

NOTTINGHAMSHIRE MINERALS LOCAL PLAN CALL FOR SITES

SITE NAME: BESTHORPE QUARRY

LOCATION EASTERN EXTENSION

	Plan Reference/Evidence	Additional Information
Proposed boundary of the site	Red line shown on Plan B302E117.	The proposed site boundary includes the proposed eastern extension area in addition to infrastructure at the existing Besthorpe Quarry (i.e. silt lagoons, clean water pond, plant site and access road) necessary to support the proposed development.
The extent of excavations	Refer to Plan B302E117.	The extent of excavations includes the proposed working phases in the eastern extension area with appropriate standoffs to the River Fleet along the eastern site boundary and standoffs along the northern/southern/western boundaries.
Proposed access to the site	As existing - refer to Plan B302E117.	Continued use of the purpose built access off the A1133 (Besthorpe Road) is proposed.
Potential location of processing plant	As existing - refer to Plan B302E117.	It is proposed to continue to utilise the existing processing plant at Besthorpe Quarry throughout the duration of the proposed development except during extraction of the underlying mineral when mobile processing plant would be utilised.
Phasing	Refer to Plan B302E117.	The proposed phasing includes the existing approved working phases (labelled Phase A-C) for consistency, although these sit outside the proposed site boundary.

		<p>The eastern extension area will be split into two main phases, which would follow the existing phases referred to above.</p> <p>The eastern extension phases comprise Phase D north of the access road, which will be split into four subphases and worked in an anti-clockwise direction and Phase E south of the access road which will also be split into four subphases and worked in a clockwise direction.</p> <p>The plant site area at the existing quarry comprises the last working phase.</p>
An OS Map of the site	OS detail included on Plan B302E117.	/
Estimated number of HGV Movements per day/month/year	/	Approximately 60 loads per day.

Reserve Data

	Plan Reference/Evidence	Additional Information
Quality and quantity of recoverable reserves	/	Estimated workable reserves of 3.3 mt of sand and gravel. Good quality Trent Valley sand and gravel suitable for production of concreting aggregate.
Estimated output per annum	/	Approximately 200,000 tonnes per annum.
Estimated lifespan of the mineral working (years)	/	Approximately 16 years extraction beyond the current extraction permitted under Planning Consent 3/14/02200/CMA.
When will the site be ready to be worked?		The remaining reserves in existing Phases A-C as shown on Plan B302E117 are expected to be exhausted within the next 3 years and it is anticipated that the site will be ready to be worked thereafter (2020/2021).

Role of Sites/Market

	Plan Reference/Evidence	Additional Information
Is the site a new Greenfield site or an extension?	/	Extension
If a Greenfield site, is it replacing an existing mineral working within or outside the county	/	/
What is your planned market area?		<p>The existing quarry has been operational for more than 20 years and serves the North Nottinghamshire and South Yorkshire market. There is on on site aggregate bagging plant.</p> <p>The market is influenced by the hgv routing restriction under the existing Section 106 Agreement, which directs all hgvs northwards on the A1133 to avoid travelling through Collingham village.</p> <p>The wharf facility to load river barges has been mothballed since 2013, but remains available to be brought back into action if the economics of supply to the West Yorkshire market by barge become viable again in the future.</p>
Is the location of the site optimum in terms of serving the market?	/	<p>Besthorpe Quarry is well placed for serving the north Nottinghamshire market as well as north Lincolnshire and Humberside.</p> <p>The quarry has an established barge loading facility to enable long distance river barges to serve additional markets. Barged sand and gravel from Besthorpe Quarry has historically supplied the West Yorkshire market, although that is currently not economically viable compared to present sand and gravel and crushed rock supply alternatives from North Yorkshire.</p>

		The barge facility is mothballed but remains a potential alternative transportation method should supply scenarios for the West Yorkshire market change in the future.
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Availability of Mineral

	Plan Reference/Evidence	Additional Information
Do you have the legal rights to work all of the mineral including access to a public highway or any other transport route?	/	Tarmac has leases of the necessary working rights over the vast majority of extension area (including the access to the main road) and are in negotiation with the owner of the two fields at the northern end of the extension area to secure necessary working rights.

Landowner Consent

	Plan Reference/Evidence	Additional Information
Who is the legal owner of the site?	/	Tarmac own part of the site, have leases from two other owners and are in negotiation with a third owner.
Is the legal owner of the site also a minerals operator?	/	No
Has the legal owner made a formal agreement with any mineral operator for minerals exploration and/or minerals extraction?	/	Yes. Tarmac have leases from two owners and are in negotiation with a third owner relating to the two northern fields in the extension area. All owners have given Tarmac their support for promoting the land for allocation

		in the Plan.
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Agricultural Land Classification

	Plan Reference/Evidence	Additional Information
Agricultural land classifications found within the site	Refer to the attached assessment of Soil Resources and Agricultural Use and Quality.	<p>In summary the eastern extension area is predominantly Subgrade 3b with 86% of the land falling within this subgrade.</p> <p>Areas to the northwest, equating to approximately 12% of the extension area, are Subgrade 3a, whilst non-agricultural areas (i.e hedgerow) account for 2% of the extension area.</p> <p>Restoration options are limited by a high flood risk. No importation of inert infill material is proposed.</p>

Sensitive Receptors

	Plan Reference/Evidence	Additional Information
Is the site located within 250m of any sensitive receptors? (schools, residential dwellings, workplaces, healthcare facilities)	Refer to Plan B302E117.	The application site is located in a predominantly rural setting and is relatively remote from residential properties with the closest property located more than 400 metres to the east.

