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A27 Arundel Bypass

Archaeological and Geoarchaeological Monitoring of Geotechnical Investigations

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1. Summary

1.1.1 Wessex Archaeology was commissioned by AECOM on behalf of Linkconnex (a partnership between BAM Ritchies, AECOM, and MACE) and their client, National Highways, to undertake geoarchaeological monitoring of Phase 2 and Phase 3 Ground Investigation (GI) works undertaken in advance of a proposed new A27 bypass to the south of Arundel (the Scheme). This report contains the results of this GI monitoring and presents a baseline assessment of archaeological and geoarchaeological potential of superficial geological deposits

1.1.2 To fulfil the aims and objectives of the monitoring, all machine dug trial pits were subject to archaeological and geoarchaeological monitoring. In total 29 trial pits were subject to archaeological and geoarchaeological monitoring. Archaeological monitoring of topsoil stripping during compound set-up was carried out where there was a risk of impacting archaeological remains.

1.1.3 Prior to the commencement of GI works, and in consultation with West Sussex County Council and Historic England's Science Advisor, the locations of proposed boreholes were subject to specialist geoarchaeological review. This review identified a range of boreholes suitable for monitoring, which would enable baseline assessment of the superficial deposits present across the Scheme. In total 57 boreholes were subject to geoarchaeological monitoring. The results of the on-site geoarchaeological monitoring have been combined with a geoarchaeological review of all 232 draft GI logs.

1.1.4 No significant archaeology was identified during monitoring of GI works. However, the monitoring has enabled the Quaternary stratigraphy present across the route to be determined, and a baseline assessment of the archaeological and geoarchaeological potential of these deposits to be provided.

1.1.5 A geoarchaeological deposit model and associated Geoarchaeological Landscape Characterisation (GLC) of the Scheme is presented. The GLC subdivides the areas investigated by the GI into ten Geoarchaeological Characterisation Zones (GCZs) based on variation in the Quaternary sediments. An initial assessment of the archaeological and geoarchaeological potential of the deposits present in each GCZ has been developed. Additionally, monitoring recovered samples from key deposits suitable for palaeoenvironmental assessment.

1.1.6 Quaternary deposits within the Scheme encompass at least three, and possibly four, periods of Middle Pleistocene near-shore marine and estuarine sedimentation belonging to the Sussex and Hampshire coastal plain raised beach sequence, with deposits of the Westbourne/Arundel, Aldingbourne and Brighton/Norton Beaches delimited. Additionally, four Middle and Upper Pleistocene terraces of the River Arun, including previously unrecognised terraces beneath the Holocene floodplain, have

been identified, as have extensive late Pleistocene and Holocene alluvial sequences in the Arun and two tributaries with the Binsted and Tortington Rifes. In the Arun Valley this includes a possible early Holocene peat.

1.1.7 Pleistocene deposits with possible Palaeolithic archaeological and geoarchaeological occur in most GCZs. Holocene sediments that may have archaeological and geoarchaeological potential occur within GCZs defined by the valleys of the Arun, Binsted Rife and Tortington Rife.

1.1.8 To fully established the risk of the Scheme impacting on deposits containing significant archaeological and geoarchaeological evidence, purposive archaeological and geoarchaeological works are likely to be required. The requirements and scope of these works can be guided and targeted by this baseline assessment, and through assessment of palaeoenvironmental samples recovered during GI monitoring. Recommendations for further works, including palaeoenvironmental assessment of selected samples recovered during monitoring, are provided.

2. Introduction

2.1 The project background

2.1.1 Wessex Archaeology was commissioned by AECOM on behalf of Linkconnex (a partnership between BAM Ritchies, AECOM, and MACE) and their client, National Highways, to undertake geoarchaeological monitoring of Ground Investigation (GI) works undertaken in advance of a proposed new A27 bypass to the south of Arundel (the Scheme). This report contains the results of this GI monitoring.

2.1.2 The GI monitoring and reporting follows the recommendations and procedures outlined in a Written Scheme of Investigation (WSI) prepared by AECOM on behalf of Highways England and Linkconnex (HE551523-BAM-EHR-ZZ-SP-AG-0001).

2.1.3 The program of monitoring outlined within the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001) was designed to mitigate against any potential impacts of the GI on the archaeological and geoarchaeological resources, and to provide a baseline assessment of archaeological and geoarchaeological potential of superficial geological deposits.

2.2 The Scheme and GI works

2.2.1 The Scheme will feature approximately 8km of new dual two-lane carriageway located to the south of the existing A27. The proposed route would start in the east at Crossbush and end east of the A27/ A29 Fontwell (east) roundabout (**Figure 1**). The scheme falls within the administrative boundaries of West Sussex County Council and Arun District Council.

2.2.2 Linkconnex has been appointed as the Principal Designer for the Scheme. Linkconnex commissioned two different geographic phases of GI works to obtain information for the management of ground uncertainties and risks relevant to the scheme. These two phases are referred to as Phase 2 and Phase 3. Phase 2 GI works were situated along the east of the Scheme, between Ford Road and Crossbush, whilst Phase 3 works were located between the A27/ A29 Fontwell (east) roundabout and Ford Road (**Figure 2**).

2.2.3 Arcadis were appointed as the Principal Contractor to undertake the Phase 2 GI works with BAM Ritchies appointed as the Principal Contractor to carry out the Phase 3 investigations. This document reports on archaeological and geoarchaeological monitoring of GI works for both the Phase 2 and 3.

2.2.4 Phase 2 included all GI works carried out east of Ford Road to the Crossbush area and incorporated the floodplain of the Arun River (**Figure 2**). This phase covered land with the Arun floodplain mostly used as pasture with areas of mixed agricultural situated east of the Arun, along the eastern edge of the Phase 2 area.

2.2.5 The Phase 2 GI locations are illustrated in **Figure 2** and included:

- 46 dynamic sampler boreholes
- 20 window sampler boreholes;
- 6 cable percussive boreholes;
- 8 machine excavated trial pits, and
- associated working compounds and laydown areas.

1.1.2 Phase 3 was located west of Ford Road to A27/ A29 Fontwell (east) roundabout (**Figure 2**). It incorporated the western edge of the Arun floodplain, running north of the settlement of Tortington, crosses both Tortington Rife and Binsted Rife, and the area between the settlements of Walberton and Binsted, prior to joining the existing A27. The eastern half of this Phase is characterised by a mix of agricultural fields and dispersed cottages and farmsteads. The western half crossed a golf course and is situated along the margins of the settlements of Binsted and Walberton.

1.1.3 The Phase 3 GI locations are illustrated in **Figure 2** and included:

- 21 dynamic sampler boreholes;
- 79 window sampler boreholes;
- 4 cable percussive boreholes;
- 21 machine excavated trial pits, and
- associated working compounds and laydown areas.

2.3 Rationale for archaeological and geoarchaeological monitoring

2.3.1 Not all ground investigations in each Phase were subject to archaeological and geoarchaeological monitoring. As outlined in the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001) the rationale behind the program of archaeological and geoarchaeology monitoring was two-fold:

- to preserve the archaeological resource through archaeological monitoring of all large excavations (principally machine dug trial pits), and
- to provide a baseline assessment of superficial deposits present across the route and recover samples suitable for initial palaeoenvironmental assessment through geoarchaeological monitoring and recording of selected interventions.

2.4 Scope archaeological and geoarchaeological monitoring

2.4.1 The scope of the archaeological and geoarchaeological monitoring was agreed in advance with the West Sussex County Council archaeologist and Historic England and is outlined in the WSI (HE551523-BAM-her-ZZ-SP-AG-0001). Archaeological and geoarchaeological monitoring was carried out in full compliance with this scope.

2.4.2 To fulfil the aims and objectives of the monitoring, all machine dug trial pits were subject to archaeological and geoarchaeological oversight. The removal of all superficial deposits during excavation of trial pits was subject to archaeological and geoarchaeological monitoring.

2.4.3 Archaeological monitoring of topsoil stripping during compound set-up was carried out where there was a risk of impacting archaeological remains. Initial archaeological monitoring of compound set-up established that these works would not have any significant impact on the archaeological resource in these areas. Consequently, in agreement with the client and the West Sussex County Council archaeologist, archaeological monitoring was curtailed.

2.4.4 Prior to the commencement of GI works, the locations of proposed boreholes were subject to specialist geoarchaeological review. This review identified a range of boreholes suitable for monitoring, which would enable baseline assessment of the superficial deposits present across the Scheme.

2.4.5 Selection of boreholes for monitoring was based on consideration of extant datasets (BGS mapping and previous geoarchaeological investigations) and the extent to which proposed ground investigation techniques would recover sediments suitable for geoarchaeological assessment.

2.4.6 Samples suitable for palaeoenvironmental assessment were obtained from trial pits and selected boreholes. The samples obtained are stored under appropriate conditions by Wessex Archaeology.

2.4.7 In total 86 interventions were subject to geoarchaeological monitoring. These comprised:

- 20 dynamic sampler boreholes;
- 37 window sampler boreholes, and
- 29 machine excavated trial pits

2.4.8 The results of the on-site geoarchaeological monitoring have been combined with a geoarchaeological review of all draft GI logs.

