adjacent to it. It is likely that this anomaly is either an unrecorded historical field boundary or has been produced due to other agricultural practices.
- 7.3.2.7. Agricultural (Zone) An area containing a high concentration of enhanced material has been identified in the southeast of Area 787135 [787135a]. This area corresponds with the extent of a former field that is recorded on the 2<sup>nd</sup> Edition OS Map (Figure 37 & 39), and likely relates to a difference in agricultural practices between the fields, such as manuring.
- 7.3.2.8. Agricultural (Trend) Across the survey area, weak parallel linear anomalies have been identified on multiple alignments. These indicate modern ploughing regimes

and correlate with the orientation of ploughing trends visible on satellite imagery and on the ground at the time of survey. Some linear anomalies identified do not match the current agricultural regime and could possibly also be drains. However, it is difficult to make a confident interpretation due to the limited size of many of the survey areas.

- 7.3.2.9. Ridge and Furrow Linear anomalies have been identified in Area 00035A that have been interpreted to be ridge and furrow cultivation [00035Aa] (Figures 73 & 76). These anomalies have a weak magnetic enhancement and are quite diffuse. The spacing of these anomalies are wider than typical ridge and furrow. Ridge and furrow cultivation are normally spaced between 4-6m whereas the spacing of anomalies in this area average between c.12m and c.9m. This could suggest that there were once more that have since been ploughed out over time.
- 7.3.2.10. **Drainage Features** Across the survey area, weak linear anomalies have been identified. The dipolar magnetic signal of some these anomalies is suggestive of ceramic drains while the weak, positive magnetic enhancement of others imply the drains are cut field drains. In addition to the characteristic magnetic signal, the orientation and layout of some of the anomalies towards ditches and watercourses, as well as some being in a herringbone layout (Figure 95), supports the interpretation of the anomalies as drains.
- 7.3.2.11. Industrial/Modern (Zone) In the southeast corner of Area 317669, a zone of strongly enhanced dipolar material has been identified [317669a] (Figure 52). The anomaly corresponds with the path of a former railway recorded on historic OS mapping (Figure 11).
- 7.3.2.12. Burning/Possible Burning Small, discrete areas of strong dipolar magnetic enhancement are present across the survey area. These anomalies most likely to relate to the burning of material and are most explicit in the XY Trace Plot, with a distinctive double peak (Figures 72, 81 & 99). One strong anomaly in the east of Area 232489 and the northwest of Area 000321 correlates to a campfire, the remains of which were identified during survey [232489a & 000321a](Figure 72).
- 7.3.2.13. Natural (Strong, Weak & Zone) Anomalies indicative of subsurface variations in the underlying geology and soil properties have been identified across the survey area. These variations are most explicit in the Total Field data (Figures 12, 28 & 32). The most prominent and clearly defined have been categorised individually, while a 'Natural Zone' classification has been used to highlight areas of weak, amorphous changes in the general background texture of the data, caused by zones of alluvium or colluvium deposits. These bands of material represent near surface sedimentary processes influenced by topographic variation (see sections 4.3, 4.4 & 4.5).
- 7.3.2.14. Services Linear anomalies with strong dipolar magnetic signals have been detected in several parts of the survey area (Figures 88, 97, 130, 136 & 142). The magnetic enhancement of these anomalies are indicative of buried services.

- 7.3.2.15. Ferrous Debris A number of discrete anomalies have been detected within Areas 324337 and 3243371 [324337a, 3243371a] (Figures 91 & 94). These anomalies have a strong negative magnetic enhancement and correspond with metal posts in the ground noted at the time of survey.
- 7.3.2.16. Ferrous Debris (Spread) Located along the northern boundary of Area 324337 is an Area of enhanced dipolar magnetic material [324337b] (94). This anomaly corresponds with an earthwork noted from the Blackdown Hills National Mapping Projects that is believed to be an extraction pit (see section 5.6) (Figure 25). Backfilled extraction pits have a characteristic appearance in magnetometer data that matches well with what is observed here: the backfill material contains highly fired ceramics or ferrous material.
- 7.3.2.17. Undetermined (Strong) In the south of Area 3243371, a discrete anomaly has been detected [3243371b]. The anomaly displays a consistent positive magnetic signal in the grayscale but a comparatively weak enhancement in the XY Trace Plot (Figures 94 & 96). The anomaly is also relatively large. The atypical magnetic signal and proximity to the edge of the survey area has precluded a confident interpretation.
- 7.3.2.18. Undetermined (Strong) Within Area 2774302, a circular anomaly with a strong positive magnetic enhancement has been identified [2774302a] (Figures 61 & 62). The morphology of the anomaly is atypical in that it is a ring shape with a diameter of c.10-14m. This along with the strong magnetic signal of the anomaly, suggests a likely anthropogenic origin. However, due to the location of the anomaly being close to the edge of the survey area and c.139m northeast of an anomaly [2774303a] classified as 'Possible Archaeology', it is impossible to determine if the anomaly has been produced due to archaeological, agricultural or modern processes. Thus an 'Undetermined' classification has been given.
- 7.3.2.19. Undetermined (Strong) Discrete anomalies have been identified across the survey area that have a dipolar magnetic signal [2774304a, 3247293a & 44371b] (Figures 64, 97 & 115). The largest and most prominent is located in Area 123409 [123409a] (Figure 104). These anomalies are atypical when compared to standard ferrous-type anomalies in that they have a negative centre surrounded by a positive halo. These could therefore suggest high temperature activity, though whether linked to modern or archaeological processes is unclear.
- 7.3.2.20. Undetermined (Weak) (Area 44371) Within Area 44371 linear and curvilinear anomalies have been detected that display a weak positive magnetic enhancement (Figures 115 & 118). As the anomalies are within close proximity to [44371a], which is thought to be of possible archaeological origins, an archaeological interpretation cannot be ruled out. This is particularly true for those anomalies in the east that follow a similar alignment to [44371a] and thus could be related. Due to the anomalies weak magnetic signal and discontinuous form it is difficult to make a confident interpretation.

- 7.3.2.21. Undetermined (Strong & Weak) (Area 85982) Within Area 85982 several anomalies that display both a strong and weak magnetic signal have been detected. These smaller, weaker anomalies in the south of the Area do not appear particularly ferrous in the XY Trace Plot (Figure 81) but are relatively prominent in the greyscales (Figure 79). The two strong anomalies in the north of the Area again display an atypical magnetic enhancement. [85982b] has a dipolar magnetic signal and appears more widespread, while [85982a] has a strong positive magnetic signal. However, both of these strong anomalies do not display a double peak in the XY Trace Plot, which is characteristic of possible burnt material (Figure 81). Due to these anomalies all being present in an Area that is isolated from the rest of the survey area, the atypical magnetic enhancement of the anomalies and the limited size of the survey area, it is difficult to arrive at a confident classification.
- 7.3.2.22. Undetermined (Strong & Weak) Numerous linear and discrete anomalies have been identified within the survey area for which the origin cannot be determined. These anomalies have a variable magnetic signal and display no clear form or pattern to suggest an archaeological origin. Due to variables such as the limited size of the survey areas and the weak or atypical magnetic enhancement of the anomalies, a confident interpretation cannot be made. These anomalies may have been produced due to natural, agricultural, or modern processes but an archaeological origin also cannot be entirely dismissed.

## 8. Conclusions

- 8.1. A fluxgate gradiometer survey has been undertaken over c.154ha between Taunton and Southfields, along the A358. An area totalling c.65.4ha across the survey area could not be surveyed due to the presence of overgrown vegetation, farming equipment and/or unsafe ground conditions as well as restrictions to land access. The geophysical survey has detected a range of anomalies of possible archaeological, agricultural, and modern origin. Natural variations in the superficial geology of the survey area have also been identified. Anomalies relating to modern activity have been produced due to extant boundary fencing, buried services and stakes in the ground present at the time of survey.
- 8.2. Possible archaeological activity has been identified within the survey area. This consists of a sub-circular and a sub-rectangular enclosure. Additional linear and curvilinear anomalies within a single Area have also been detected and appear to form a series of sub-enclosures. No certain interpretation regarding date or function can be given for these anomalies.
- 8.3. Anomalies which correspond to mapped former field boundaries have been detected, along with several that are believed to be unmapped former field boundaries. An area of enhanced magnetic material falls within one of these former fields and likely results from differences in agricultural practice, such as manuring. Anomalies suggestive of ridge and furrow cultivation have also been identified. There is also evidence of multiple networks of drains and modern ploughing. These anomalies reflect the extensive historical and modern management and cultivation of the survey area.

- 8.4. An area of strongly enhanced, dipolar magnetic material has also been detected. The anomaly aligns with the path of a former railway recorded on historical maps.
- 8.5. Anomalies possibly suggestive of localised and isolated burning activities have also been identified. These are considered likely to be agricultural and/or modern in origin.
- 8.6. Anomalies which have been classified as 'undetermined' in origin have also been identified. These are considered likely to relate to natural processes, agricultural and/or modern activity; however, an archaeological explanation cannot be ruled out entirely.

## 9. Archiving

- 9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and ungeoreferenced images, XY traces and a copy of the final report.
- 9.2. MS contributes reports to the ADS Grey Literature Library upon permission from the client, subject to any dictated time embargoes.

## 10. Copyright

10.1. Copyright and intellectual property pertaining to all reports, figures and datasets produced by Magnitude Services Ltd is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

## 11. References

British Geological Survey, 2021. Geology of Britain. Taunton, Somerset. [http://mapapps.bgs.ac.uk/geologyofbritain/home.html/]. Accessed 06/04/2021.

Chartered Institute for Archaeologists, 2020. Standards and guidance for archaeological geophysical survey. CIFA.

David, A., Linford, N., Linford, P. and Martin, L., 2008. Geophysical survey in archaeological field evaluation: research and professional services guidelines (2<sup>nd</sup> edition). Historic England.

Google Earth, 2021. Google Earth Pro V 7.1.7.2606.

Highways England, 20XX. Preliminary Environmental Information Report – Appendix 6.1 Archaeological and Historic Background.

Olsen, N., Toffner-Clausen, L., Sabaka, T.J., Brauer, P., Merayo, J.M.G., Jorgensen, J.L., Leger, J.M., Nielsen, O.V., Primdahl, F., and Risbo, T., 2003. Calibration of the Orsted vector magnetometer. Earth Planets Space 55: 11-18.

Salmon, F., 2021. Written Scheme of Investigation for a Geophysical Survey of A358 Taunton to Southfields Dualling, Taunton, Somerset. Magnitude Surveys, reference number MSST901A.

Schmidt, A. and Ernenwein, E., 2013. Guide to good practice: geophysical data in archaeology (2<sup>nd</sup> edition). Oxbow Books: Oxford.

Schmidt, A., Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A. and Fassbinder, J., 2015. Guidelines for the use of geophysics in archaeology: questions to ask and points to consider. EAC Guidelines 2. European Archaeological Council: Belgium.

Soilscapes, 2021. Taunton, Somerset. Cranfield University, National Soil Resources Institute. [http://landis.org.uk]. Accessed 06/04/2021.

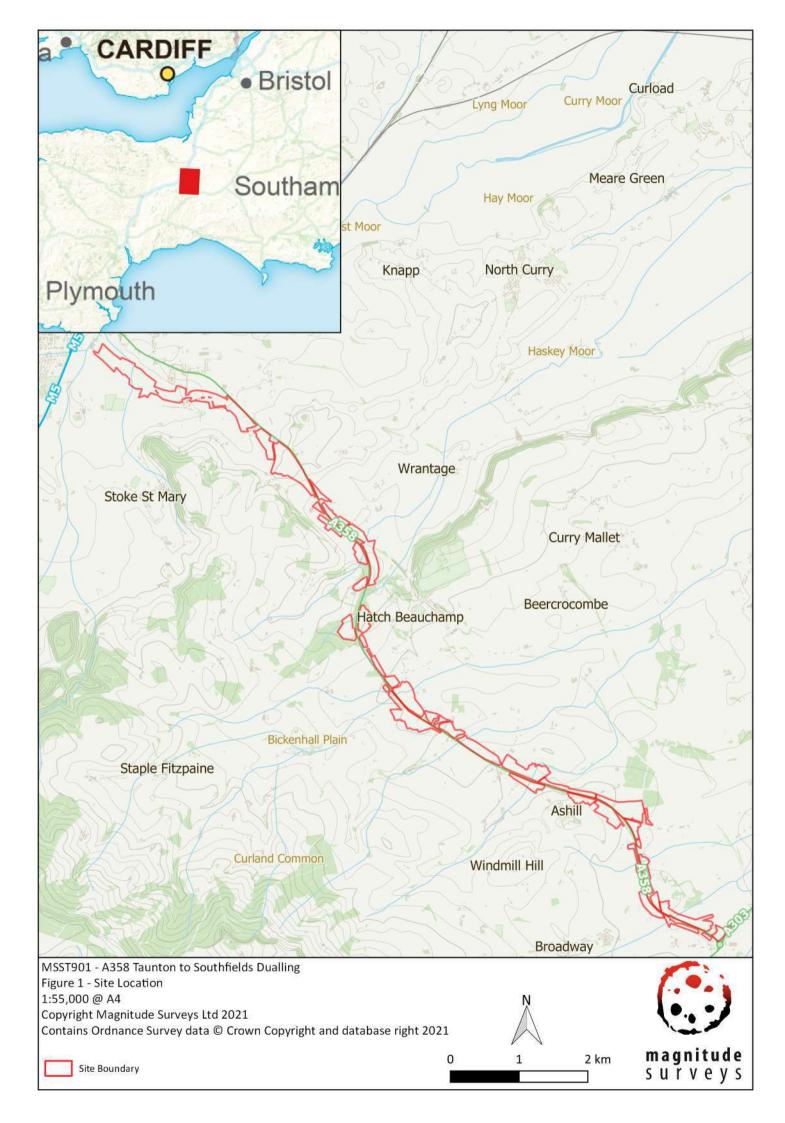


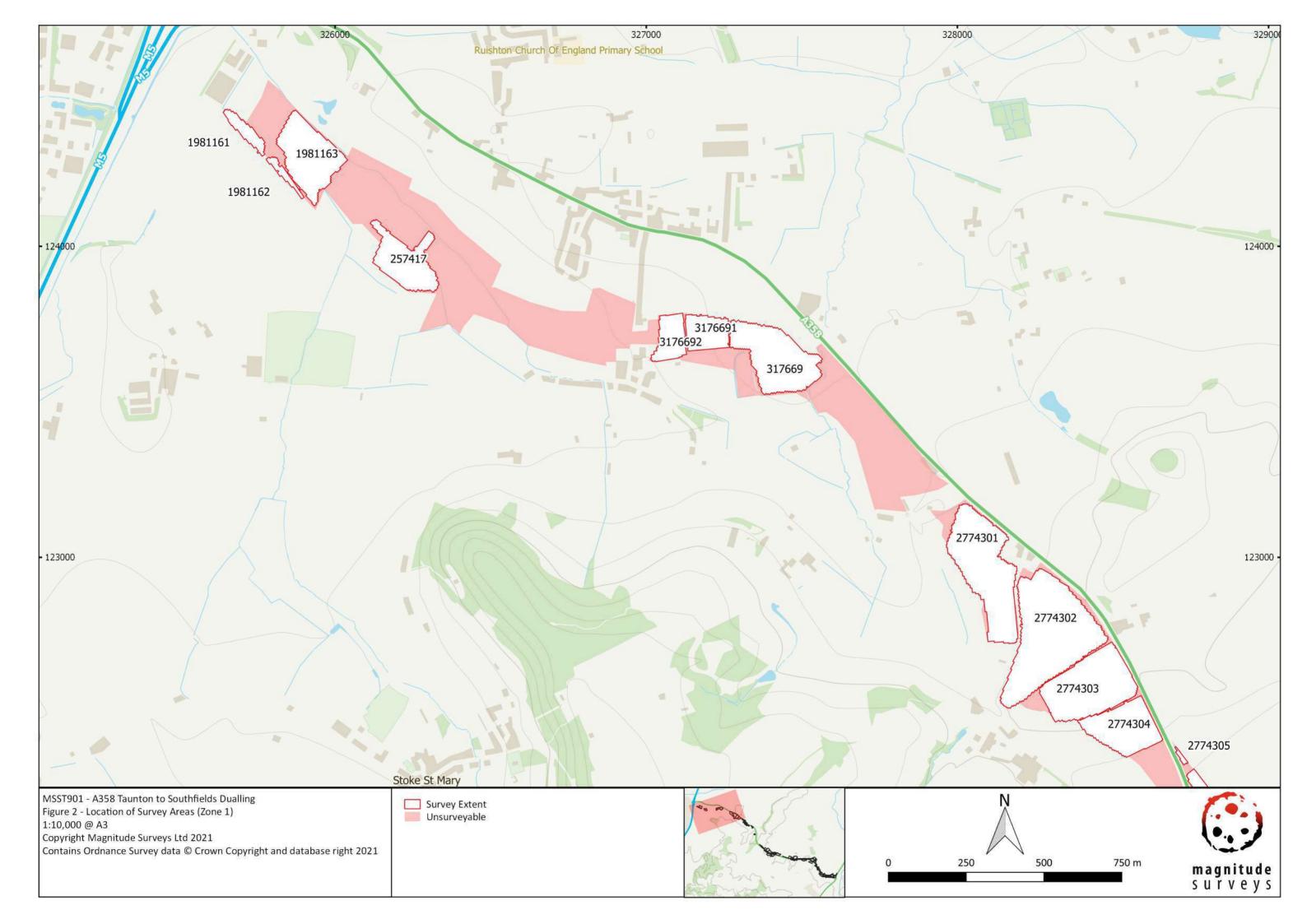
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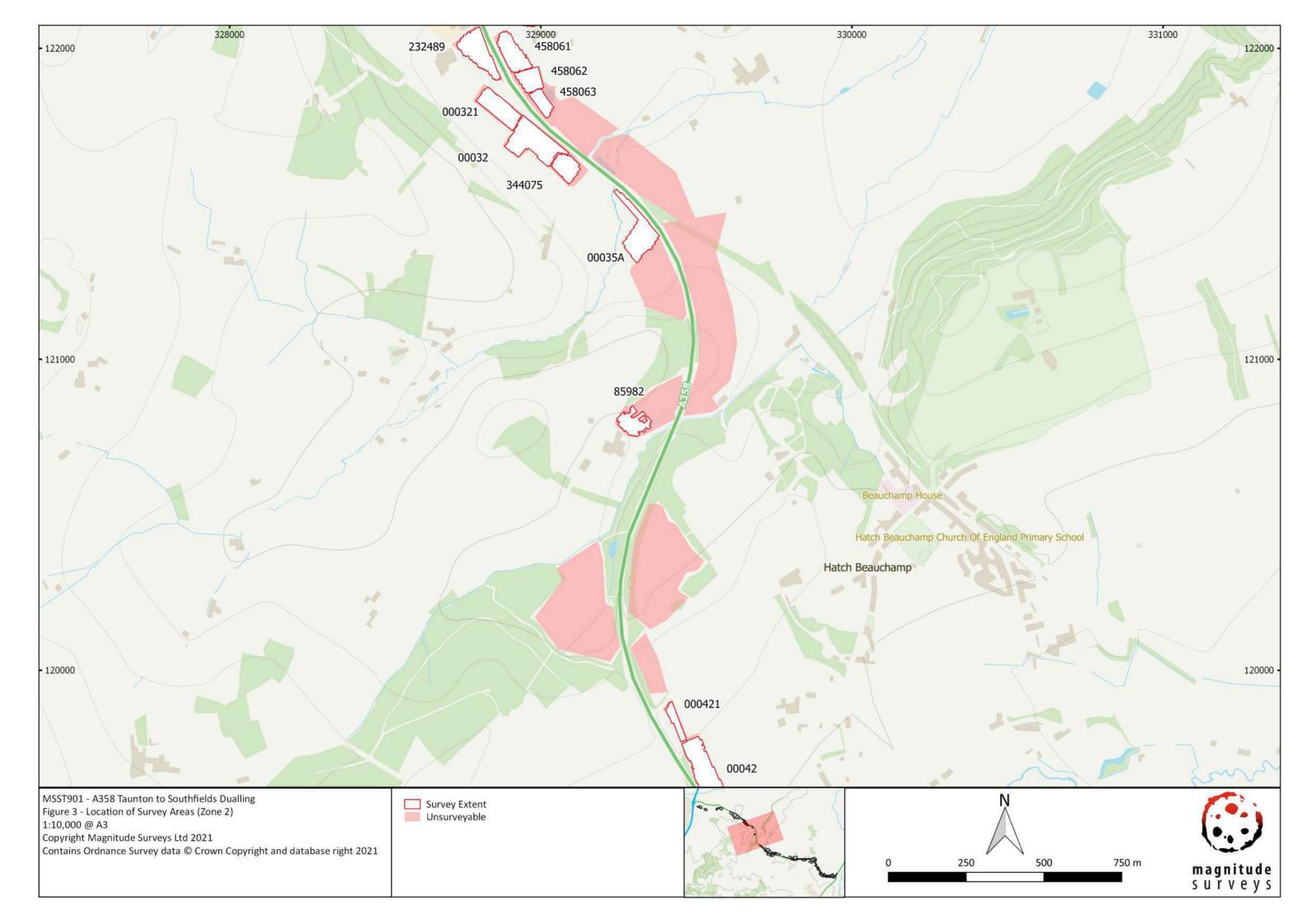
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Client	Taylor Woodrow Civil Engineering	
Grid Reference	ST 3429 1547	
Survey Techniques	Magnetometry	
Survey Size (ha)	236ha (Magnetometry)	
Survey Dates	22/03/2021 – 25/06/2021	
Project Lead	roject Lead Frederick Salmon BSc FGS ACIfA	
Project Officer	N/A	
HER Event No	N/A	
OASIS No	N/A	
S42 Licence No	N/A	
Report Version	0.2	

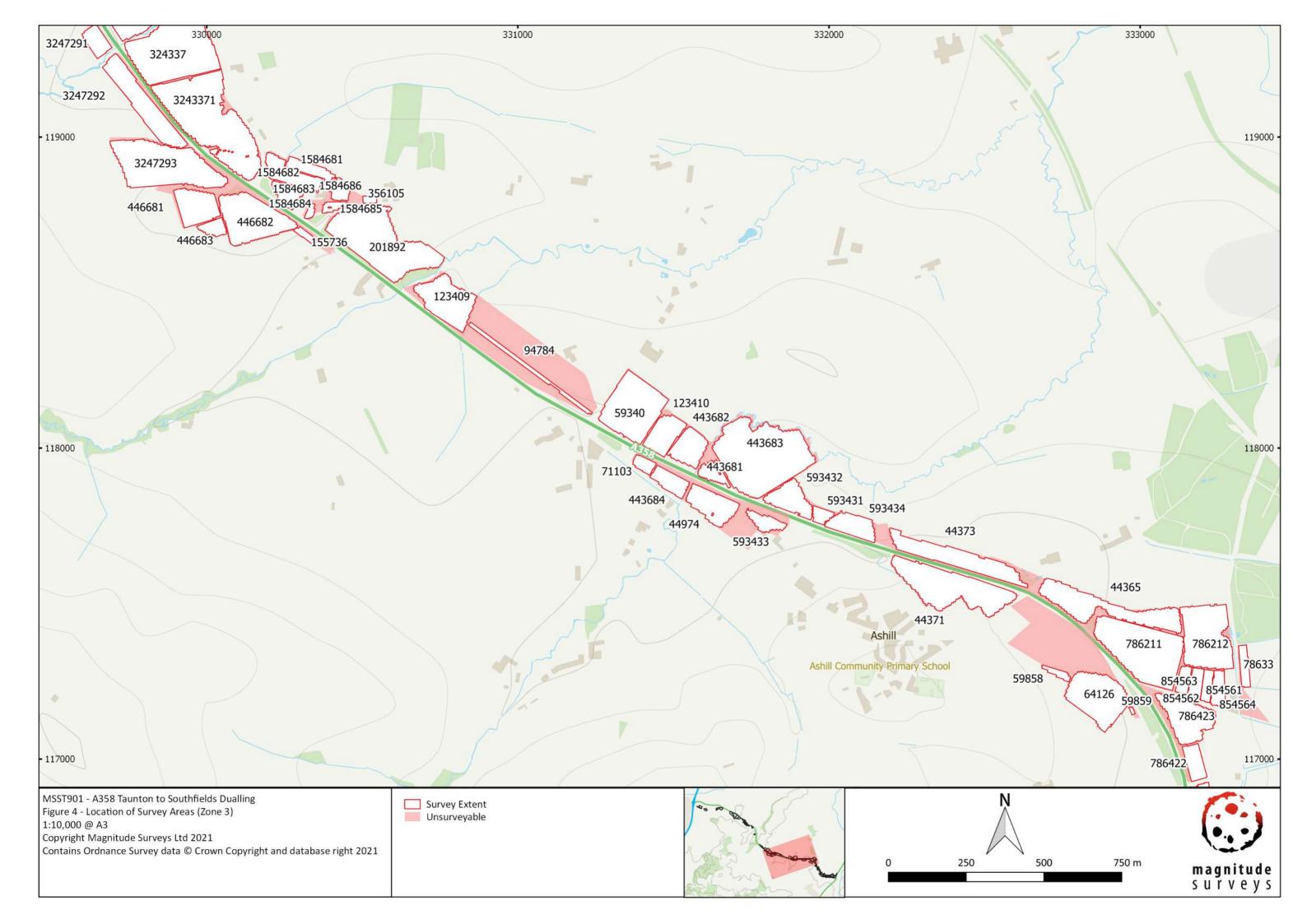
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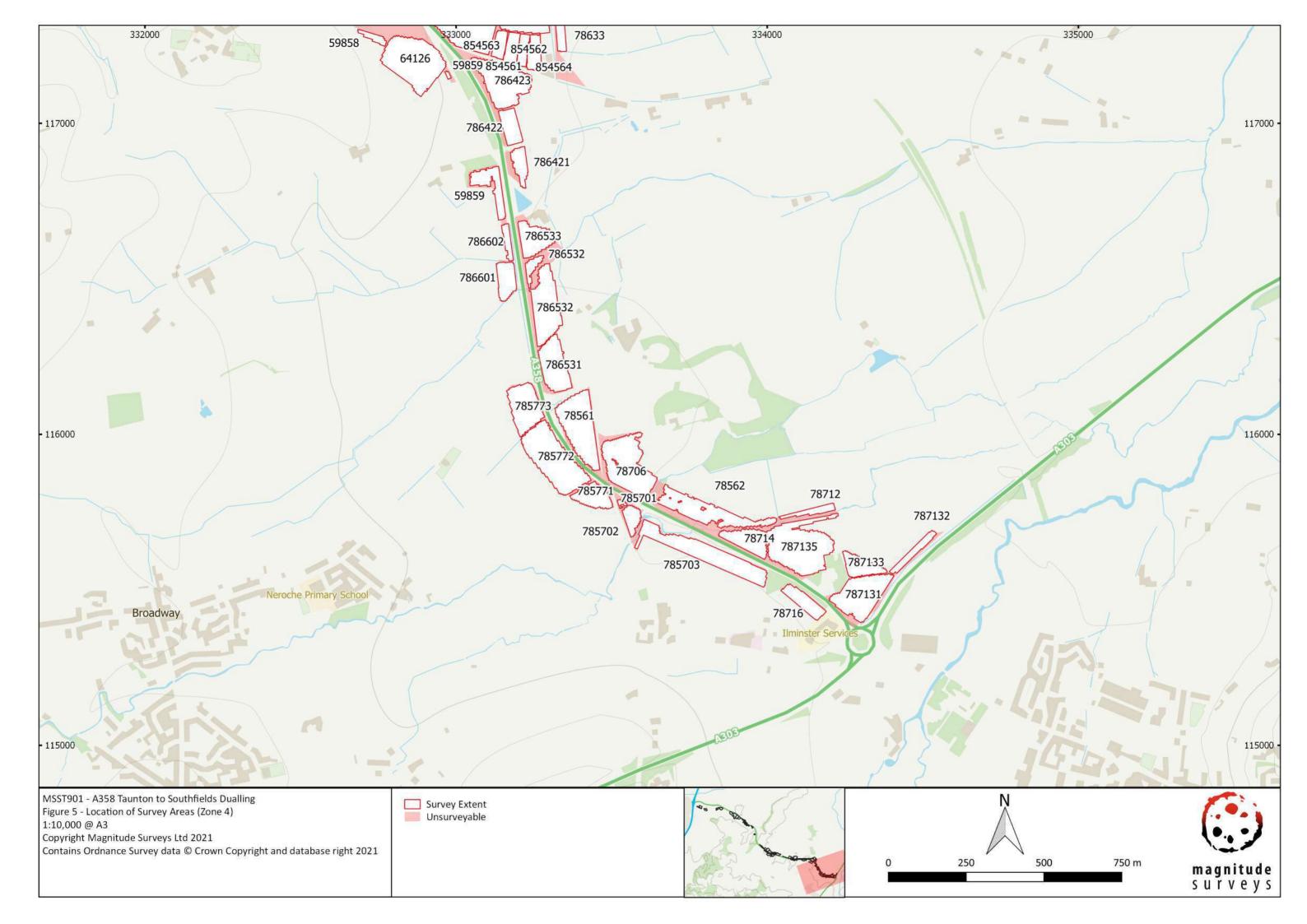
Version	Comments	Author	Checked By	Date
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	to Review	PFP		
0.2	Revi <mark>ew for Proj</mark> ect Manager	MC	КА	03 June
				2021