Reclamation

	Plan Reference/Evidence	Additional Information	
<p>Proposed reclamation schemes – what opportunities for environmental benefits do you see arising from the scheme?</p>	<p>Refer to Plan B302RE117.</p>	<p>Restoration to predominantly water based nature conservation in line with the published RSPB “Bigger Better” vision for the restoration and after use of sand and gravel workings in the Trent Valley north of Newark.</p> <p>The extension area is to be progressively restored to water-based nature conservation after uses, including open water, shallows, wetland, and restored meadows and lake margins through the use of indigenous materials.</p> <p>The restoration scheme enhances the existing wetland nature reserve areas created through quarry reclamation schemes at Besthorpe Quarry over the previous 30 years and now managed by Nottinghamshire Wildlife Trust.</p>	
<p>Does the reclamation of the site depend on importing fill? If so, please indicate type of waste, main sources and timescales</p>	<p>/</p>	<p>Infill required?</p>	<p>No.</p>
		<p>Type of waste</p>	<p>/</p>
		<p>Main source of waste</p>	<p>/</p>
		<p>Timescales</p>	<p>/</p>

**RESTORATION OF EXISTING QUARRY
(CURRENTLY APPROVED SCHEME)**

PHASE A RESTORATION AREA

- Margins to Western and Southern Lakes
Soil storage bunds will be removed to create additional shallows in the margins of the Western and Southern Lakes. Re-grading works will also take place to create low profile seasonal ponds and shallows in the lake margin areas.

- Silt Pond A

During Phase A silt disposal will be discontinued in Silt Pond A in the north west corner of the site. Silt will be settled in Silt Pond B. This will allow the silt in Silt Pond A to dry out as the water table returns to its natural seasonal level. This will create more extensive shallow areas which will be further enhanced by the removal and placement of soils from the adjacent soil storage bunds. Tree and shrubs will be planted to add to the existing vegetation.

- Phase A Extraction Area

During the period of extraction of Phase A the overburden and existing soil storage bunds will be progressively placed back into the excavated void. This will create shallow lake margins as part of the formation of the new Northern Lake.

PHASE B RESTORATION AREA

During Phase B de-watering of the Southern Lake will take place to allow the extraction of the remaining reserves of sand and gravel in the quarry floor. This will be followed by the re-grading of the eastern and south east lake margins.

Two new lake viewing areas will also be created with pedestrian access from the public right of way on the eastern boundary of the site and from the public highway on the southern boundary of the quarry.

PHASE C RESTORATION AREA

Re-grading works and overburden placement during Phase C will create a new footpath corridor through the central part of the site. This will replace part of the current footpath to allow the extraction of the remaining Phase C sand and gravel.

The restoration in the Phase C Extraction Area will create an Eastern Lake with bays and shallow lake margins.

Soils will be placed to create the margins and tree and shrub planting will be undertaken in the first season following completion of re-grading works. The planting will enhance the existing vegetation.

PHASE F RESTORATION AREA

This is the restoration of the main plant site, operational product stocking areas and silt ponds. The area was Phase D in the permitted restoration scheme.

The Phase F restoration is the final Phase of restoration in the current scheme and will follow after the restoration of the proposed Eastern Extension. The restoration in Phase F will incorporate various shallow lake margins and bays with additional tree and shrub planting around the lake perimeter.

Following cessation of silt placement in Silt Pond B final re-grading works and tree and shrub planting will take place. The restored area of shallows will form part of the Western Lake.

RESTORATION OF PROPOSED EASTERN EXTENSION AREA

PHASE D RESTORATION AREA

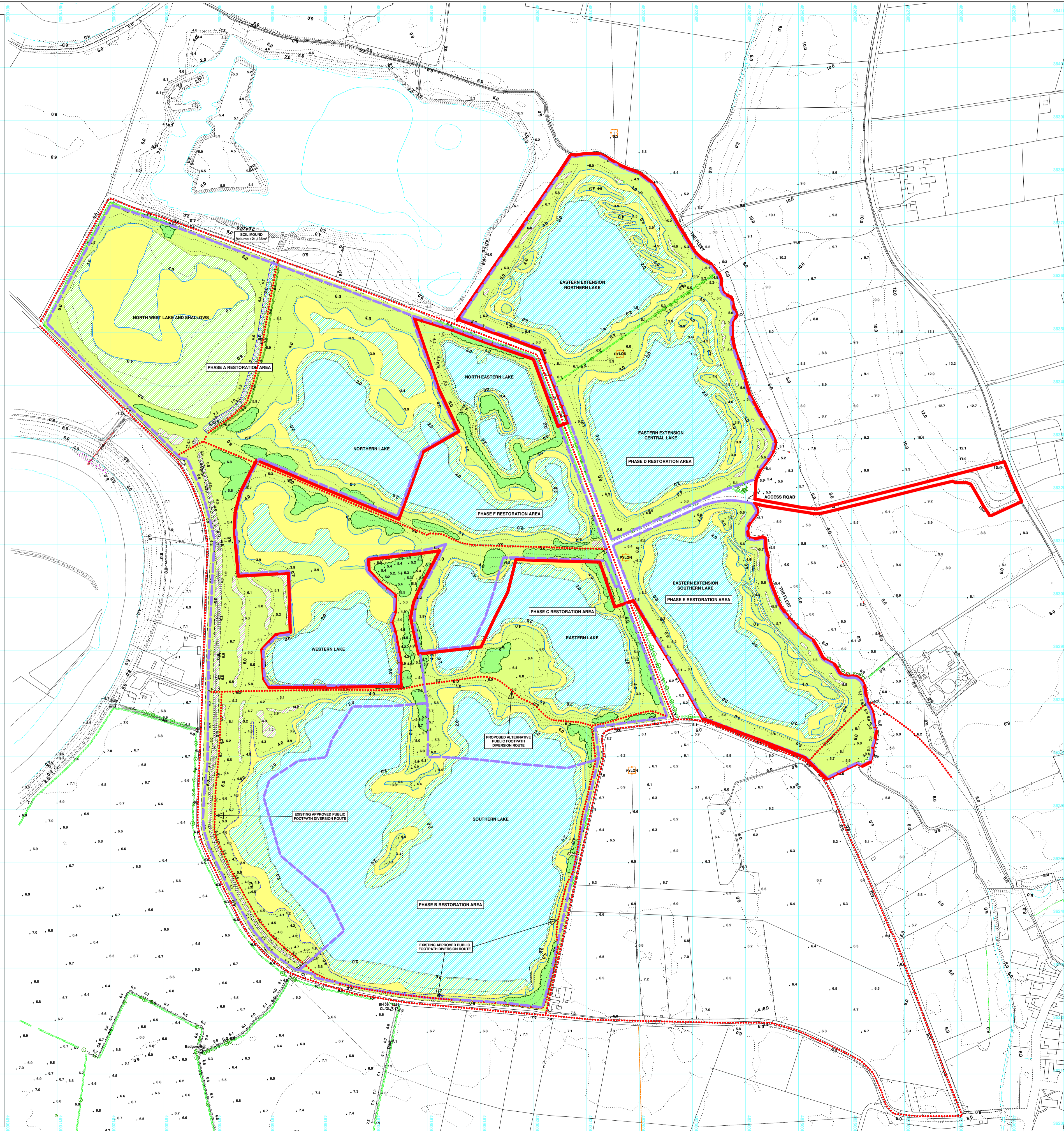
Phase D is part of the proposed Eastern Extension Area to the north of the quarry access road. The restoration will be to two lakes which will be in continuity with the ground water. The soil and overburden overlying the sand and gravel as well as some clay from the base of the extraction areas will be used to create a wide area of shallow islands on the eastern margin of the area adjacent to the Fleet.