3. Aims and objectives

3.1 Introduction

3.1.1 As outlined in the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001), the general aim of the GI monitoring was to mitigate the impact of proposed works on the archaeological and geoarchaeological resource through archaeological and geoarchaeological monitoring, palaeoenvironmental sampling, and recording.

3.1.2 The specific aims and objectives of archaeological and geoarchaeological monitoring are summarised below.

3.2 Archaeological monitoring

3.2.1 The general overarching aims and objectives of the archaeological monitoring were:

- to identity and record any archaeological features, material or deposits within machine excavated trial pits;
- to minimise or mitigate impact to significant archaeological remains identified through avoidance or detailed recording, and
- to assess the depth of topsoil and subsoil overlying deposits within which archaeological remains may occur.

3.3 Geoarchaeological monitoring

3.3.1 The general overarching aims and objectives of the geoarchaeological monitoring were:

- to record superficial deposits within exploratory excavations and boreholes;
- to assess the depositional processes associated with superficial deposits within each GI intervention;
- to assess the potential for superficial deposits to preserve organic remains and palaeoenvironmental evidence;
- to ascertain the depths and locations of superficial deposits which have the potential to contain palaeoenvironmental remains, and/or to seal/preserve significant archaeological evidence;
- to retrieve samples from superficial deposits that are suitable for palaeoenvironmental assessment;
- to retrieve dating evidence for superficial deposits, where possible and relevant;
- to develop a geoarchaeological deposit model for the scheme that highlights deposit with varying archaeological and geoarchaeological potential;

- to inform the baseline evidence for any environmental impact assessment that may be carried out for the Scheme, and
- to provide information that may assist in development of an appropriate archaeological strategy as the Scheme develops.

3.3.2 The WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001) additionally identified two specific objectives of the geoarchaeological monitoring. These were:

- to identify the location and extent of Pleistocene deposits belonging to the Sussex Raised Beach sequence (see section 4.3) and consider their archaeological, palaeoenvironmental and geoarchaeological potential, and
- to relate superficial deposits within the River Arun Valley to the Pleistocene and early Holocene deposits identified within the wider area, and to consider the archaeological and geoarchaeological potential of these deposits.

4. Archaeological and geoarchaeological background

4.1 Introduction

4.1.1 This section provides background information relevant to assessing the archaeological and geoarchaeological potential of the superficial deposits potentially present beneath the Scheme.

4.1.2 Where age estimates are available for deposits, these are expressed in millions of years (MA), thousands of years (Ka) and within the Holocene epoch as either years Before Present (BP), Before Christ (BC) and Anno Domini (AD). Where radiocarbon dates are included, they are quoted as calibrated (cal.) BP. These dates are supplemented where relevant with the comparable Marine Isotope Stage (MIS) where odd numbers indicate an interglacial period and even numbers a glacial period.

4.1.3 Superficial sediments in and surrounding the Scheme include Pleistocene and Holocene units. Together these epochs form the most recent parts of the Quaternary, a period covering the last 2.6 MA, and defined by repeated fluctuations between cold (glacial) and warm (interglacial) climate stages (**Table 1**).

Table 1 British Quaternary chronostratigraphy

Geological period	Chronostratigraphy		Age (Ka)	Marine Isotope Stage (MIS)
Holocene	Holocene interglacial		11.7 – present	1
Late Pleistocene	Devensian	Loch Lomond Stadial	11.7 – 12.9	2 – 5d
		Windermere Interstadial	12.9 – 15	
		Dimlington Stadial	15 – 26	
		Upton Warren Interstadial	40 – 43	
		Early Devensian	60 – 110	
	Ipswichian interglacial		115 – 130	5e

Middle Pleistocene		Unnamed cold stage	130 – 374	6
		Aveley interglacial		7
		Unnamed cold stage		8
		Purfleet interglacial		9
		Unnamed cold stage		10
			374 – 424	11
	Anglian glaciation		424 – 478	12
	Cromerian Complex		478 - 780	13 – 19

4.1.4

4.2 Solid geology

4.2.1 The Scheme is located south of the chalk uplands of the South Downs and north of Littleton Anticline. The Littleton Anticline, together with the Portsdown Anticline to the west, form the remnants of two inliers of the chalk. These are separated from the South Downs by a topographic low in the chalk bedrock forming the Chichester Syncline. This chalk geomorphology forms the template over which later Palaeogene and Pleistocene sediments are preserved. This structure has particular significance for the deposition of Pleistocene sediments, with the Littleton and Portsdown Anticlines forming a semi-enclosed embayment within which Middle and Upper Pleistocene sediments of the Sussex and Hampshire coastal plain raised beach sequences were deposited (see section 4.3).

4.2.2 The mapped solid geology (BGS on-line viewer) underlying the Scheme is illustrated in **Figure 3**. At the western end of Scheme, between the A27/A29 Fontwell (east) roundabout and Mill Road, estuarine and deltaic sediments of the Lambeth Group (48 – 59 MA) are recorded that overlie the chalk of the Spetisbury Chalk Member (72 – 84 MA). East of Mill Road, to as far west as the Arun Valley, detrital marine sediments of the London Clay Formation (48 – 56 MA) are mapped, which overlie units of the Lambeth Group and the chalk. Within the Arun Valley, units of London Clay Formation have been largely removed through erosion during the Quaternary, with the uppermost solid geology belonging to the Lambeth

Group. East of the Arun Valley, at the eastern-most extremity of the Scheme, at Crossbush, bedrock sediments of the London Clay Formation are once more preserved.

4.3 Quaternary sediments

4.3.1 Previous geoarchaeological investigations (Bates et al. 2007; 2010, Bates and Briant 2009, Roberts and Pope 2018) have demonstrated that superficial geology in the region of the Scheme is not accurately reflected in the current BGS mapping (BGS on-line viewer; **Figure 4**). Drawing on the results of these previous studies, the following sections provide a review of the Quaternary deposits likely present within the Scheme boundary, and their possible archaeological and geoarchaeological potential.

4.3.2 Such deposits can be particularly rich contexts for Palaeolithic and Mesolithic archaeology, and the location of Palaeolithic and Mesolithic archaeological findspots located within the immediate vicinity of the Scheme and recorded on the Historic Environmental Record (HER) are illustrated in **Figure 5**.

Pleistocene raised beach deposits

4.3.3 The Scheme is situated towards the eastern end of the Sussex and Hampshire coastal plain. Pleistocene marine deposits within the coastal plain have been recognised since the 1850s (Prestwich 1859). Initially two sets of marine deposits were identified, one situated at 30 m OD, referred to as the Upper Coastal Plain, and a lower series of sediments at 4.5 m OD, forming the Lower Coastal Plain (Palmer and Cooke 1923, Fowler 1932, Calkin 1934). However, it is now recognised that deposits within the Lower Coastal Plain include at least three phases of sea-level highstands as well as lowstands (Bates et al. 2000; 2003; 2007; 2010).

4.3.4 The current stratigraphic and local palaeogeographic succession for Pleistocene raised beach sequence of the Sussex and Hampshire coastal plain are summarised in **Table 2**.

Table 2 Stratigraphic and local palaeogeographic succession for Pleistocene raised beach sequence of the Sussex and Hampshire coastal plain (after Bates et al. 2010)

Geological period	Age (Ka)	Marine Isotope Stage (MIS)	Raised Beach	Local palaeogeography
Holocene	11.7 – present	1		Harboured
Late Pleistocene	26 – 11.7	2		
	57 – 26	3		

	72 – 37	4		
	116 – 72	5d – 5a		
	130 – 116	5e	Pagham Raised Beach	Open coastline
Middle Pleistocene	191 – 130	6		
	243 – 191	7	Brighton/Norton Raised Beach	
			? Aldingbourne Raised Beach	Embayed coastline
	300 – 243	8		
	337 – 300	9	? Aldingbourne Raised Beach	Embayed coastline
	374 – 337	10		
	424 – 374	11	? Aldingbourne Raised Beach	Embayed coastline
	478 – 424	12		
	676 – 478	16 – 13	Westbourne/Arundel Raised Beach	Embayed coastline

4.3.5 The sediments forming the Sussex and Hampshire coastal plain raised beach sequence comprise silts, sands and gravels associated with transgressive sea-level highstands and fine-grained terrestrial sediments reflective of sea-level regression, accumulating under low-energy, fresh and brackish water conditions.

4.3.6 Previous mapping of cliff lines associated with these raised beaches (Bates et al. 2010, Roberts and Pope 2018) suggests that sediments attributable to three of these raised beaches occur within the Scheme boundary (see **Figure 4**). These are:

- Westbourne/Arundel (also referred to as Goodwood/Slindon) Beach
- Aldingbourne Beach
- Brighton/Norton Beach

Westbourne/Arundel Beach

4.3.7 The earliest sediments currently recognised within the Sussex and Hampshire coastal plain raised beach stratigraphy belong to the Westbourne/Arundel Raised Beach, which are associated with internationally significant Lower Palaeolithic archaeology. The units forming and overlying the Westbourne/Arundel Raised Beach, and the Palaeolithic archaeology they contain, are summarised in **Table 3**.

Table 3 Stratigraphy and archaeology associated with the Westbourne/Arundel Raised Beach and overlying sediments (data from Robert and Pope 2018, Pope et al. 2020).