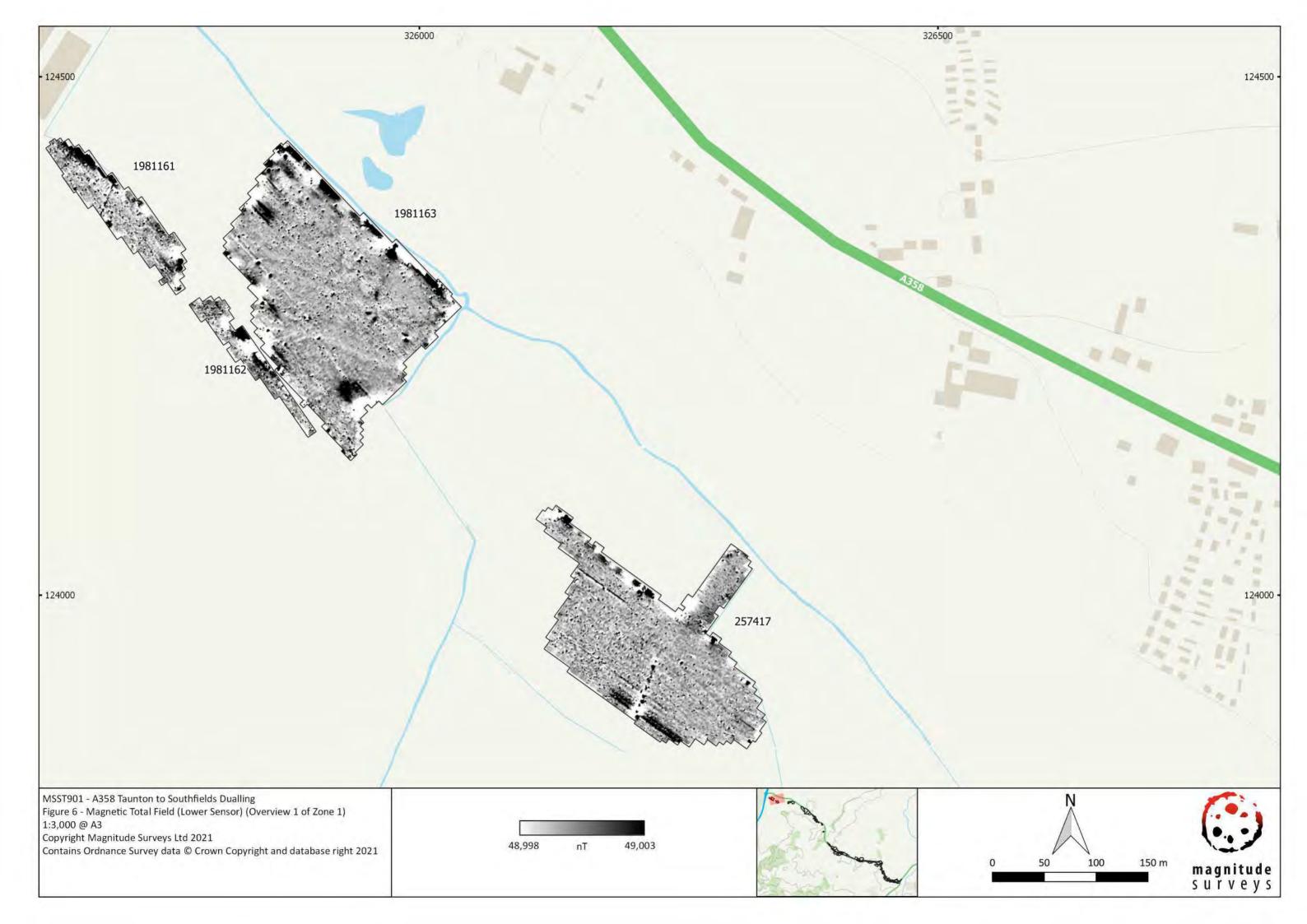


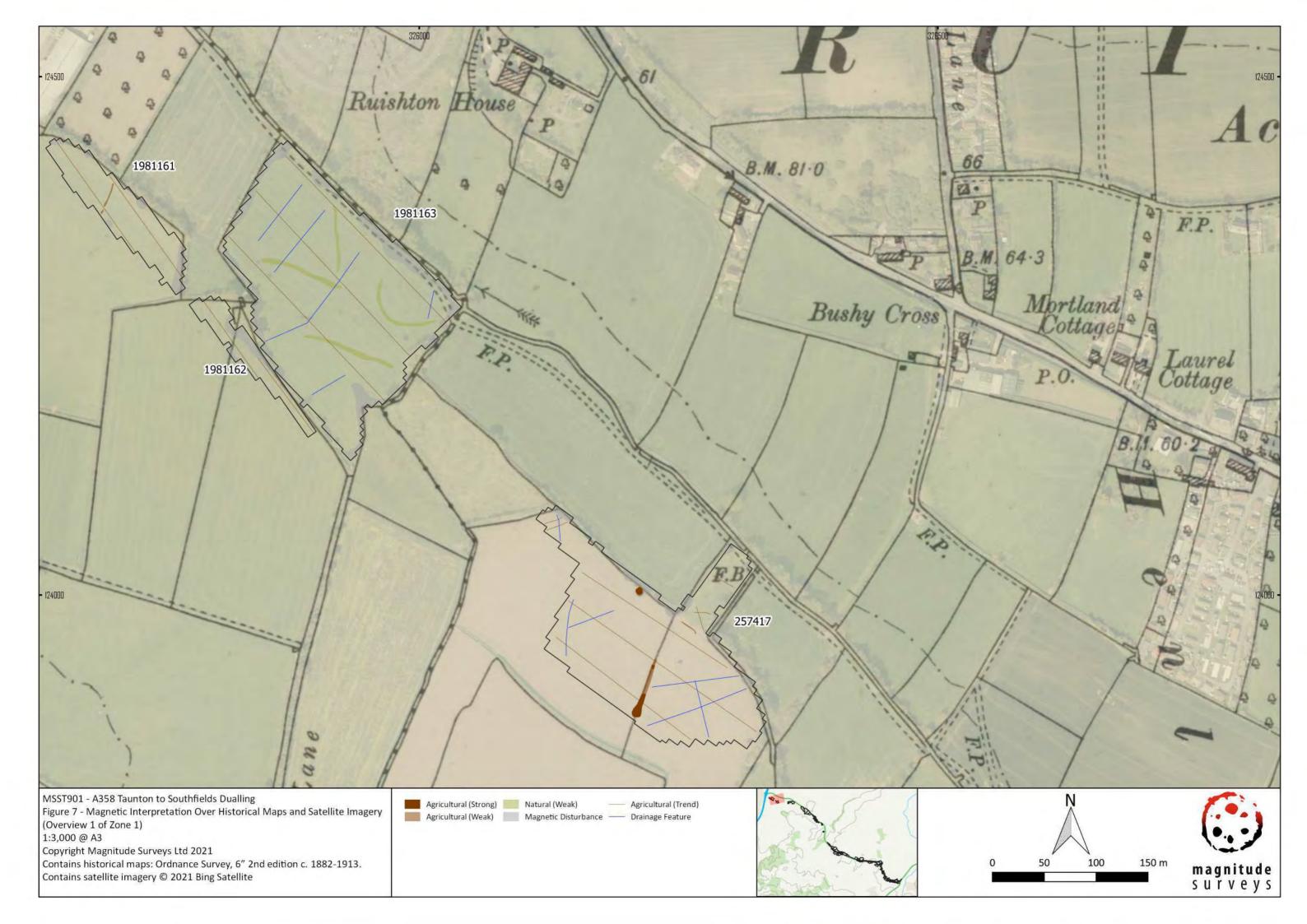




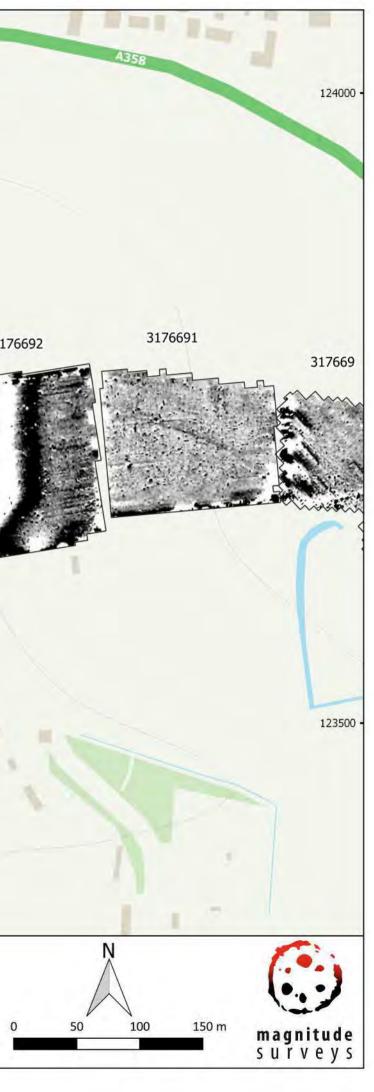


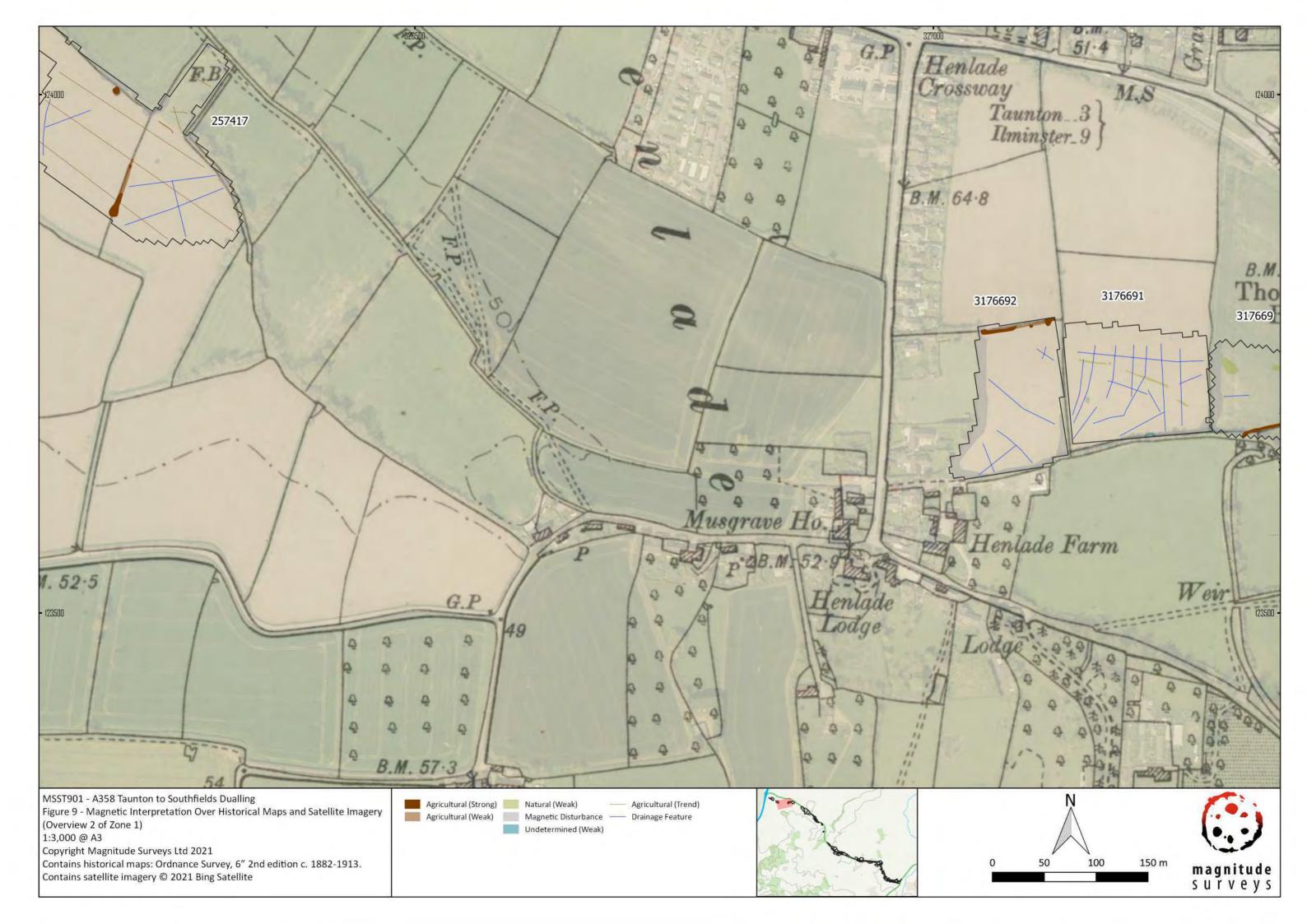


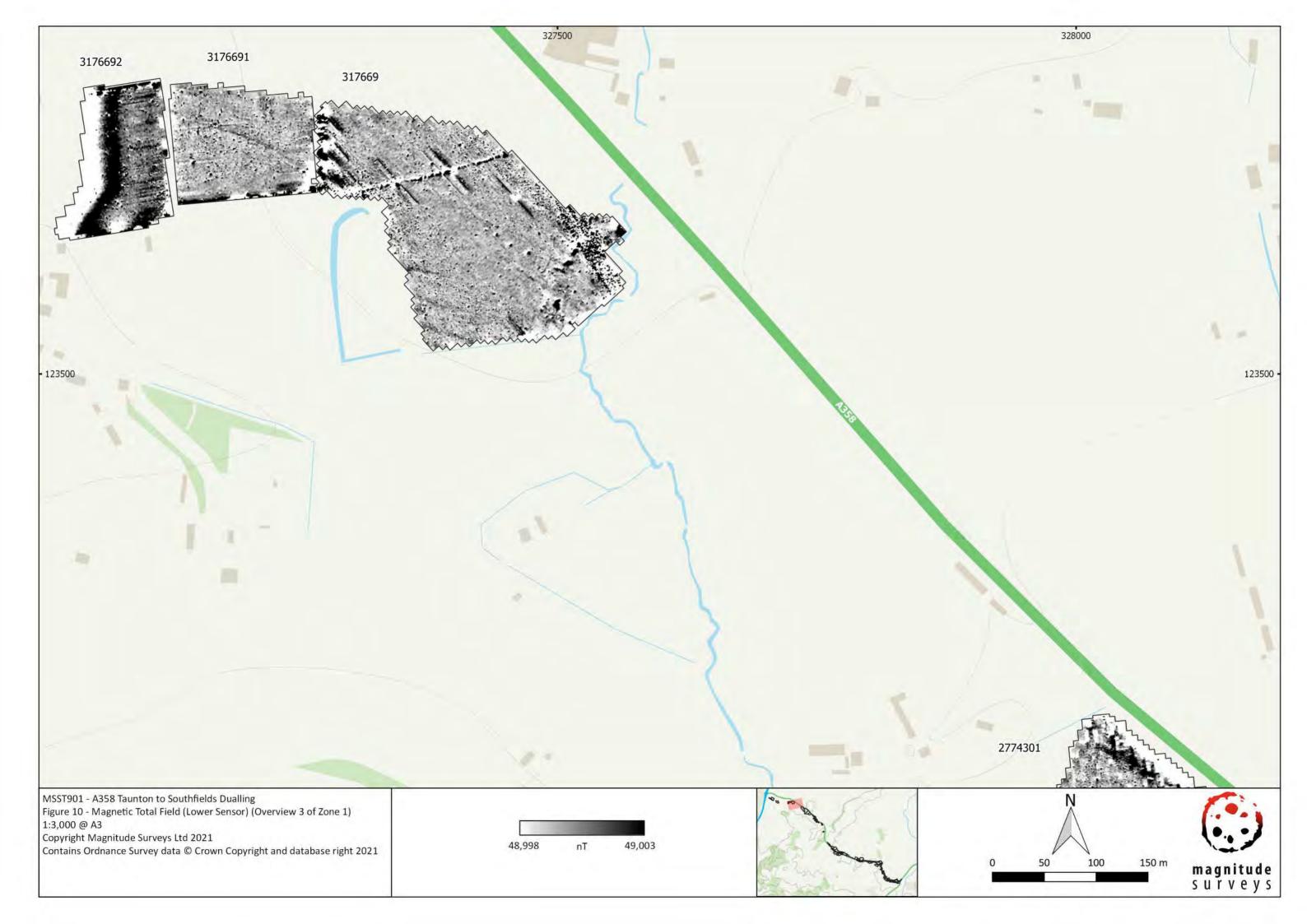


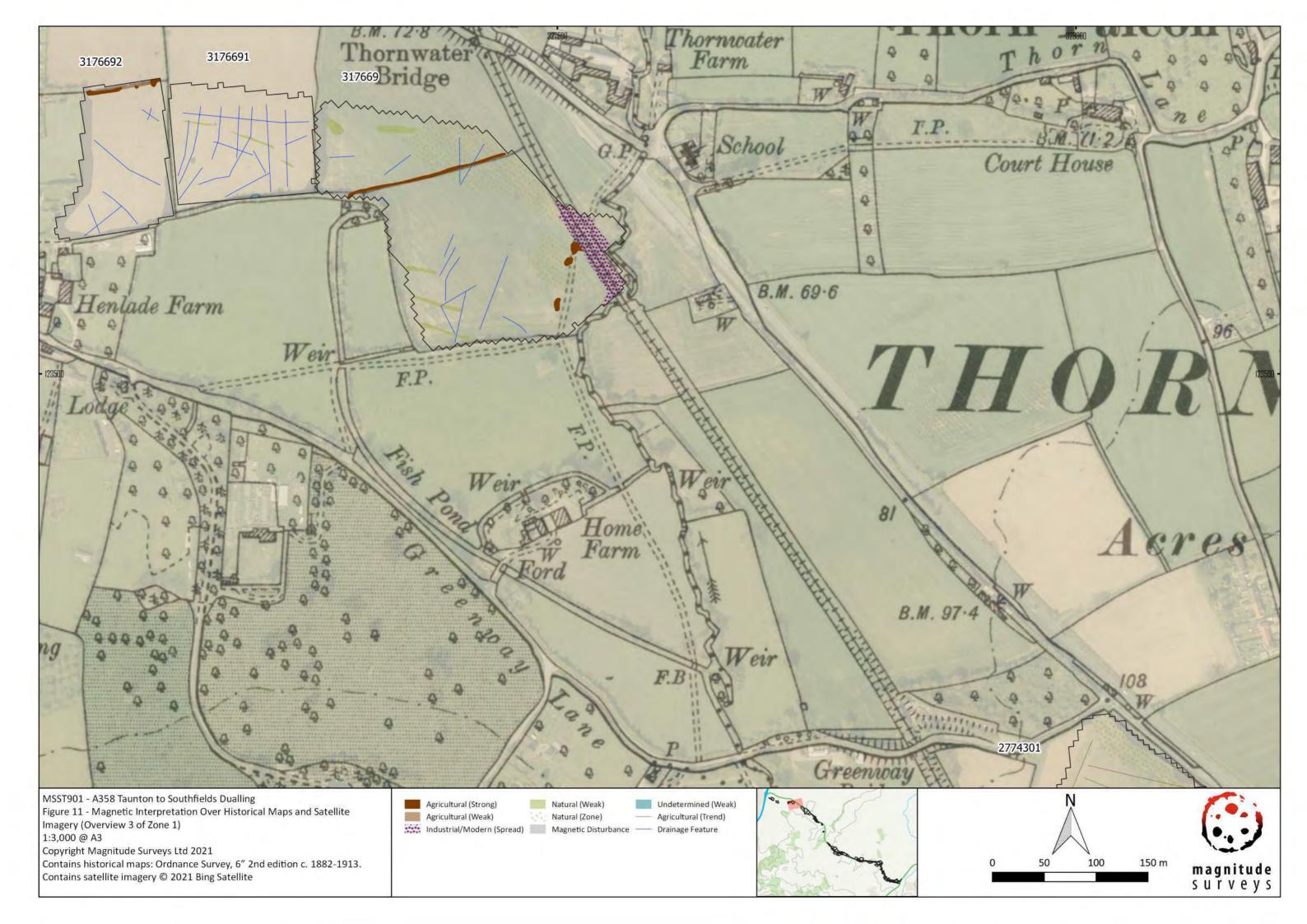


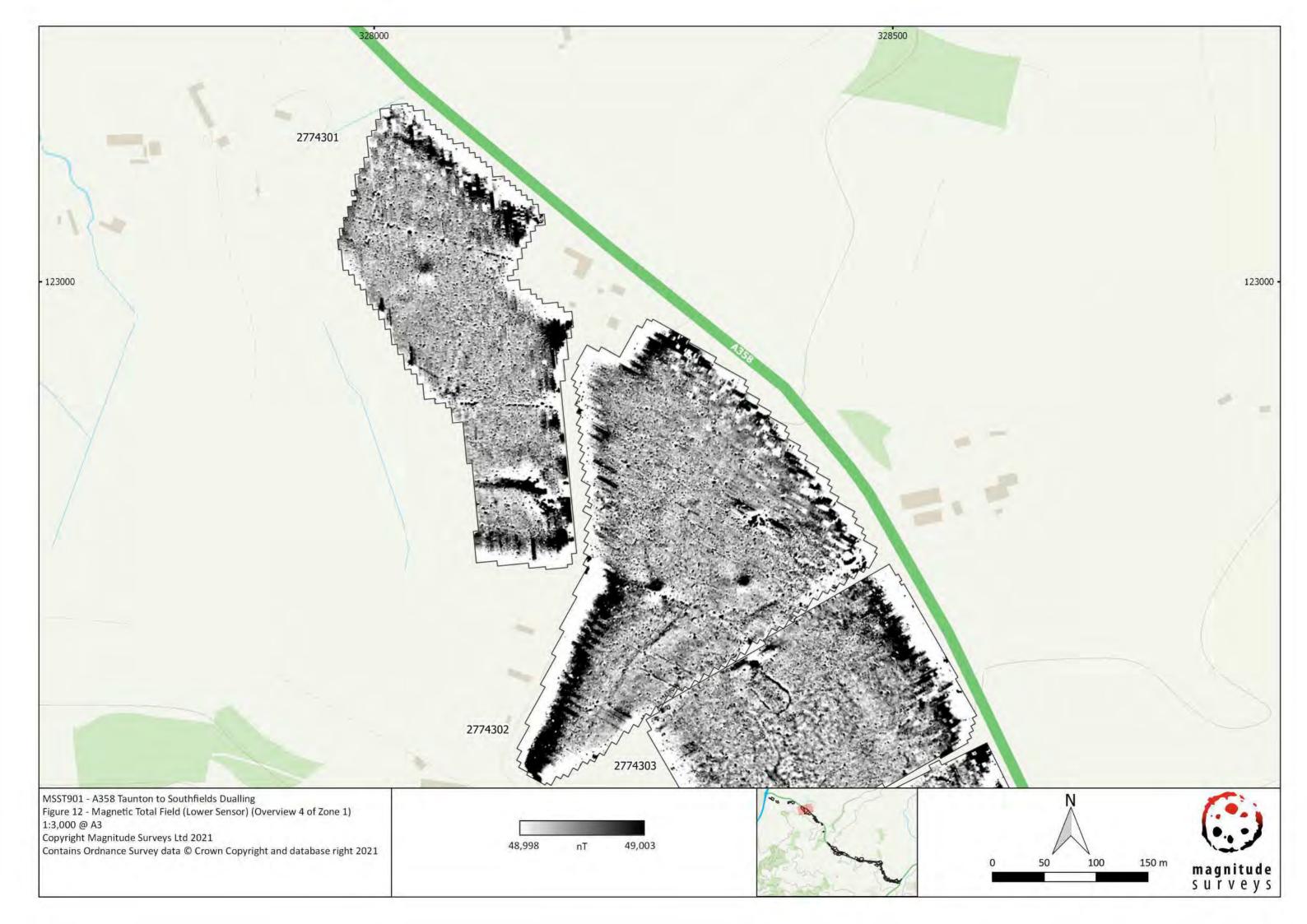
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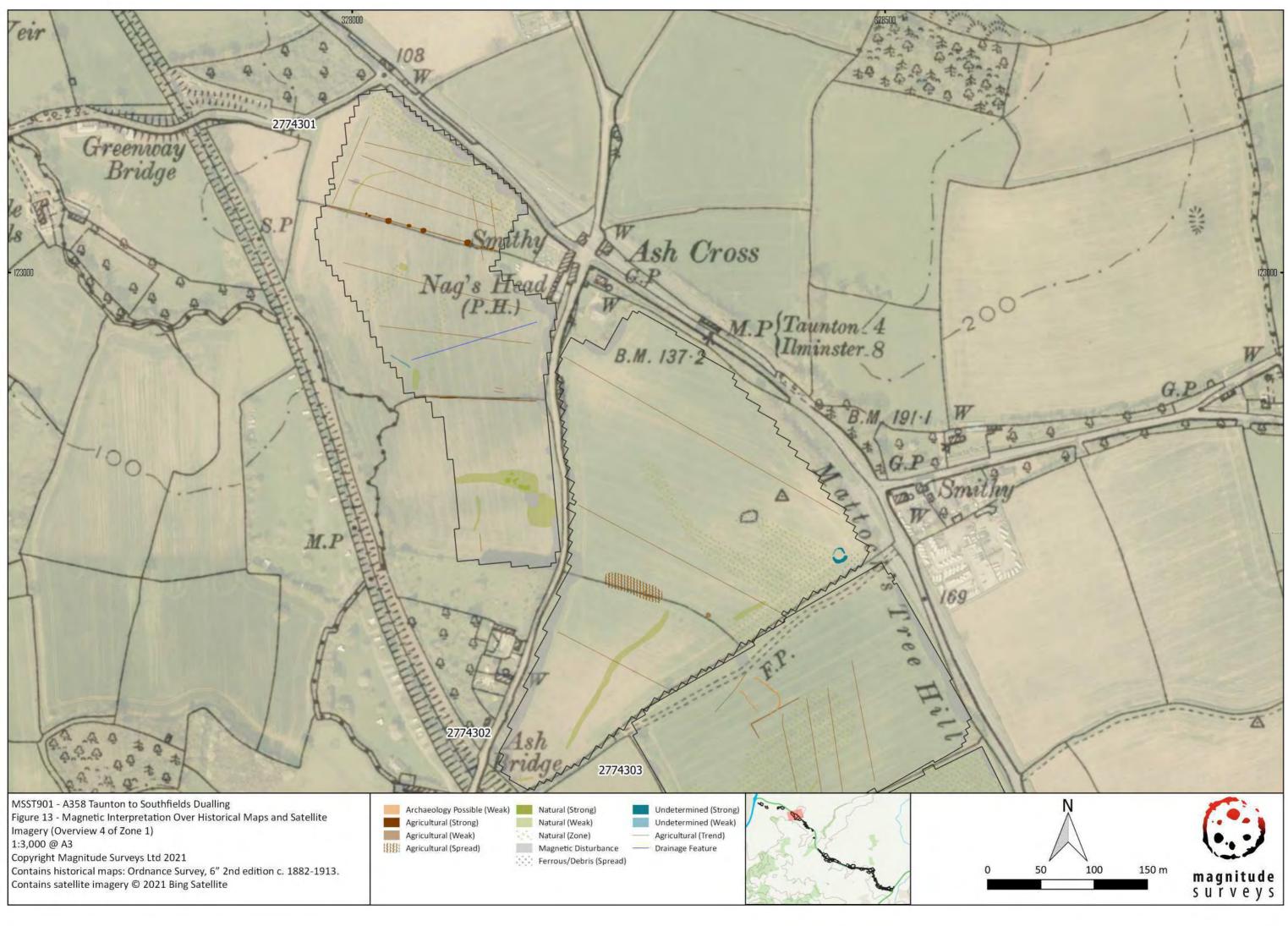