The hedgerow and trees in the centre of the Phase D Restoration Area will be replanted along its original line to replace the landholding boundary and to divide the area into two lakes. Various shallow seasonal ponds will be created around the eastern perimeter of the Phase D Restoration Area to increase the biodiversity of the final restoration.




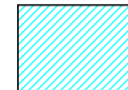

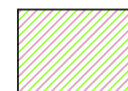
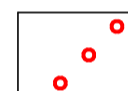


PHASE E RESTORATION AREA

Phase E is the part of the proposed Eastern Extension to the south of the quarry access road. The restoration will be carried by phased earthmoving operations to create the final landform.

The southern area will be extracted and backfilled to enable the public right of way to be restored back along its original line with the land to the south restored to a species rich wild flower meadow. The eastern margin of the Phase E Area will be restored to a series of shallows and islands. This area combined with the Phase D area will create a very high quality wildlife corridor over 1.1 km long and 80 metres wide to the west of the Fleet.

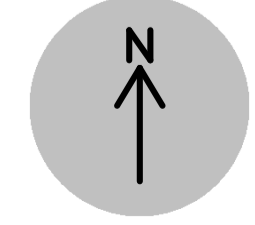


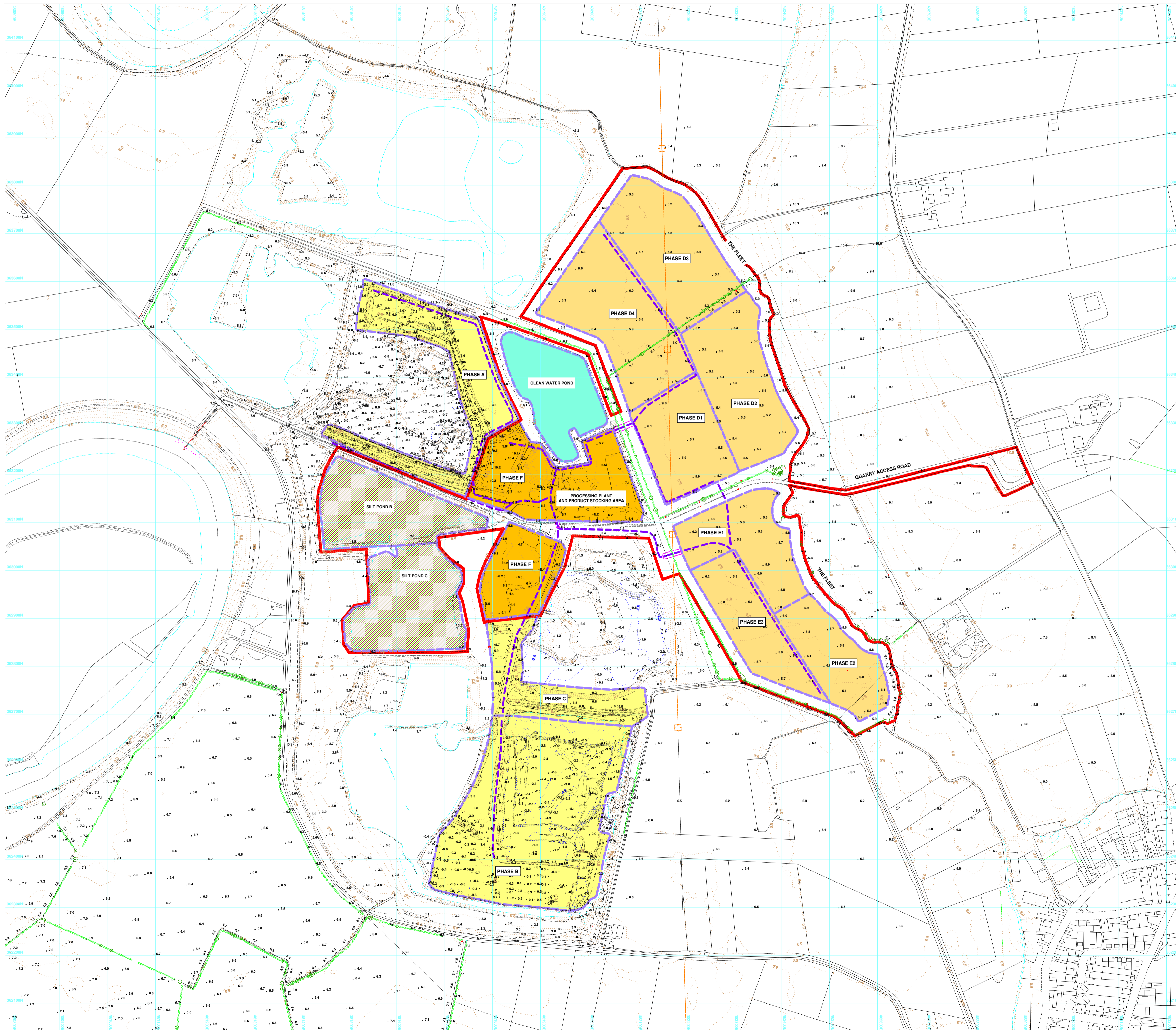
LEGEND

-  Restored meadows and lake margins.
-  Area of shallow water in lakes and ponds between 0 and 0.5m deep.
-  Area of shallow water in lakes and ponds between 0.5 and 2 metres deep.
-  Area of deep water in lakes and ponds generally greater than 2 metres deep.
-  Former silt pond areas allowed to re-generate into areas of willow carr
-  Areas of seasonal wetland hollows above water table
-  Public Right of Way
-  Restoration Phase Boundaries
-  Application Area

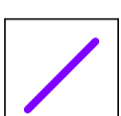



Site Name: Besthorpe Quarry	
Drawing Name: Proposed Eastern Extension Concept Final Restoration	
Drawn By: N.G.Jones	Scale: 1 : 4000
Date: 07/07/2017	Drawing No: B302RE117.PDF





LEGEND

-  Existing permitted extraction areas phases A,B and C.
-  Proposed additional extraction areas with Eastern extension Area. Phases D1, D2, D3 and D4 (north of quarry access road). Phases E1, E2 and E3 (south of quarry access road).
-  Existing permitted extraction area containing processing plant and product stockpiles. Area to be worked as final phase of extraction after extraction of Eastern Extension Area Phase F.
-  Main access routes to transport sand and gravel back to processing plant area.
-  Location of where quarry roads cross public rights of way
-  Area of silt disposal from processing sand and gravel.
-  Area of existing clean water used to process sand and gravel
-  Extraction Area Phase Boundaries
-  Application Area



Site Name:
Besthorpe Quarry

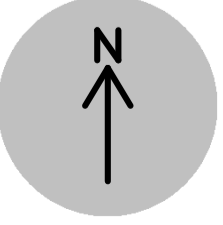
Drawing Name:
**Eastern Extension
Phasing of Extraction**

Drawn By:
N.G.Jones

Date:
07/07/2017

Scale:
1 : 4000

Drawing No:
B302E117.PDF



**SOIL RESOURCES AND
AGRICULTURAL USE & QUALITY OF
LAND AT EAST OF
BESTHORPE QUARRY
(EASTERN EXTENSION)**

Report 1347/1

18th September, 2017

**SOIL RESOURCES AND AGRICULTURAL USE & QUALITY
OF LAND EAST OF BESTHORPE QUARRY
(EASTERN EXTENSION)**