Unit	Description and interpretation	Marine Isotope Stage (MIS)	Archaeology
Eartham Upper Gravel	Head gravel		Lower Palaeolithic archaeology reworked from higher ground
	Calcareous Head gravel		Lower Palaeolithic archaeology reworked from higher ground
Eartham Lower Gravel	Freeze-thaw sorted flint gravel	12	
	Waterlain chalk pellet gravel	12	
	Chalk cliff collapse	late 13 / early 12	Undisturbed Lower Palaeolithic archaeology
	Colluvial and water lain silts.	late 13 / early 12	
Slindon Silt	Mineralised organic deposits	13	
	Soil horizon	13	Undisturbed Lower Palaeolithic archaeology
	Intertidal muds	13	
Slindon Sand	Freshwater channels and scoured landsurfaces	13	
	Near-shore marine sands	13	Lower Palaeolithic archaeology; ?reworked from adjacent terrestrial landscape
Slindon Gravel	Near-shore marine gravel	13	

4.3.8

4.3.9 The earliest units of the Westbourne/Arundel Raised Beach are transgressive storm beach gravels (Slindon Gravel), located at the foot of a degraded chalk cliff. These are post-dated by geographically more extensive marine sands (Slindon Sands). The Slindon Sands are overlain by silts reflecting marine regressions (Slindon Silts). Units within the Slindon Sands and Silts have produced microfauna assemblages (foraminifera, ostracods and molluscs), whilst vertebrate faunal remains (including small and large mammals) have also been recovered from the Slindon Silts (Roberts and Parfitt 1999).

4.3.10 Microfauna assemblages from the Slindon Sands and Silts generally reflect temperate, interglacial conditions, although they also include “non-analogue species” found today in more cool/cold environments (Whittaker in Roberts and Parfitt 1999, Bates et al. 2010). Additionally, species favouring ‘‘marine’’, brackish water and “freshwater” environments have been identified. These combined characteristics have been interpreted as reflecting a temperate, interglacial period, with sediments deposited in an overall embayed environment containing areas of water of much lower salinity (Bates et al. 2010).

4.3.11 The age of the Slindon Gravel, Sands and Silts is now well established within MIS 13 (524 – 474 Ka; Roberts and Parfitt 1999, Roberts and Pope 2009). A laterally extensive landsurface associated with soil development occurs with the top of the Slindon Silts. This landsurface has produced international significant, undisturbed, Lower Palaeolithic archaeology at several locations, most notably at Boxgrove, Amey's Eartham Pit (Roberts and Parfitt, 1999); Slindon Bottom Pit (Pope 2001, Roberts and Pope 2009) and Valdoe Quarry (Pope et al. 2009). This archaeology includes refitting lithic scatters and butchered mammal remains, as well as human remains and palaeoenvironmental datasets.

4.3.12 Lower Palaoelithic archaeology has also been recovered from towards the base of the Slindon Sands at Boxgrove, in areas adjacent to the palaeo-cliff line, which indicates an earlier phase of human activity in the adjacent landscape at the peak of high sea levels.

4.3.13 Lower Palaeolithic archaeology has also been found in sediments post-dating the landsurface associated with Slindon Silts. This includes undisturbed archaeology from within chalk cliff collapse within the Eartham Lower Gravel, which is indicative a later phase of human activity post-dating peak interglacial conditions, either late in MIS 13 or early MIS 12 (478 – 424 Ka). Lower Palaeolithic artefacts have also been recovered from the Eartham Upper Gravel, but this may all be reworked from upslope.

4.3.14 Boxgrove, Amey’s Eartham Pit is located 3km north-west from the Scheme boundary, however, several other sites which have produced Lower Palaoelithic archaeology from the same Westbourne/Arundel Raised Beach deposits are located near to the western part of the Scheme. These include Everyman’s Pit and Slindon Bottom Pit, located 1 km and 1.4 km north-west of the Scheme, and Penfolds Pit (**MWS2302**), located 0.4 km north-east of the Scheme.

4.3.15 The full Westbourne/Arundel Raised Beach sequence has been identified at Everyman's Pit, and a handaxe was recovered from the base of the pit in the 1920s (Fowler 1929). More recently, lithics and vertebrate micro-fauna has been recovered from deposits located north of the former pit (Roberts and Pope 2006). The deposits at Slindon Bottom have historically produced significant numbers of Palaeolithic artefacts (Woodcock 1981), whilst more recent excavations (Pope 2001) recovered a handaxe and associated knapping debris from sediments demonstrated to belong to the Slindon Silts. Penfolds Pit has produced numerous historic Palaeolithic finds (Pyddoke 1950, Woodcook 1981); however, the deposits have not been subject to modern investigation.

4.3.16 MWS2332 Palaeolithic axe was found at West Walberton Lane, Walberton

Aldingbourne Beach

4.3.17 The Westbourne/Arundel Beach is post-dated by younger Pleistocene marine sediment assigned to the Aldingbourne Beach. Sediments assigned to Aldingbourne Beach are much more poorly researched that those of the Westbourne/Arundel Beach and it is possible that sediments assigned to this beach include more than one phase of marine transgression and regression.

4.3.18 Units of the Aldingbourne Beach occur along the line of the A27 between Chichester and Arundel (Fowler 1932, Calkin 1934, Shephard-Thorn et al. 1982, Bates 1998), but are best characterised within the area to the east of Chichester, where fossiliferous sediments containing pollen, ostracods, foraminifera, molluscs and vertebrate remains have been identified at Norton Farm, Chichester and Pear Tree Knap, Tangmere (Bates et al. 2000, Bates et al. 2010). Units of the Aldingbourne Beach at these locations have been divided into two groups, separated by a major unconformity in the stratigraphy. The lower sediments comprised coarse sands and gravels that fine upwards, whilst the overlying deposits comprised finer grained, bedded sands and silts. Foraminifera, ostracods and molluscs from these sediments are indicative of a declining marine influence up through the sequence and generally temperate, interglacial conditions.

4.3.19 The Aldingbourne Beach has previous been suggested to date to MIS 11 or MIS 9 (424 – 374 Ka / 337 – 300 Ka; Bates et al., 1997). However, Optically Stimulated Luminescence (OSL) dates on sediments from Norton Farm indicate an MIS 7 age (240 – 190 Ka; Bates et al. 2010). Younger marine sediments belonging to later Brighton/Norton Raised Beach at Portfield Pit, Chichester have also produced MIS 7 age estimates. It has therefore been suggested that units of the Aldingbourne Beach reflect marine transgression and recession early in MIS 7, whilst those of the Brighton/Norton Beach form part of a second transgressive and regressive phase later in MIS 7 (Bates et al. 2010).

4.3.20 Only a few Palaeolithic artefacts can currently be attributed to the Aldingbourne Beach (Bates et al. 2007). However, elsewhere in southern

Britain (in particular the Thames Valley) MIS 7 is associated with extensive evidence for human occupation (Scott 2011). Most artefacts currently provenanced to the Aldingbourne Beach are abraded and therefore likely to be reworked (Bates et al. 2007). However, there is some fresh material which may be indicative of contemporary human activity. This likely includes a handaxe in fresh condition recovered ex-situ, but likely to originate from deposits of the Aldingbourne Beach, from near the western boundary of the Scheme, at the north end of West Walberton Lane (**MWS2332**; Graves 1993). In-situ material in fresh condition from the Aldingbourne Beach include a handaxe from Pear Tree Knap, Tangmere (Woodcock 1981: 262) and a flake at Crockerhill, Boxgrove (Woodcock 1981: 249)

Brighton-Norton Beach

4.3.21 Further marine sediments post-dating those attributed to the Aldingbourne Beach are found above 5 m OD. These extend across east Hampshire and West Sussex, from Havant (Southleigh Park) in the west to Black Rock, Brighton in the east. These are attributed to the Brighton-Norton Beach.

4.3.22 Sediments of the Brighton-Norton Beach have tended to consist of horizontally bedded, slightly gravelly, marine sands. Detailed investigations of sediments belonging to Brighton-Norton Beach (Bates 1998, Bates et al. 2000) have demonstrated that close to the palaeo-cliff line, at the northern extent of the sediments, regressive sequences occur. These have comprised marine sands that fined upwards to laminated estuarine sands, buried by low-energy fluvial sediments. A major buried soil has been identified at the surface of the estuarine sands (Bates et al. 2010) Further south, the finer grained transgressive sediments are absent, with a major unconformity at the top of the marine sands.

4.3.23 Microfauna from sediments of the Brighton-Norton Beach have been studied from a significant number of localities (Bates 1998, Bates et al. 2010). These have consistently indicated deposition under cold conditions. OSL age estimates on units of the Brighton-Norton Beach at Norton Farm and Portfield Pit, Chichester and suggest a late MIS 7 to MIS 6 date (Bates et al. 2010).

4.3.24 As with the Aldingbourne Beach, relatively few Palaeolithic artefacts are currently known from the Brighton-Norton Beach sediments, although some artefacts have been recorded (Bates et al. 2007), and contemporary occupation late in MIS 7 would be consistent with the early Middle Palaeolithic settlement history of southern Britain.

