

**AGRICULTURAL QUALITY
OF LAND SOUTH OF LOWER TEAN
STOKE-ON-TRENT**

Report 2200/1

20th March, 2025

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**AGRICULTURAL QUALITY
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Report 2200/1
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SUMMARY

An agricultural land quality survey has been undertaken of 4.1 ha of land south of Lower Tean, Stoke-on-Trent in July 2023.

The land has heavy topsoils over dense reddish clay. The land is of Grade 4 agricultural quality, limited by significant wetness/workability constraints.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 4.1 ha of land south of Lower Tean, Stoke-on-Trent. The report is based on a survey of the land in July 2023.

SITE ENVIRONMENT

- 1.2 The survey area comprises one grassland field. The site is bordered on all sides by adjoining agricultural land.
- 1.3 The land is mainly level bordered by banks in the north and west. The site has an average elevation of approximately 175 m AOD.

PUBLISHED INFORMATION

- 1.4 British Geological Survey 1:50,000 scale information records the solid geology as Mercia Mudstone Group. No superficial overlying deposits are recorded.
- 1.5 The National Soil Map (published at 1:250,000 scale) records the land to be within the Whimple 3 Association: typically reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils and variable degrees of seasonal waterlogging¹.

¹ Ragg, J.M., *et al.*, (1984). *Soils and their Use in Midland and Western England*, Soil Survey of England and Wales Bulletin No. 12, Harpenden.

2.0 Soils

- 2.1 A soils and agricultural quality survey was carried out in July 2023 in accordance with MAFF (1988) Agricultural Land Classification guidelines². It was based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. During the survey, soils were examined by hand augerings and pits to a maximum depth of 1.0 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

HEAVY SLOWLY PERMEABLE SOILS

- 2.2 The site comprises heavy clay loam topsoils over dense slowly permeable reddish clay or heavy clay loam subsoil which overlies mudstone at moderate depth (typically between 50-70 cm depth). The subsoils are gleyed (pale coloured ped faces and greyish, brownish or ochreous mottles or ferri-manganiferous concentrations), indicating the soils suffer seasonal waterlogging. The soils are judged to be poorly-draining under the local climate (Soil Wetness Class IV).
- 2.3 An example profile is described from a pit at observation point 2 (see Map 1) in an appendix to this report.

²MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

3.0 Agricultural land quality

- 3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.
- 3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification³. The relevant site data for a central location at grid reference SK 007,383 and an average elevation of 175 m is given below.

- Average annual rainfall: 862 mm
- January-June accumulated temperature >0°C 1267 day°
- Field capacity period 209 days
(when the soils are fully replete with water) early Oct-mid May
- Summer moisture deficits for: wheat: 71 mm
potatoes: 53 mm

- 3.3 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF⁴. Under the slightly wet and cool local climate, agricultural land quality is limited to a maximum of Grade 2.

SURVEY RESULTS

- 3.4 The agricultural quality of the land is primarily determined by wetness/workability limitations. Other factors have been assessed but do not affect the land grade. Land of Grade 4 has been identified.

Grade 4

- 3.5 This land grade makes up all the agricultural land within the site. The combination of high topsoil clay content and impeded drainage (Soil Wetness Class IV) under the wet local climate causes significant wetness/workability limitations. This means that autumn and

³Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁴MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

spring access with machinery for cultivation is rarely possible. Agricultural use of the land is mainly suited to grass with occasional arable crops.

Grade areas

- 3.6 The land grade is shown on Map 2 and the area occupied shown below.

Table 1: Areas occupied by the different land grades

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 4	4.1	100
Total	4.1	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land south of Lower Tean: Soils and ALC survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-29	HCL	<5	~~29-52~~ 52-72	HCL/Cr Cr	xxx	~~42-100+~~	Cr/MST	xxx	6	IV	4	W
2	0-27	HCL	<5	27-42	C	xxx	42-70+	MST		4	IV	4	W
3	0-27	HCL	<5	27-41	C/HCL	xxx	41-50+	MST		0	IV	4	W
4	0-26	HCL	<5	26-50+	Cr	xx	50+	MST		0	IV	4	W

Soil log key

Gley indicators¹

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common root mottles (topsoils)) ³
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix (gleyed horizon) or reddish matrix and >2% greyish, brownish or ochreous mottles and pale ped faces
xxxx	mottles or f-m concentrations (gleyed horizon) dominantly blueish matrix, often with some ochreous mottles (gleyed horizon)

Slowly permeable layers⁴

a depth underlined (e.g. 50) indicates
the top of a slowly permeable layer

A wavy underline (e.g. 50) indicates
the top of a layer borderline to slowly permeable

Texture²

C	clay
ZC	silty clay
SC	sandy clay
CL	clay loam (H-heavy, M-medium)
ZCL	silty clay loam (H-heavy, M-medium)
SZL	sandy silt loam (F-fine, M-medium, C-coarse)
LS	loamy sand (F-fine, M-medium, C-coarse)
SL	sandy loam (F-fine, M-medium, C-coarse)
S	sand (F-fine, M-medium, C-coarse)
SCL	sandy clay loam
P	peat (H-humified, SF-semi-fibrous, F-fibrous)
LP	loamy peat; PL - peaty loam