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Report 1347/1

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18th September, 2017

SUMMARY

A soil resources and agricultural land quality survey has been undertaken of 36.2 ha of land east of Besthorpe Quarry, Nottinghamshire.

The survey has shown two main soil types at the site: permeable loamy soils and slowly permeable clayey soils. The land is predominantly of subgrade 3b agricultural quality with an area in the north-west of subgrade 3a and grade 2 quality. The land is mainly limited by wetness or flood risk, although some areas suffer droughtiness limitations.

Permeable loamy soils are a reusable topsoil resource of moderate to high quality, although the proposed wetland restoration scheme would be best achieved without the use of topsoil.

1.0 Introduction

- 1.1 This report provides information on the soil resources and agricultural quality and use of 36.2 ha of land to the east of Besthorpe Quarry, which has been proposed as an extension to the existing quarry. The report is based on a survey of the land in September 2017.

SITE ENVIRONMENT

- 1.2 The site comprises four arable fields. It is bordered to the west by Besthorpe Quarry, to the east by The Fleet river and on other sides by adjoining agricultural land.
- 1.3 The land is level at an average elevation of approximately 10 m AOD.

AGRICULTURAL USE

- 1.4 The two northern most fields are registered to an Entry Level plus Higher Level Stewardship (HLS) scheme as part of a wider 540 ha holding. None of the other land is registered to any agri-environment schemes.
- 1.5 All of the land was in stubble following the harvest of a cereal crop at the time of survey.

PUBLISHED INFORMATION

- 1.6 1:50,000 BGS geological information shows the basal geology as Mercia Mudstone Group (mudstone). Superficial deposits of alluvium (clay, silt, sand and gravel) are recorded to overlie the majority of the site, with an area of Holme Pierre Point Sand and Gravel Member in the north.
- 1.7 The National Soil Map¹ (1:250,000 scale) shows the land as within the Fladbury 2 Association. These soils are formed in alluvium and are mainly fine-textured (clayey) with slowly permeable subsoil.
- 1.8 Provisional Agricultural Land Classification of the site shows the land as grade 3. No more detailed survey of the site has been published.

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 detailed soil resource and agricultural quality survey was carried out in September 2017. It was based on observations at intersects of a 100 m grid, giving a sampling density of one observation per hectare. During the survey soils were examined by a combination of pits and augerings to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

SOILS

2.2 Two soil types, varying in texture and drainage, were identified. They are mapped in Map 2 (see appendix) and are described below.

Permeable loamy soils

2.3 These soils are located in the east of the site. Broadly the soils comprise heavy clay loam or sandy clay loam topsoil over permeable sandy clay loam subsoil. However, subsoils vary in texture from sandy clay loam to sand.