Pleistocene Head

4.3.25 Extensive Head sequences are known to occur in and around the Scheme (BGS borehole records on BGS online viewer), either overlying raised beach sequences, or occupying broad basin like features devoid of marine sediments. These Head sequences comprise poorly sorted, angular flint and/or chalk rich gravels, along with finer-grained clays, silts and sands. They are generally considered to reflect sediments that has been mobilised

down-slope through seasonal freeze-thaw processes (solifluction) associated with landscape instability resulting from a lack of vegetation cover during periglacial conditions. They may, however, also include wind-blown loess deposited during periglacial conditions and/or deposits laid down through colluvial slope processes during periods of reduced vegetation cover and landscape instability, but which are not necessarily reflective of a periglacial environment.

4.3.26 Head sequences in the area are frequently extensive and exhibit distinct stratigraphic units. This stratigraphy is suggestive of multiple periods of deposition during the Pleistocene. There are few dates for such sequences and, except for Head deposits at Boxgrove, Amey's Eartham Pit (Roberts and Parfitt 1999), their specific Palaeolithic archaeological potential is poorly understood. Some age control for Head sequences is provided by raised beach sequences that they overlie, which demonstrate that individual Head sequences post-date these associated raised beach sequences.

4.3.27 Head deposits can contain Palaeolithic artefacts reworked downslope within the Head. However, they can also include stable horizons / landsurfaces associated with minimally disturbed archaeology; this is demonstrated by the undisturbed Lower Palaeolithic archaeology associated with chalk cliff collapse sediments within the Eartham Lower Gravel at Amey's Eartham Pit (Roberts and Parfitt 1999). Other known Palaeolithic artefact occurrences within Head sequences in the wider area include four individual handaxes findspots from within Head overlying units of the Brighton/Norton Raised Beach, and six handaxes of uncertain context but likely to derive from Head (Bates et al. 2007).

Pleistocene terraces of the River Arun

4.3.28 The eastern end of the Scheme crosses the valley of the River Arun. Pleistocene sediments are recorded in the Arun Valley but have been subject to only limited investigation and their age as well as their archaeological and geoarchaeological potential are poorly understood.

4.3.29 Up to six different terraces of the River Arun are mapped by the British Geological Survey on morphostratigraphic grounds (BGS online viewer). However, the earliest two, Terrace 5 and Terrace 6, are only sporadically mapped and limited to the upper Arun, north of the Scheme.

4.3.30 The number of terraces of the River Arun present within the Scheme boundary is currently uncertain. An isolated outcrop of deposits assigned to Terrace 4 is located east of the Arun, adjacent to the northern boundary of the Scheme, at Upper Broomhurst Farm, Crossbush (see **Figure 4**).

4.3.31 The age of the Arun terraces is currently poorly constrained, with only two dates available. However, these dates do comprise two OSL dates taken from the sediments assigned to Terrace 4 at Upper Broomhurst Farm. A test pit dug at Upper Broomhurst Farm as part of “The Palaeolithic Archaeology of the Sussex/Hampshire Coastal Corridor” Project (PASHCC) recorded 3 m of fluvial flint gravels, with occasional sand beds (Bates et al.

2007; 2010). Two OSL samples taken from these sediments provided ages indicative of an MIS 7 (240 – 191 Ka) date.

4.3.32 As Terrace 4 at Upper Broomhurst Farm is located overlooking, and at a higher elevation, than the postulated location of the Brighton/Norton Beach (see **Figure 4**), which itself potentially also dates to MIS 7 (see above), it has been suggested Terrace 4 of the Arun formed during a low sea level event within MIS 7, when an expanded coastal plain that allowed the river to extend seawards (Bates et al. 2010)

4.3.33 There has been little archaeological investigation of the Arun terraces and few artefacts are currently known. A handaxe has been found at South Stoke (Woodcock 1981: 299), where Terraces 4, 3 and 2 are mapped and, although attributed to Terrace 3, there is some uncertainty (cf. Curwen and Curwen 1922, Woodcock 1981: 299) over which terrace it comes from (Bates et al. 2007).

Holocene alluvial deposits of the River Arun

4.3.34 Historic borehole data (BGS online viewer) demonstrates that extensive Holocene alluvial sequences of the River Arun occur within the Scheme boundary, with up to 27.90 m of such sediments recorded (TQ00NW147; BGS online viewer). Previous reviews of borehole data from the lower Arun Valley (Aldiss 2002) identified a buried valley extending to a depth of 36 m below surface at the mouth of Arun and 31 m at Arundel. This valley was noted to contain alluvial sediments dominated by silty clay, silt and fine sand units. However, the Holocene alluvial sequences of the lower Arun have been subject to only limited archaeological and geoarchaeological investigation.

4.3.35 Few organic Holocene sequences have been recorded from the Arun and extensive peat horizons are rare. This current lack of identified peats has been suggested to due to one of three possible explanations (Waller and Long 2010):

- that they exist but are yet to be discovered, either due to scarcity or lack of investigation;
- they may have been removed by erosion, or
- they may never have formed due to periods associated with intertidal conditions continuing into the late Holocene.

4.3.36 The earliest currently identified Holocene sequences from the Arun are from downstream of the Scheme, in the now offshore and submerged lower reaches of the river. These deposits have been investigated through boreholes and seismic data, which identified Holocene sediments that included peats interstratified between estuarine sediments (Gupta et al. 2004; 2007, Bayliss et al. 2007). Early Holocene radiocarbon dates from these organics units suggest peat formation between 11,300–9750 cal. BP in the lower Arun.

4.3.37 Purposive geoarchaeological boreholes sunk near the edge of the floodplain in the Arun gap, north of the Scheme, at North Stoke revealed an 8 m sequence clayey silts and sands containing reworked organic material (Waller and Long 2010). Further north, at Amberley Wild Brooks, peat underlain by sands and clay have been identified (Waton 1983). The onset of peat formation here is dated to c. 2650 cal. yr BP (Godwin and Willis 1964). Pollen within the clay beneath has been interpreted as indicate a marine/brackish influence prior to this date.

4.3.38 In contrast to the main valleys, extensive organic deposits have been identified in two tributary valleys of the Arun, the Western Rother and the Chilt. Within the Chilt at Hurston Warren, near Pulborough peat formation dating from c. 4300 cal. yr BP has been identified, whist a sequence of over 5 m of peat has been reported in the Western Rother (Aldiss 2002).

4.3.39 Establishing depositional processes and environments, as well as chronology, for the Holocene alluvial sediments of the River Arun within the Scheme boundary are key to establishing the process of Holocene landscape evolution in this area and for assessing the archaeological geoarchaeological potential of the sediments.

Quaternary deposits within the Binsted Rife and Tortington Rife

4.3.40 The Scheme crosses deep valleys of two convergent tributary streams (known locally as rifes) of the River Arun, the Binsted Rife and the Tortington Rife (**Figure 4**). The age of these valley forms, and the archaeological and geoarchaeological potential of any deposits they contain, is currently unknown. As both the Binsted and Tortington rifes are incised through the Brighton/Norton raised beach (see **Figure 4**), they clearly post-date these marine sediments, which implies they formed after MIS 7 (240 – 191 Ka; see above). These valleys may in fact be late Pleistocene in origin. They potentially post-date the Last Glacial Maximum (LGM, 26 – 20 kya); they could result from erosion through seasonal freeze-thaw during cold conditions (solifluction) and high water discharge from the South Downs at the end of the Pleistocene.

4.3.41 Both the Binsted and Tortington rifes are mapped by the BGS as containing Holocene alluvium (**Figure 4**). They may, therefore, have potential to preserve Holocene peats with archaeological and geoarchaeological potential. Such deposits are recorded in similar restricted catchments in the region (Waller and Long 2010), including the tributaries of the Arun (the Chilt and Western Rother; see above).

4.3.42 Whereas the formation and preservation of peats within the main Arun Valley may be dictated by the relationship to tidally influenced sea-levels, any peat formation within these tributary valleys may not be governed by such processes. These valleys may therefore include Holocene organic sediments, the equivalent of which are not present, or not preserved, in the lower Arun.

Holocene colluvium

4.3.43 Holocene colluvial sediments are likely to be present within the Scheme boundary. These deposits reflect the downslope mobilisation of sediments caused by landscape insatiability and erosion brought on by a lack of vegetation cover, likely due to Holocene landscape-use and agricultural practices.

4.3.44 Holocene colluvial deposits can incorporate reworked archaeological artefacts of multiple dates. However, they can also bury earlier archaeological features and layers.

4.4 Summary of archaeological and geoarchaeological potential

4.4.1 The archaeological and geoarchaeological potential of Quaternary deposits that may be present within the Scheme boundary can be summarised as follows:

- At least three Pleistocene raised beach sequences of the Sussex-Hampshire Coast Plain may be present. These are the:
  - Westbourne/Arundel Beach. Units of this beach have been demonstrated to have high potential to contain significant Lower Palaeolithic archaeology and palaeoenvironmental datasets;
  - Aldingbourne Beach. Deposits of the Aldingbourne raised beach are currently generally poorly understood but have been shown to sporadically preserve significant palaeoenvironmental datasets. They may have potential to contain significant Lower and/or Middle Palaeolithic archaeology.
  - Brighton/Norton Beach. The archaeological potential of these deposits is poorly defined; however, they have potential to contain contemporary Middle Palaeolithic archaeology. Although the specific geoarchaeological potential of units of the Brighton/Norton Beach along the Scheme are poorly understood, elsewhere they have been shown to preserve significant palaeoenvironmental datasets.
- Pleistocene Head sequences are likely to be present within the Scheme and overlie raised beach deposits. Head may reflect multiple periods of deposition through the Pleistocene. Although some limited age control for such deposits is provided by the raised beach sediments they overlie, they are generally poorly dated. Such deposits can incorporate reworked Palaeolithic artefacts but can also bury stable horizons/landsurfaces preserving contemporary Palaeolithic artefacts, including lithic scatters. The specific potential of Head sequences within the Scheme boundary remains to be determined.