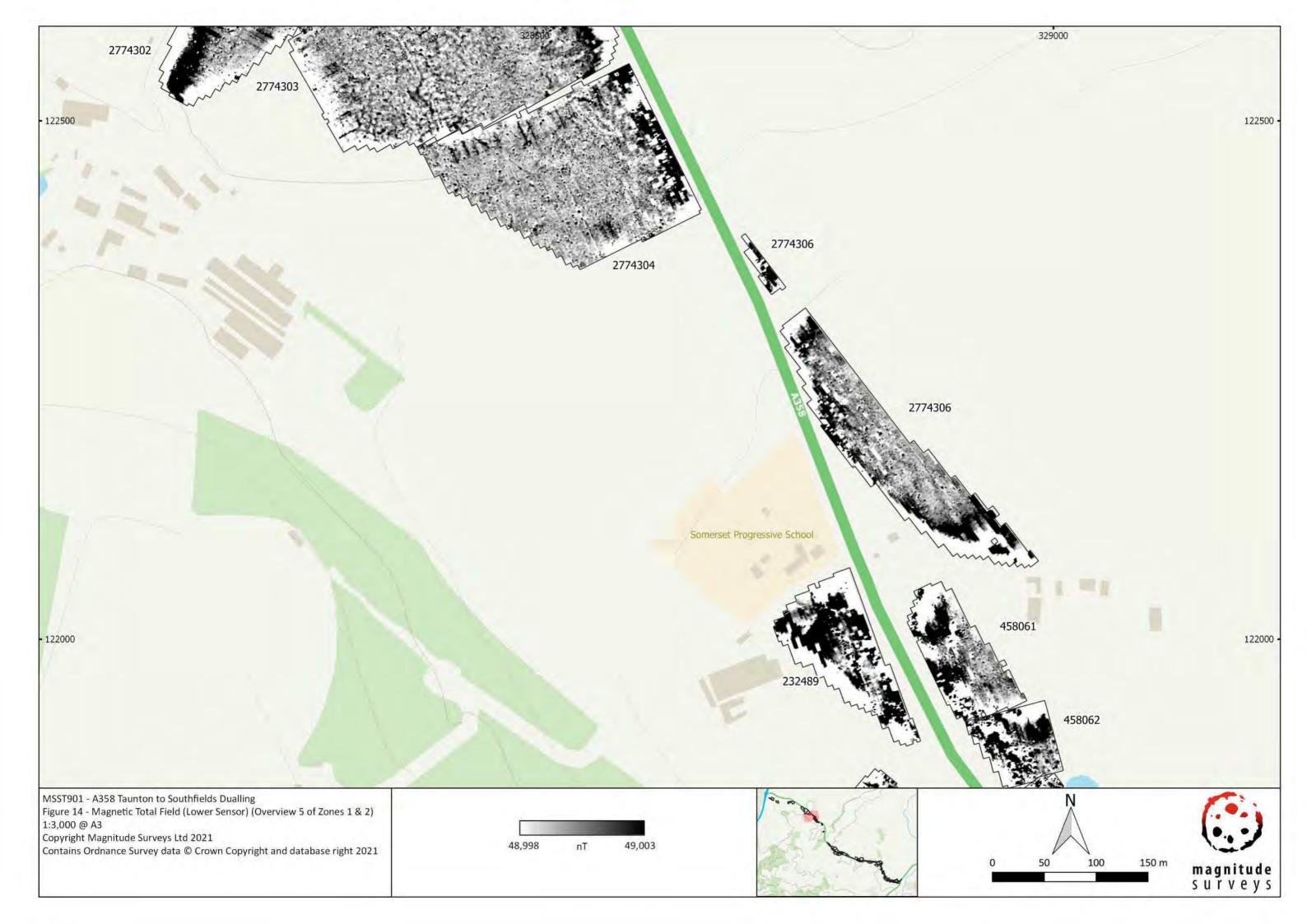


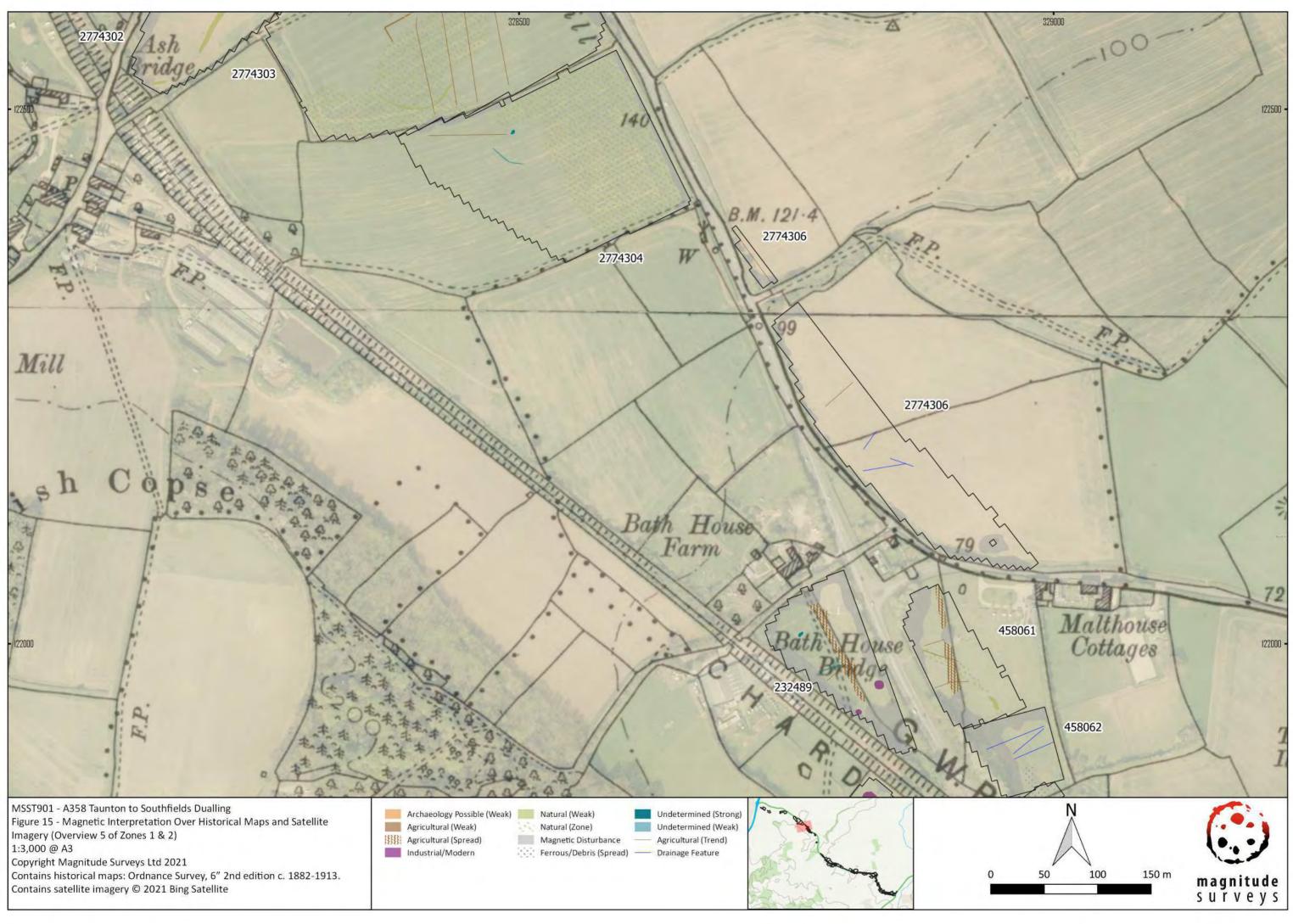




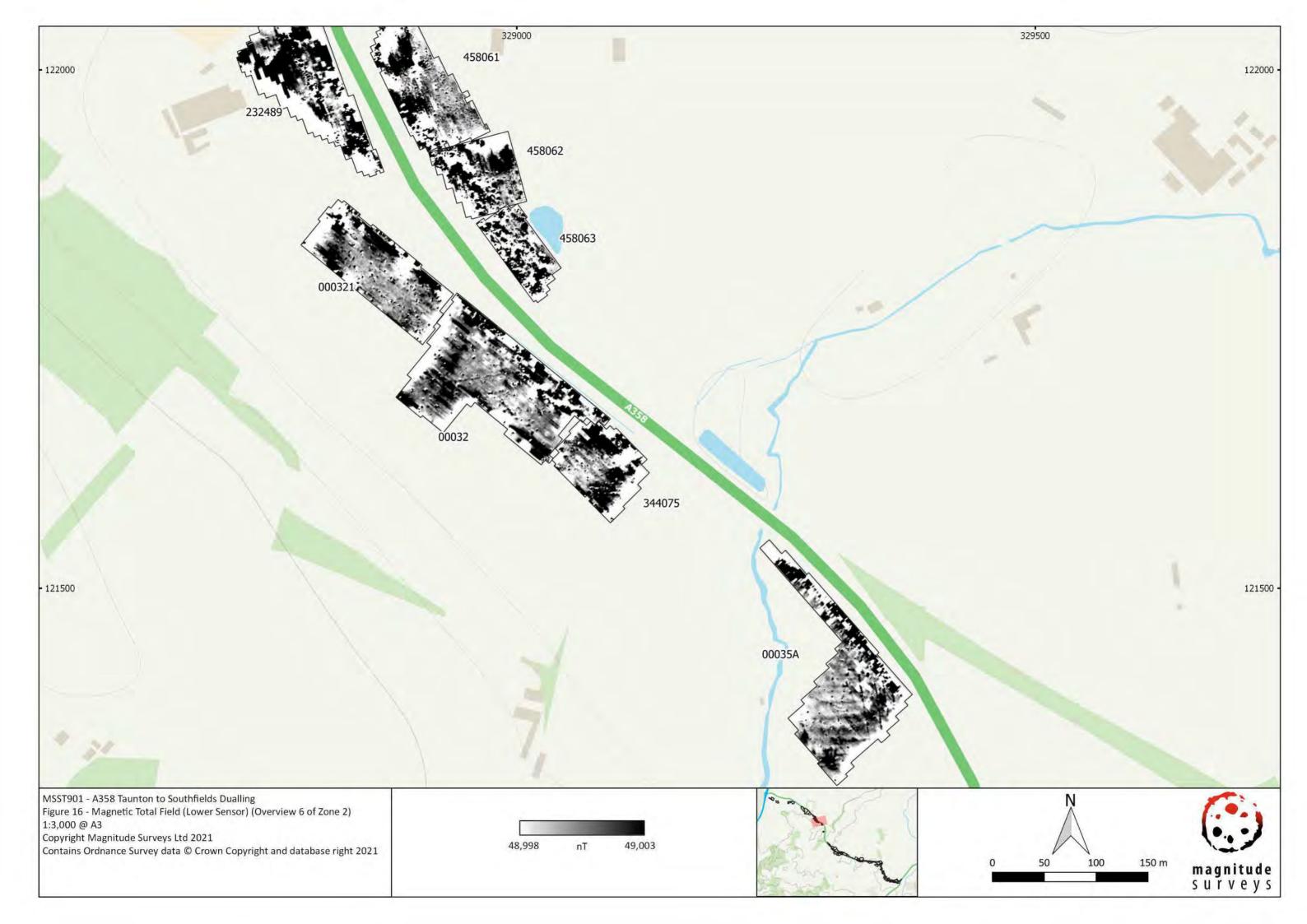


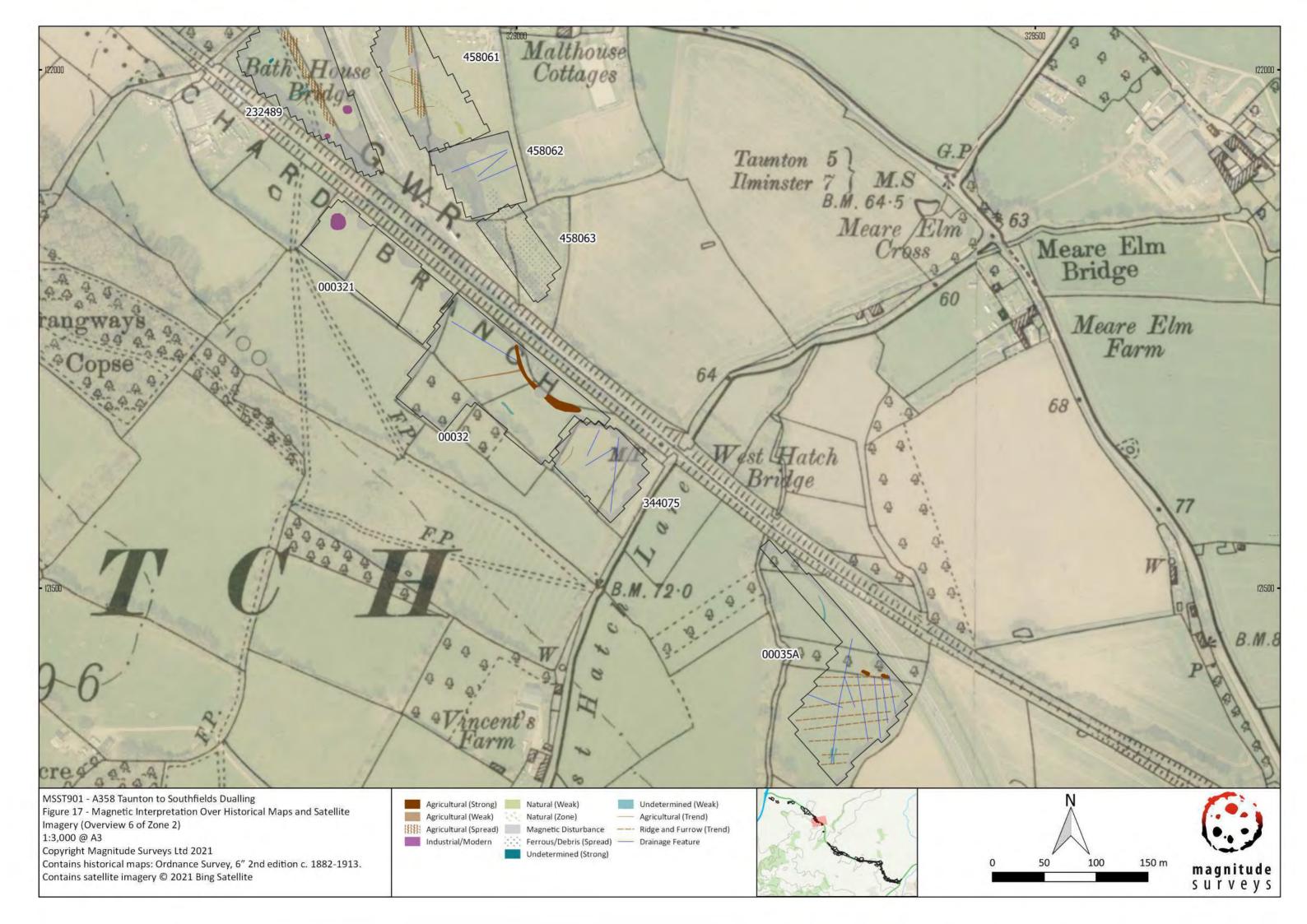


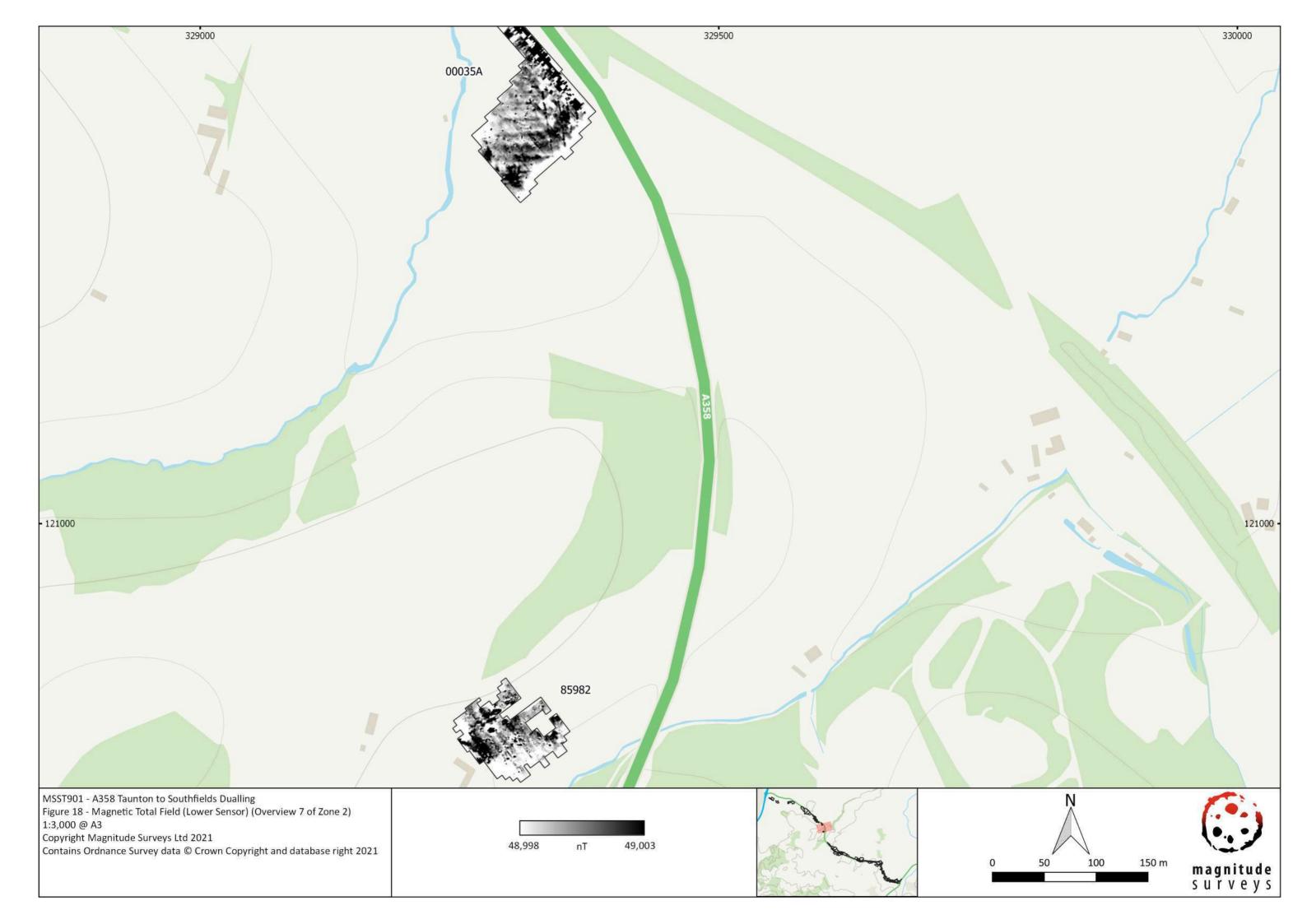


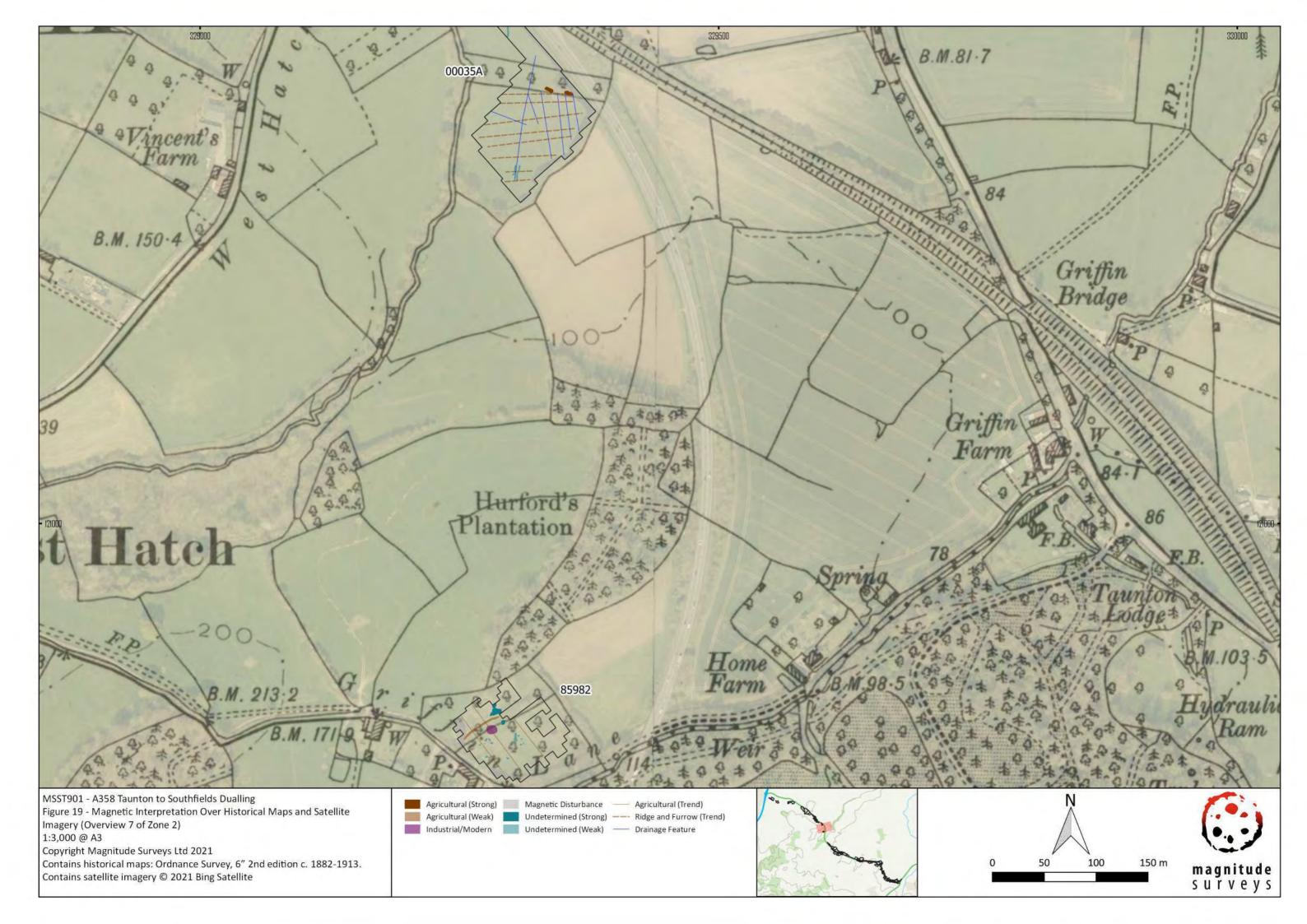


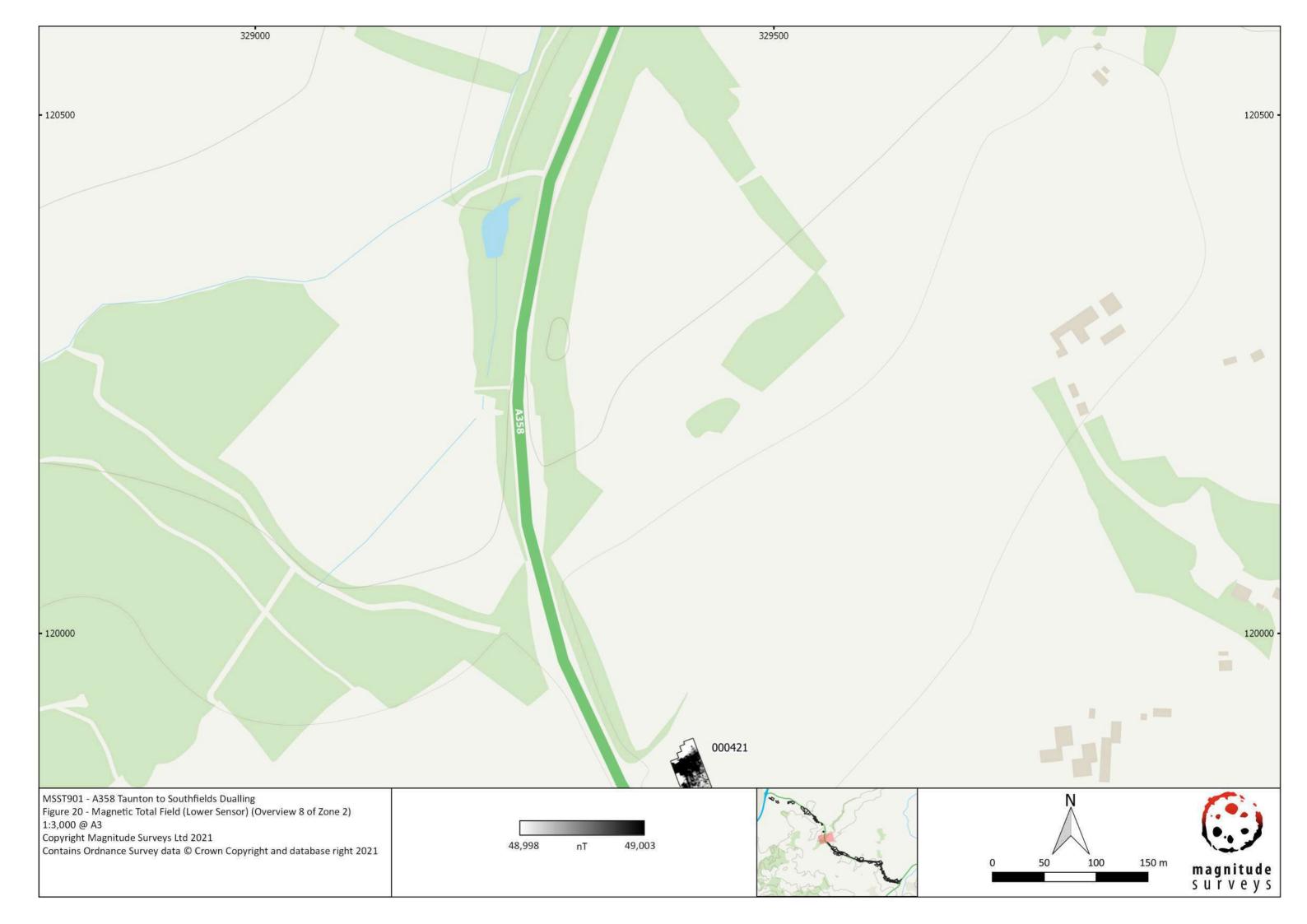


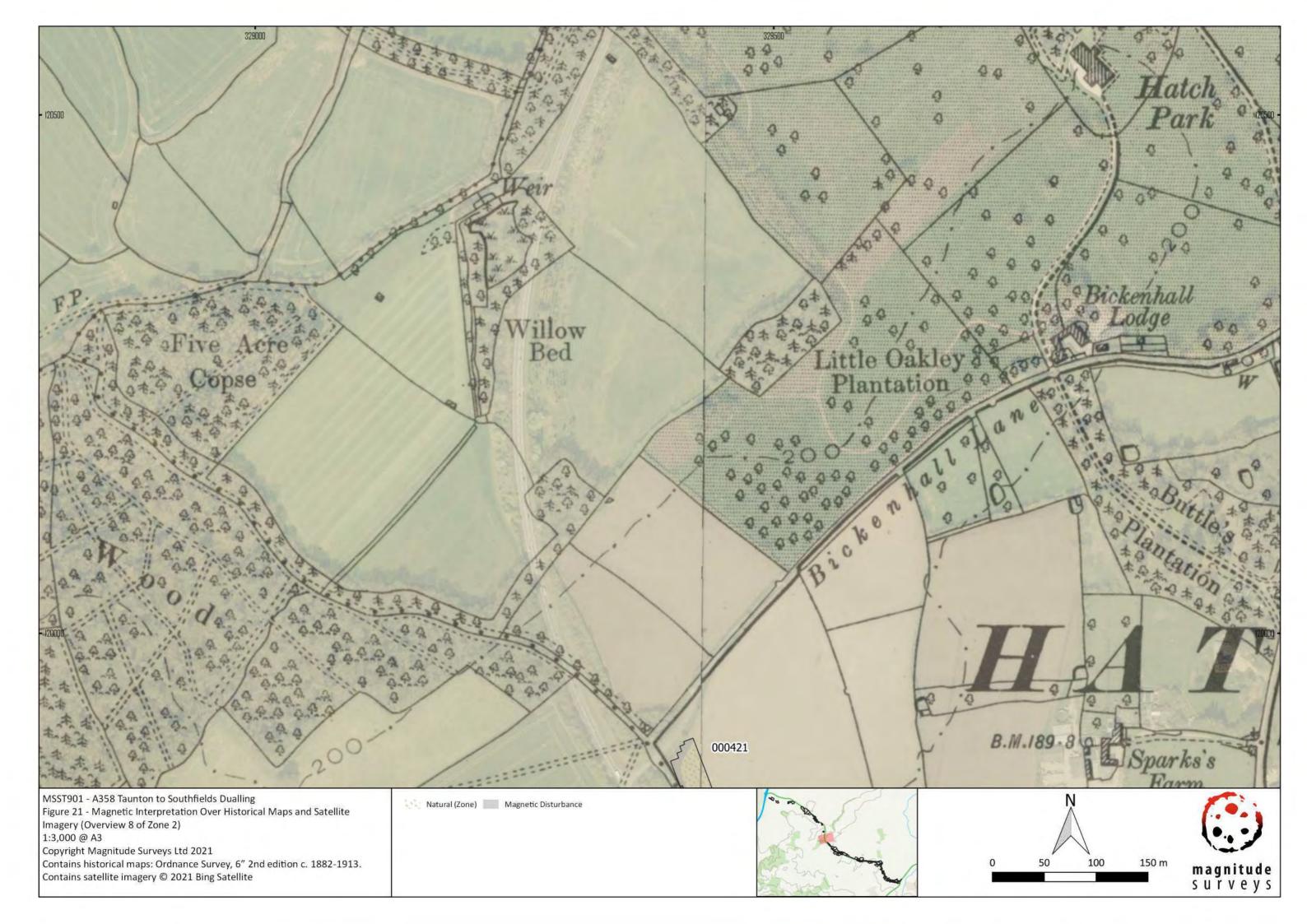


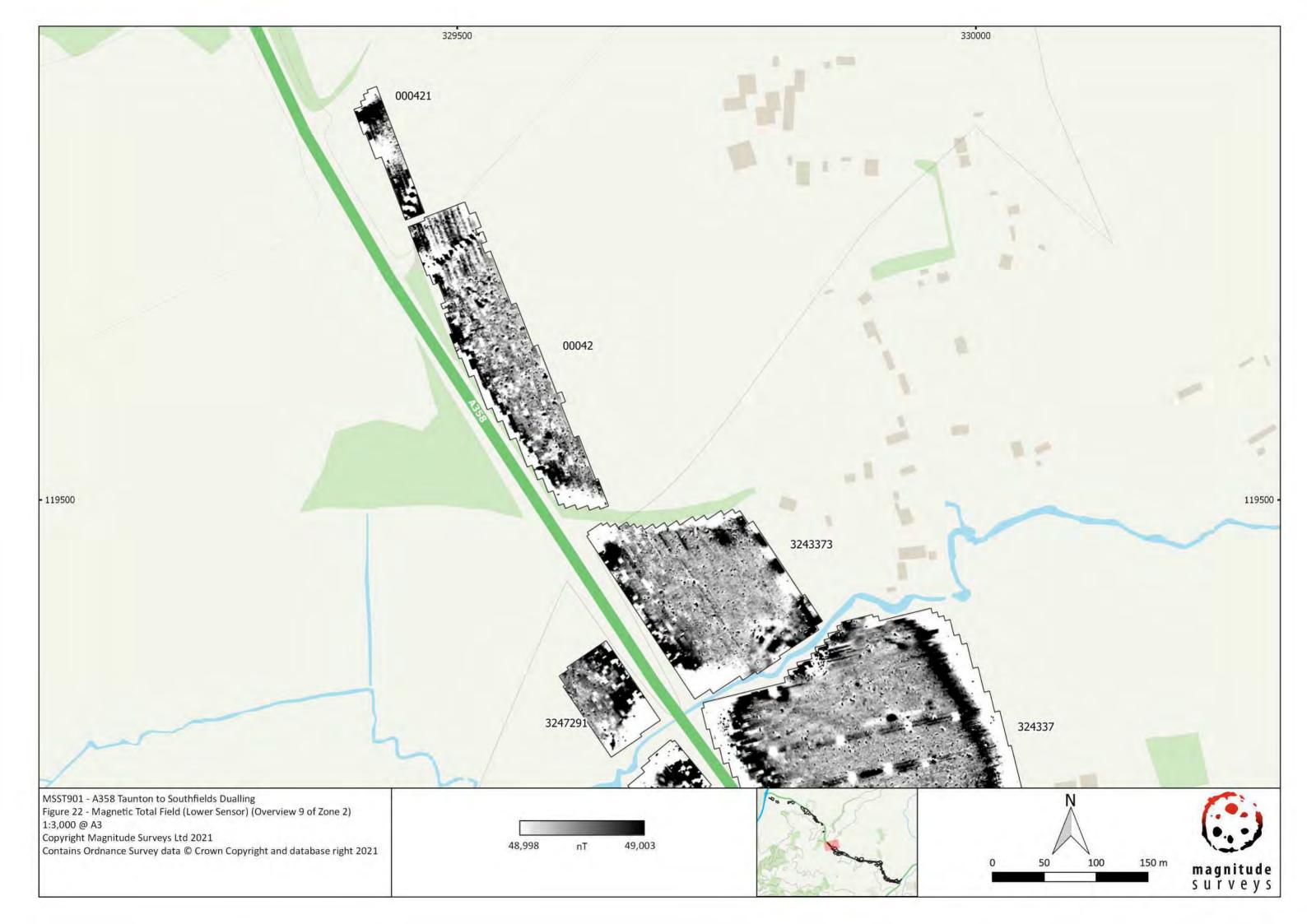


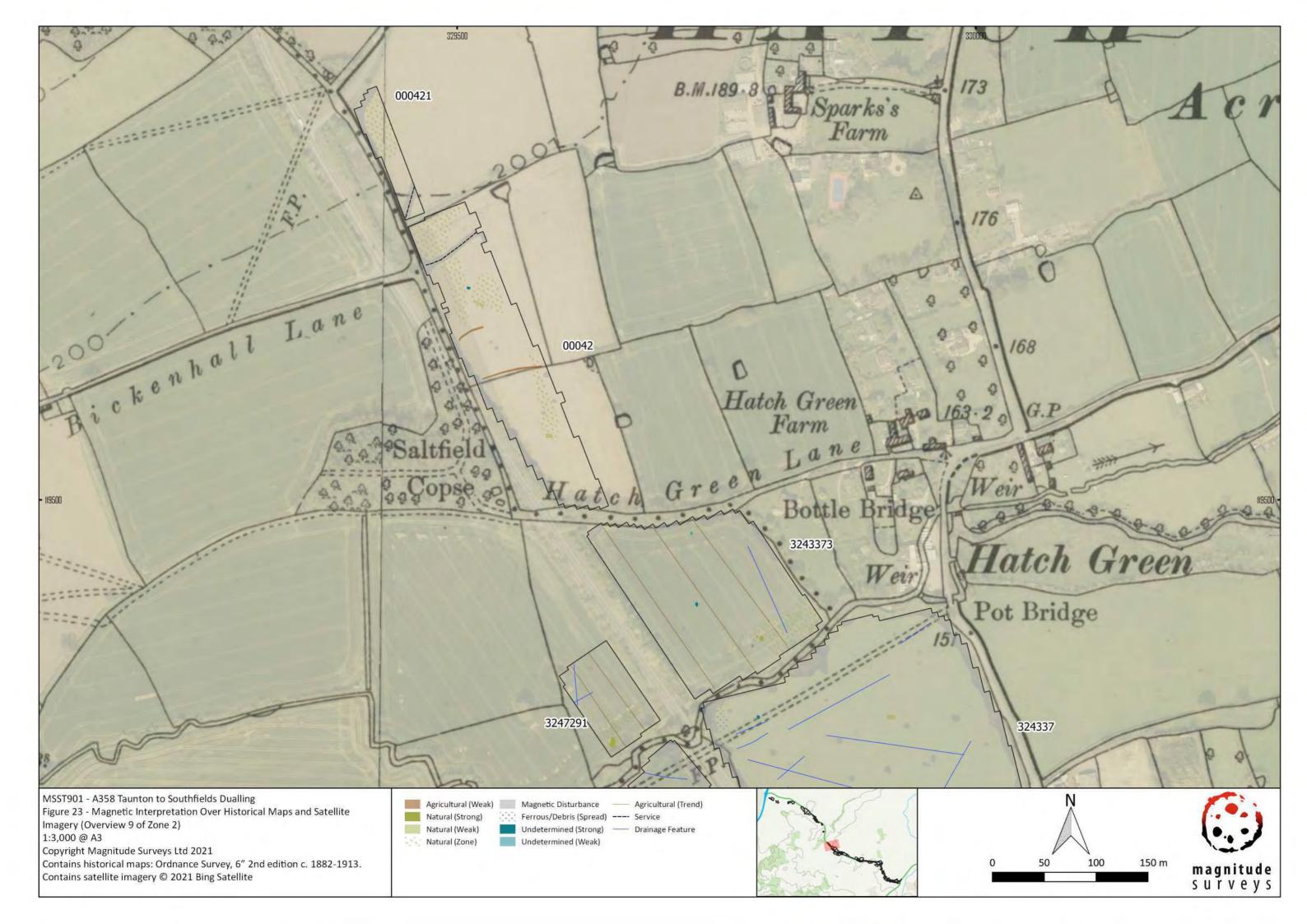