Wetness Class⁵

I (freely drained) to VI (very poorly drained)

Limitations:

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St – stoniness
SI – slope
T – topography/microrelief
C - Climate
Te – sandy topsoil texture

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)st – (very slightly, slightly,
moderately, very, extremely) stony⁶

(vsl, sl, m, v, x)ca
(very slightly, slightly,
moderately, very, extremely) calcareous⁷

Other abbreviations

fmn - ferri-manganiferous concentrations
dist - disturbed soil layer;
R – bedrock (CH – chalk, SST – sandstone)
LST – limestone, MST – Mudstone)
r-reddish, gn – greenish

¹Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5

²Texture in accordance with particle size classes in Hodgson (1997)

³ Occasionally recorded in the texture box

⁴Permeability is estimated for auger borings and must be confirmed by full pit observations in accordance with the definitions in:
Revised Guidelines for grading the quality of Agricultural Land (Maff 1988)

⁵Soil Wetness Classes are defined in Hodgson (1997)

⁶stoniness classes as defined in Hodgson (1997)

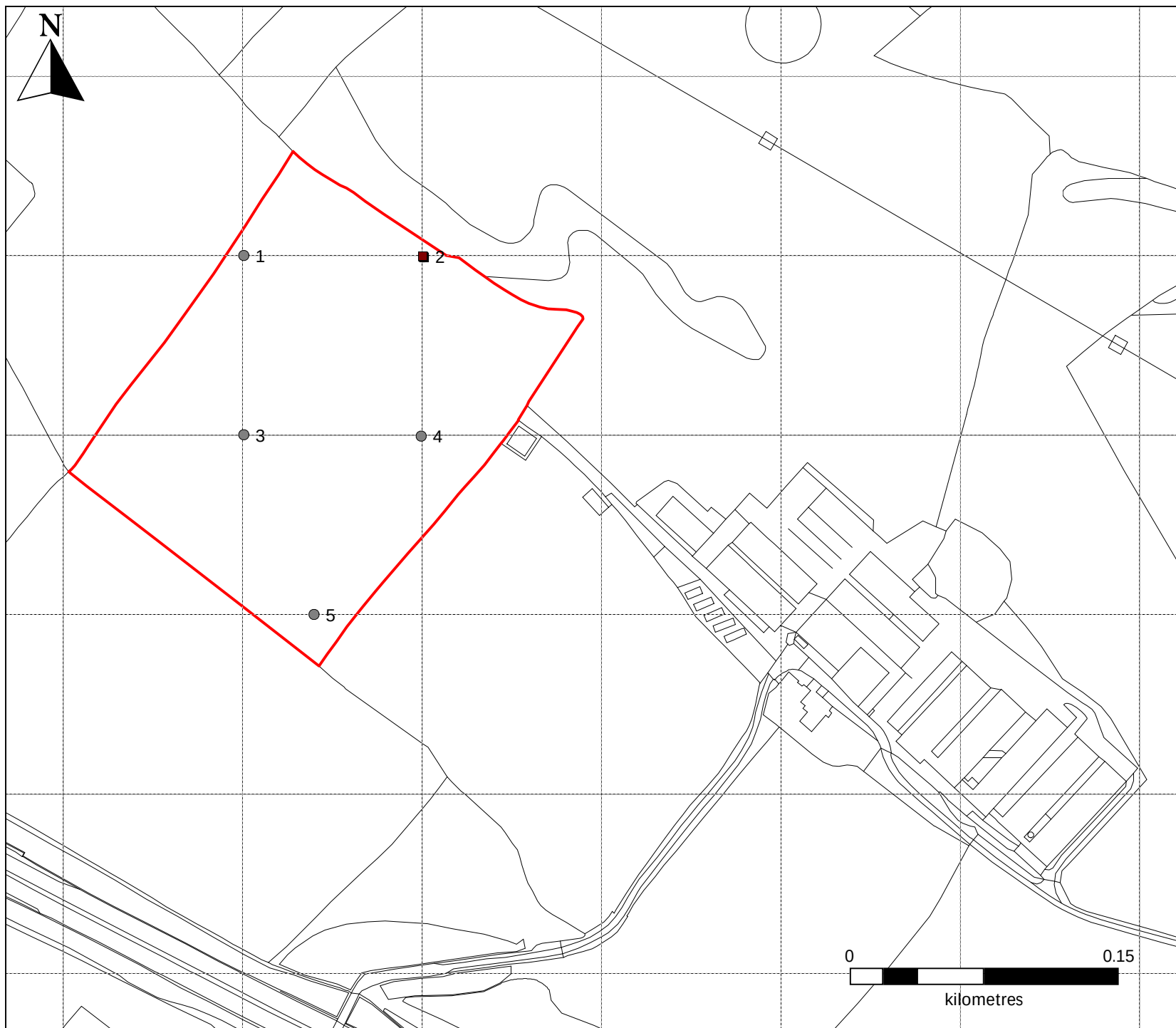
⁷calcareous classes as defined in Hodgson (1997)

Grades shown in brackets are the current gradings for restored soils

Soil pit descriptions

Pit 2

0-27 cm	Dark reddish grey (5YR 4/2) heavy clay loam; slightly stony with 5% medium subangular hard stones; moderately developed coarse angular blocky structure; friable; 5% fine pores and worm channels; abundant very fine fibrous roots; smooth clear boundary to:
27-42 cm	Reddish brown (5YR 4/3) clay with grey (5YR 6/1) ped faces and 15% reddish yellow (5YR 6/8) mottles; weakly developed very coarse prismatic structure; very firm; stoneless; <0.5% bio-pores; few fine roots; smooth diffuse boundary to
42-70+ cm	Red (2.5YR 4/6) clay/mudstone; weakly developed coarse platy structure; very firm.