- Pleistocene terraces of the River Arun may be present within the Scheme boundary. The number of terraces present, their age, and their archaeological and geoarchaeological is unknown. Previous investigations suggest that any terraces present are likely to date to MIS 7 (240 – 191 Ka), and later. They therefore have broad Middle and/or Upper Palaeolithic archaeological and geoarchaeological potential.
- Extensive Holocene alluvial sequences of the lower River Arun are known to be present within the Scheme boundary. The archaeological and geoarchaeological potential of these deposits is not well characterised currently. They may contain minerogenic alluvial sequences reflecting changing tidal influence and landscape evolution. Depending on the impacts of tidal influences, they may also be associated with organic peats with significant archaeological and palaeoenvironmental potential.
- Holocene colluvial sediments are likely to be present. These slope deposits can incorporate reworked archaeology of multiple dates. However, more significantly, they also have potential to bury earlier archaeological layers and features.

5. Methods

5.1 Introduction

5.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001). This takes account of the assessment guidance provided by the DMRB Volume 10, Section 6, Part 1 (Highways Agency 2019), the standard and guidance issued by the Chartered Institute for Archaeologists (CIfA), including the Standard and Guidance for Archaeological Field Evaluation (CIfA 2020a), the Standard and Guidance for the Creation, Transfer and Deposition of Archaeological Archives (CIfA 2020b), and the CIfA Code of Conduct (CIfA 2019), as well as Historic England guidance (Historic England 2015a; English Heritage, 2011) and Archaeology Data Service guidance (Archaeology Data Service, 2011).

5.1.2 A daily monitoring pro forma for each monitored GI intervention was completed, which recorded the GI intervention number monitored, a summary of observations and/or field notes, and the time and date of the monitoring.

5.1.3 The specific methods employed during archaeological monitoring and geoarchaeological investigations are summarised below

5.2 Archaeological monitoring

General

5.2.1 Archaeological monitoring works were carried out in accordance with the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001). All trial pits were subject to archaeological monitoring. The archaeological and geoarchaeological potential of all Quaternary deposits within these trial pits was also assessed, with monitoring ceasing on a trial pit reaching maximum depth, or once bedrock was encountered.

5.2.2 Trial pits were monitored by a suitably qualified archaeologist who was also trained in the recording and assessment of Quaternary sediments. Trial pits were excavated by the GI Contractor using an appropriate mechanical excavator. The GI contractor was responsible for identifying the presence of services and ensuring it was safe to excavate.

5.2.3 The GI Contractor provided a suitable and safe position for the monitoring archaeologist to view the excavation of the trial pit. Excavation of trial pits proceeded with a toothless ditching bucket under direct archaeological supervision, in level spits. Arisings from the trial pits were visually scanned for artefacts and ecofacts.

5.2.4 If archaeological remains were encountered, machine excavation ceased to allow the remains to be inspected and recorded as far as safely practicable.

5.2.5 Appropriate strategies for the recovery of artefacts and palaeoenvironmental samples were in line with those detailed in the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001).

5.2.6 In accordance with the WSI the trial pit was not entered by the monitoring archaeologist and no hand excavation of features or archaeological horizons was carried out. All recording was carried out from a safe position and in accordance with the site rules as set out by Linkconnex and the GI contractor.

Recording

5.2.7 All exposed archaeological deposits and features, as well as the Quaternary stratigraphy, were recorded using a pro forma recording system. A record of the datum (either m above Ordnance Datum or m below ground level) levels of the archaeological deposits was provided by the GI Contractor. This data was then tabulated by trial pit and depth (**Appendix A**).

5.2.8 A scaled drawn record of at least one representative exposed section was made for each trial pit. A full photographic record was made using digital cameras equipped with an image sensor of not less than 10 megapixels. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

5.3 Geoarchaeological monitoring

General

5.3.1 Geoarchaeological monitoring works were carried out in accordance with the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001).

5.3.2 As outlined in section 5.2, all trial pits were subject to both on-site archaeological and geoarchaeological monitoring.

5.3.3 Selected boreholes were subject to geoarchaeological monitoring. In accordance with the WSI, borehole starter pits were not subject to archaeological monitoring.

5.3.4 Monitoring of all selected dynamic sampler (BH) cores was carried out either at the Phase 2 and 3 site compounds, or at the BAM Nutall logging facility in Godstone, Surrey. All Phase 3 window sample (WS) cores were also assessed either at the site compound, or at Godstone. Cores from Phase 2 window sample cores were split on-site at the hole locations; selected cores from Phase 2 widow sample boreholes were logged and sampled on-site by a monitoring geoarchaeologist.

5.3.5 Logs from all GI interventions have been made available and have been subject to geoarchaeological review.

Recording

5.3.6 Deposits from all monitored boreholes were described by a suitably experienced geoarchaeologist, who considered the palaeoenvironmental and dating potential of all Quaternary units.

5.3.7 Descriptions included information such as:

- Depth
- Texture
- Composition
- Colour
- Inclusions
- Structure (bedding, ped characteristics etc.)
- Contacts between deposits

5.3.8 Interpretations were made regarding the probable depositional environments and formation processes of the deposits.

5.3.9 All deposits were recorded using a pro forma recording system. A record of the Ordnance Datum was provided by the GI Contractor. This data was then tabulated by borehole and depth (**Appendix B**).

Palaeoenvironmental sampling

5.3.10 Appropriate strategies for the recovery of palaeoenvironmental samples were in line with those detailed in the WSI (HE551523-BAM-EHR-ZZ-SP-AG-0001).

5.3.11 Assessment of selected cores identified Quaternary deposits with palaeoenvironmental potential. These deposits were sampled to provide a dataset suitable for providing a baseline assessment of this potential. These samples are retained and stored by Wessex Archaeology.

5.3.12 Palaeoenvironmental assessment of selected samples is recommended (see section 8).

Deposit modelling and Geoarchaeological Landscape Characterisation

Deposit modelling

5.3.13 The results of the archaeological and geoarchaeological assessment have been integrated with all Phase 2 and Phase 3 draft GI logs (Arcadis 2021, BAM Ritchies 2022), and available BGS historic borehole data within the Scheme boundary and surrounding area (BGS on-line viewer) to produce a model of the Quaternary deposits present.

5.3.14 The different lithologies and stratigraphic interpretations have been entered into the deposit modelling software Rockworks™ v17.0. Based on geoarchaeological interpretation of the lithological data (e.g., peat, clay, silt,

sand etc.), a set of stratigraphic units (e.g., alluvium, peat, buried soils etc.) were created to group sets of deposits across the Scheme.

5.3.15 The Rockworks data was utilised to map the lateral extent of key stratigraphic units and to produce representative cross-sections mapping the Quaternary stratigraphy beneath the Scheme.

5.3.16 The key aims of the modelling were to interpret the data, relate different deposits from within Scheme and adjacent areas, identify the probable environments represented, and determine areas of higher and/or lower archaeological and geoarchaeological potential (e.g., deposits with potential for the recovery of significant archaeological and/or palaeoenvironmental remains, and/or dating evidence).

Geoarchaeological Landscape Characterisation

5.3.17 Based on the results of the monitoring and deposit modelling, a Geoarchaeological Landscape Characterisation (GLC) for the Scheme is provided.

5.3.18 The GLC works on the same principles as a Historic Landscape Characterisation (English Heritage 2004) and Landscape Character Assessment (Natural England 2014), but in this case largely considers the shallow buried and outcropping Quaternary geological elements of the landscape.

5.3.19 The GLC involves breaking down the Site into defined areas called Geoarchaeological Character Zones (GCZs). The GCZs are based on variation in Quaternary geological characteristics linked to an assessment of the archaeological and geoarchaeological potential of the deposits.

6. Results

Introduction

6.1.1 All GI data from Phase 2 and Phase 3 works, along with all BGS borehole data from areas within and adjacent to the Scheme boundary, were reviewed and used to model the sub-surface Quaternary deposits present. This data was entered into Rockworks™ 17 to create projected cross-sections through the deposits (**Figures 6–16**).

6.1.2 In total, records from 372 interventions were included in the modelling. Data coverage is good, with interventions generally spaced at 50 m or less across the area of the Scheme investigated by the GI. The modelling therefore provides a detailed illustration of the Quaternary stratigraphy present and stratigraphic relationships.

6.1.3 The deposit model has been used to produce a Geoarchaeological Landscape Characterisation (GLC) for the Scheme. This subdivides the Scheme into ten Geoarchaeological Characterisation Zones (GCZs) based on differences in Quaternary deposits present (**Figure 17**).