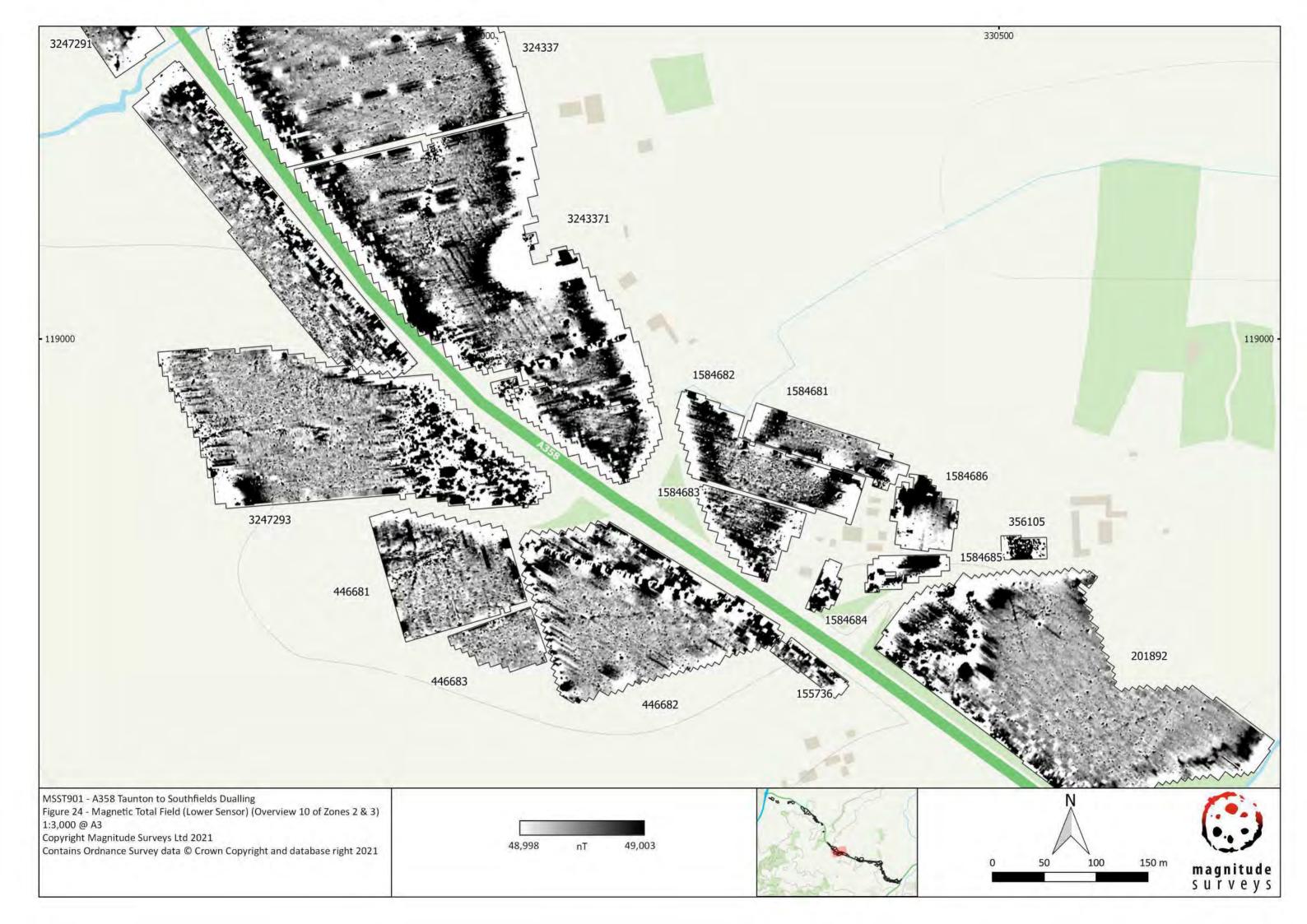


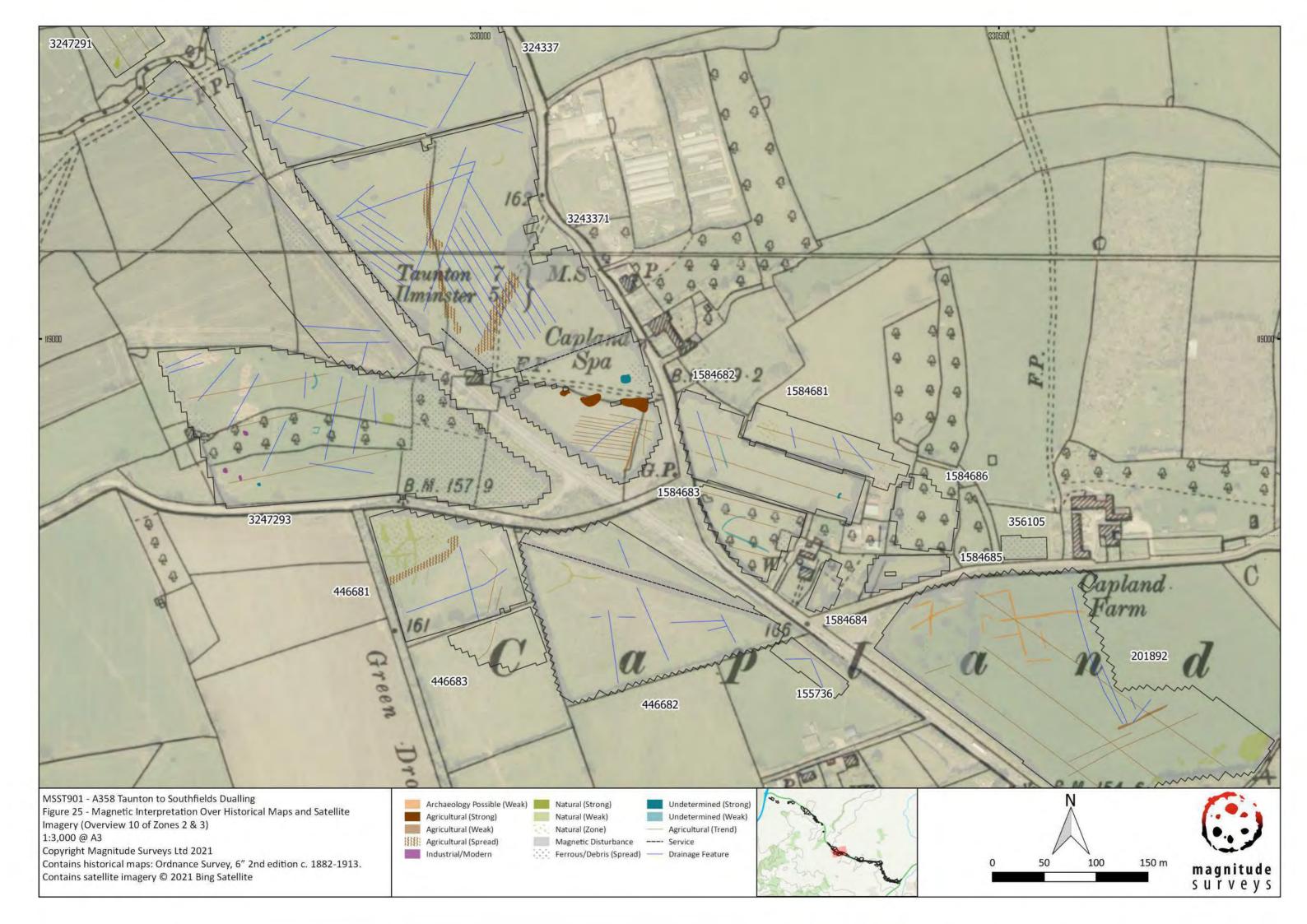


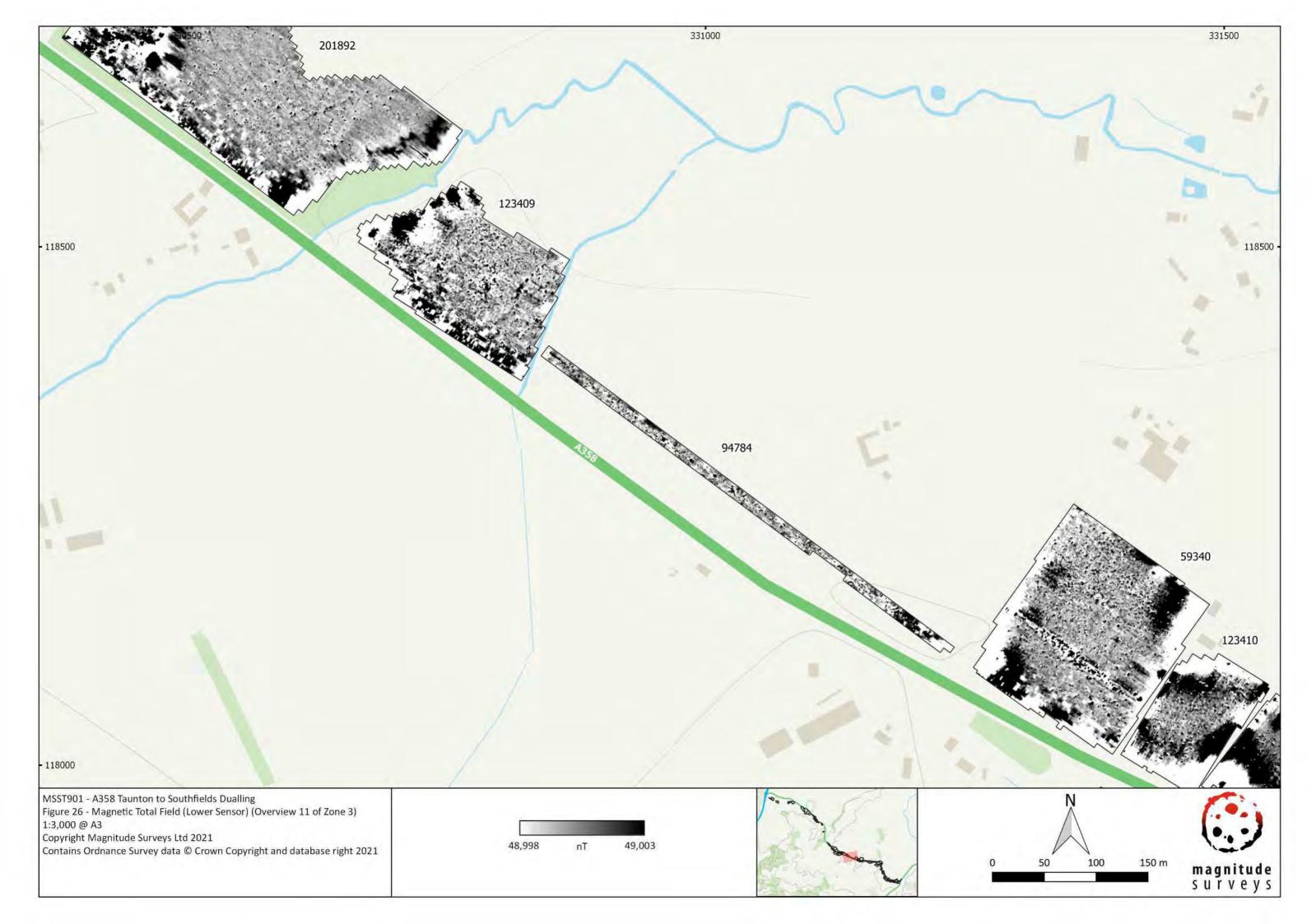


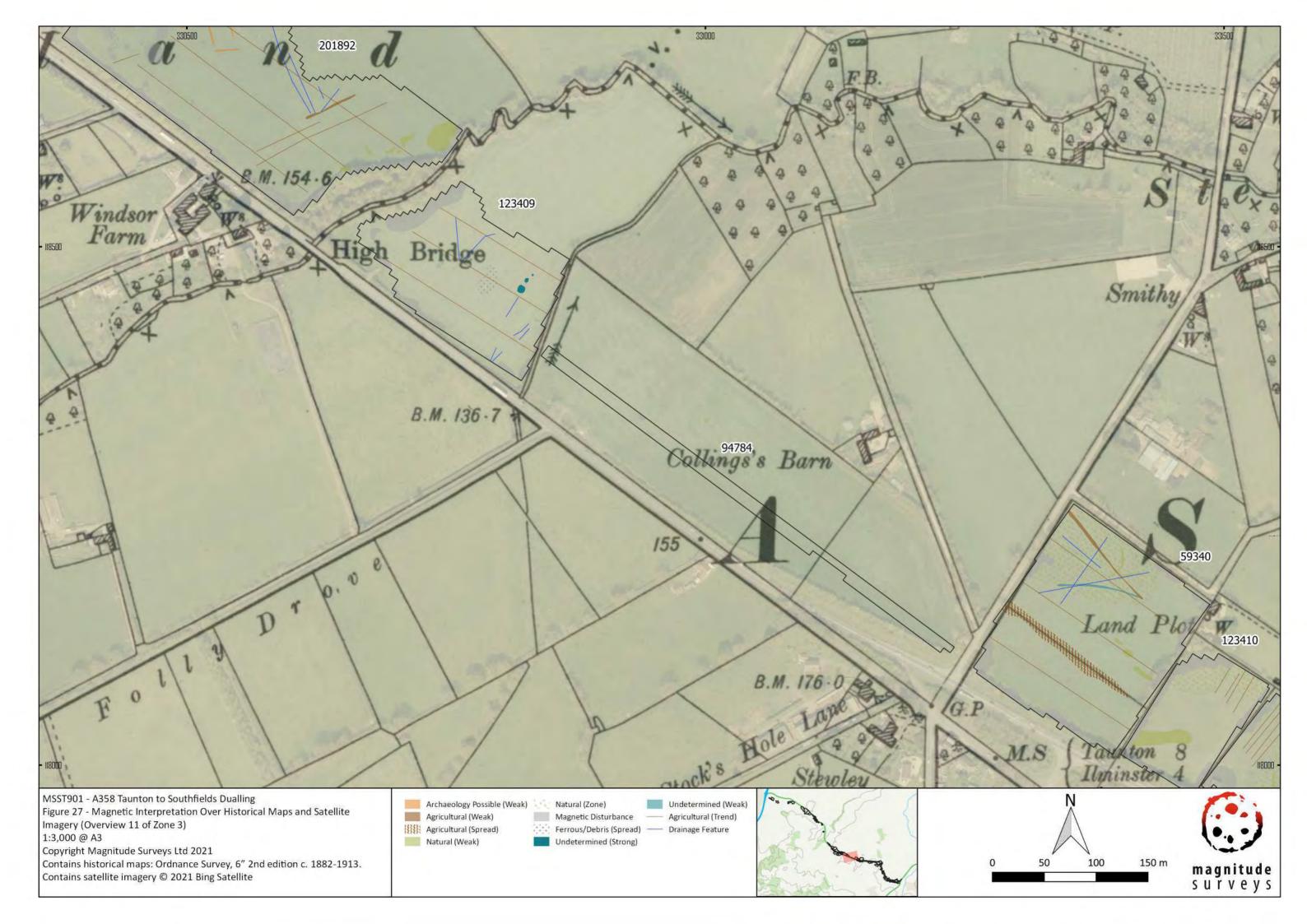


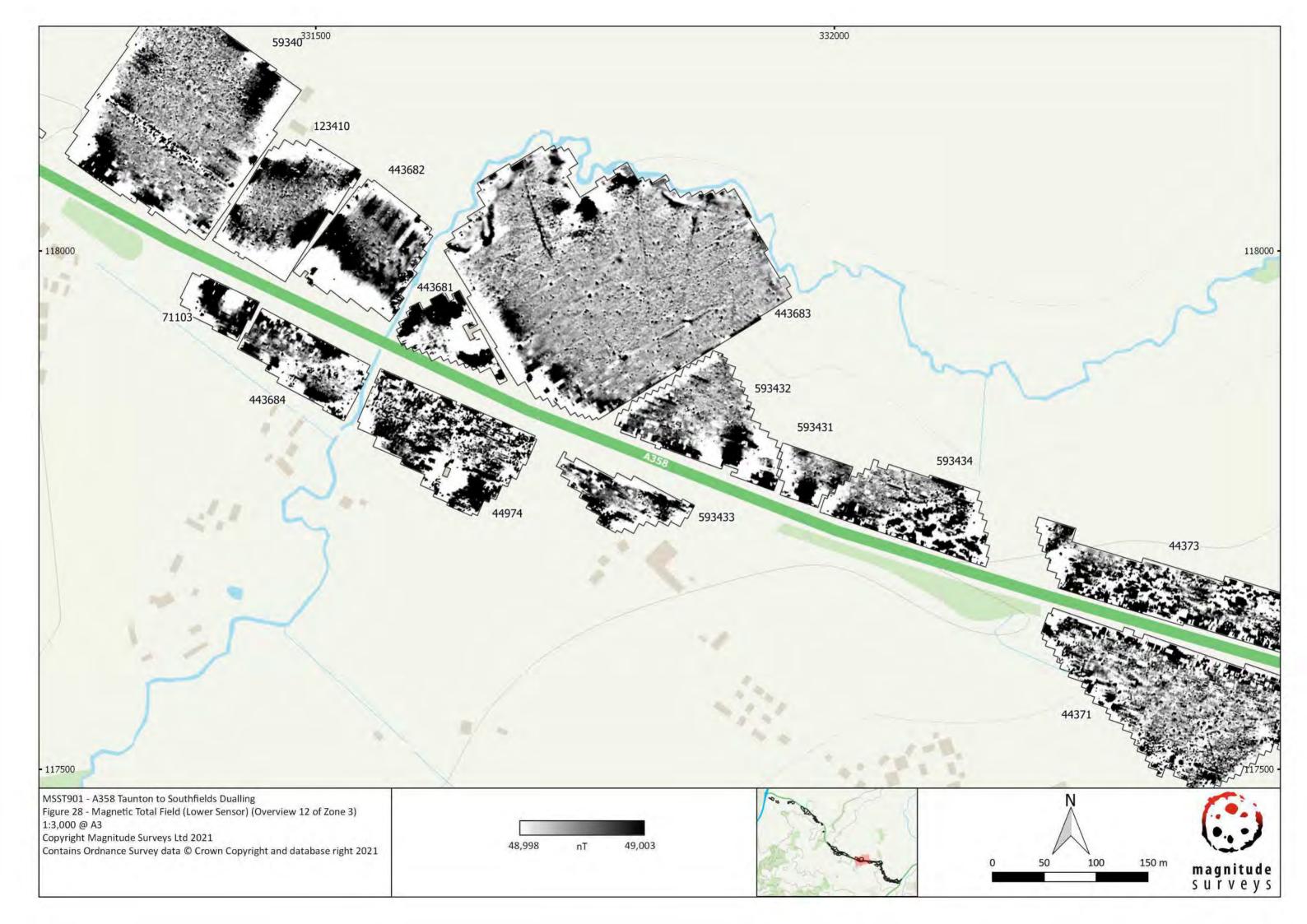


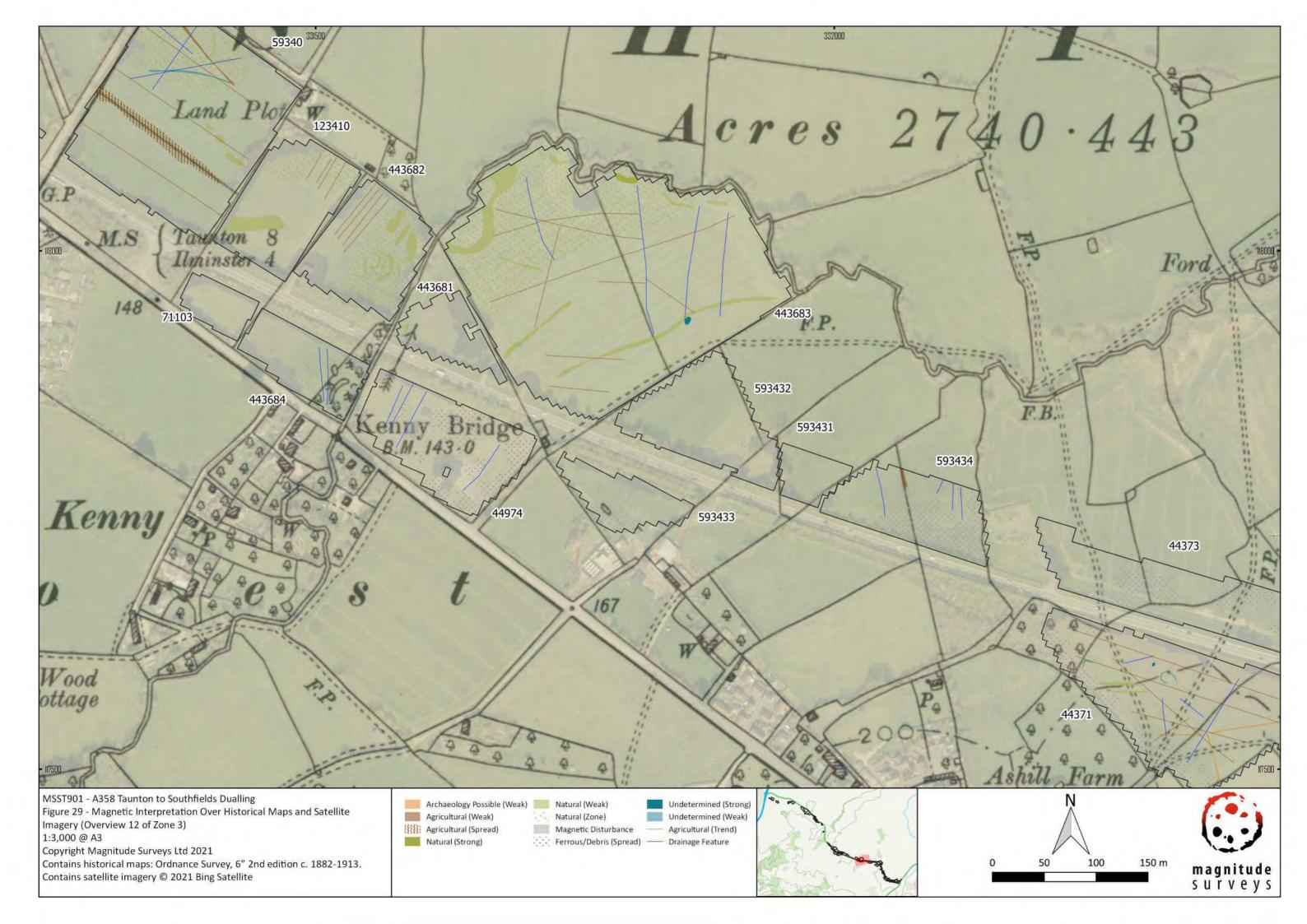


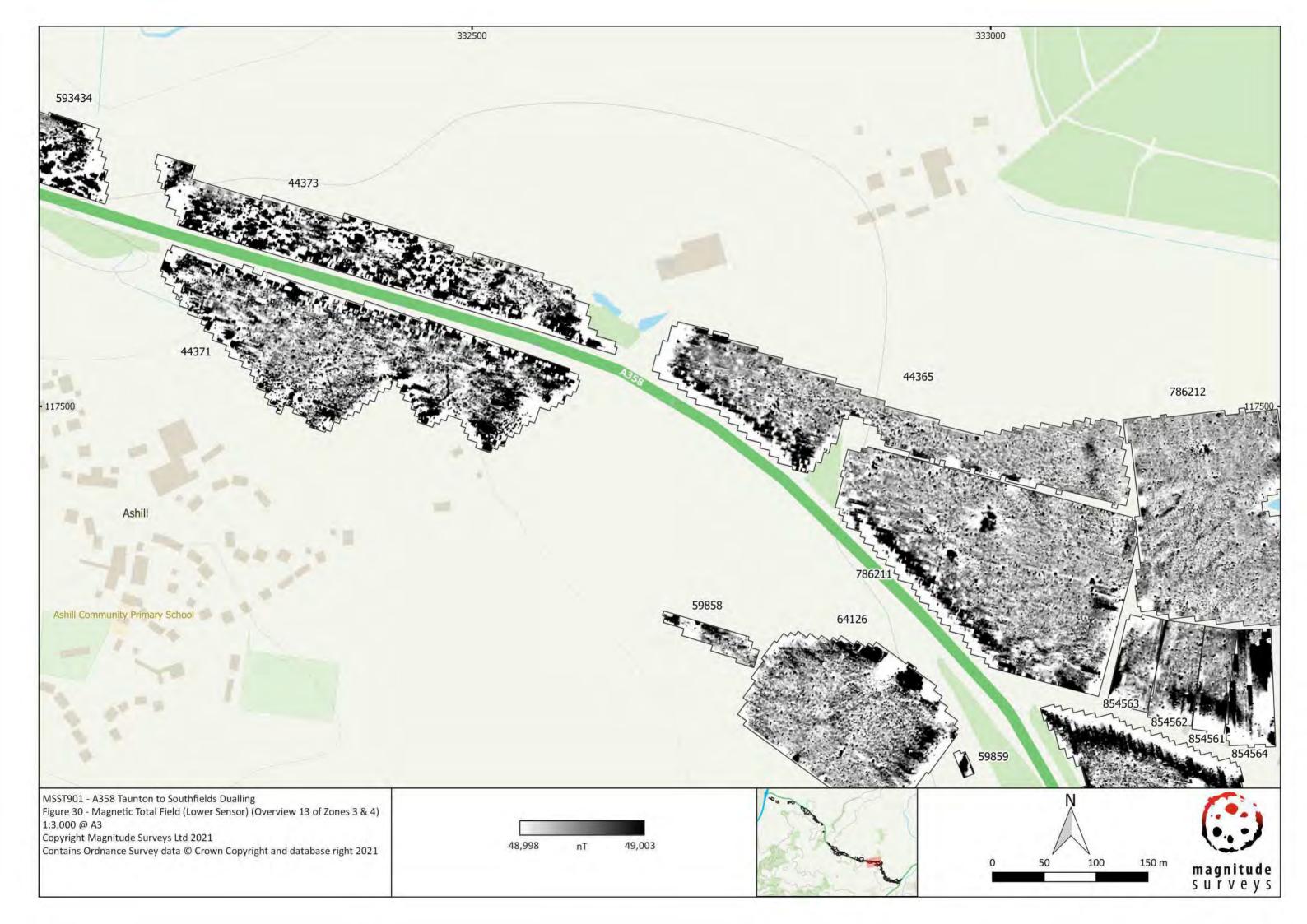


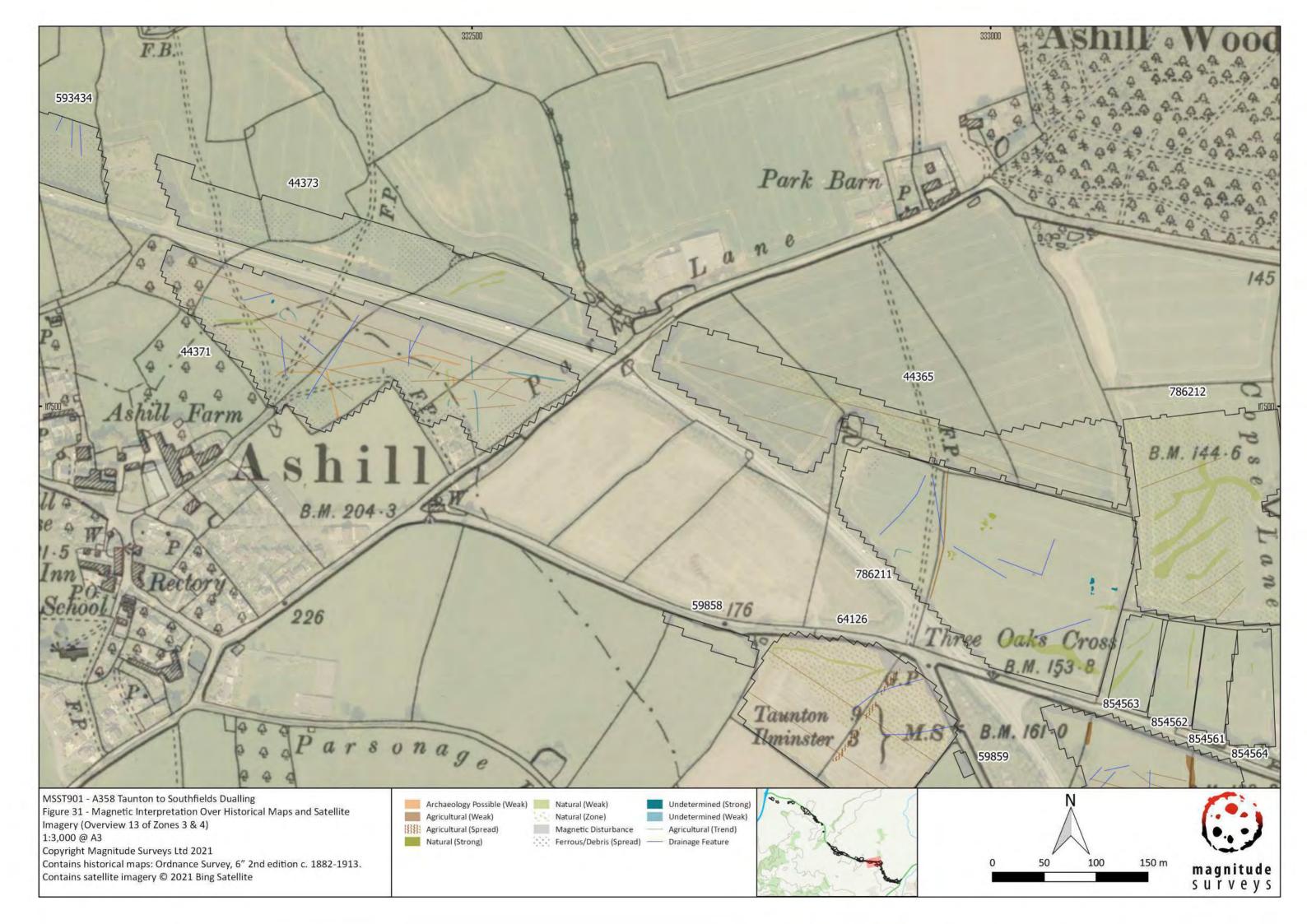




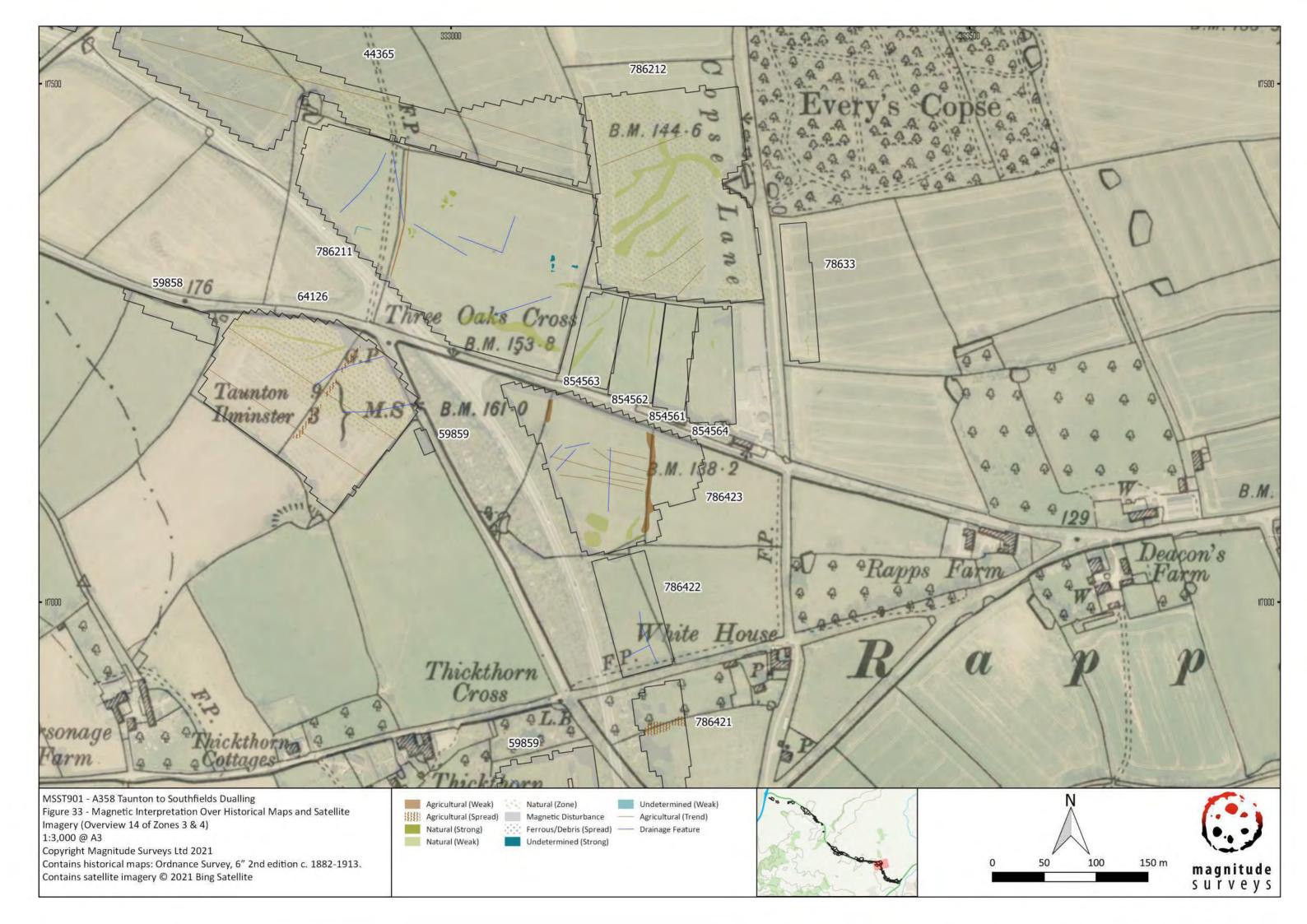


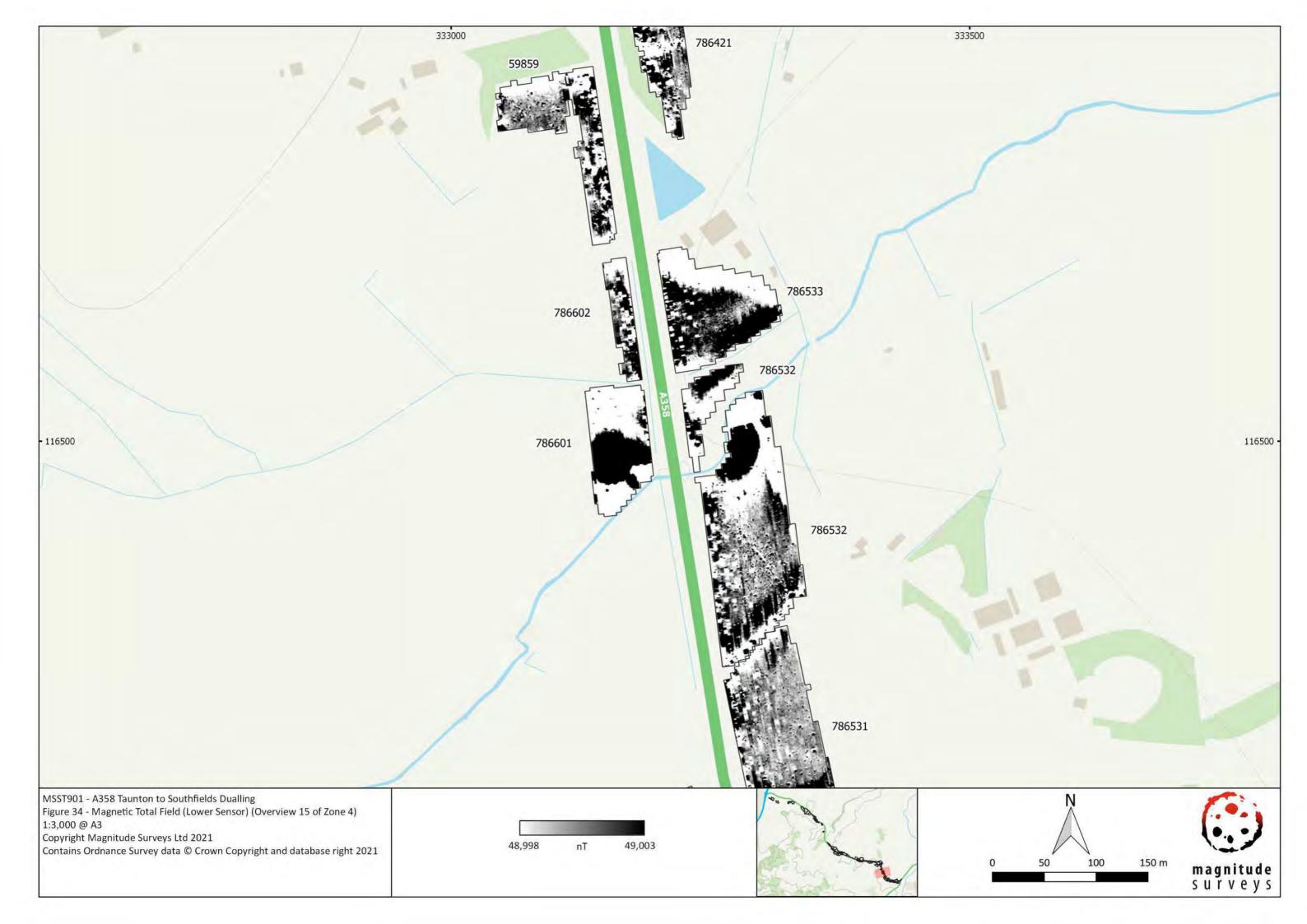