2.4 An example profile from a pit at observation 10 (Map 1) is described below:

0-30 cm	Dark brown (7.5YR 3/3) heavy clay loam; very slightly stony with small rounded hard stones; very well developed fine subangular blocky structure; friable; smooth clear boundary to:
30-63 cm	Reddish brown (5YR 4/3) sandy clay loam with common faint fine reddish yellow (7.5YR 6/8) mottles; stoneless; well developed fine subangular blocky structure; smooth clear boundary to:
63-120 cm+	Yellowish red (5YR 4/6) sandy clay loam with common fine faint reddish yellow (5YR 6/8) and pinkish grey (7.5YR 6/2) mottles and few fine distinct ferrimanganiferous concretions; very stony with small rounded gravel stones; weakly developed fine to medium subangular blocky structure; friable.

2.5 These soils are freely-draining (Soil Wetness Class I/II) and have a high capacity to absorb excess winter rainfall.

Slowly permeable clayey soils

2.6 These soils dominate at the site and comprise clay topsoil that lies directly over slowly permeable clay subsoil.

2.7 An example profile from a pit at observation 32 (see Map 1) is described below:

0-32 cm	Dark greyish brown (10YR 3/2) clay with distinct common reddish yellow (7.5YR 6/8) root channel mottles; stoneless; weakly developed medium subangular blocky structure; firm; smooth clear boundary to:
32-120 cm+	Dark grey (2.5Y 4/1) clay with common distinct fine reddish yellow (7.5YR 6/8) mottles; stoneless; massive(structureless); very firm.

- 2.8 These soils are imperfectly-draining (Soil Wetness Class III) and have a moderate to low capacity to absorb excess winter rainfall.

3.0 Agricultural Quality

3.1 To assist in assessing land quality, the former 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 Agricultural Land Classification (ALC) system classifies land into five grades numbered 1 to 5, with grade 3 divided into two sub-grades (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 Classification.² The relevant site data for an average elevation of 10 m is given below.

- Average annual rainfall: 573 mm
- January-June accumulated temperature >0°C 1426 day°
- Field capacity period 112 days
(when the soils are fully replete with water) early Dec – early Apr
- Summer moisture deficits for: wheat: 116 mm
potatoes: 110 mm

3.3 The survey described in the previous section was used in conjunction with the agroclimatic data above to classify the site using the revised guidelines for Agricultural Land Classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food.³ There are no climatic limitations in this locality.

SURVEY RESULTS

3.4 Land of grade 3 exists on the site. Land quality is mainly determined by wetness or flooding, with some limited by droughtiness.

² *Climatological Data for Agricultural Land Classification*. Meteorological Office, 1989

³ *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*. MAFF, 1988.

Subgrade 3a

- 3.5 This grade accounts for 4.6 ha of the land, limited by wetness where the combination of a moderately high clay content topsoil and slightly impeded drainage is likely to limit access with machinery during winter and early spring, thereby restricting cultivation flexibility.
- 3.6 An area in the north of the site is limited to this subgrade by droughtiness. The sandy subsoil in this part of the site has a restricted moisture storage capacity which is likely to reduce average yields of arable crops.
- 3.7 All of the land in this grade is equally limited by flood risk. The rate of flooding has been deemed occasional (once every 5 years). Flooding influences the choice of crops grown, due to the detrimental effect it has on yields at certain times of year, and can cause soil management problems.

Subgrade 3b

- 3.8 This subgrade accounts for 31 ha of the site. The combination of a high topsoil clay content and imperfect drainage results in restricted machinery access to the land in winter and spring, with arable land use mainly limited to autumn-sown combinable crops.

Non agricultural

- 3.9 This land comprises hedgerows and a roadway to the quarry.

Grade areas

- 3.10 The boundaries between the different grades of land are shown on Map 3 and the areas occupied by each are shown below.

Table 1. Areas within the survey area occupied by the different land grades

<i>Grade/sub-grade</i>	<i>Area (ha)</i>	<i>% of land</i>
Subgrade 3a	4.6	12
Subgrade 3b	31.0	86
Non agricultural	0.6	2
Total	36.2	100

4.0 Soil resources and their use

4.1 Government policy as outlined in the Defra Soil Strategy for England and Department of Communities and Local Government's National Planning Policy Framework (paragraphs 109 and 143) is to protect valuable soil resources from loss or damage during land disturbance and ensure that stripped soils are used either for land reinstatement after quarrying or other beneficial use off-site.

4.2 The identified soil resources are shown on Map 2.

TOPSOIL

TS1

4.3 This topsoil occurs in the north and east of the site and is a high to moderate quality resource comprising sandy clay loams and heavy clay loams (**TS1**). Should these soils be stripped it should be as a single resource to a thickness of **300 mm**. The soil is well structured although handling with machinery should be avoided during or just after heavy rainfall and is best carried out between March and November.

Estimated potential maximum yield TS1: 9,000 m³

TS2

4.4 This comprises the rest of the soils on site, predominantly clays with some heavy clay loams. These soils are difficult to handle with machinery and have a poor structure which will likely worsen with stripping. This topsoil is approximately **300 mm** thick over the whole site.

Estimated potential yield TS2: 98,000 m³

SUBSOIL

4.5 The proposed landscaping scheme (shallow and open water wetland with areas of meadow grassland) would be best achieved by excluding the use of topsoil resources, which, having been in intensive agricultural use, are very likely high in available nutrients. This would result in an undesirable species mix for grassland areas and excessive nutrient loss to wetland areas. The following subsoil resources have been identified for reuse in the landscaping scheme:

SS1

- 4.6 Loamy and sandy subsoils found in the north and east of the site (see Map 2) may be used as a planting medium for meadow areas.

Estimated minimum potential yield (to 1.2 m sample depth) SS1: 27,000 m³

Other subsoils

- 4.7 Clay subsoils (which cover most of the site) may be utilised as liners for open water areas.