6.1.4 The results of archaeological and geoarchaeological monitoring are presented below, subdivided between each GCZ.

6.2 GCZ 1

Introduction

6.2.1 GCZ 1 covers the area of the western end of the Scheme, north of the A27. It is defined by the presence of raised beach deposits with a bedrock height of 26 m OD. Three interventions are in this zone (**Figure 17**). The Quaternary stratigraphy comprises Pleistocene Head deposits over Pleistocene raised beach deposits, above Lambeth Group bedrock (**Figures 6–7**).

Stratigraphic evidence

Raised beach

6.2.2 Raised beach sediments comprised interstratified clayey marine sands and sandy clays, with some gravelly units dominated by sub-rounded flint clasts.

Head

6.2.3 Head sequence in this zone were relatively shallow (0.25 – 0.80 m) and comprised gravelly sandy clays, with the gravel component dominated by angular and sub-angular flint clasts.

Archaeological evidence

6.2.4 No trial pits were in this zone and no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.2.5 Two samples from a single intervention were taken from clay silts to clayey fine sands attributed to a raised beach sequence in GCZ 1 (**Table 4**). These are suitable for assessing the potential of these deposits to preserve microfauna assemblages which may inform on depositional environment and, possibly, chronology.

Table 4 Palaeoenvironmental samples from GI interventions in GCZ 1

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS303	95	0.5	830302	Clayey silt/fine sand	Raised Beach	Microfauna
WS303	96	0.5	830302	Clayey silt/ fine sand	Raised Beach	Microfauna

6.3 GCZ 2

Introduction

6.3.1 GCZ 2 is in the west of the Scheme, south of GCZ1, and extends from the area south of the A27, towards Binsted Rife. Thirty-one interventions were in this zone (**Figure 17**)**.** The zone extent is defined by the presence of raised beach deposits with a bedrock height of 21 – 15 m OD.

6.3.2 The Quaternary stratigraphy comprised Pleistocene Head deposits over Pleistocene raised beach deposits, above Lambeth Group and London Clay Formation. The data indicates that a cliff line is located between BH301 and BH302, which separates these raised deposits from those located at a higher elevation to the north, in GCZ 1 (**Figures 6–7** and **18**)**.** The raised beach sediments in GCZ 2 are thickest in the north of the zone, towards this cliff line; they are heavily truncated by overlying Head in the south.

Stratigraphic evidence

Raised beach

6.3.3 Three possible stratigraphic phases were identified within the raised beach sediments (**Figure 7**). These comprised:

- ? Phase 1: Orangish brown very sandy clay identified in BH302, adjacent to the cliff line and at the base of the raised beach beneath sequence at the northern end of the zone (and possibly slightly further south in WS304), may represent the first phase of deposition associated with this raised beach sequence.

- Phase 2: Yellowish brown and brownish grey slightly, slightly gravelly, sands are present in interventions across the zone. The gravel component consists of sub-rounded and sub-angular clasts. These deposits are marine sands reflecting a period of marine transgression. Adjacent to the cliff line at the northern end of the zone (BH302) these sediments include large sub-rounded flint cobbles belonging to a storm beach.
- Phase 3: Grey sandy silty clays overlie the marine sands. Laminated units were identified within these sediments, whilst in some interventions these clays interdigitated with sand units. These are likely to be regressive sediments, reflecting falling sea levels.

6.3.4 Phase 2 and 3 may reflect changes from marine transgression to regression. The status of the Phase 1 sediments is uncertain. If they belong to raised beach sequence, they may reflect an earlier regressive event, or possibly transgressive intertidal backbarrier deposits.

Head

6.3.5 Head sequences in this zone varied from 0.50 to 5.00 m in thickness, with the most extensive occurrences located in the north and south of the zone.

6.3.6 The Head deposits generally comprised gravels and gravelly clays containing angular and sub-angular flint clasts, with a light to dark brown, sometimes mottled greenish brown, blueish grey and orange, sandy clay/clay sand matrix. Calcareous units containing chalk clasts were very occasionally observed towards the base of some Head sequences.

6.3.7 These deposits likely reflect material moved down-slope through colluvial processes, likely including periglacial solifluction processes. Stratigraphy is apparent within these sediments, suggestive of multiple periods of deposition. Frequently three stratigraphically distinct units were observed within the deeper Head sequences.

6.3.8 Finer grained slightly gravelly clays were identified within the top of the Head sequences, above gravelly units, in the very south of the zone (BH210). This is in-line with observations made during archaeological trial trenching in this area (AOC in prep.). These finer grained units (often referred to as Head-Brickearth) likely reflect colluvial, and possibly aeolian deposition; they could include Holocene colluvial sediments .

Archaeological evidence

6.3.9 Five trial pits were in this zone (**Figure 17**). No archaeology was identified during monitoring within these trial pits.

Palaeoenvironmental samples

6.3.10 Thirty-one samples were taken from interventions in GCZ 2, principally from the raised beach sequences (**Table 5**). Phase 2 and 3 deposits were extensively sampled, as were deposits from several interventions located at the southern end of the zone that included sediments whose position within the raised beach stratigraphy is uncertain (WS 324, WS 326 and WS 328).

These samples are suitable for assessing the potential of these deposits to preserve microfauna assemblages which may inform on depositional environment and, possibly, chronology.

Table 5 Palaeoenvironmental samples from GI interventions in GCZ 2

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH302	1059	0.5	93022	Sand	Raised Beach – Phase 2	Microfauna
WS304	1046	0.5	83044	Sandy clay	Raised Beach – Phase 3	Microfauna
WS304	1047	0.5	83045	Sand	Raised Beach – Phase 2	Microfauna
WS304	1048	0.5	83045	Sand	Raised Beach – Phase 2	Microfauna
WS304	1049	0.5	83045	Sand	Raised Beach – Phase 2	Microfauna
WS304	1050	0.5	83046	Sand	Raised Beach – Phase 2	Microfauna
WS304	1051	0.5	83047	Sandy silty clay	? Raised Beach Phase 1	Microfauna
WS305	1044	0.5	83056	Clayey sand	Raised Beach – Phase 2	Microfauna
WS305	1045	0.5	83057	Sand	Raised Beach – Phase 2	Microfauna
WS308	1052	0.5	83083	Laminated silty clay	Raised Beach – Phase 3	Microfauna

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS308	1053	0.5	83083	Clayey sand	Raised Beach – Phase 2	Microfauna
WS311	1054	0.5	83112	Gravelly clay	Head	Microfauna
WS311	1055	0.5	83113	Clayey sand	Raised Beach – Phase 3	Microfauna
WS311	1056	0.5	83114	Sandy silty clay	Raised Beach – Phase 3	Microfauna
WS311	1057	0.5	83115	Clayey silty sand	Raised Beach – Phase 2	Microfauna
WS311	1058	0.5	83115	Clayey silty sand	Raised Beach – Phase 2	Microfauna
WS318	36	0.5	831801	Silty clay	Raised Beach – Phase 3	Microfauna
WS318	36	0.5	831802	Sandy clay	Raised Beach – Phase 3	Microfauna
WS318	36	0.5	831803	Silty sand	Raised Beach – Phase 2	Microfauna
WS318	36	0.5	831803	Silty sand	Raised Beach – Phase 2	Microfauna
WS320	55	0.5	832202	Clayey sand	Raised Beach – Phase 2	Microfauna
WS324	58	0.5	832202	Gravelly clay	Head	Microfauna
WS324	57	0.5	832403	Sandy clay	? Raised Beach	Microfauna

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS326	14	0.5	832603	Sand silty clay	? Raised Beach	Microfauna
WS326	15	0.5	832603	Sand silty clay	? Raised Beach	Microfauna
WS326	16	0.5	832603	Sand silty clay	? Raised Beach	Microfauna
WS326	17	0.5	832603	Sand silty clay	? Raised Beach	Microfauna
WS328	18	0.5	832603	Sand silty clay	? Raised Beach	Microfauna
TP304	511	0.5	30404	Clay	Raised Beach – Phase 3	Microfauna
TP304	512	0.5	30405	Sand	Raised Beach – Phase 2	Microfauna
TP304	513	0.5	30405	Sand	Raised Beach – Phase 2	Microfauna

6.4 GCZ 3a

Introduction

6.4.1 GCZ 3a extends south-east of GCZ 2 to the western flank of Binsted Rife. Twelve interventions are in this zone (**Figure 17**). The zone comprises raised beach deposits with a bedrock height of 6 m OD, which are separated from raised beach sediments at a higher elevation in GCZ 2 by a cliff line located between BH310 and BH313 (**Figures 7–8,** and **18**).

6.4.2 The Quaternary stratigraphy comprises Pleistocene Head deposits over Pleistocene raised beach deposits, above Harwich Formation bedrock.

Stratigraphic evidence

Raised beach

6.4.3 Raised beach sediments up to 5.20 m thick were present in this zone. Where full sequences were observed these sediments comprised sandy, silty clays over silty sands and silty clays. Laminations were observed within the upper silty clays, which are potentially indicative of

intertidal/estuarine conditions associated with a period of marine regression.

Head

6.4.4 Head deposits in this zone were generally thick, ranging up to 6.50 m, with the base of these deposits often not reached. These sediments display clear stratigraphy, indicative of multiple periods of deposition.