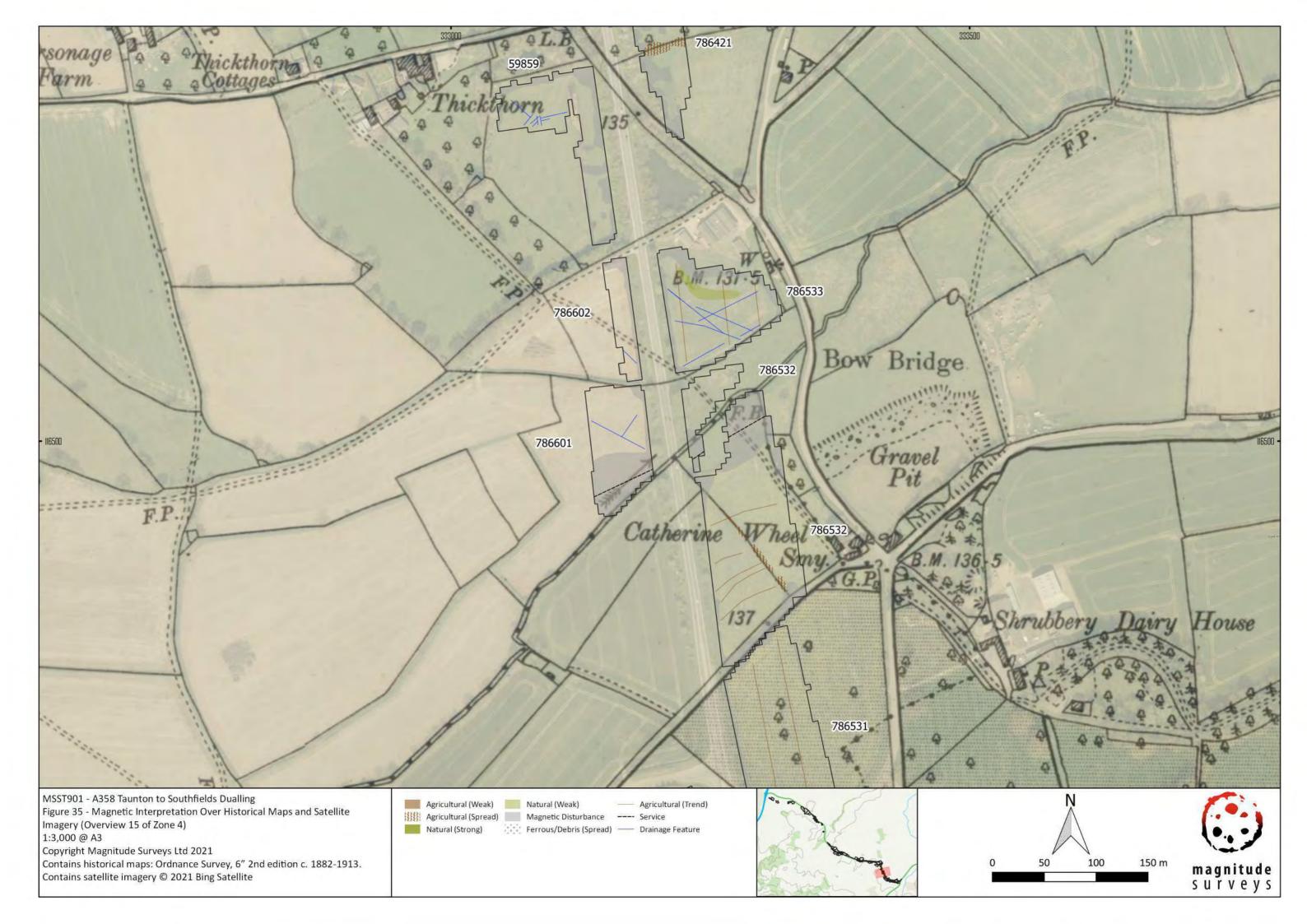


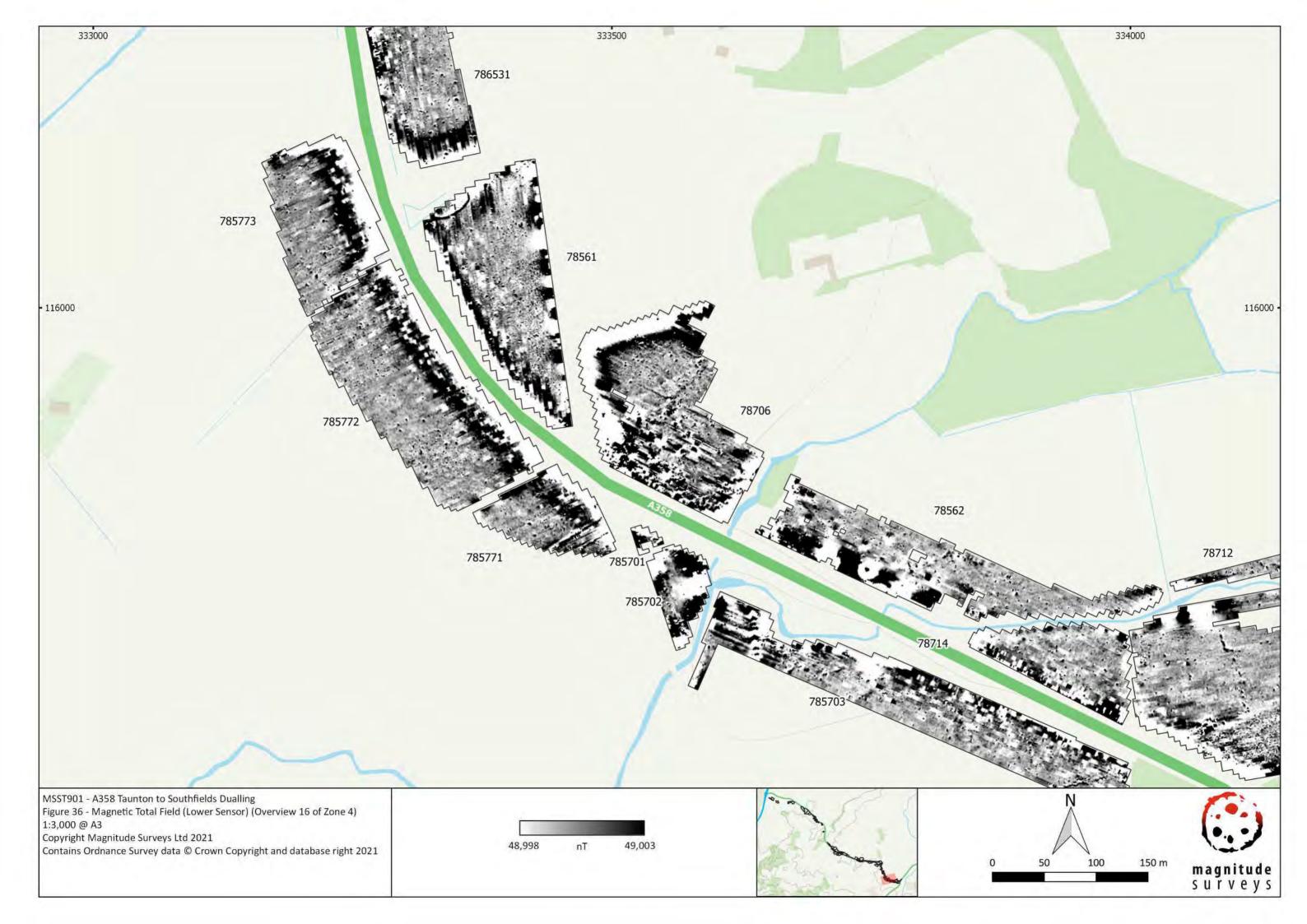


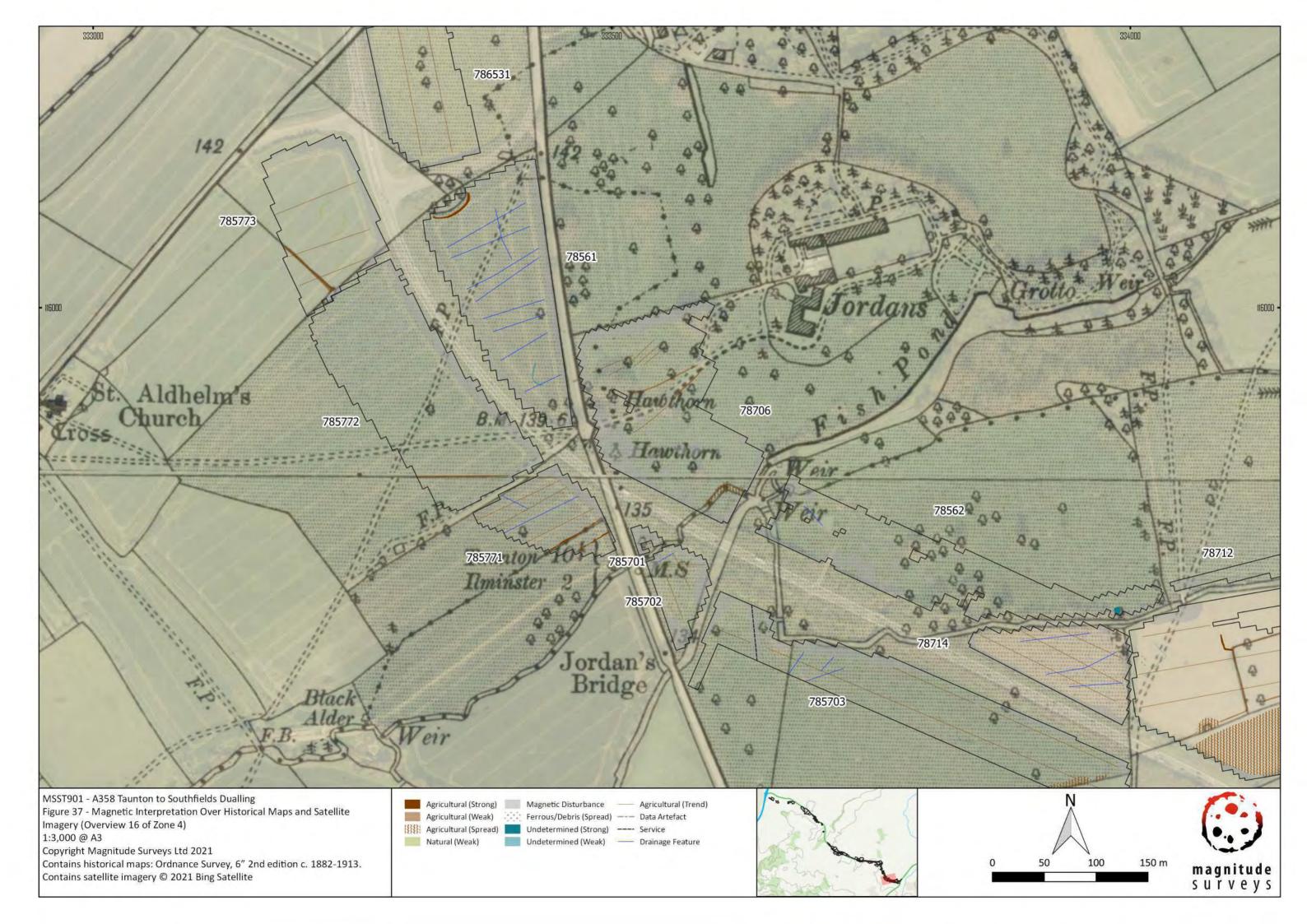


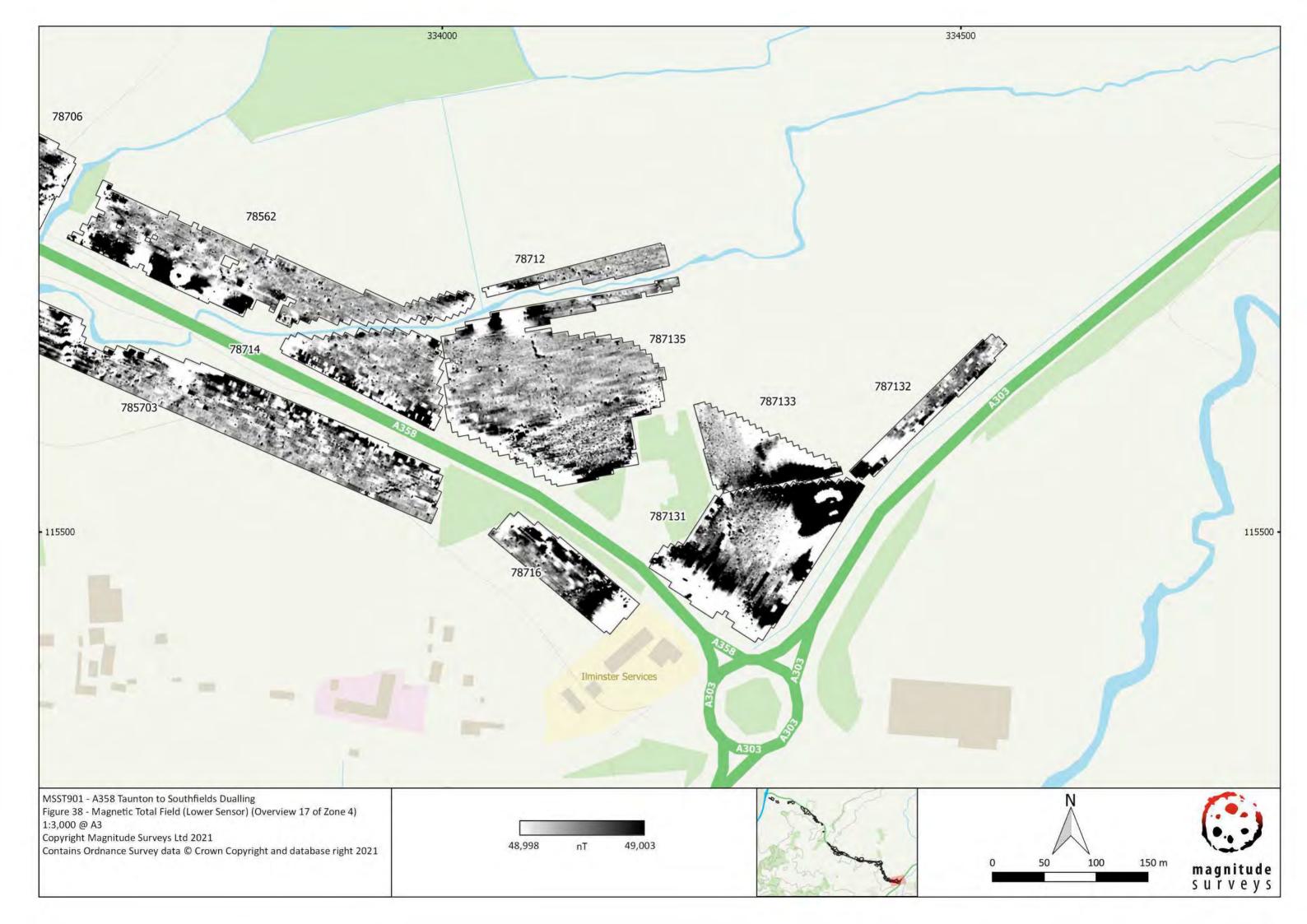


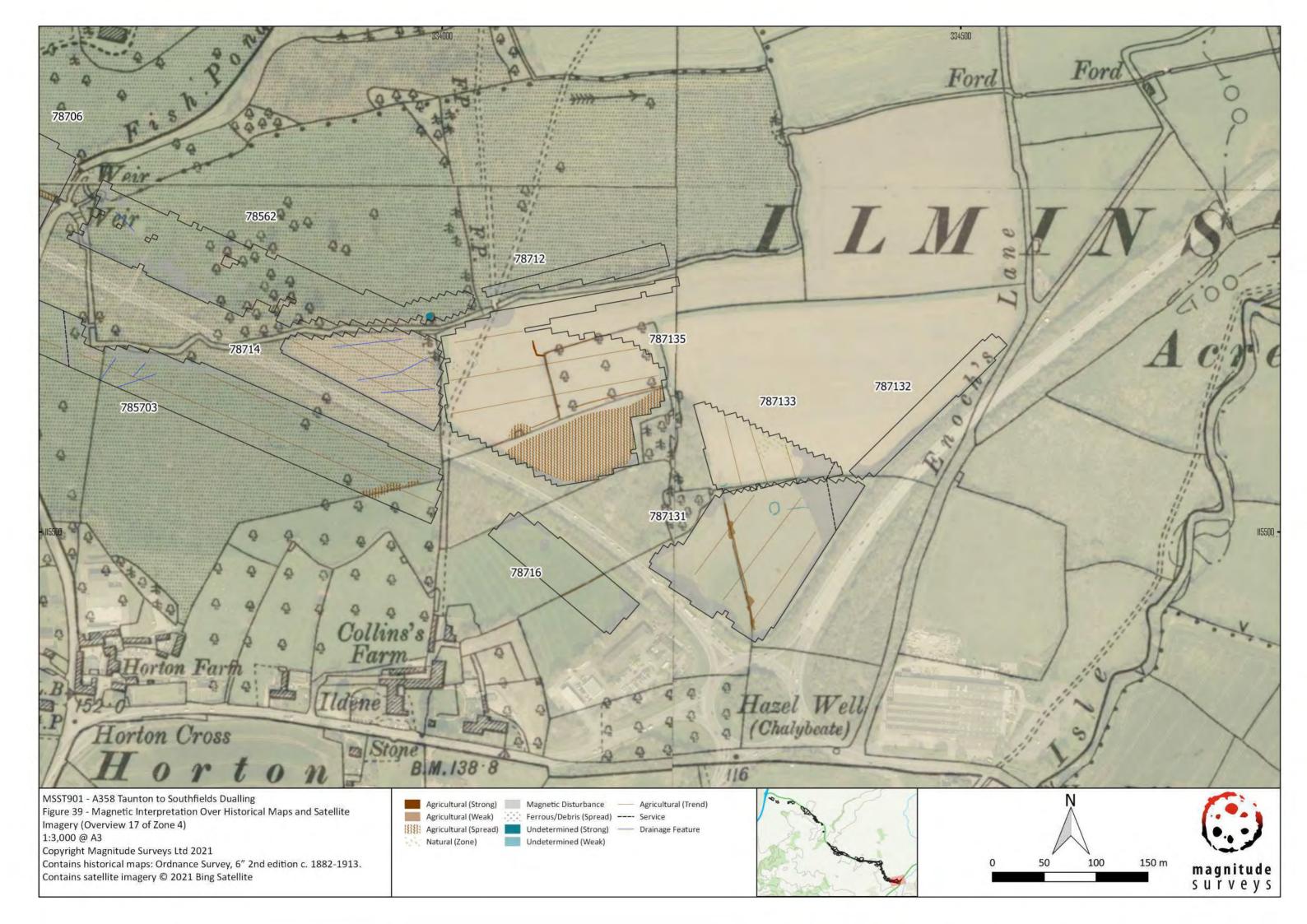


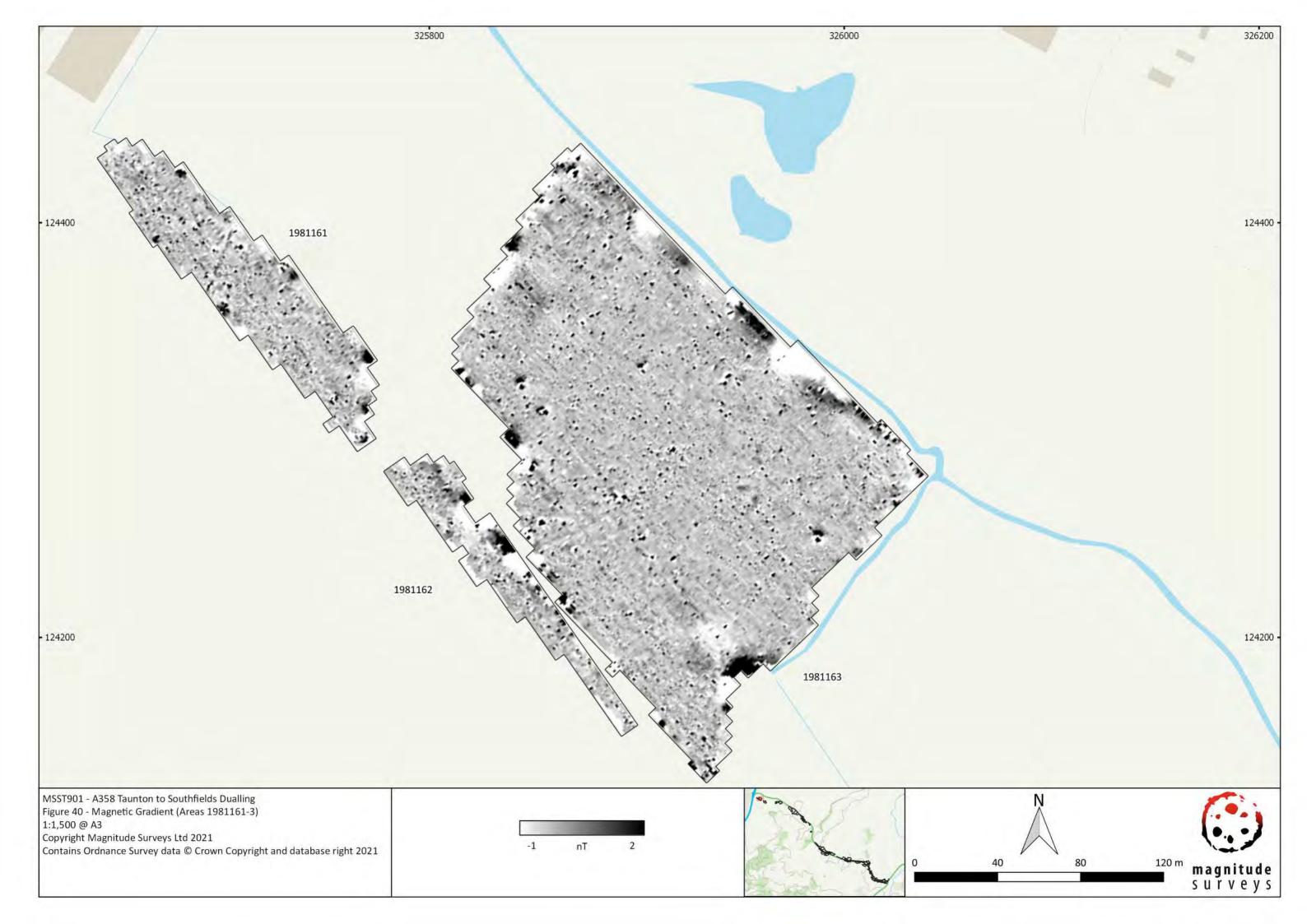


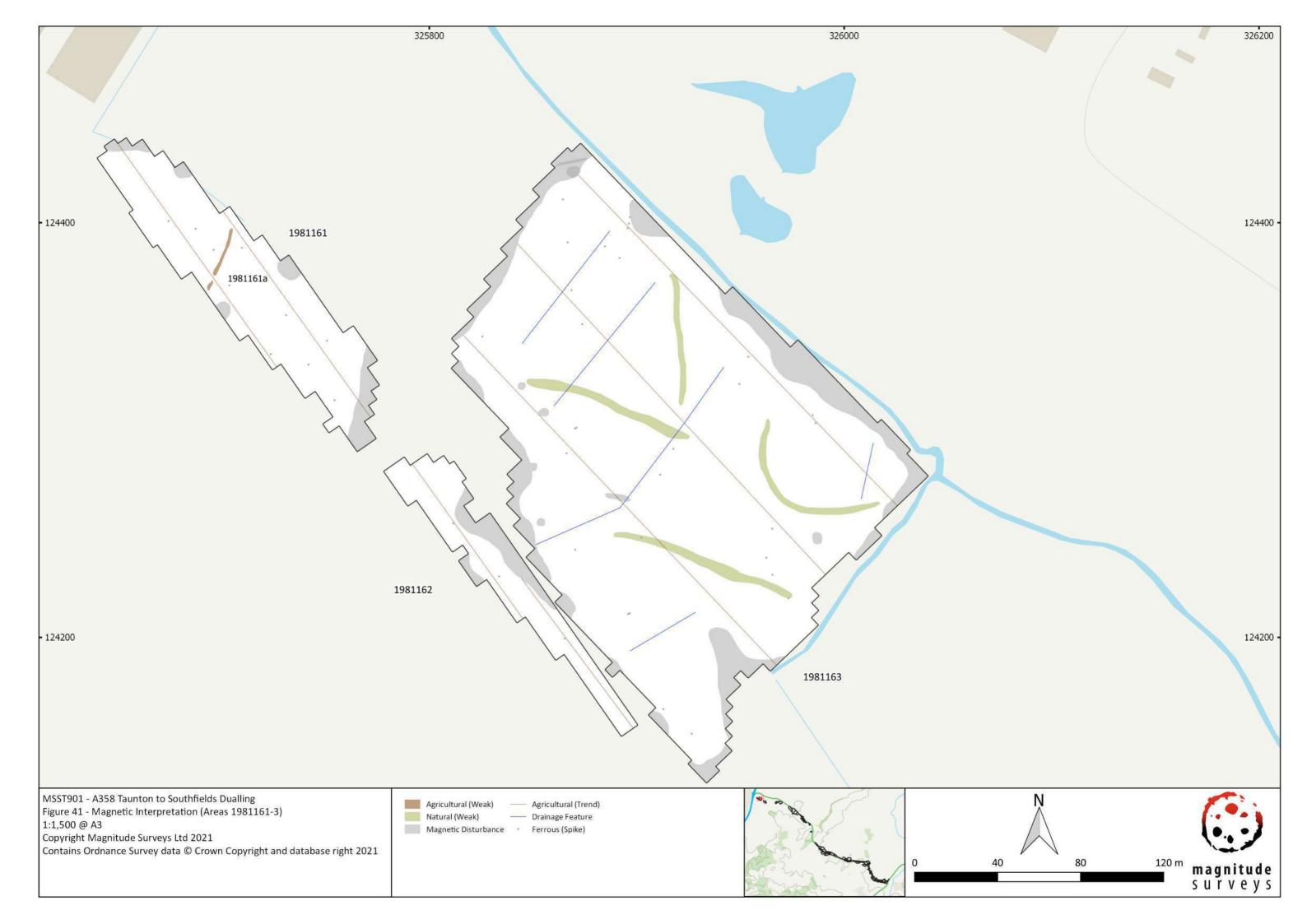


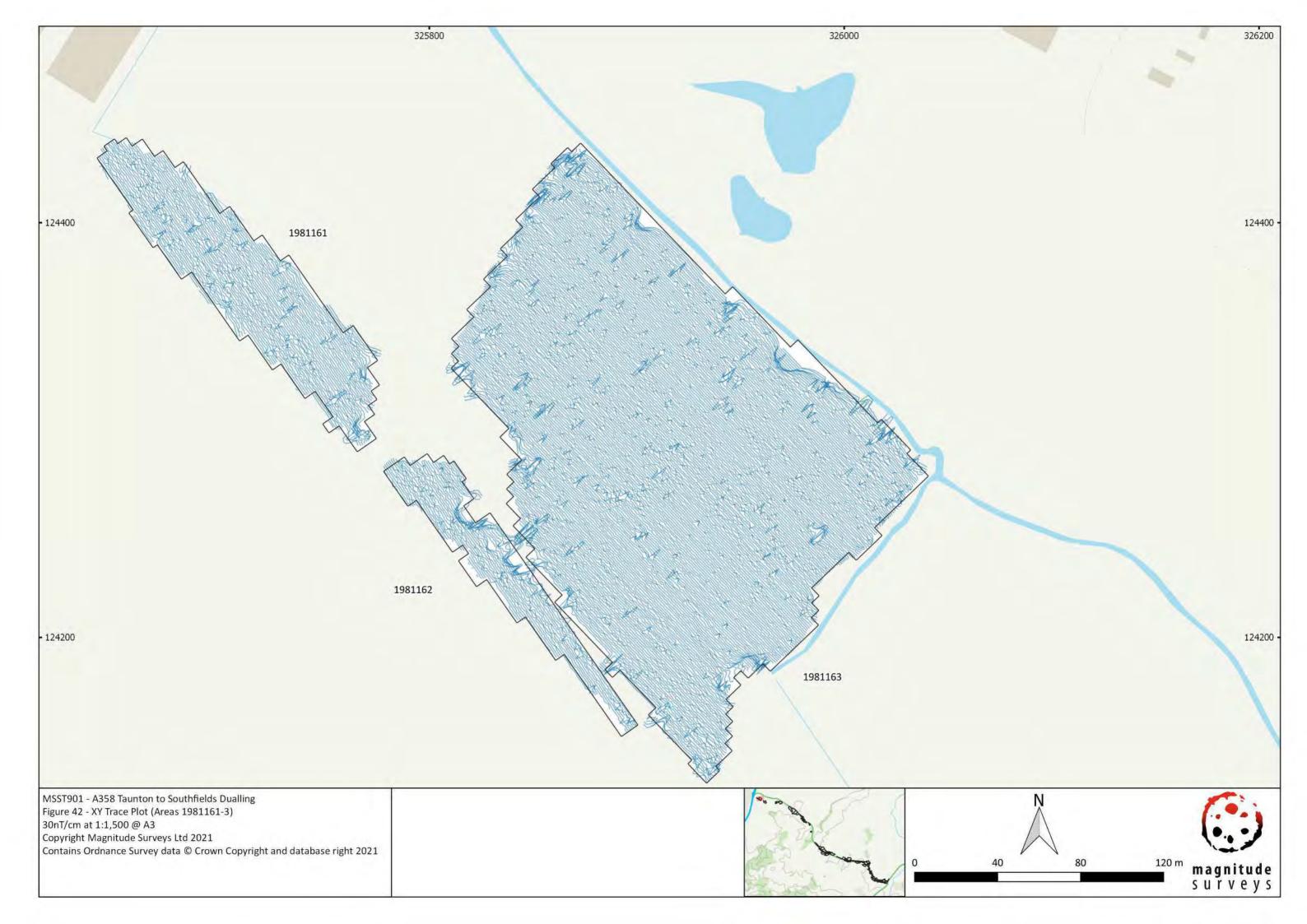


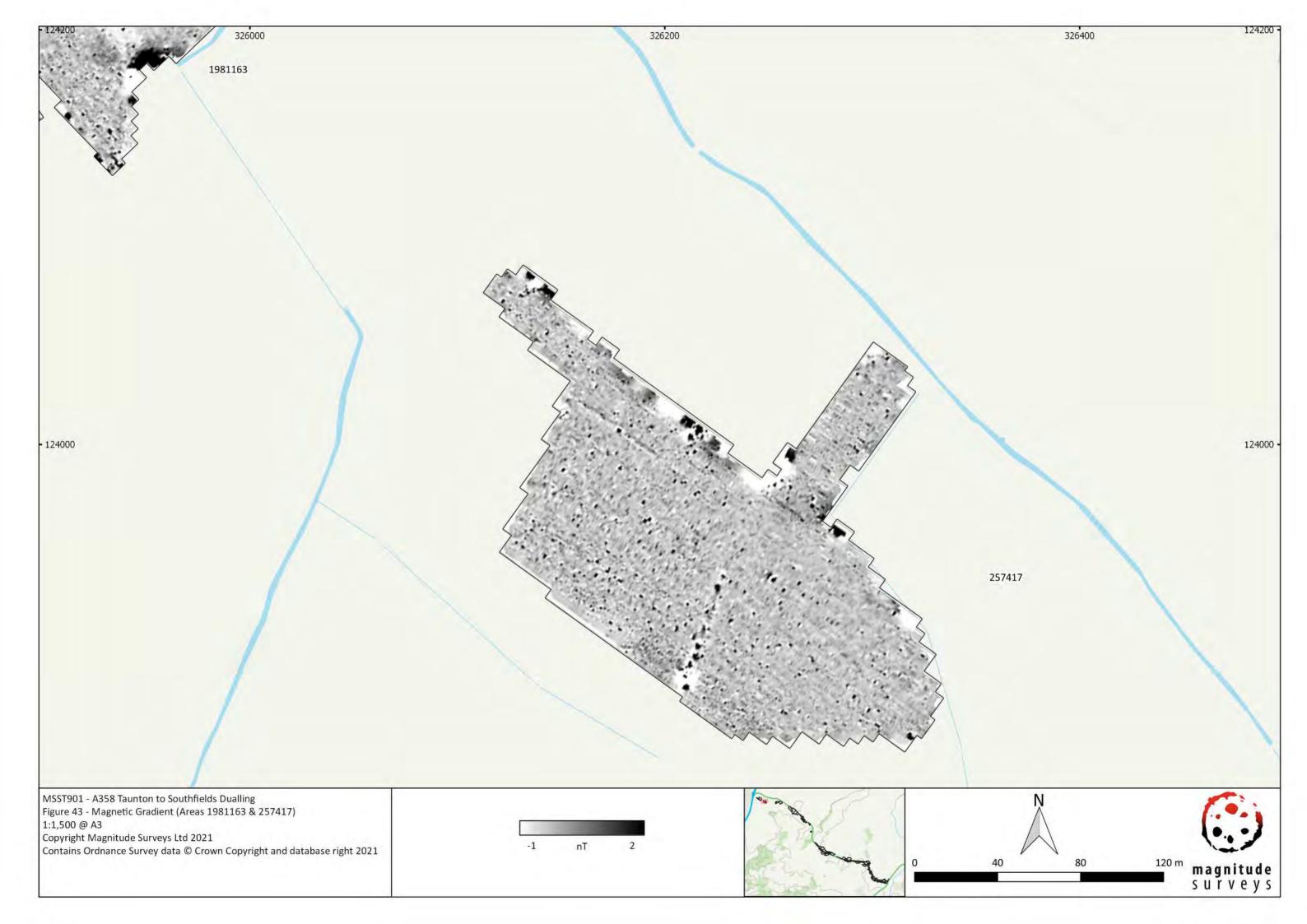


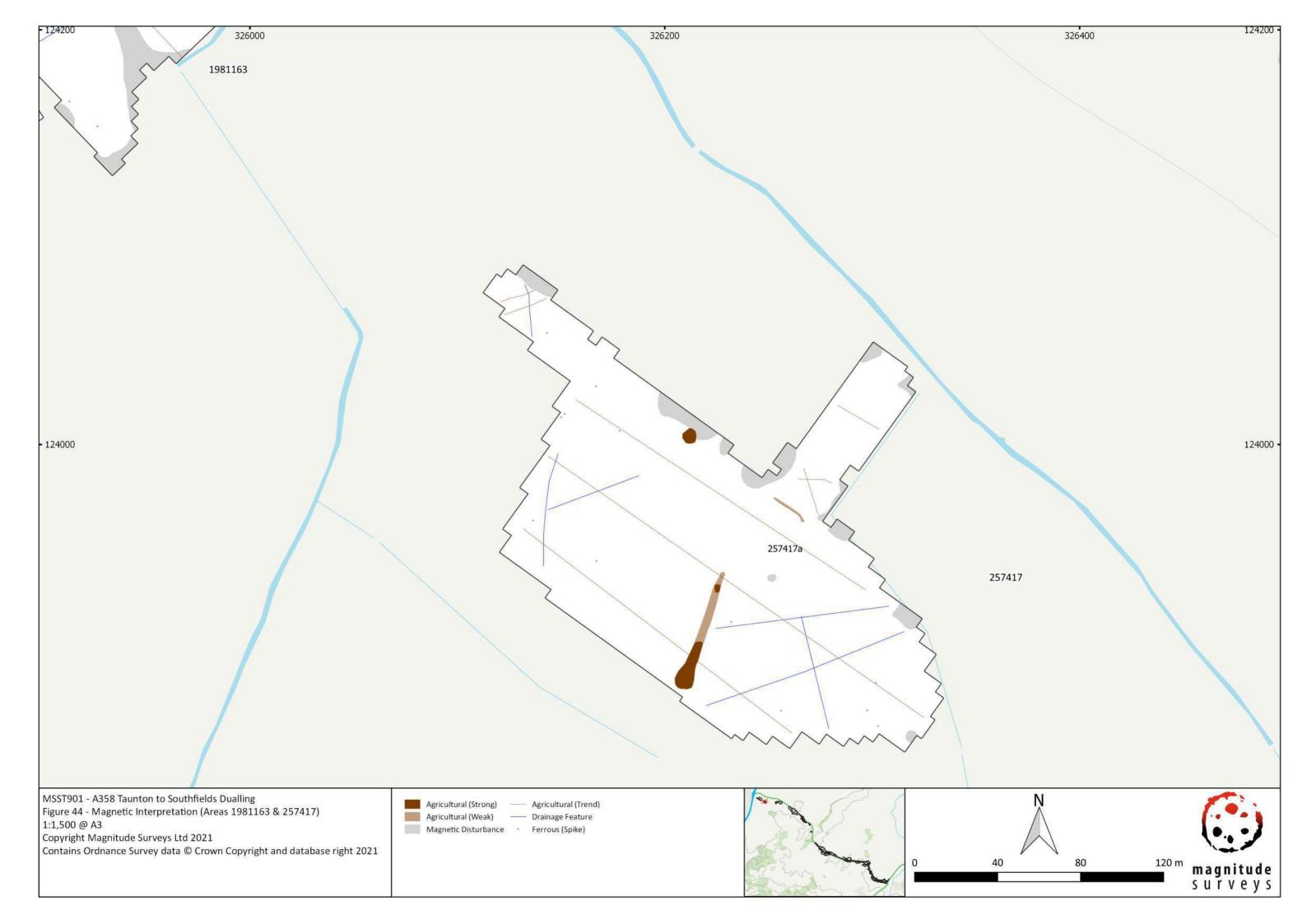