Soil Handling and Restoration

- 5.1 Soil resources can be damaged by being stripped or moved when wet. Consequently, stripping should only take place in the driest parts of the year and avoided during or just after heavy rainfall. Soils should be stripped using the excavator and dumper method as described by Sheet 1 in the MAFF Good Practice Guide for Handling Soils⁴.
- 5.2 The resources should be stripped and stored separately in low bunds (no more than 3 m high for topsoil). Topsoil should be stripped from areas designated for storing subsoil. The bunds should be constructed either by excavator or bulldozer (Sheets 2 and 14 in the MAFF Good Practice Guide) avoiding over-compaction. They should be sown with grass to help maintain biological activity and prevent water erosion.
- 5.3 The soils should be removed from storage (Sheet 3 in the MAFF Good Practice Guide) and replaced by excavator during the summer using the loose tipping technique (Sheet 4 in MAFF Good Practice Guide), which avoids traffic on the restored surfaces.

⁴ MAFF Good Practice Guide for Handling Soils, (www.defra.gov.uk/farm/environment/land-use/soilguid/)

APPENDIX

MAPS AND DETAILS OF OBSERVATIONS

Land east of Besthorpe Quarry: Details of observations at each sampling point

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
1	0-27	C	<5	27-90+	C	xxx				0	III	3b	W
2	0-32	LMS	<5	32-70	LMS	x	70-100+	MS	o	0	I	3b	D
3	0-30	C	<5	30-67	SC	xxx	67-100	MSL/SCL	xxx	0	III	3b	W
4	0-30	C	<5	30-100+	C	xxx				0	III	3b	W
5	0-31	SCL	<5	31-73	SCL	xxx	73-100+	MSL	xx	0	I	3a	FI
6	0-29	C	<5	29-54	HCL	xxx	54-100+	SCL	xxx	0	II	3a	W/FL
7	0-28	C	<5	28-47	C	xxx	47-100	C grey	xxx	0	III	3b	W
8	0-25	C	<5	25-80+	C	xxx				0	III	3b	W
9	0-30	C	<5	30-71	HCL	xxx	71-100+	SCL	xxx	0	II	3a	W/FI
10	0-30	HCL	<5	30-63	SCL	x	63-100+	SCL	xxx	0	I	3a	FI
11	0-30	C	<5	30-60	C	xxx	50-100	SCL	xxx	0	III	3b	W
12	0-30	C	<5	30-80+	C	xxx				0	III	3b	W
13	0-25	C	<5	25-100+	C	xxx				0	III	3b	W
14	0-32	HCL	<5	32-60	C	xxx	60-100+	HCL/SCL	xxx	1	III	3b	W
15	0-27	C	<5	27-100	C	xxx				0	III	3b	W
16	0-22	C	<5	22-110	C	xxx				0	III	3b	W
17	0-28	C/HCL	<5	28-80	SCL/HCL	xxx	80-100+	SCL	xxx	0	II	3a	W/FI
18	0-20	C	<5	20-110+	C	xxx				0	III	3b	W
19	0-26	C	<5	26-100+	C	xxx				0	III	3b	W
20	0-26	C	<5	26-110+	C	xxx				0	III	3b	W
21	0-30	C	<5	30-100+	C	xxx				0	III	3b	W
22	0-33	C	<5	33-110+	C	xxx				0	III	3b	W
23	Non agricultural – ditch/hedgeline												
24	0-30	HCL	<5	30-54	HCL	xxx	54-80+	HZCL	xxx	0	II	3a	W/FI
25	0-30	C	<5	30-80+	C	xxx				0	III	3b	W
26	0-25	C	<5	25-80+	C	xxx				1	III	3b	W
27	0-28	HCL	<5	28-43	HCL	x	43-54 54+	Gravel/SCL Stopped (dist.?)	xxx	0	II	3a	D/FI
28	0-27	C	<5	27-80+	C	xxx				0	III	3b	W
29	0-29	C	<5	29-80+	C	xxx				0	III	3b	W
30	0-21	C	<5	21-80+	C	xxx				0	III	3b	W
31	0-30	C	<5	30-44	C	xxx	44-80 80+	SCL Stopped on stone	xxx	I	III	3b	W
32	0-32	C	<5	32-100+	C	xxx				0	III	3b	W
33	0-30	C/HCL	<5	26-46	C mod st	xxx	46-52 52+	SCL Stopped on stone	xxx	0	III	3b	W
34	0-28	C	<5	28-77	C (sand inc.)	xxx	77+	Stopped on stone		0	III	3b	W
35	0-33	HCL	<5	33-100+	C	xxx				0	III	3b	W
36	0-27	C	<5	27-80+	C	xxx				1	III	3b	W

Key to table

Mottle intensity:

- o unmottled
- x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
- xx common to many ochreous mottles and/or dull structure faces
- xxx common to many greyish or pale mottles (gleyed horizon)
- xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

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

Texture:

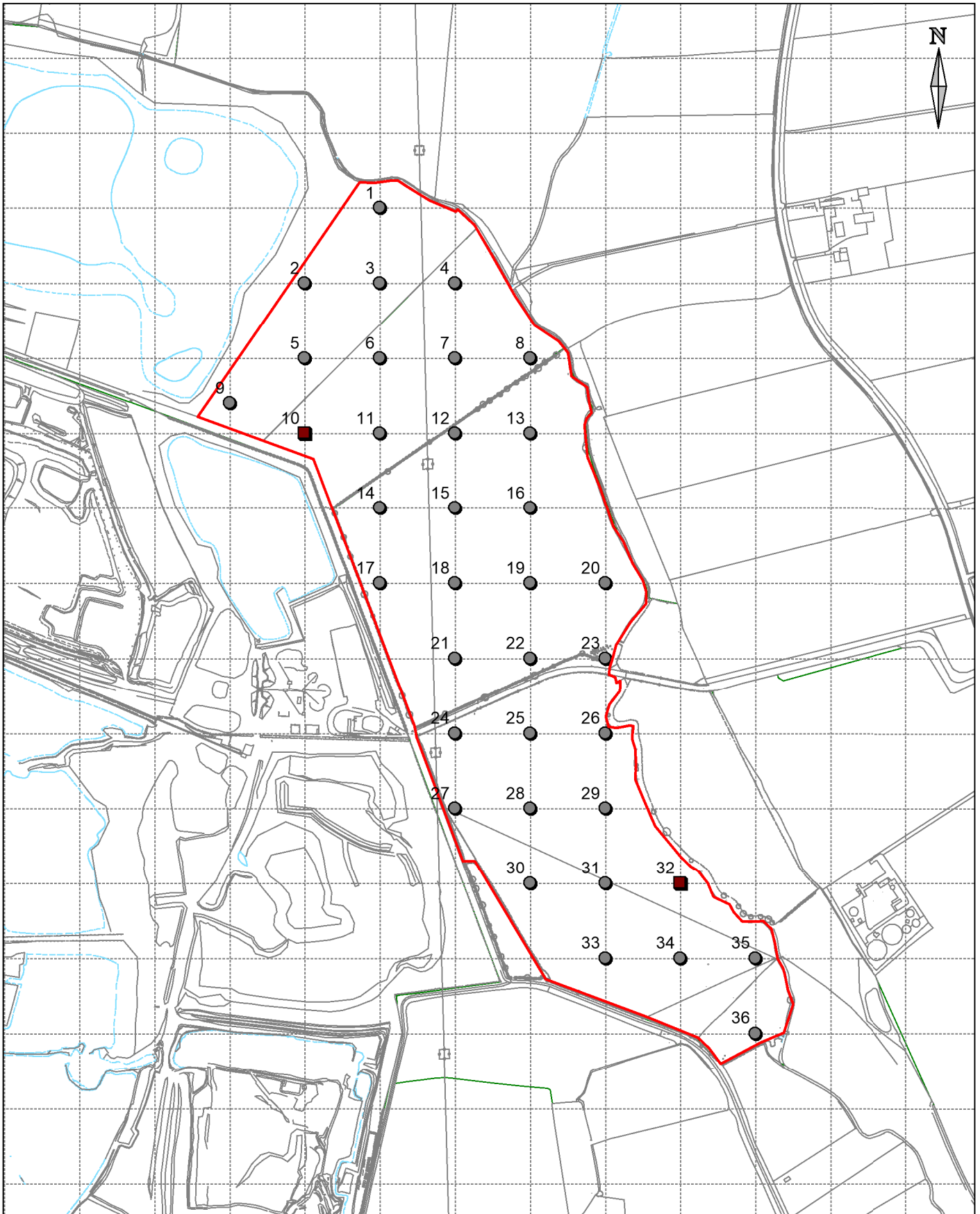
- C - clay
- ZC - silty clay
- SC - sandy clay
- CL - clay loam (H-heavy, M-medium)
- ZCL - silty clay loam (H-heavy, M-medium)
- SCL - sandy clay loam
- SZL - sandy silt loam (F-fine, M-medium, C-coarse)
- SL - sandy loam (F-fine, M-medium, C-coarse)
- LS - loamy sand (F-fine, M-medium, C-coarse)
-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

Limitations:

- W - wetness/workability
- D - droughtiness
- De - depth
- St - stoniness
- SI - slope
- FI - Flooding
- T - topography/microrelief

Texture suffixes & prefixes:

- ca - calcareous: x-extremely, v-very, sl-slightly
- (ca) - marginally calcareous
- st - stony, v st - very stony
- h - organic
- gr - greyish, br - brownish, r - redd



Client:  **TARMAC**
A CRH COMPANY

Project: **Land east of
Besthorpe Quarry**

Map title: **Map 1
Survey observations**

KEY

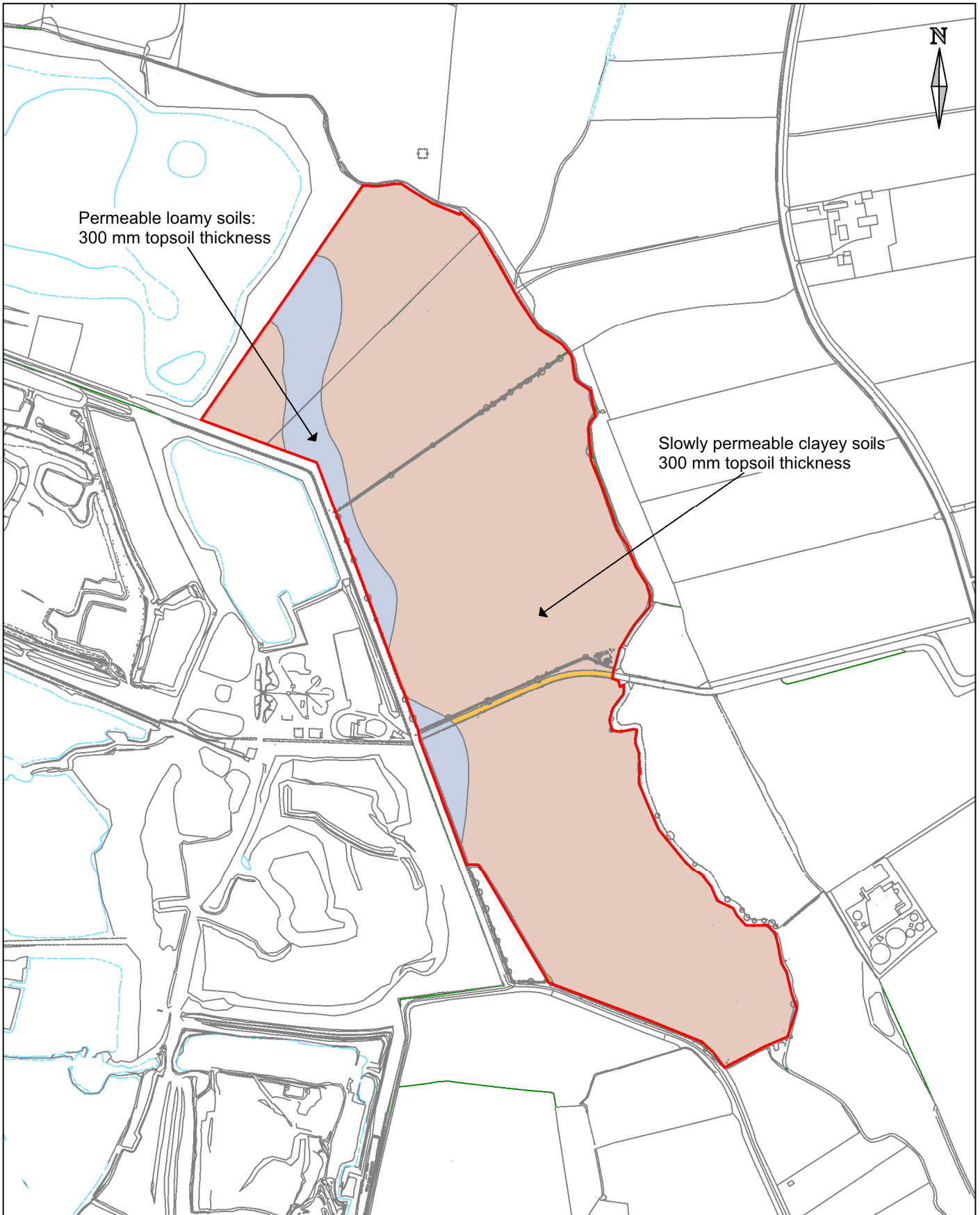
- Survey observation
- Soil/land grade description pit
- ▭ Survey area