KEY

● Auger observation

■ Soil/land grade
description pit

□ Survey area

Site:

**Land south of Lower Tean,
Stoke-on-Trent**

Map title:

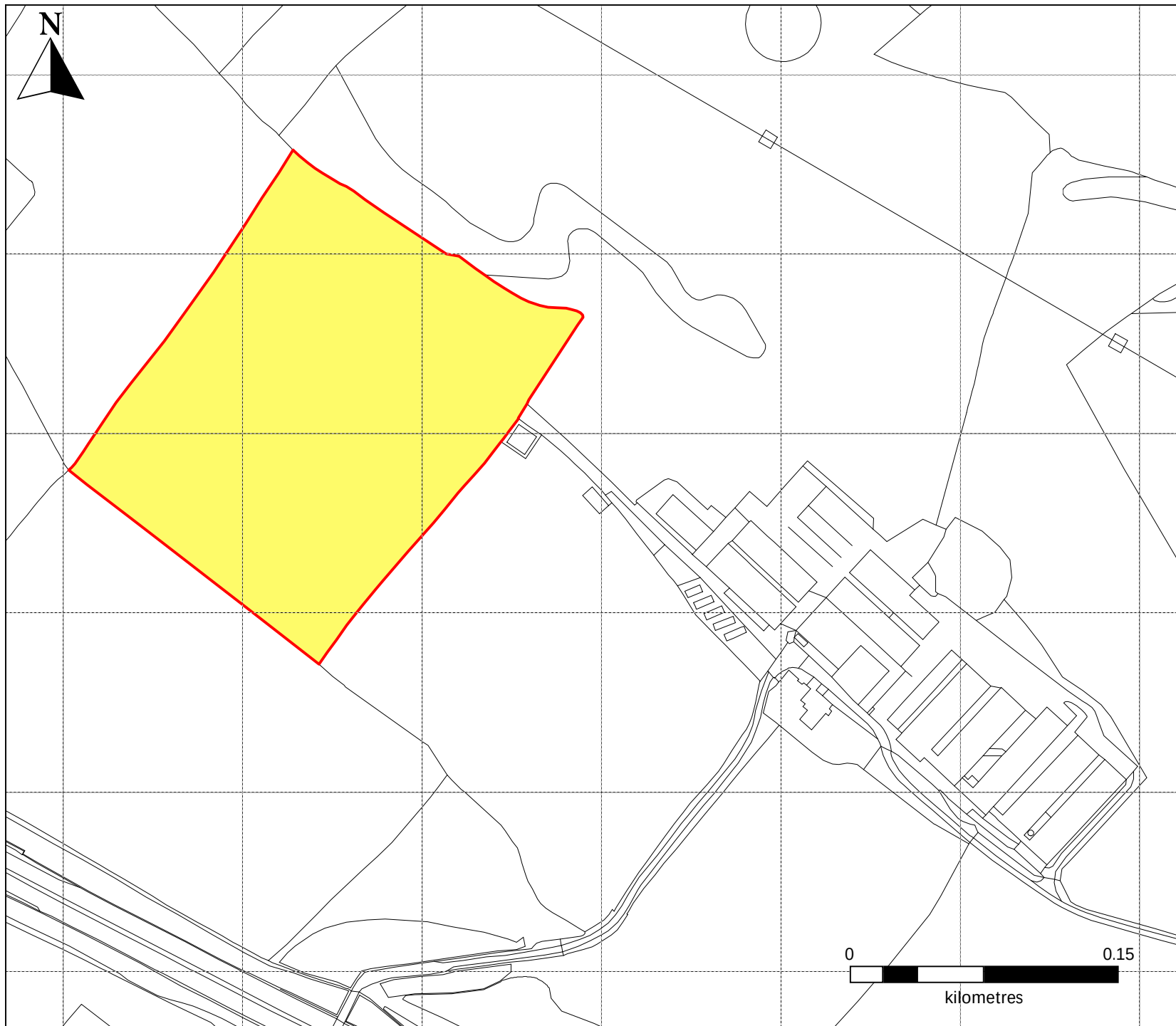
**Map 1
Survey observations**

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Scale: 1:3,000

Date: 23/08/2023



KEY

 Grade 4

 Survey area

Site:

**Land south of Lower Tean,
Stoke-on-Trent**

Map title:

**Map 2
Agricultural Land Classification**

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Date: 23/08/2023