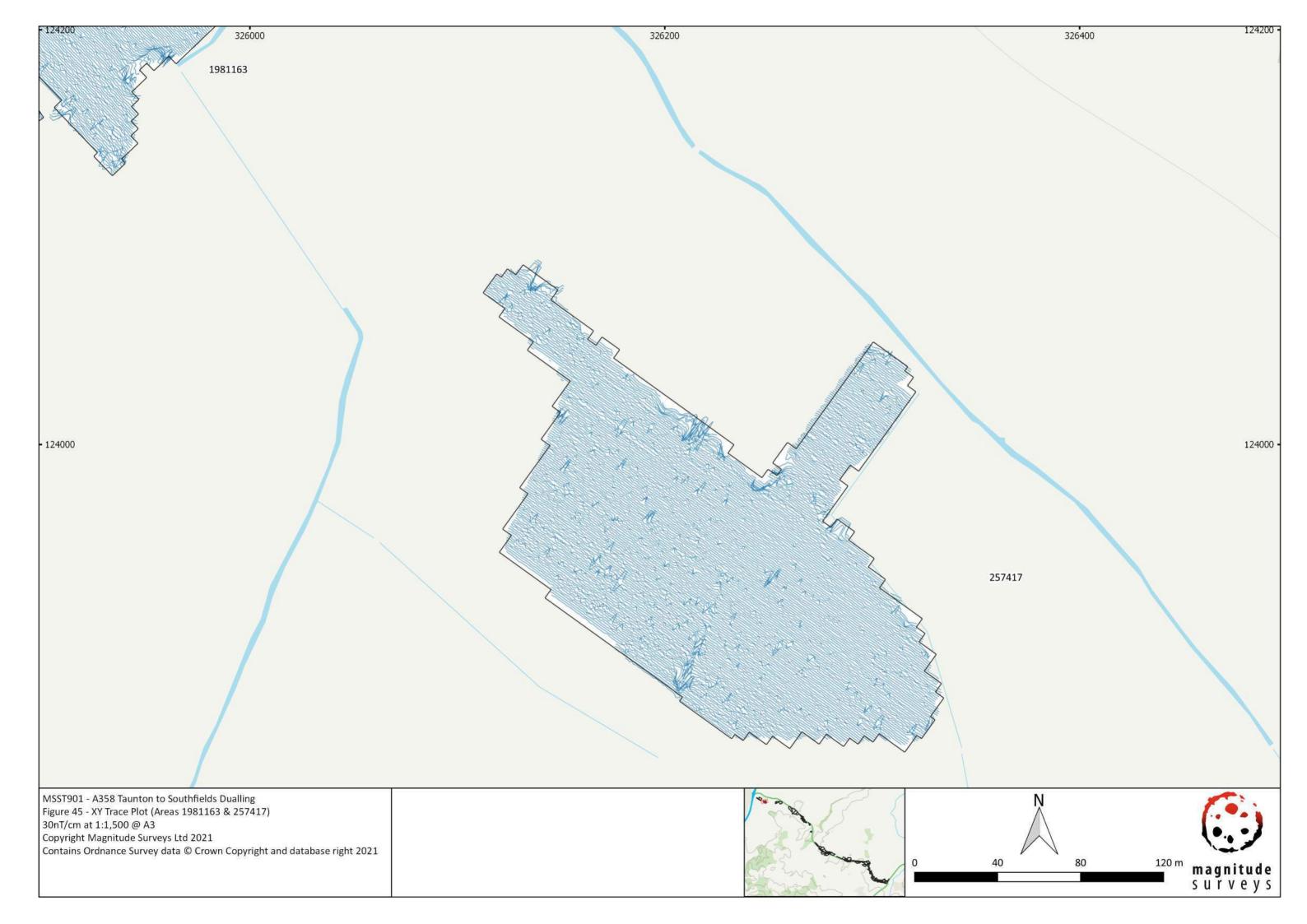


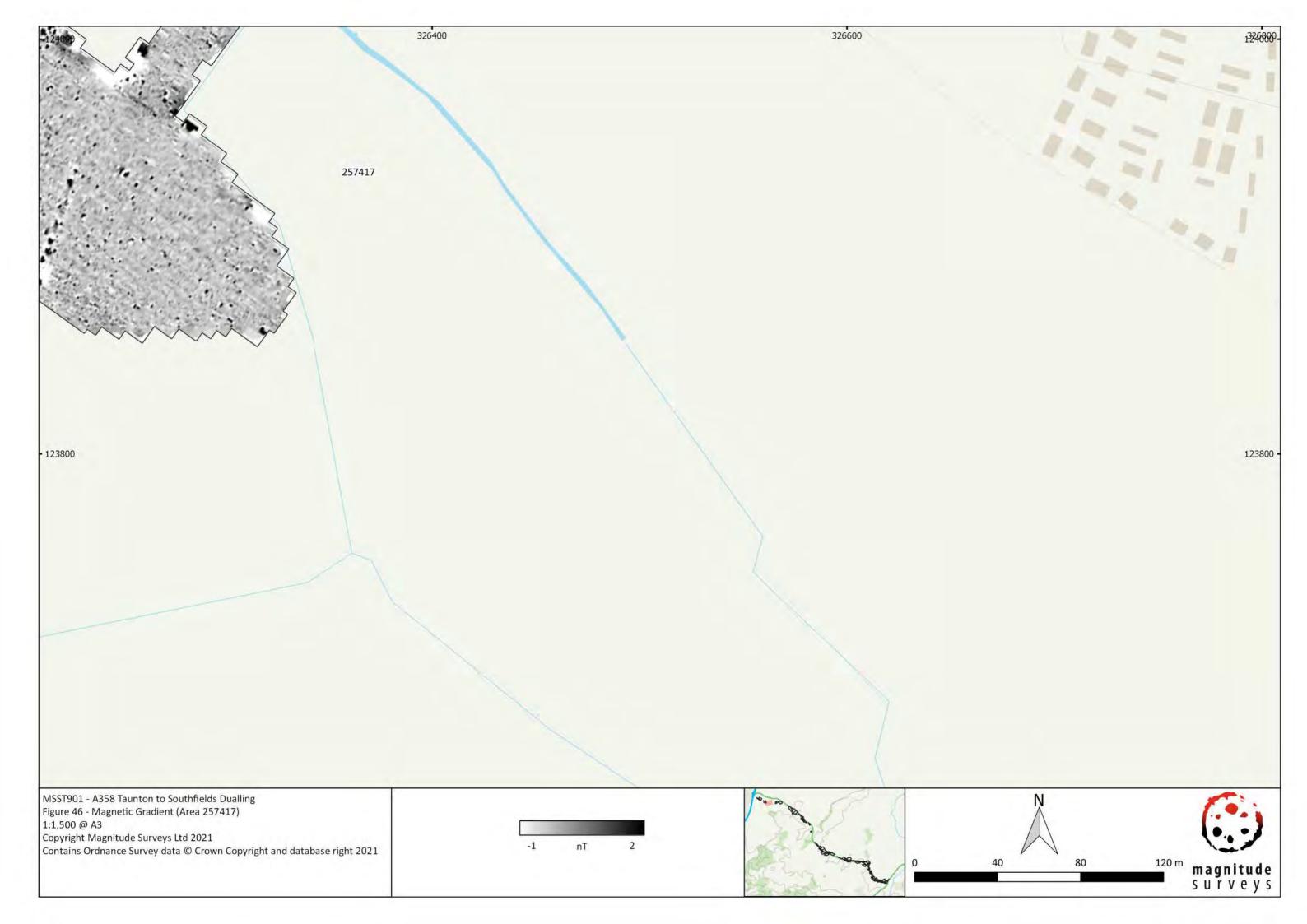


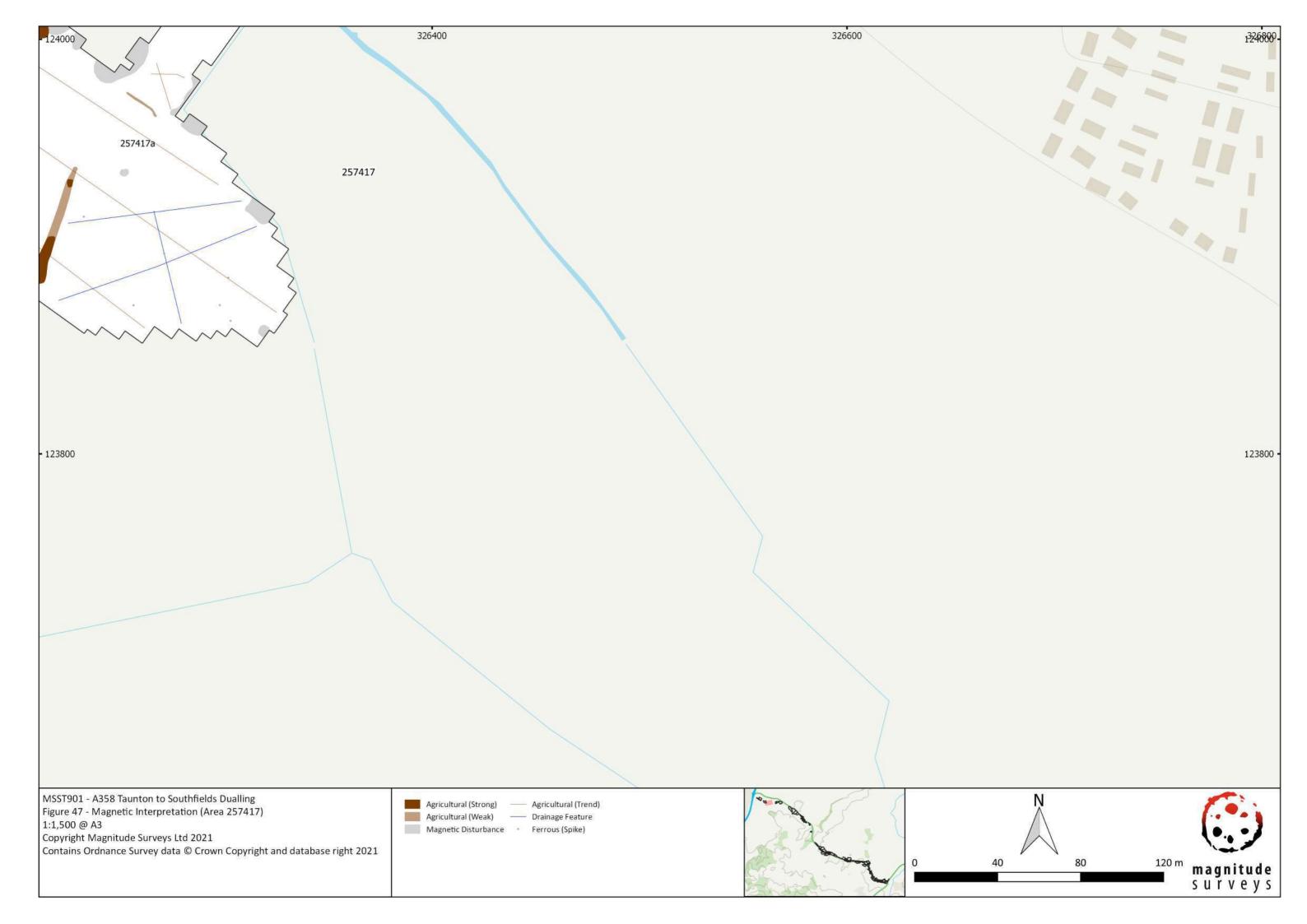


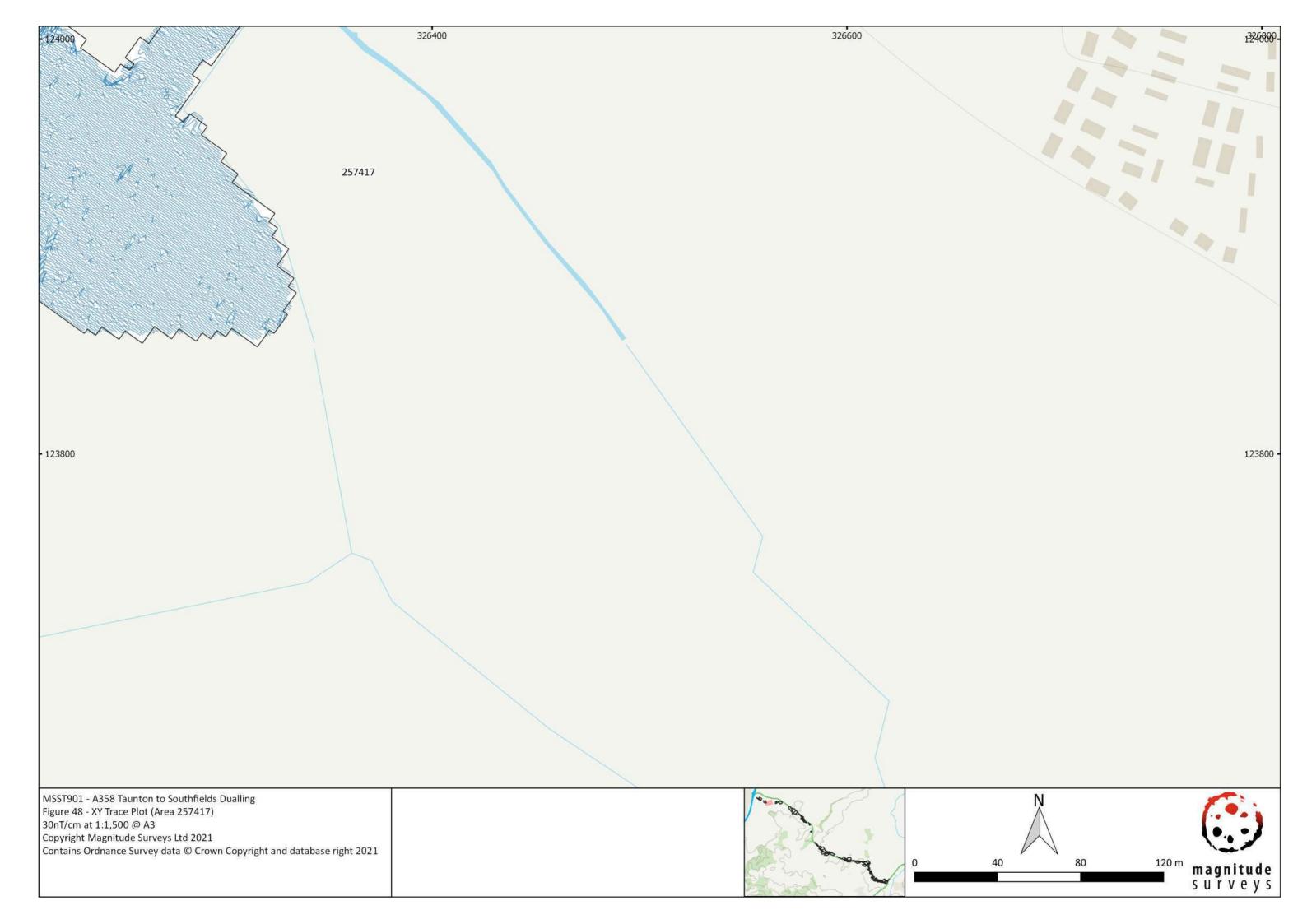


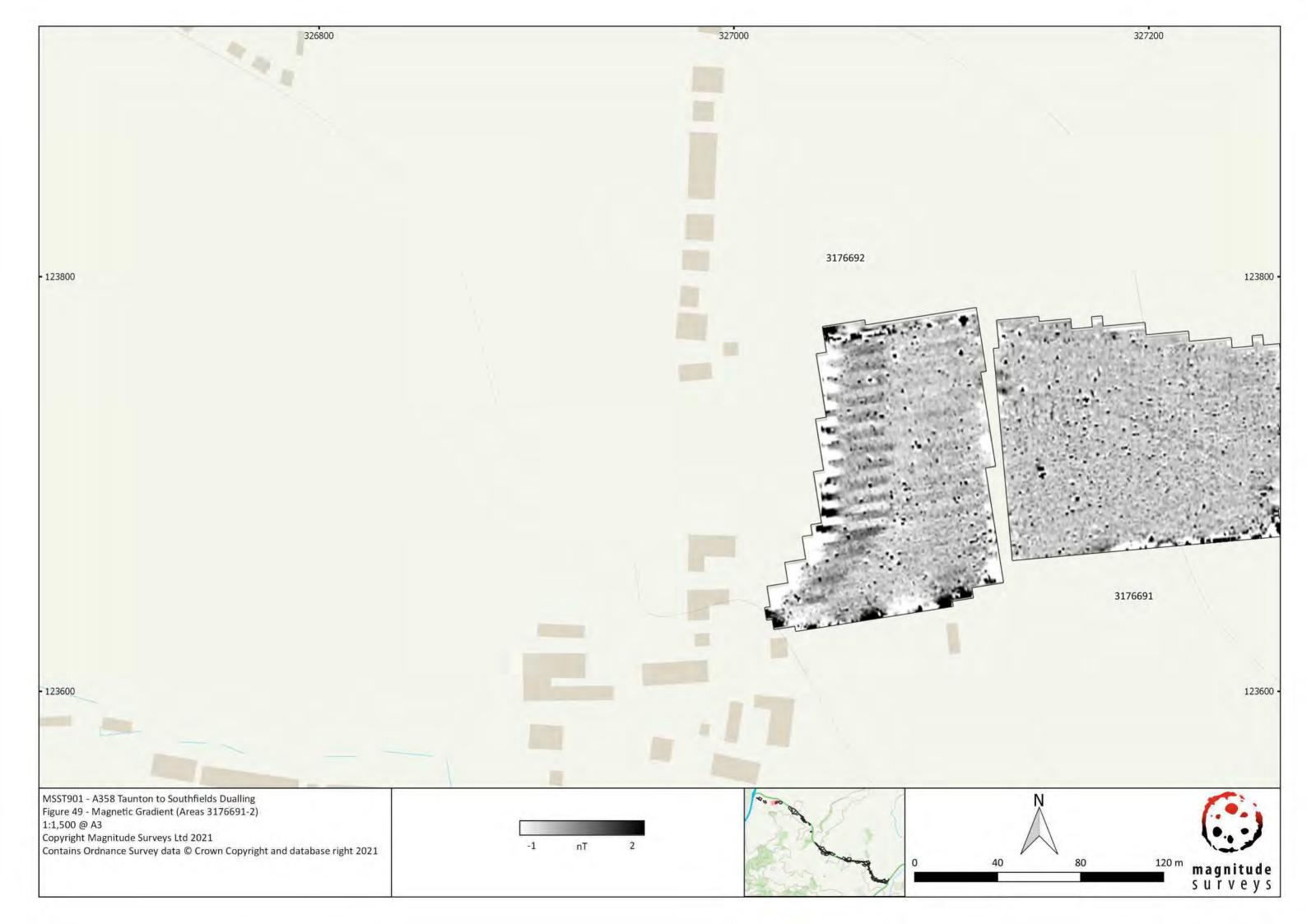


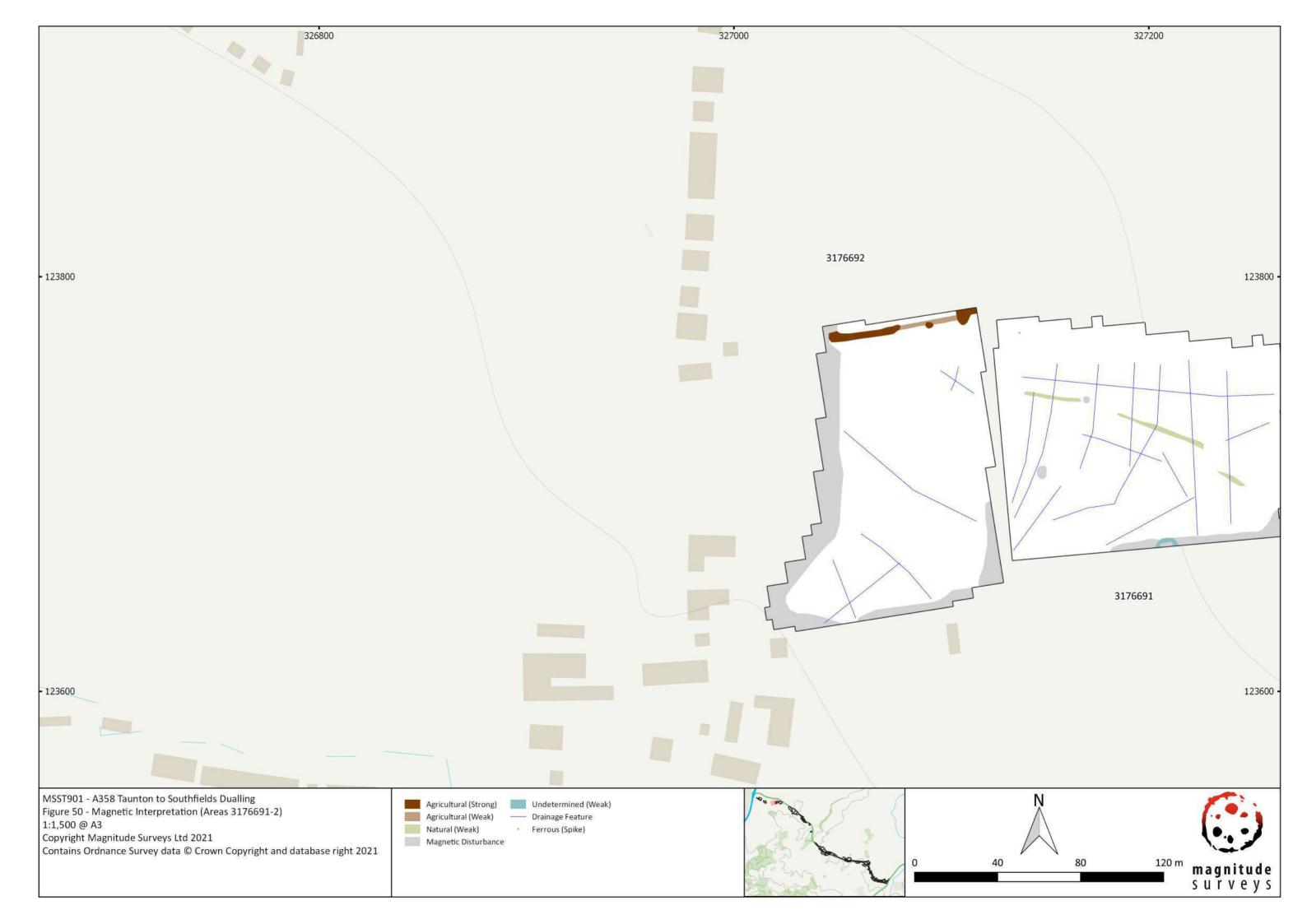


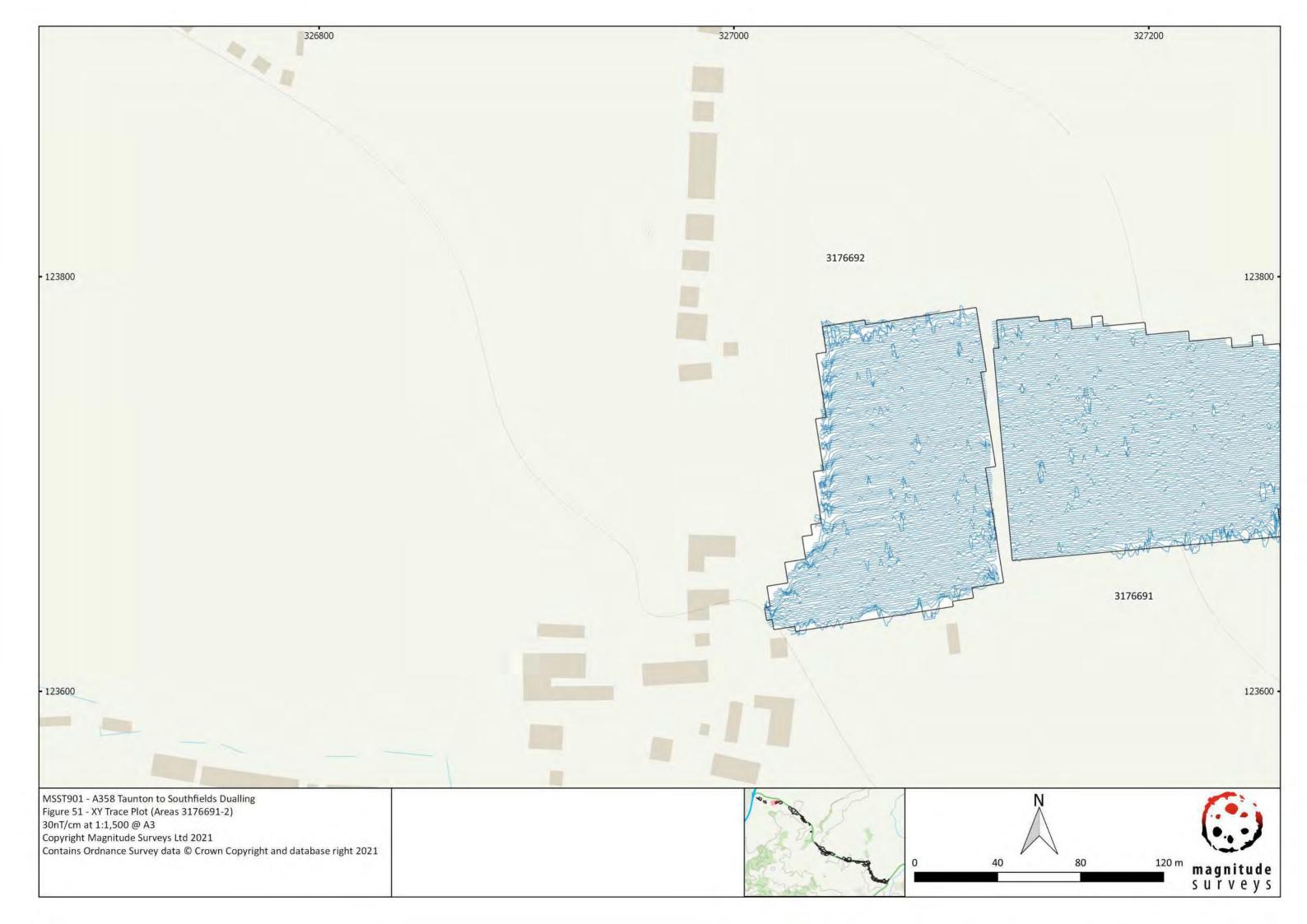


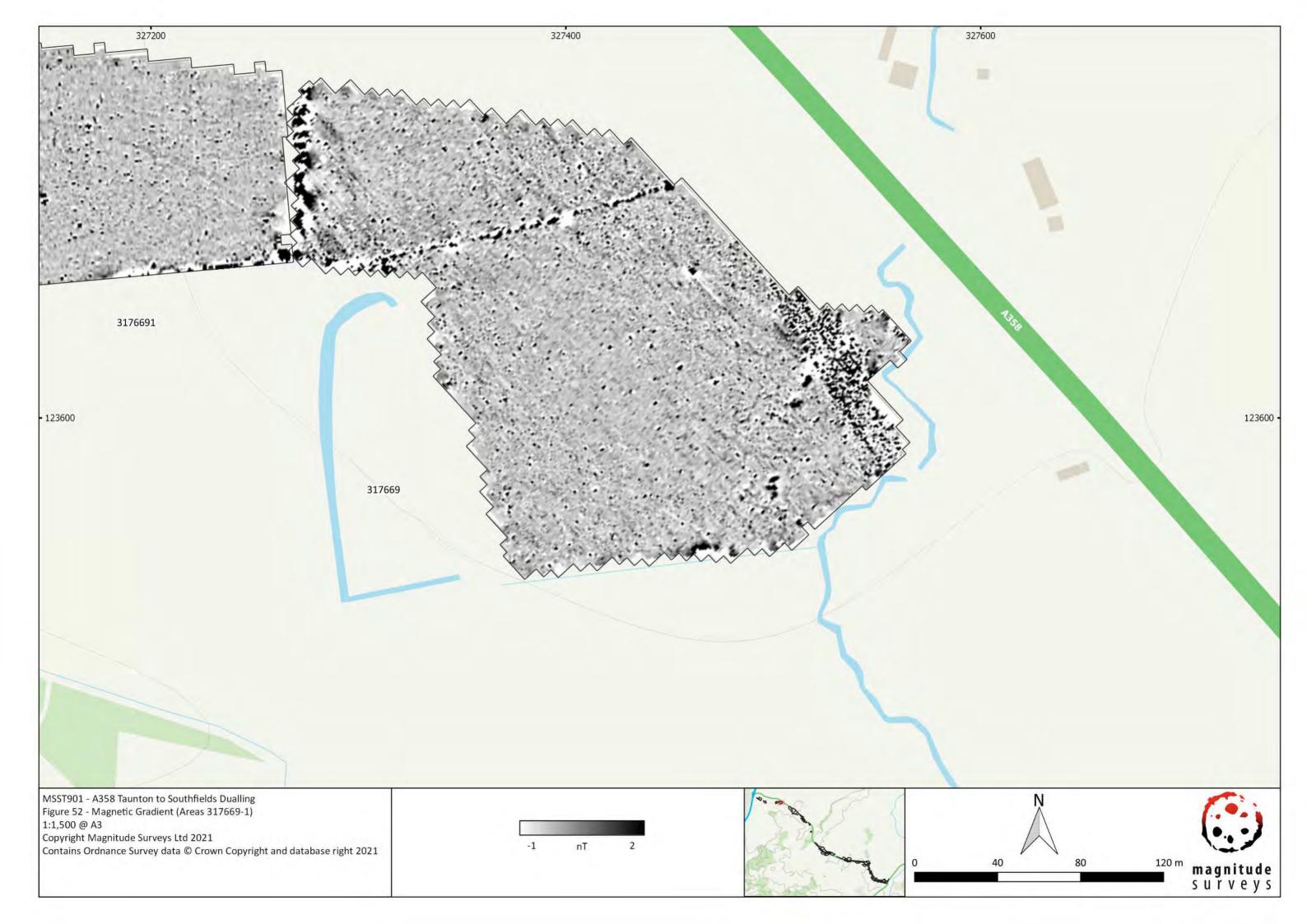


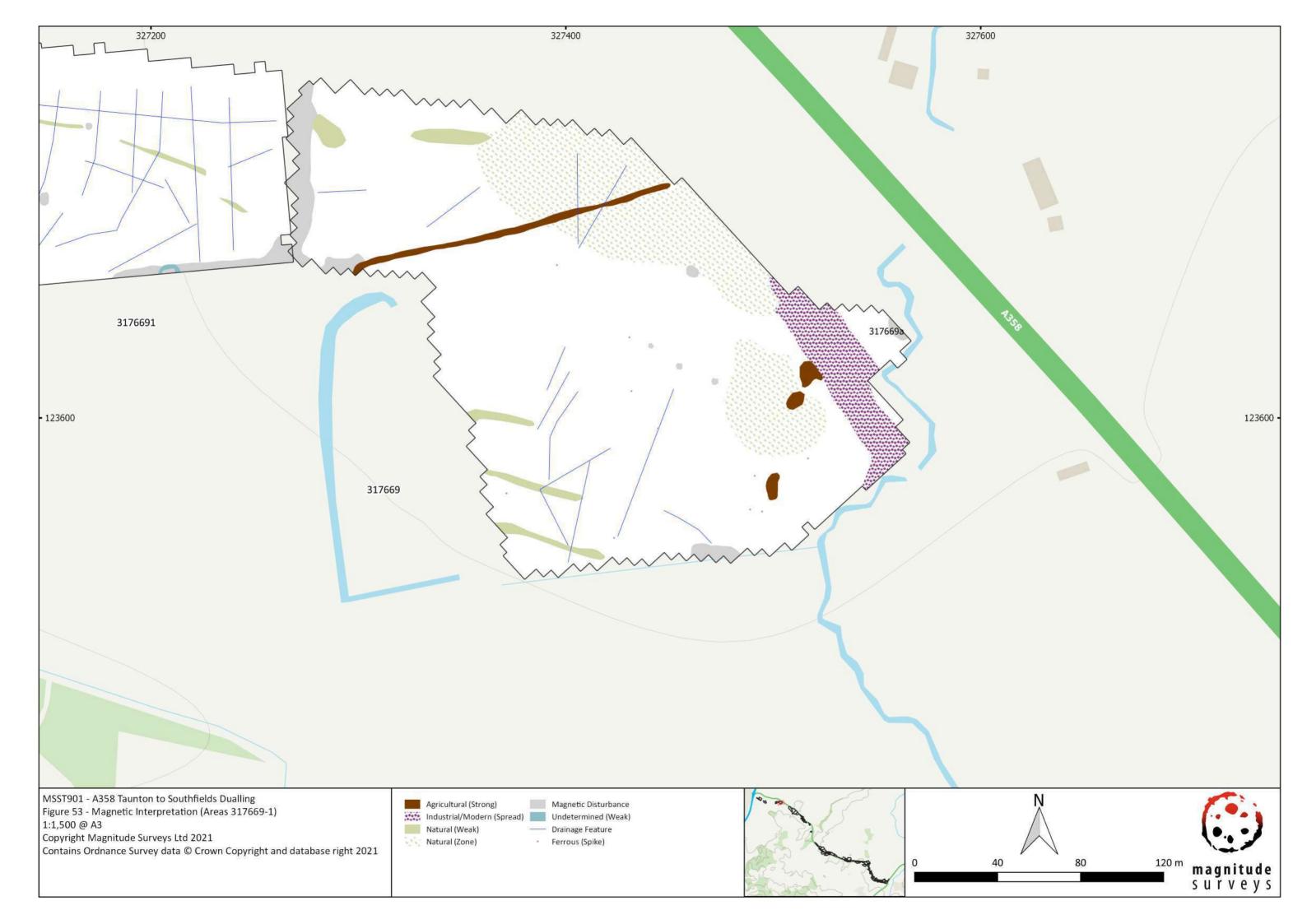