Scale: 1:7,000 at A4

Date: 08/09/2017

**Land
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Client: **TARMAC**
A CRH COMPANY

Project: **Land east of
Besthorpe Quarry**

Map title: **Map 2
Soil types**

KEY

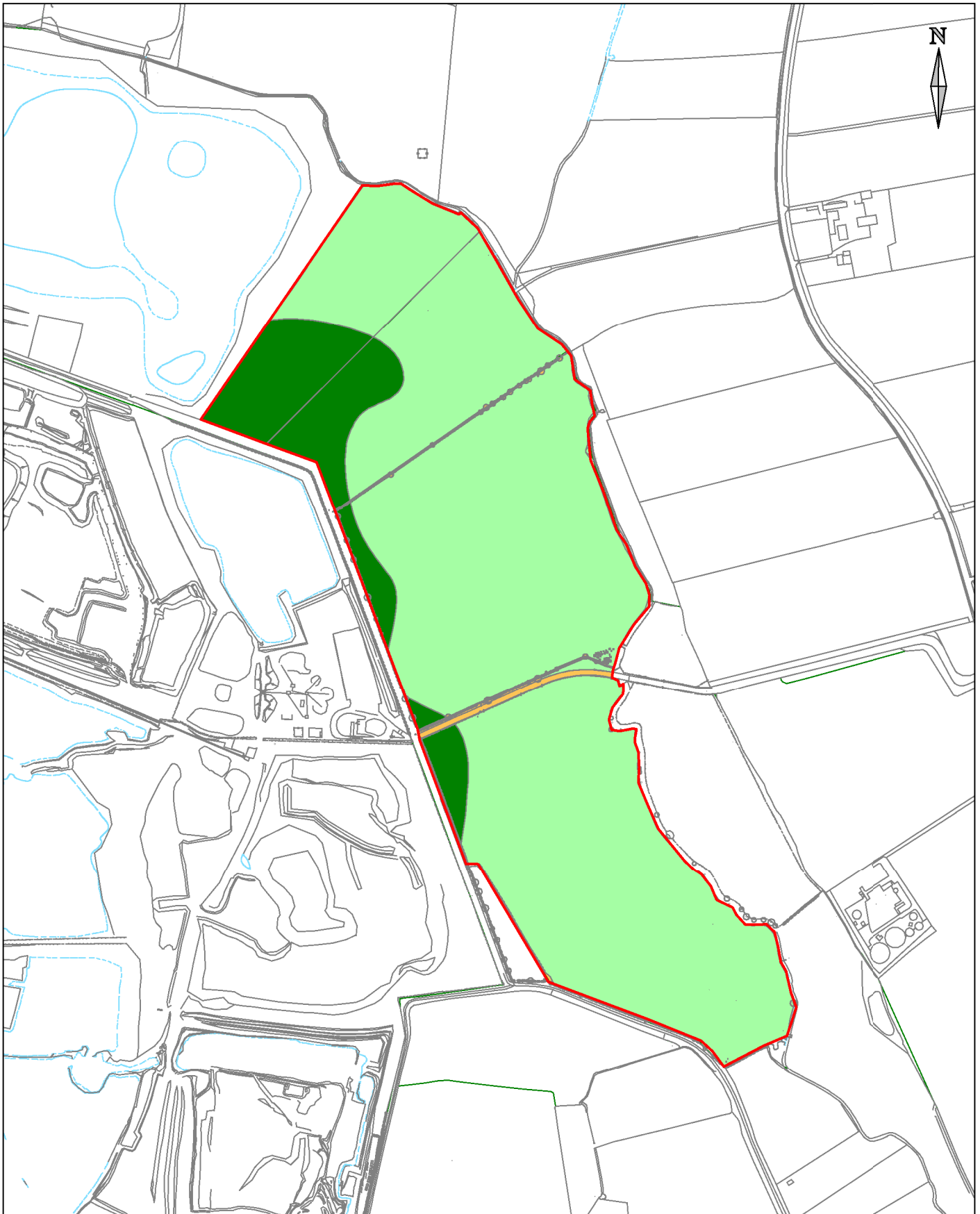
- Permeable loamy soils (TS1/SS1)
- Slowly permeable clayey soils (TS2)
- Non agricultural land
- Survey area

Scale: 1:7,000 at A4

Date: 08/09/2017

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Client:  **TARMAC**
A CRH COMPANY

Project: **Land east of
Besthorpe Quarry**

Map title: **Map 3
Agricultural Land Classification**

KEY

-  Subgrade 3a
-  Subgrade 3b
-  Non agricultural land
-  Survey area

Scale: 1:7,000 at A4

Date: 08/09/2017

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