6.4.5 The most extensive sequences recorded comprised brown gravelly silty clays containing angular and sub-angular silt clasts, over brown gravelly clays containing angular and sub-angular flint and chalk clasts, with light brown grey chalky gravelly silt sometimes identified at the base. These Head sediments likely primarily reflect deposition through solifluction. The upper units of these sequences may be decalcified, whilst the lower unit are calcareous.

Archaeological evidence

6.4.6 One trial pit was in this zone (**Figure 17**). No archaeology was identified during monitoring of this trial pit.

Palaeoenvironmental samples

6.4.7 Eight palaeoenvironmental samples were taken from the calcareous Head and underlying raised beach deposits in WS327. The samples taken are summarised in **Table 6**. These samples are suitable for assessing the palaeoenvironmental potential of these sediments.

Table 6 Palaeoenvironmental samples from GI interventions in GCZ 3a

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS327	18	0.5	823701	Calcareous gravelly, silty clay	Head	Microfauna
WS327	19	0.5	823701	Calcareous gravelly, silty clay	Head	Microfauna
WS327	20	0.5	823701	Calcareous gravelly, silty clay	Head	Microfauna
WS327	21	0.5	823701	Calcareous gravelly, silty clay	Head	Microfauna
WS327	22	0.5	823703	Silty clay	Raised Beach	Microfauna

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS327	23	0.5	823703	Silty clay	Raised Beach	Microfauna
WS327	24	0.5	823705	Silty sand	Raised Beach	Microfauna
WS327	25	0.5	823708	Silty sand	Raised Beach	Microfauna

6.5 GCZ 4

Introduction

6.5.1 GCZ 4 is defined by the Binsted Rife (**Figure 17**). Seven interventions were in this zone, The Quaternary stratigraphy comprises Head and Raised Beach deposits, the latter of which have been truncated by incision of the rife (**Figures 8–9)**. A shallow alluvial sequence (up to 1.35 m thick) was recorded in the base of the rife.

Stratigraphic evidence

Raised beach

6.5.2 Raised beach sediments up to 3.50 m thick were present in the east and west of the zone. These are continuations of the deposits identified in adjacent areas of GCZ 3a and 3b. However, the upper units of the raised beach sequences in this zone have been truncated by erosion during the incision of the Binsted Rife. The Raise Beach sequences in GCZ 4 consists of sands and sandy clasts overlying basal gravelly units containing sub-angular and rounded clasts indicative of a marine gravel. The basal heights of these raised beach sediments occurred at between 6.00 m and 4.00 m OD on either side of family, indicating that they belong to a single raised beach sequence.

Head

6.5.3 Head deposits overlie the raised beach deposits and mantle the margins of the Binsted Rife. These sequences are fairly thin (< 1.20 m thick) and consist of sandy, slightly gravelly silts over gravelly clays. Their geometry (see **Figure 8**) indicates that these post-dates the incision of the Binsted Rife. They likely reflect colluvial sediments, possibly including Holocene material, deposited down-slopes of the valley margins reworking raised beach sediments and earlier Head

Alluvium

6.5.4 Minerogenic alluvial sediments occurred in interventions in the base of the Binsted Rife. These comprised up to 1.35 m of sandy and gravelly clays

and silts, and some clays containing reworked organic fragments. A thin (0.10 m) gravel was recorded at the base of the sequence in the centre of the rife (BH319).

Archaeological evidence

6.5.5 No trial pits were in this zone and no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.5.6 No deposits with significant palaeoenvironmental potential were identified in this zone during monitoring and no samples were taken

6.6 GCZ 3b

Introduction

6.6.1 GCZ 3b extends from the eastern margin of Binsted Rife to the western edge of Tortington Rife, located east of Binsted Lane (**Figure 17**). Thirty-nine interventions were in this zone. The zone is defined by the eastwards lateral continuation of the raised beach deposits present in GCZ 3a, which are overlain by Head deposits (**Figure 8 – 9**).

Stratigraphic evidence

Raised beach

6.6.2 Raised beach deposits occurred across the zone. A consistent stratigraphy was observed of sandy clays up to 1.05 m thick, over sands ranging up to 5.00 m in thickness. Both the clays and silts contained occasional organic debris. The base of the raised beach sequences was rarely reached; however, where encountered, these basal deposits included slightly gravelly sands and silty clays containing angular to sub-rounded flint clasts, and occasional sub-angular to well-rounded chalk clasts. These raised beach sequences are characteristic of marine sands and gravels, overlain by clays formed during marine regression.

Head

6.6.3 Head sequences overlying raised beach deposits occurred across the zone, being thickest in the west and becoming progressively shallower in the east (a decrease from approximately 3.00 m to 0.50 m, or less). These sediments were characterised by gravelly deposits dominated by angular flint clasts in a clayey sand matrix, likely deposited through solifluction processes. Only limited stratigraphy was discernible, and the sediments may be decalcified.

Palaeoenvironmental samples

6.6.4 Eight palaeoenvironmental samples were taken from the raised beach sequences in GCZ 3b (**Table 8**). These samples are principally from the upper units of the raised beach sequence and are suitable for assessing the palaeoenvironmental potential of these sediments.

Table 8 Palaeoenvironmental samples from GI interventions in GCZ 3b

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS363	97	0.5	86301	Silty sand	Raised Beach	Microfauna
WS363	98	0.5	86301	Silty sand	Raised Beach	Microfauna
WS363	99	0.5	86301	Silty sand	Raised Beach	Microfauna
TP318	506	0.5	31804	Clayey sand	Raised Beach	Microfauna
TP318	507	0.5	31804	Clayey sand	Raised Beach	Microfauna
TP318	508	0.5	31804	Clayey sand	Raised Beach	Microfauna
TP318	509	0.5	31804	Clayey sand	Raised Beach	Microfauna
TP318	510	0.5	31804	Clayey sand	Raised Beach	Microfauna

6.7 GCZ 5

Introduction

6.7.1 GCZ 5 covers Tortington Rife, from east of Binsted Lane to the west towards Tortington village (**Figure 17**). The Quaternary sediments within Tortington Rife comprised up 8.50 m of alluvial sediments, which overlie bedrock, with intervening Head deposits at the margins of the valley (**Figures 9–10**). Eight interventions were in this zone.

Stratigraphic evidence

6.7.2 The deposits within Tortington Rife comprised:

- Head – located in areas on the upper valley margins and composed of slightly gravelly (angular flint gravel) clays;
- Gravelly sandy clays – restricted to the deepest sequences in the centre of the valley;
- Lower silty clays – containing occasional organic fragments, with some units containing occasional shell fragments, and
- Upper silty clays – lacking organic material.

6.7.3 The stratigraphy reflects an initial phase of down cutting and higher energy deposition associated with a restricted channel in the centre of the valley, and deposition of Head on the upper valley slopes. This was followed by phases of lower energy accretion of finer alluvial sediments (the lower units of which continue reworked organic material and occasional shell fragments), which have infilled the valley.

6.7.4 It is likely that the deposition of the basal gravelly sands and the accumulation of Head occurred during cold conditions associated with limited vegetation cover at the end of the Pleistocene, whilst the silty clays reflect alluvial deposition (potential with a colluvial component) during periods of the Holocene.

Archaeological evidence

6.7.5 No trial pits were in this zone and no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.7.6 One sequence through deposits in this zone was sampled (**Table 9**). These samples are suitable for providing a base-line assessment of the palaeoenvironment potential of the Holocene alluvial sediments.

Table 9 Palaeoenvironmental samples from GI interventions in GCZ 5

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH328	80	0.5	932801	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	81	0.5	932801	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	82	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	83	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	84	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	85	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH328	86	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	87	0.5	932802	Silty clay	Upper alluvial deposits	Microfauna, pollen
BH328	88	0.5	932803	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	89	0.5	932804	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	90	0.5	932804	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	91	0.5	932804	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	92	0.5	932805	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	93	0.5	932805	Silty clay	Lower alluvial deposits	Microfauna, pollen
BH328	94	0.5	932806	Silty clay	Lower alluvial deposits	Microfauna, pollen

6.8 GCZ 3c

Introduction

6.8.1 GCZ 3c contains the eastward, lateral continuation of the units of the raised beach sequence present in GCZs 3a and 3b (**Figures 10–11**). As elsewhere, these raised beach sediments are mantled by Head. The zone extends from east of Tortington Rife to the Arun Valley (**Figure 17**). Twenty-four interventions were in this zone.

Stratigraphic evidence

Raised beach

6.8.2 Raised beach deposits occurred across the zone. In comparison to the equivalent deposits in GCZs 3a and the west of GCZ 3b these raised beach deposits are relatively thin, being generally 3.00 m thick, or less. This reflects the position of the deposits in GCZ 3c, being located further south, away from the palaeo-cliff line (see **Figure 18a**).

6.8.3 The raised beach sediments in this zone exhibited generally uniform lithologies and principally consisted of marine sands and clayey sands, which included some more gravelly units containing sub-angular to sub-rounded flint clasts. Occasionally these sands were interbedded with clay units. These marine sands rested on London Clay Formation bedrock.

Head

6.8.4 Head sequences overlay the raised beach deposits in this zone. These sediments were relatively shallow, being generally no more than 0.60 m thick, with a maximum thickness of 0.90 m recorded. The Head comprised brown, slightly gravelly, sandy clays and clayey sands, likely deposited through solifluction. The gravel clasts were flint and contained a high angular component. Little stratigraphy was discernible in these sediments, and their lithological characteristics suggested that they may be decalcified.