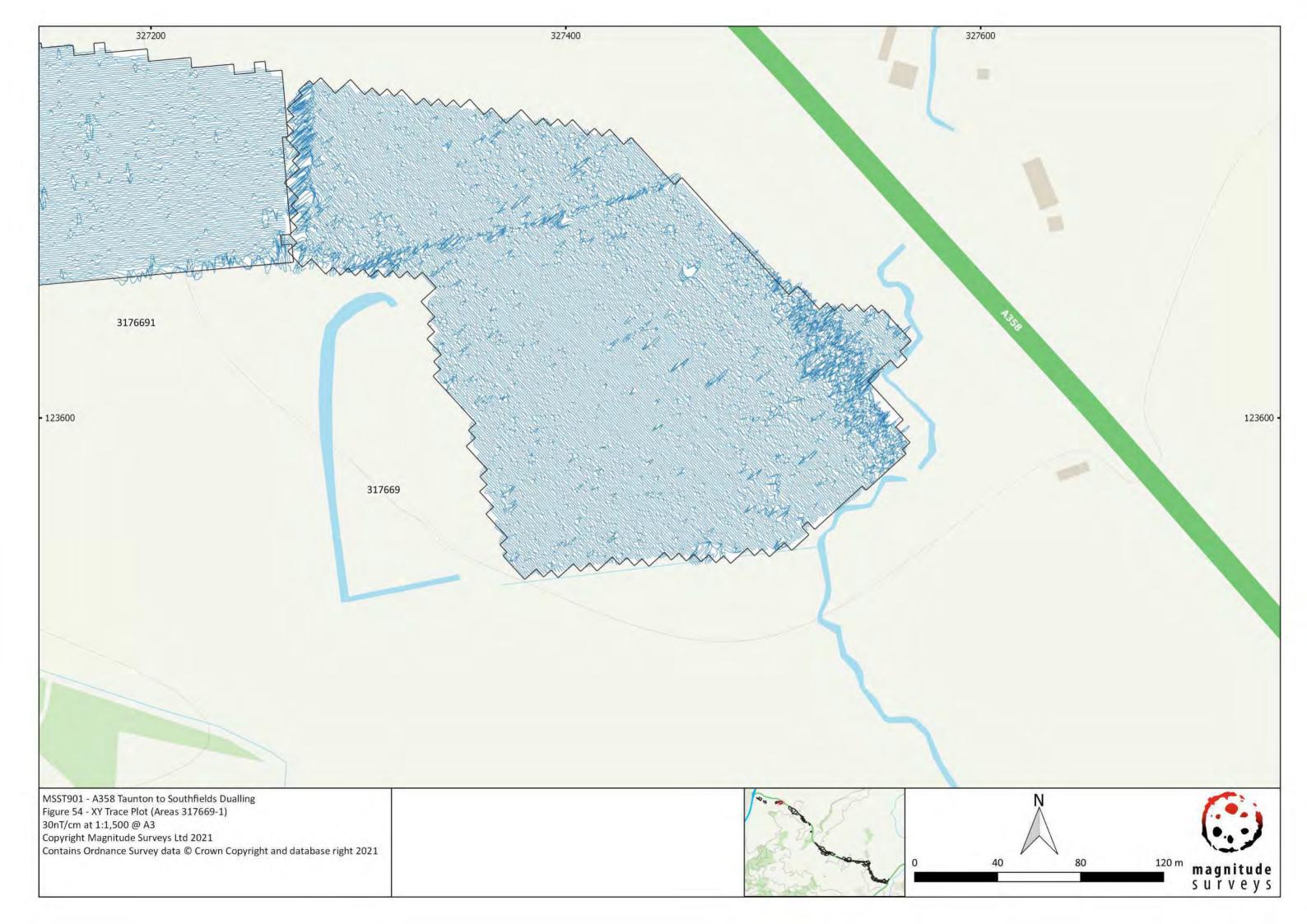


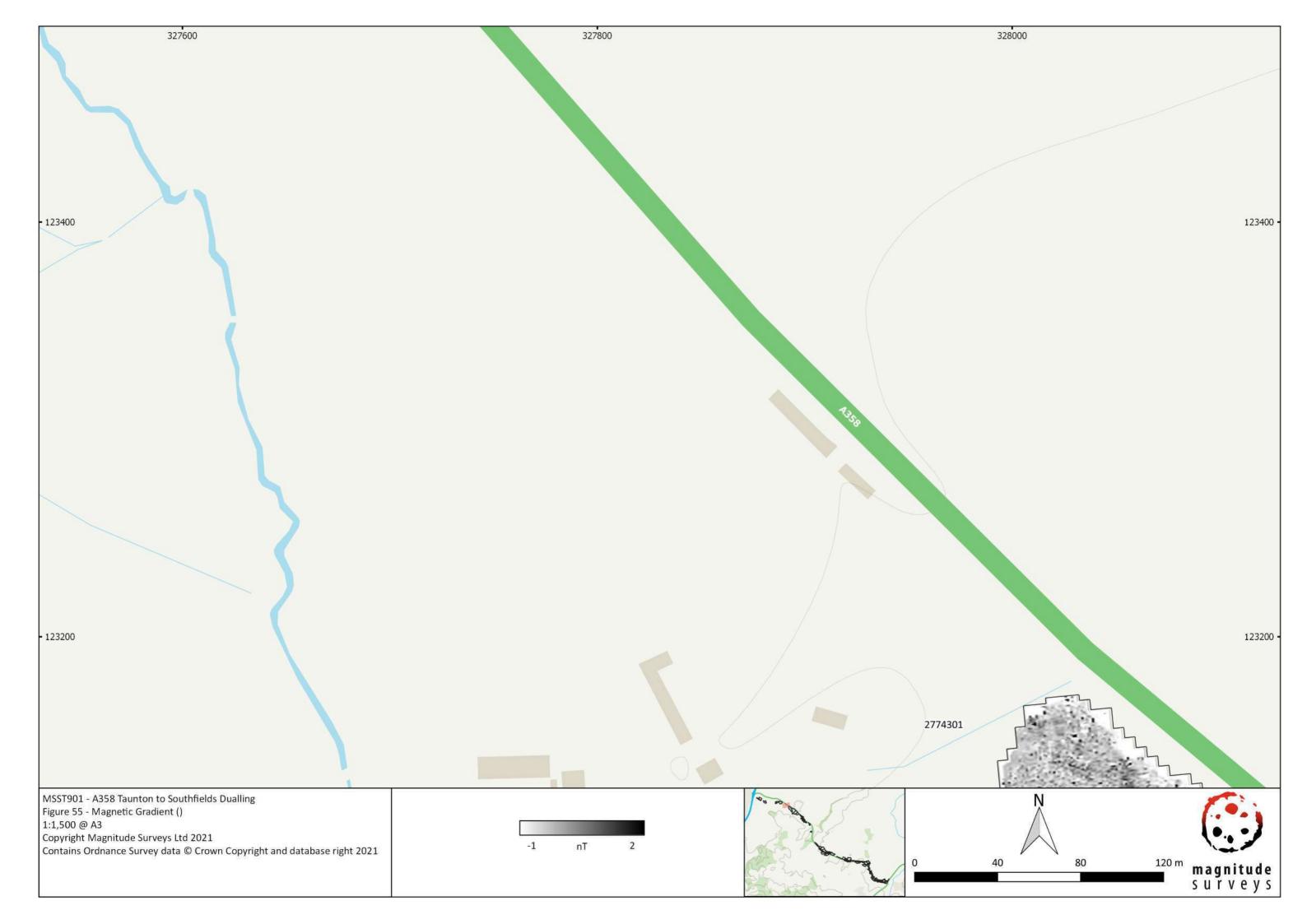


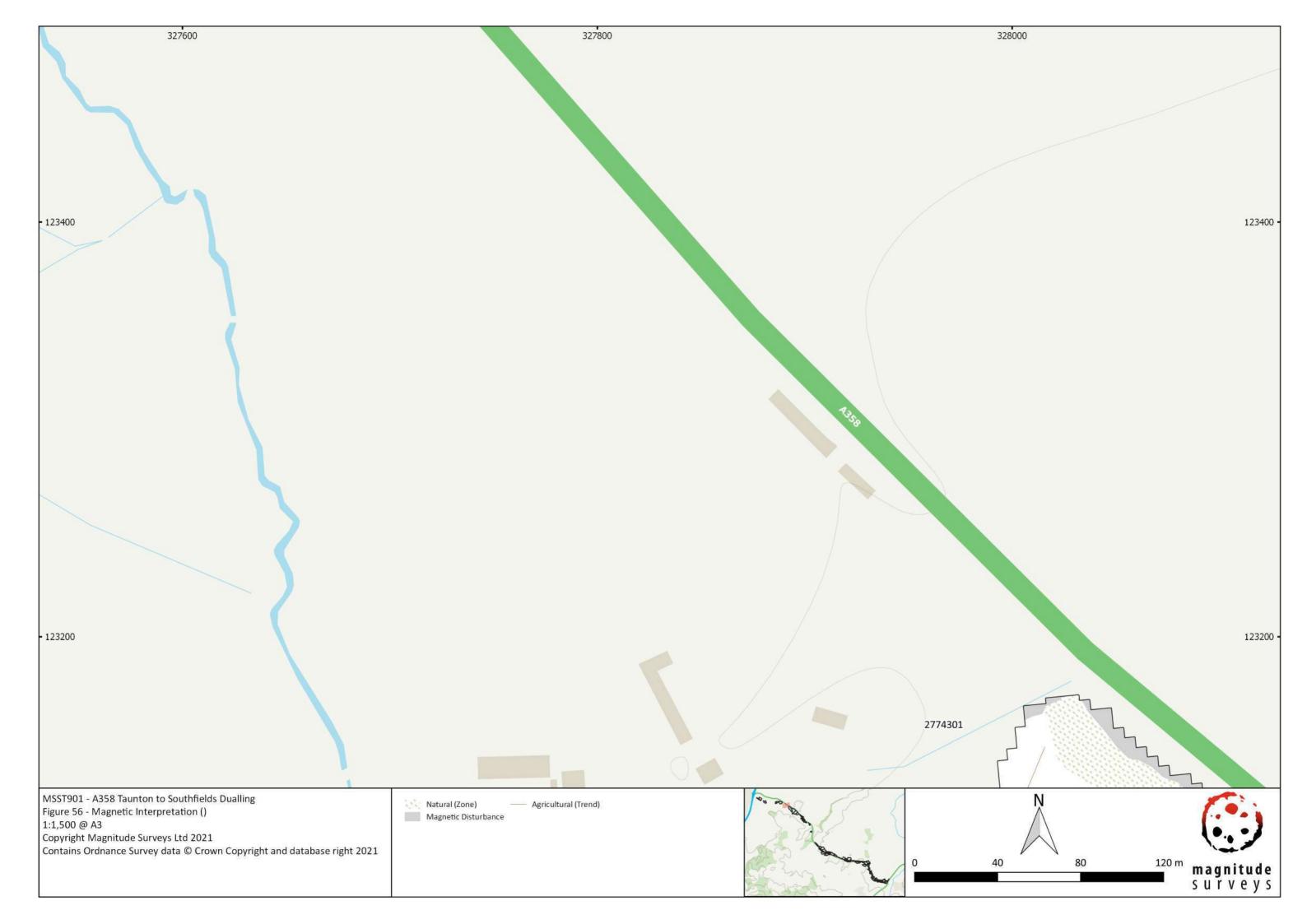




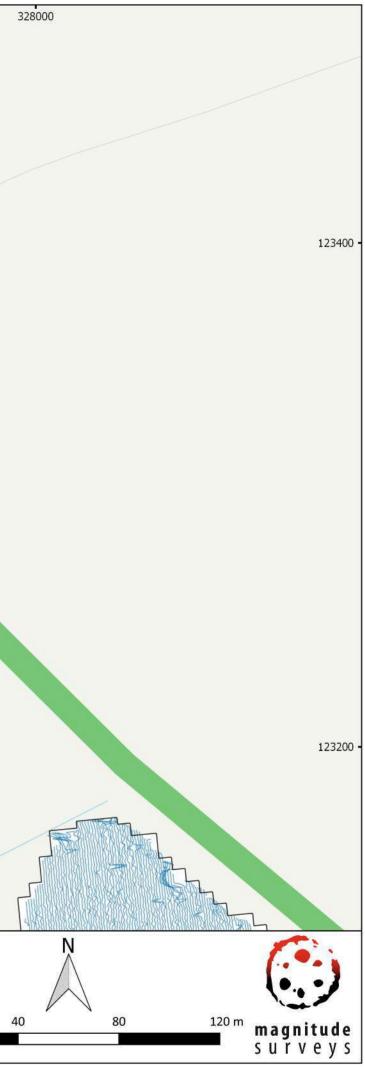


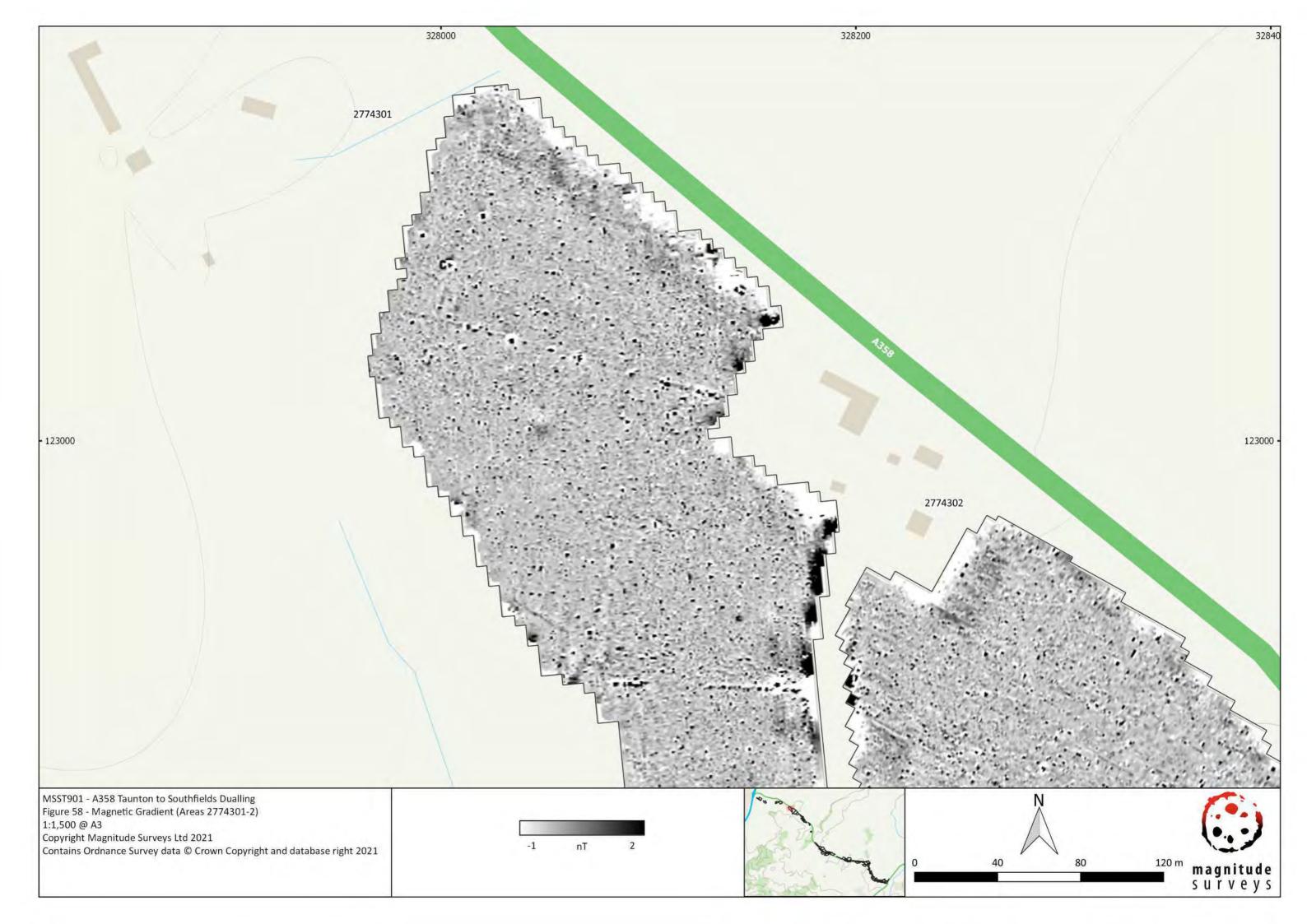


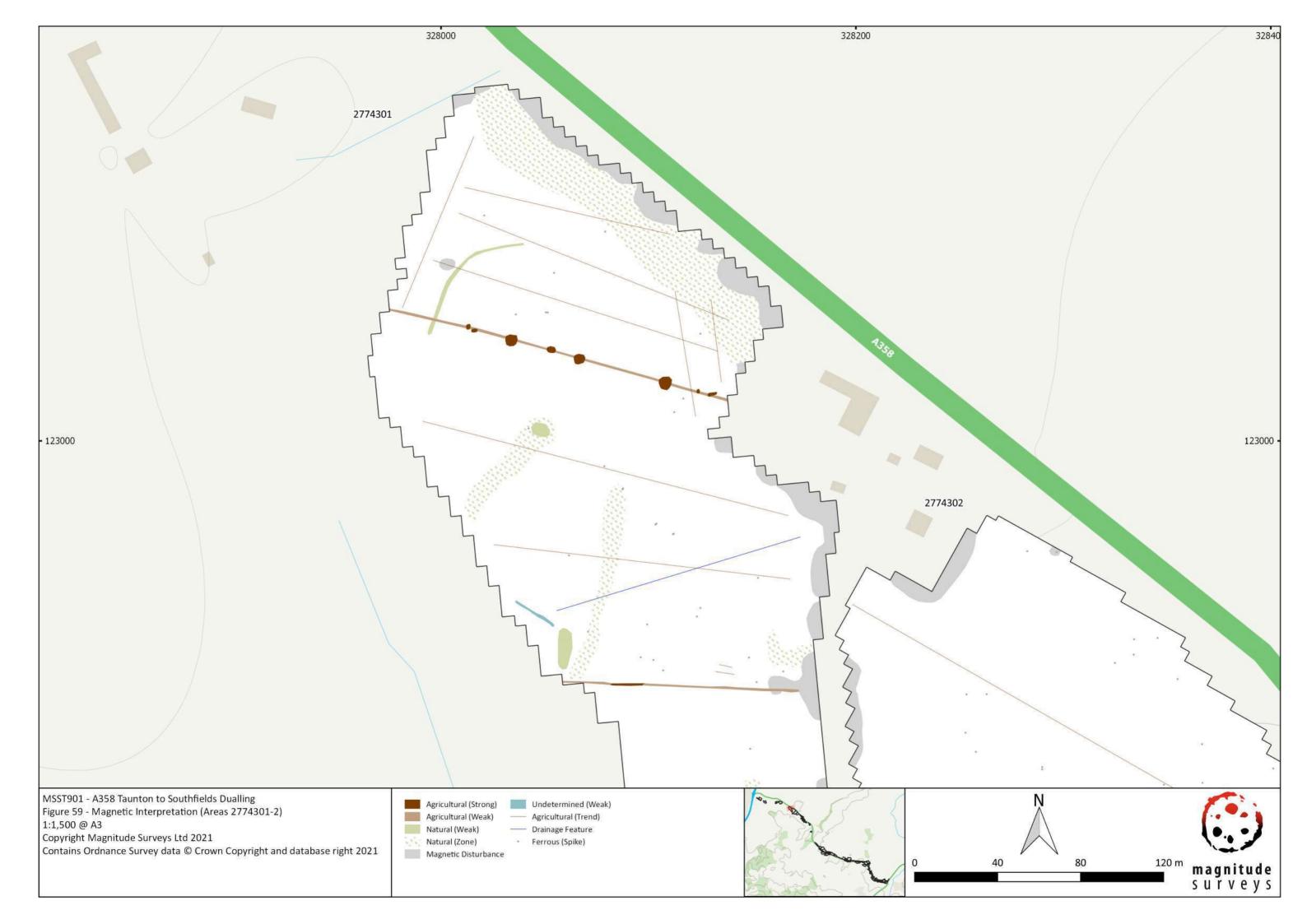


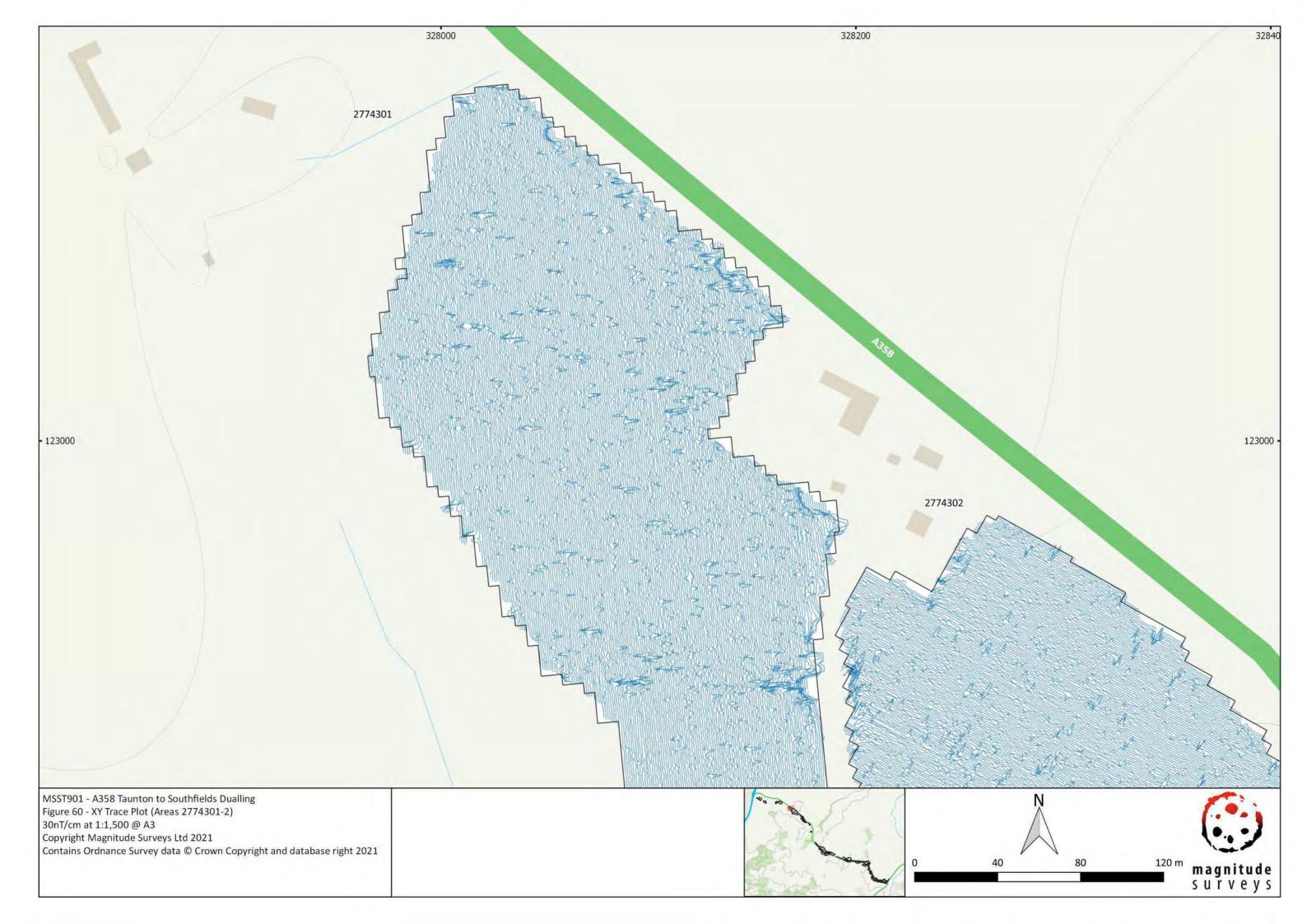


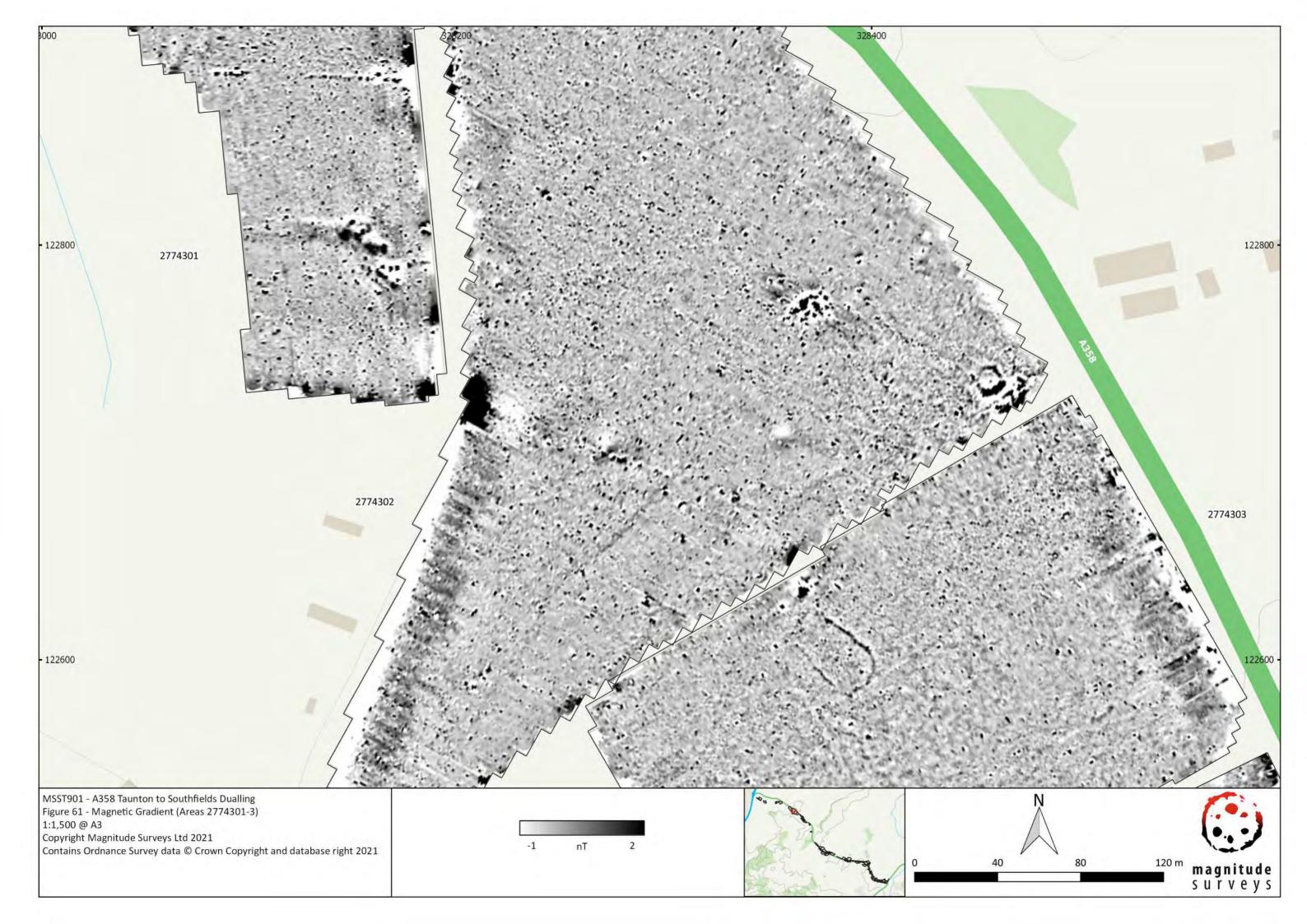
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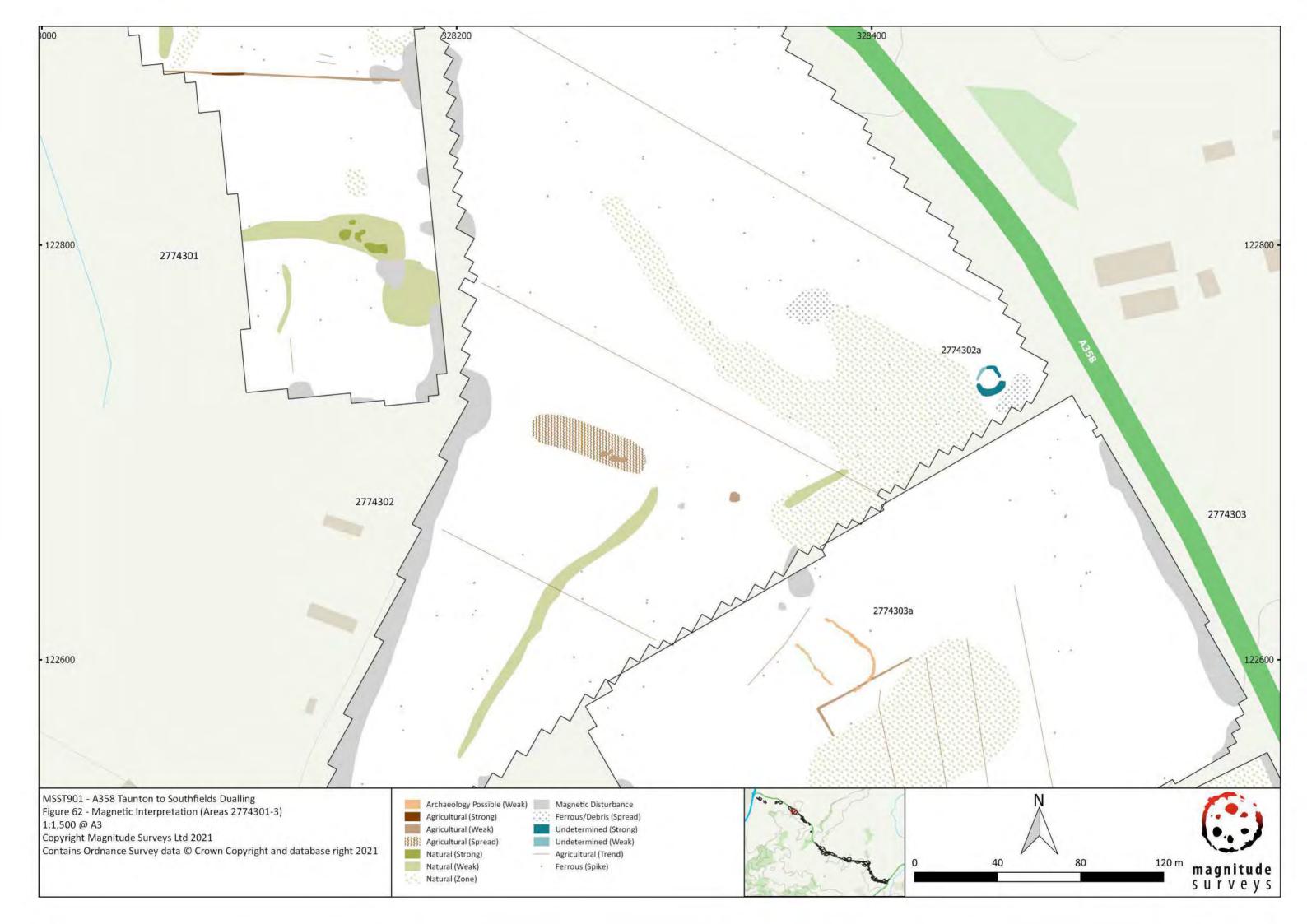


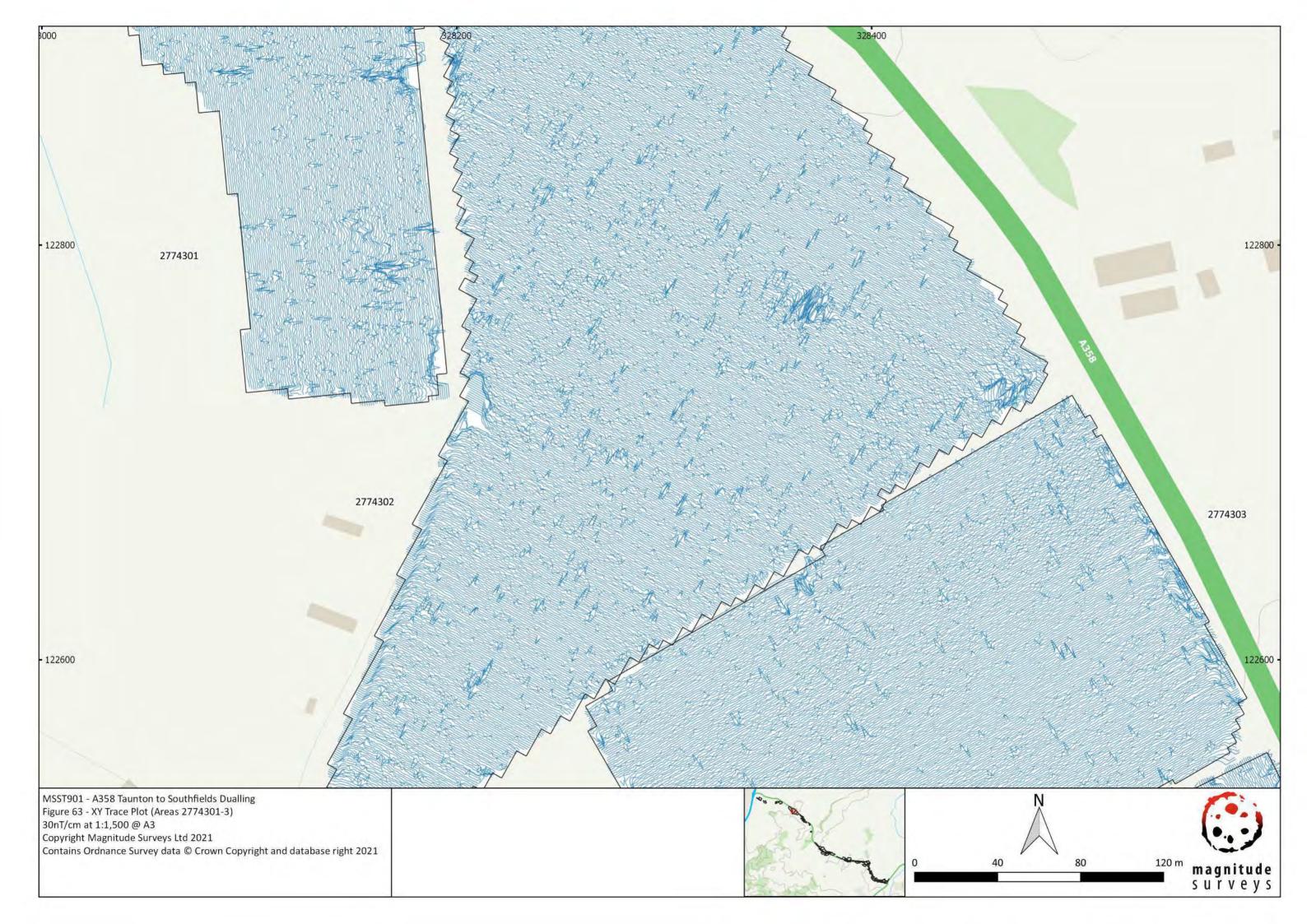


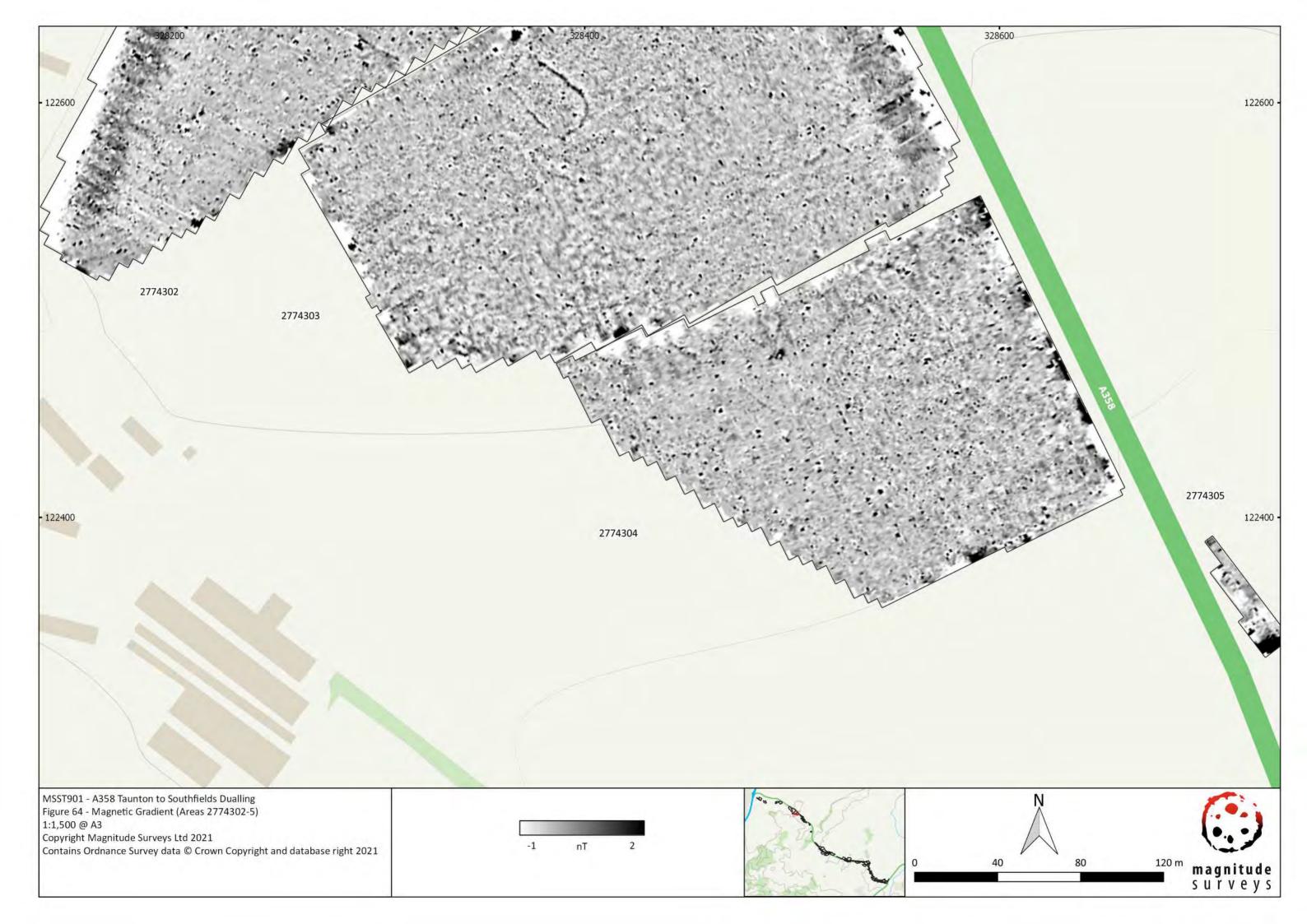


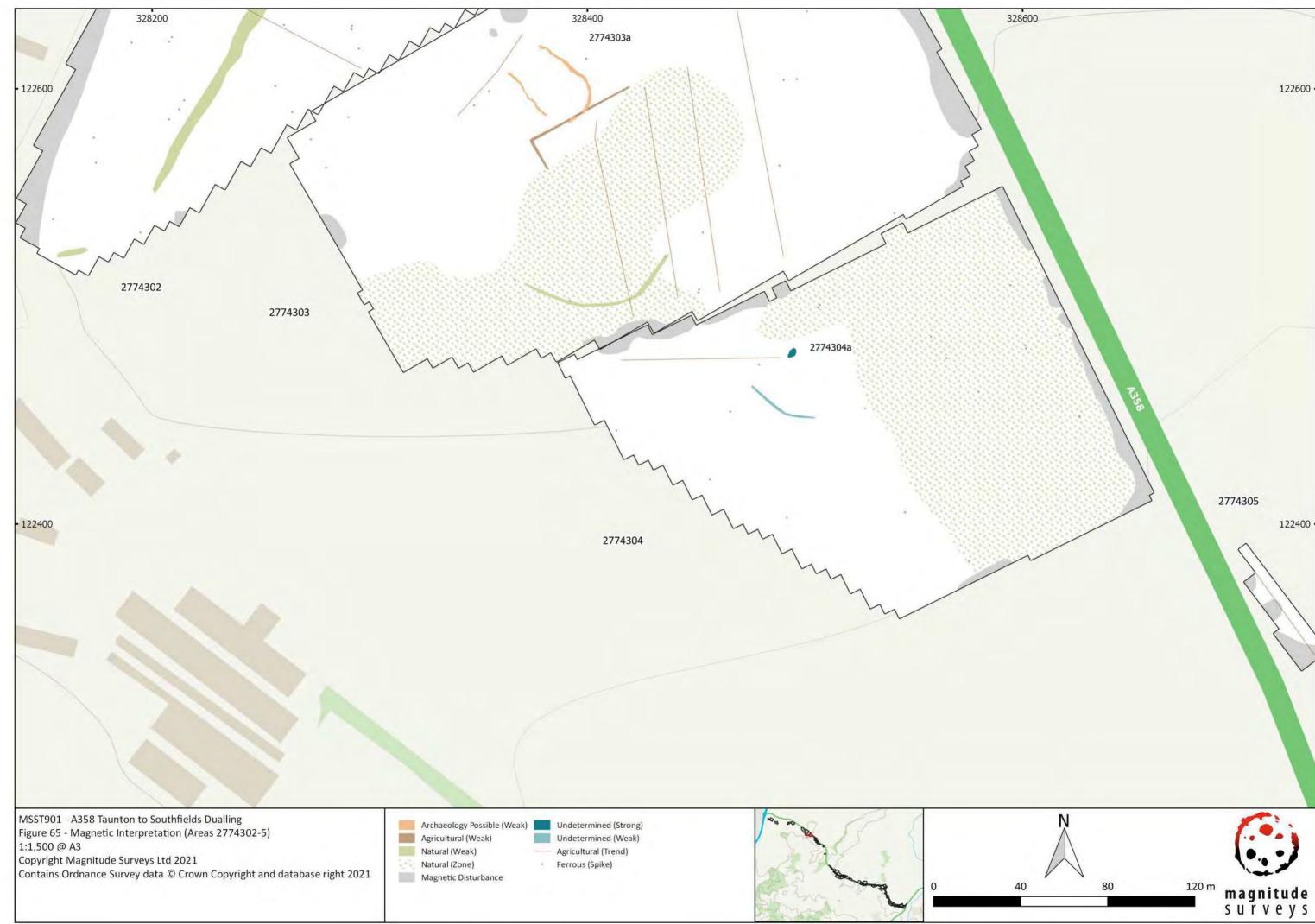




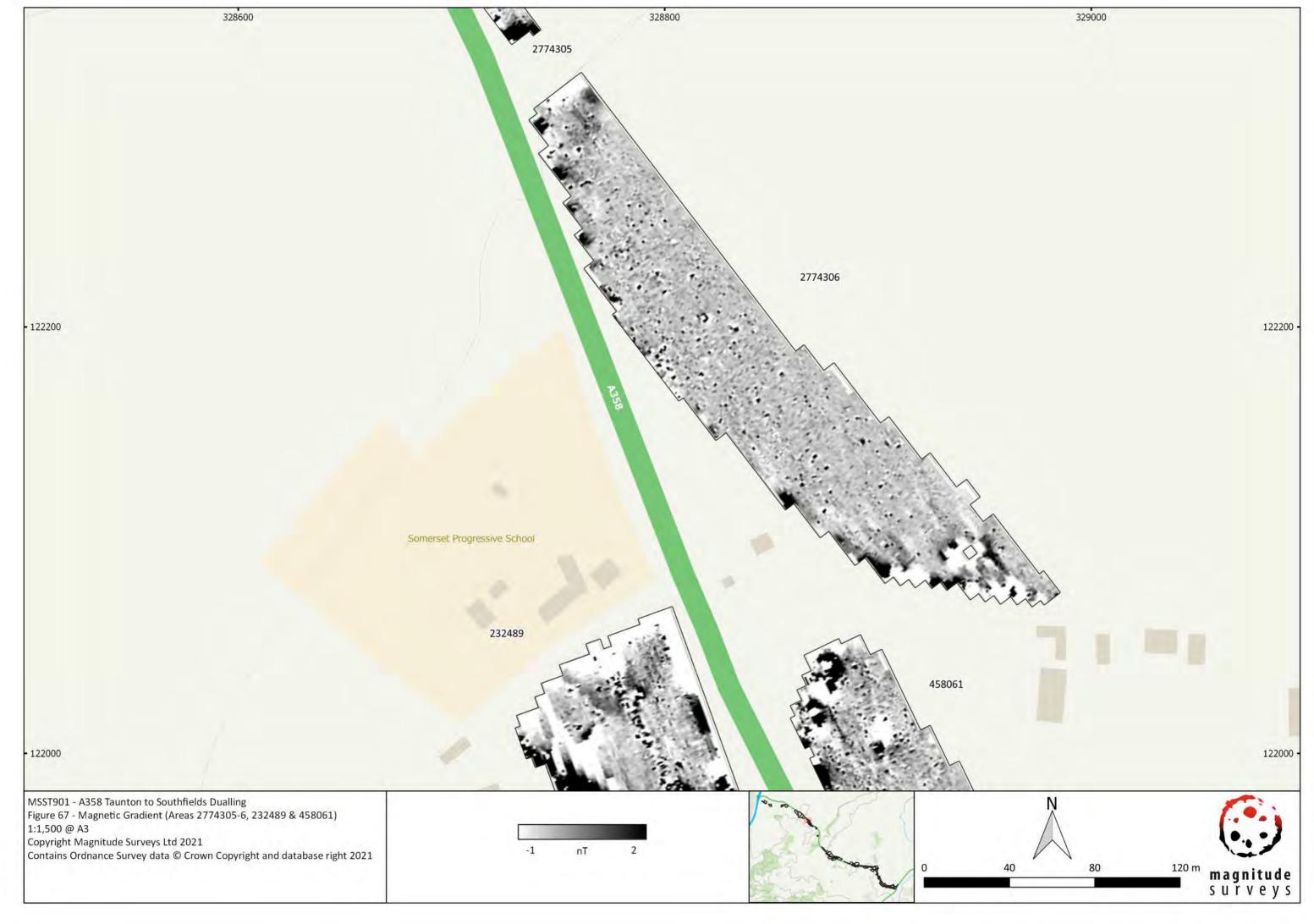


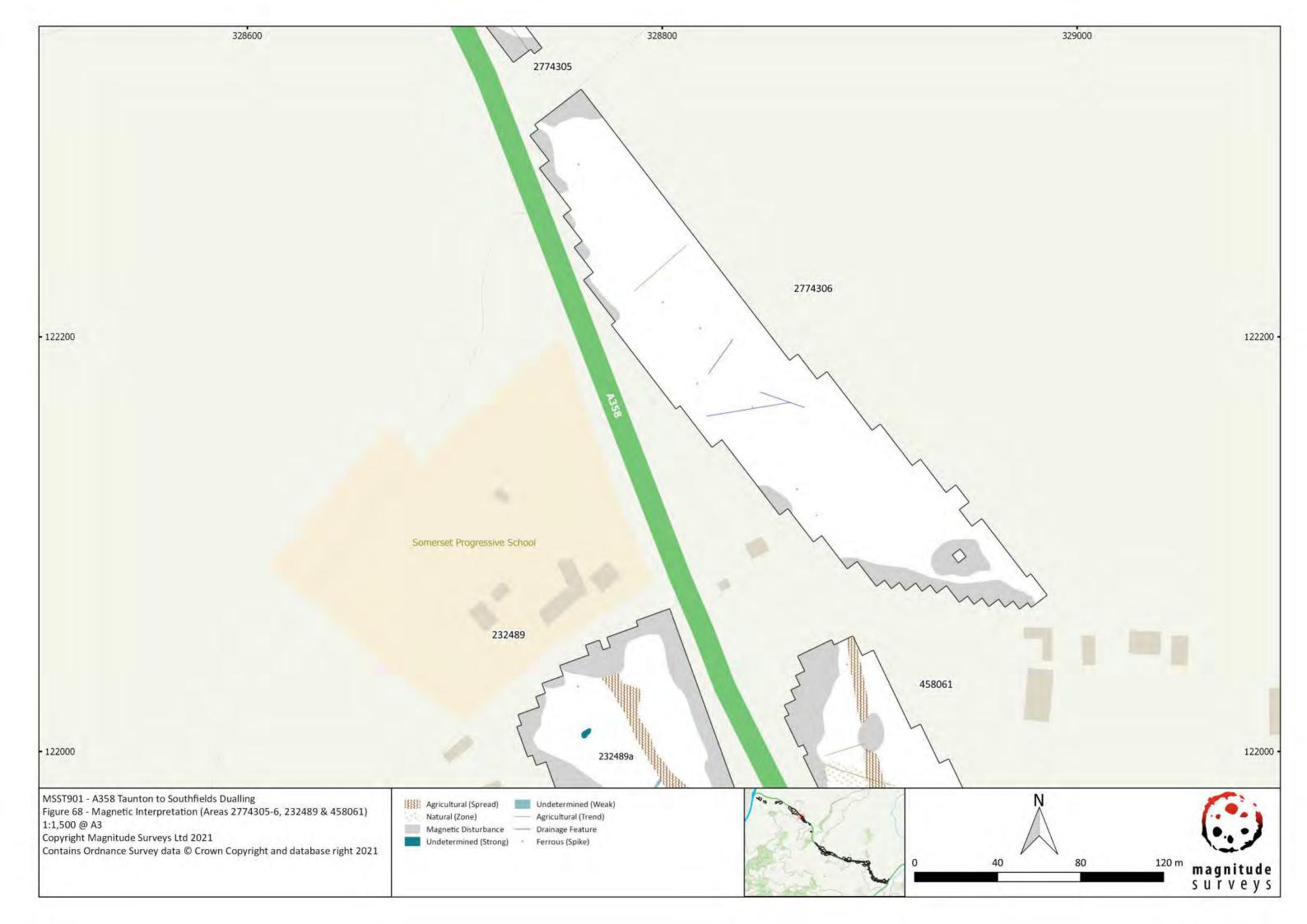






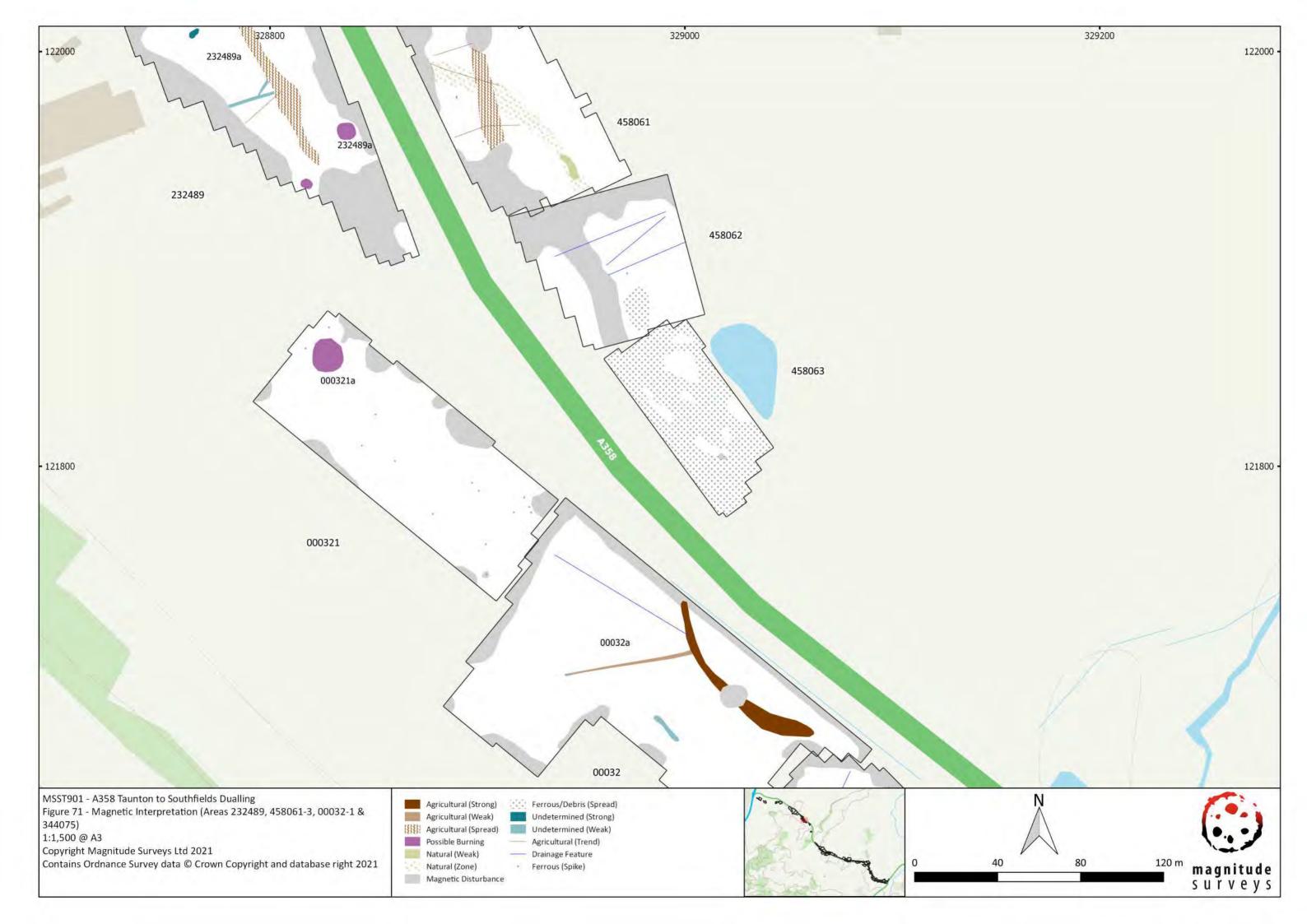




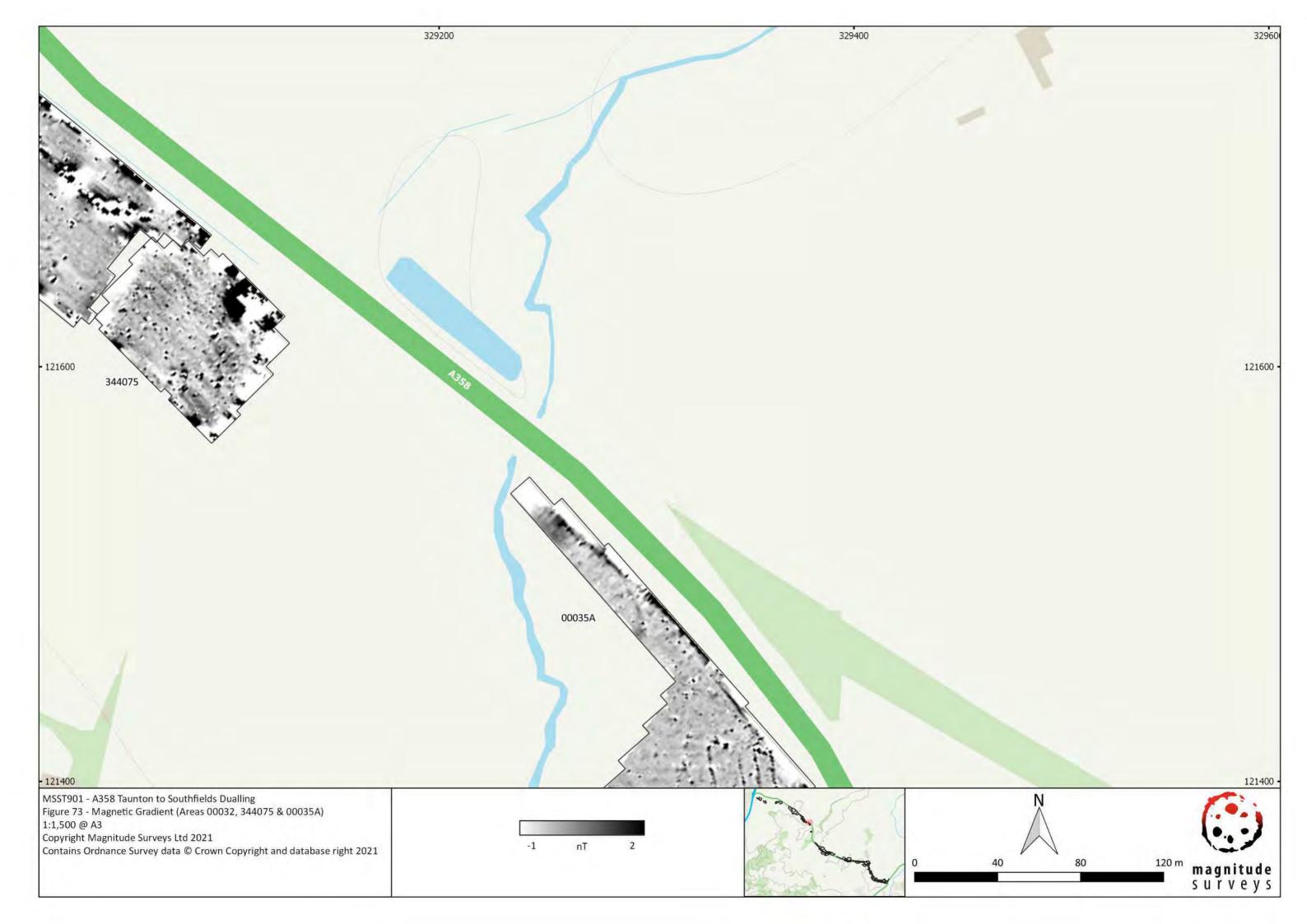


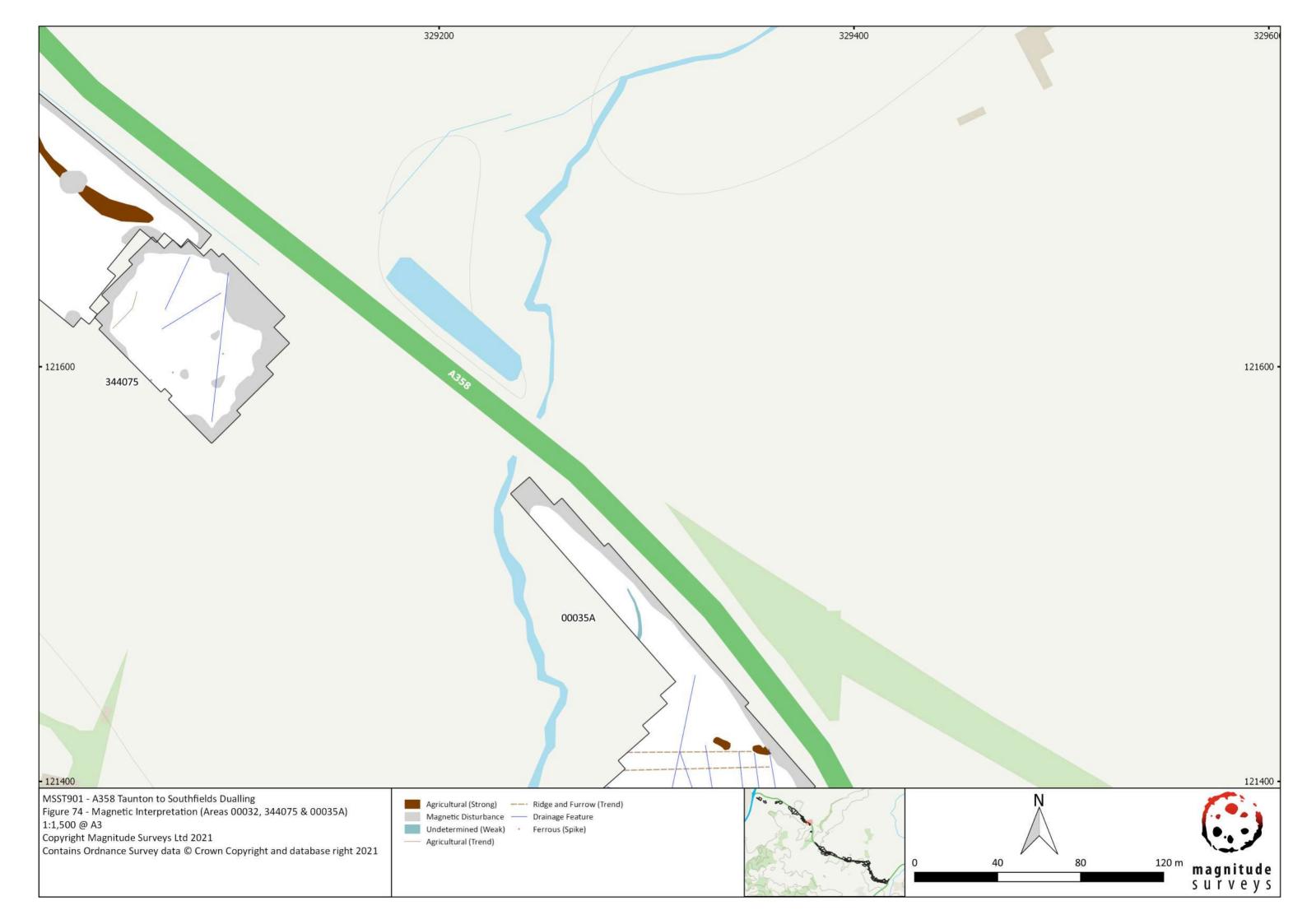


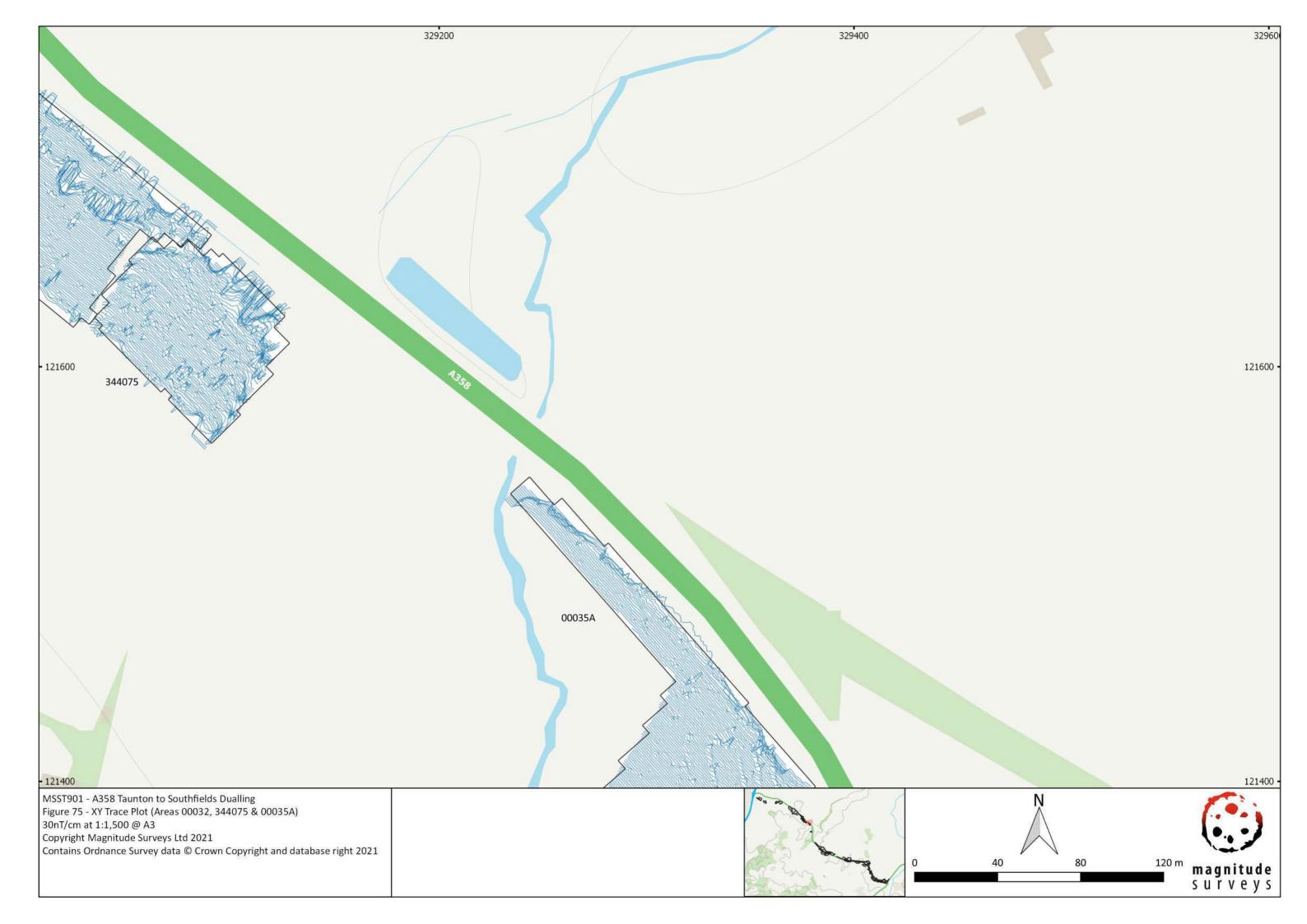


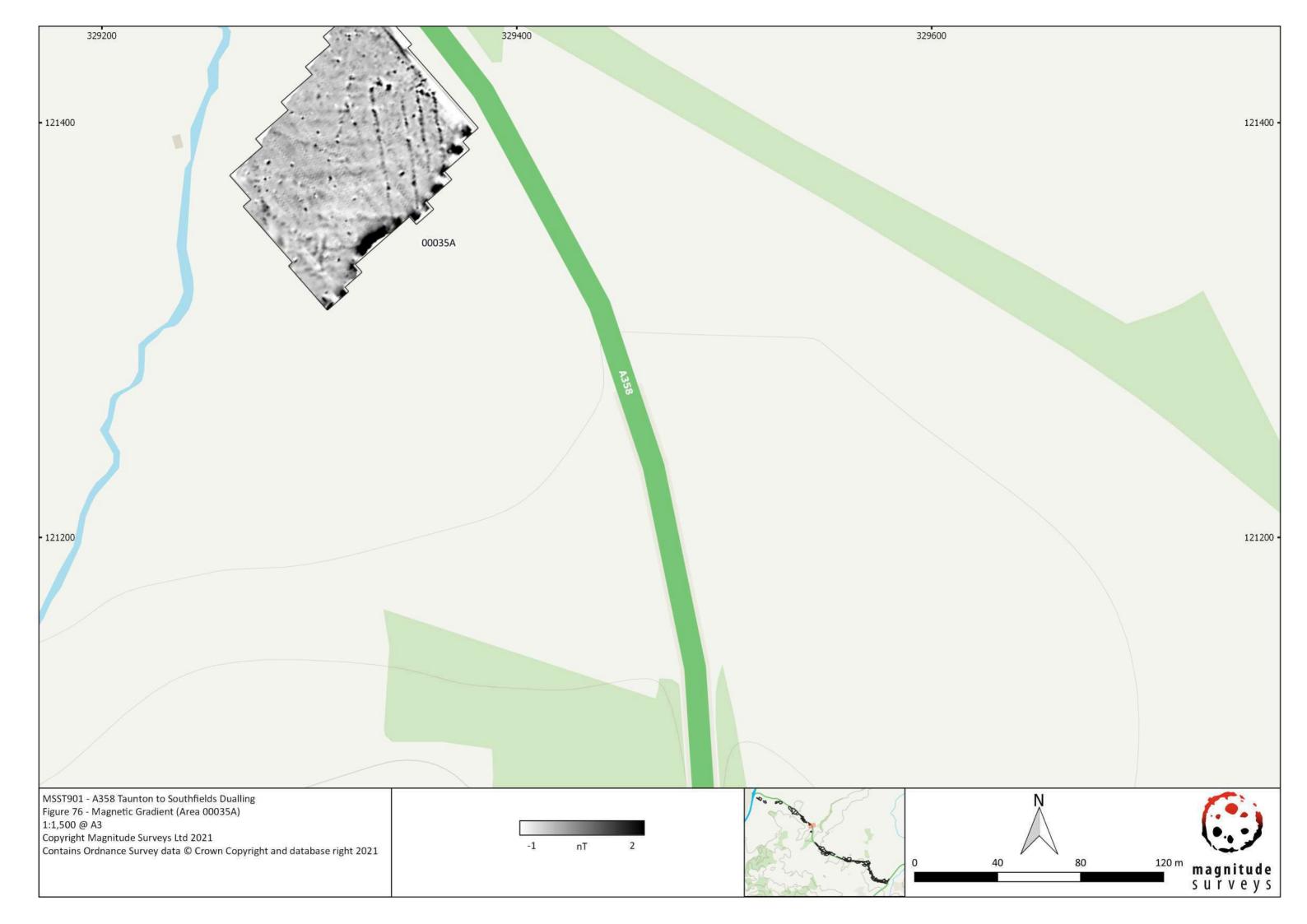


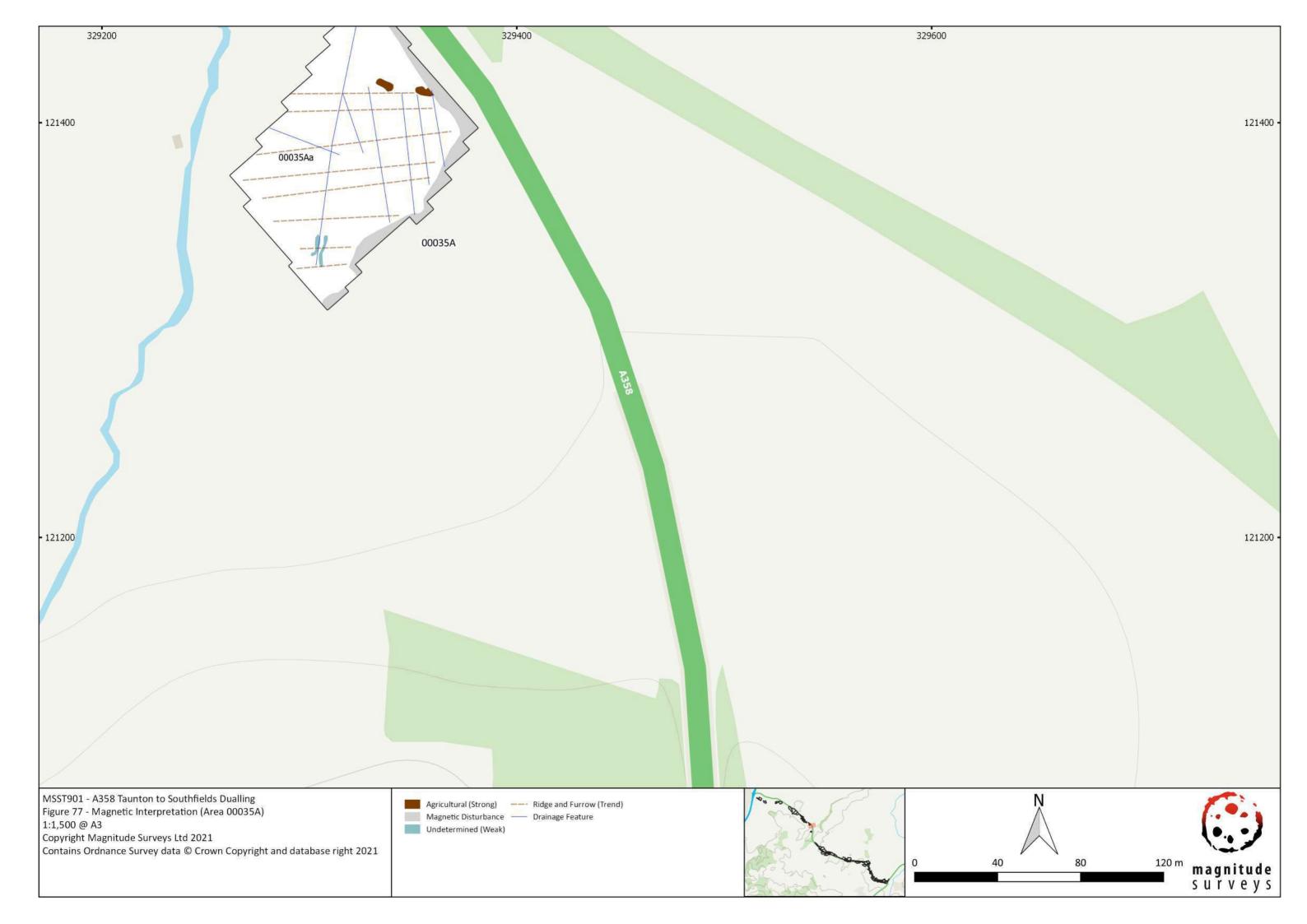






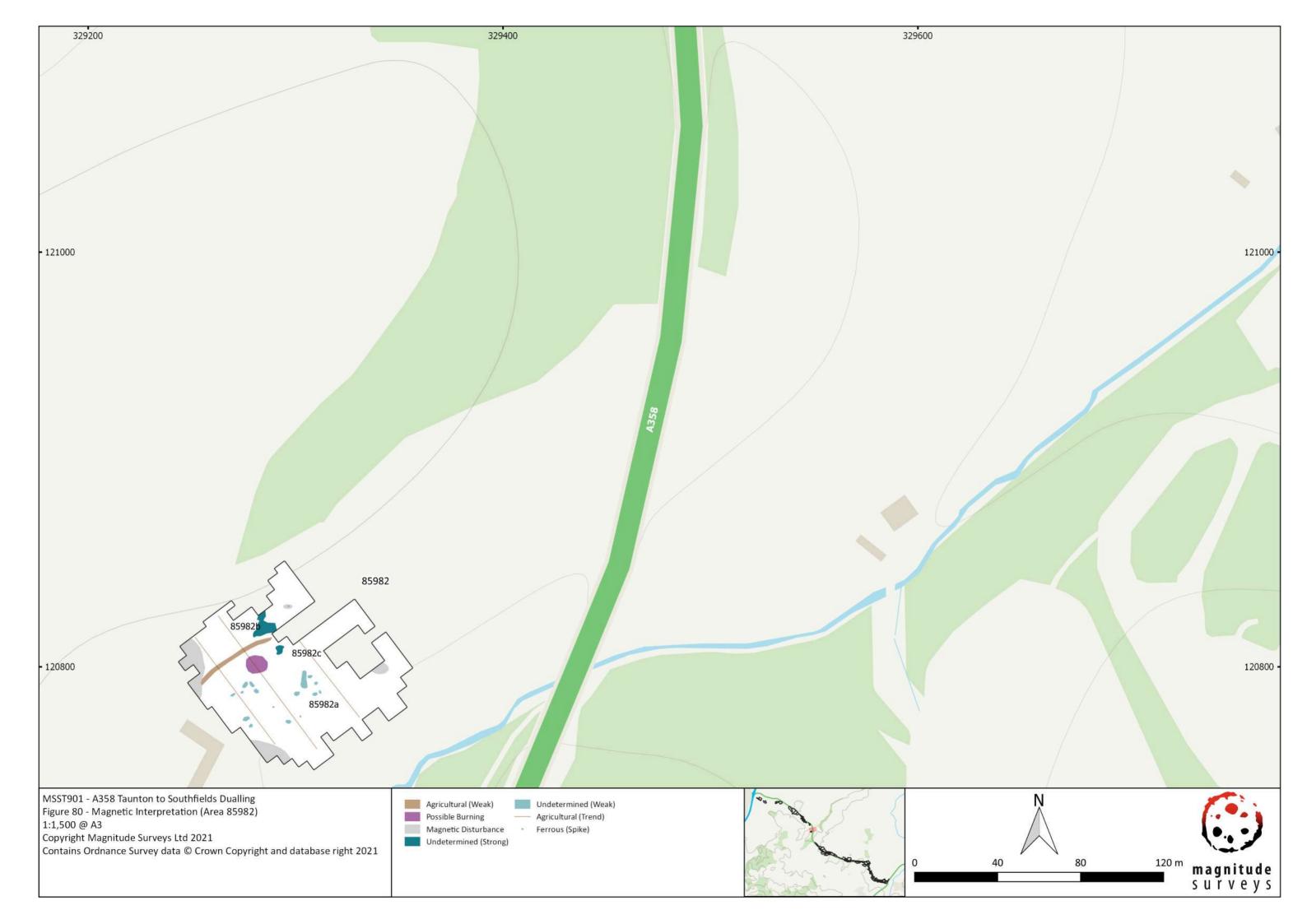














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