Archaeological evidence

6.8.5 Seven trial pits were in this zone; no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.8.6 Sixteen palaeoenvironmental samples were taken from interventions in GCZ 3c (**Table 10**). These samples are from throughout the raised beach sediments and are suitable for assessing the palaeoenvironmental potential of these deposits.

Table 10 Palaeoenvironmental samples from GI interventions in GCZ 3b

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS367	26	0.5	836701	Gravelly sand	Head	Microfauna
WS367	27	0.5	836702	Sandy clay	Raised Beach	Microfauna
WS368	28	0.5	836801	Sand	? Head	Microfauna

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
WS368	29	0.5	836802	Gravelly sand	? Head	Microfauna
WS368	30	0.5	836803	Sandy clay	? Head	Microfauna
WS369	31	0.5	836901	Silty sand	? Head	Microfauna
WS369	32	0.5	836901	Silty sand	Raised Beach	Microfauna
WS369	33	0.5	836901	Silty sand	Raised Beach	Microfauna
WS369	34	0.5	836901	Sand	Raised Beach	Microfauna
WS371	35	0.5	837103	Sand	Raised Beach	Microfauna
TP321	500	0.5	32103	Sand	Raised Beach	Microfauna
TP321	501	0.5	32104	Sand	Raised Beach	Microfauna
TP323	502	0.5	32303	Silty sand	Raised Beach	Microfauna
TP323	503	0.5	32303	Silty sand	Raised Beach	Microfauna
TP323	504	0.5	32304	Clay silt	Raised Beach	Microfauna
TP323	505	0.5	32305	Sand	Raised Beach	Microfauna
TP321	500	0.5	32103	Sand	Raised Beach	Microfauna
TP321	501	0.5	32104	Sand	Raised Beach	Microfauna

6.9 GCZs 6a – 6c

Introduction

6.9.1 GCZs 6a-6c crosses the valley of the River Arun (**Figures 11–13**). Monitoring of GI interventions has demonstrated that Quaternary sediments infilling the Arun Valley in this area include an extensive alluvial sequence of likely late Pleistocene and Holocene age, as well as previously unrecognised earlier Pleistocene terraces of the River Arun that are buried beneath this alluvial sequence (**Figures 11–13**). The valley is incised into Lambeth Group and London Clay bedrock.

6.9.2 In total three Pleistocene terraces have been identified, with basal elevations at -10.00 m OD, -16.00 m OD and -21.00 m OD (**Figure 12**). As deposits assigned to Terrace 4 are recorded at a higher elevation east of Arun (see GCZ 6d below), these terraces are tentatively equated with Terrace 3, Terrace 2 and Terrace 1 of the Arun terrace stratigraphy (see section 4.3).

6.9.3 The later alluvial sequence in the valley is illustrated in **Figure 13** and consisted of:

- Phase 1: Channel fill – ? late Pleistocene/early Holocene
- Phase 2: Peat formation – ? early Holocene
- Phase 3: Major sandy channel fills towards centre of floodplain, with alluvial clays towards floodplain margins – Holocene

6.9.4 The uppermost Quaternary sediments in these zones comprised sediments interpreted as being colluvial, but which may include some recent overbank alluvial sediments; during the formation of these deposits the River Arun has been located within stable channels.

GCZ 6a

6.9.5 GCZ 6a is located along the western flank of the Arun Valley (**Figure 17**). It is defined by buried Pleistocene terraces and overlying Holocene alluvial sequences (**Figure 12**). Here two buried terraces are preserved, Terrace 3 and Terrace 2. Terrace 1 is absent from this zone. Thirteen interventions were in GCZ 6a.

Terrace 3

6.9.6 Deposits belonging to Terrace 3 were demonstrated extensively preserved in this zone. In the GI interventions they comprised up to 5.00 m of sands, gravelly sands and sands and gravels, and pockets of silty clay. The gravel comprised angular to sub-angular flint, with some sandstone, clasts.

Terrace 2

6.9.7 More limited preservation of Terrace 2 sediments was demonstrated; they appear to have been truncated by subsequent downcutting and erosion in the later Pleistocene and/or Holocene. Terrace 2 sediments in GCZ 6a comprised 1.50 m of fluvial sands and gravels, overlain by 1.30 m of sandy,

sometimes gravelly, clays; these clays contained flint and occasional chalk clasts, as well as organic sandy clay bands.

Head

6.9.8 Restricted outcrops of Head were identified beneath alluvium on the valley margins in this zone. This Head comprised clayey, very gravelly sands. The gravel component consisted of angular to rounded flint clasts; it is likely that the rounded clasts are reworked by slope processes from raised beach deposits located to the west and upslope (GCZ 3c; see **Figure 11**).

Holocene alluvial deposits

6.9.9 The Pleistocene terrace deposits in GCZ 6a were overlain by between 3.15 m and 10.20 m of silty clays, sometimes laminated, containing pockets of organic material. These are later Holocene alluvial clays. The alluvial clays in the GCZ 5a belong to Phase 3b/3c of the Arun later alluvial sequence (see below). These sediments reflect low energy alluvial deposition, possibly with a tidal influence. The specific age of these sediments is currently unknown, and specific environmental conditions and landscape context, including degree of fluctuating tidal influence on their deposition, is uncertain.

Holocene colluvial deposits

6.9.10 The uppermost deposits in this zone consisted of mottled grey brown clays, occasionally containing round and sub-rounded flint clasts, likely reworked from early marine sediments. These clays are later Holocene and were interpreted in GI as colluvial deposits. However, the lithology and topography suggest that they may include overbank alluvial sediments. During the deposition of these sediments the River Arun, as today, was associated with stable channels.

GCZ 6b

6.9.11 GCZs 6b comprises the central portion of the Arun Valley (**Figure 17**) and contained alluvial sediments. These may include late Pleistocene sediments at the base but are principally Holocene in date.

6.9.12 The zone includes sediments associated with the entire later alluvial stratigraphy identified in the valley. This stratigraphy can be summarised as follows:

- Phase 1: Channel fill – ? late Pleistocene/early Holocene
- Phase 2: Peat formation – ? early Holocene
- Phase 3: Major sandy channel fills towards centre of floodplain, with alluvial clays towards floodplain margins – Holocene

6.9.13 No earlier Pleistocene terrace deposits were identified in this zone. Sixteen interventions were in GCZ 6b (**Figure 17**)

Phase 1: ? Channel fill

6.9.14 The earliest sediments in this zone comprised clayey sands, containing some sub-angular and subrounded flint clasts, at the base of which a coarse flint gravel was identified in some interventions. These deposits likely infill a channel situated at the base of the Holocene alluvial sequence. Lithologically, the deposits suggest high energy deposition by a braided river during cool/cold open conditions, with deposition occurring immediately after the final phase of fluvial down-cutting of the valley. This suggests that this channel fill dates to the late Pleistocene.

Phase 2: Peat

6.9.15 A peat was identified overlying the channel fill deposits. This peat is up to 2.00 m thick. This peat reflects a period of landscape stabilisation following deposition of the sands and gravels infilling the channel. The stratigraphic position of this peat suggests that it may date to the early Holocene

Phase 3: Holocene alluvial deposits

6.9.16 The peat is overlain by an extensive Holocene alluvial sequence, which is up to 28.50 m thick. Although the details of the changing depositional regimes relating to these sequences are difficult to reconstruct with certainty, and the time periods represented are unknown, the following broad depositional units can be discerned:

- Phase 3a: laminated silts and clays, which laterally transition to sand units, within a restricted floodplain. These sediments potentially reflect mudflats and filled channels.
- Phase 3b: extensive sequences of sands and sand clays, which contained shell fragments and pockets of organic material, and which were located within a wider floodplain. These may reflect a more dynamic, potentially estuarine/intertidal environment, with frequent reworking of sediments.
- Phase 3c: often laminated, silty clays and clayey sands with frequent pockets of organic material, distributed over a wide floodplain. These sediments may reflect a return to more quiescent alluvial deposition, potentially with tidal influence.

Holocene colluvial deposits

6.9.17 As in GCZ 6a, the youngest Quaternary deposits in GCZ 6b comprised mottled grey brown, sometimes slightly gravel clays. These were interpreted as Holocene colluvium, although they may contain some overbank alluvial components. These sediments were deposited during the later Holocene, with River Arun located in stable channels.

GCZ 6c

6.9.18 GCZ 6c covers the eastern Arun Valley (**Figure 17**) and contained buried Pleistocene terraces and overlying Holocene alluvial sequences. In this

zone all three buried Arun terraces (Terrace 3, 2 and 1) were identified (**Figure 12**). Ten interventions were in this zone.

Terrace 3

6.9.19 Up to 5.25 m of deposits attributed to Terrace 3 of the Arun were identified in this zone. These deposits consisted of fluvial sands and gravels, which in some instances were interbedded with silty clay horizons. The gravel comprised, angular, sub-angular and sub-rounded flint, with some sandstone clasts.

Terrace 2

6.9.20 Further fluvial sediments belonging to Terrace 2 were identified at a lower elevation than Terrace 3 in this zone. The Terrace 2 deposits consisted of up to 4.45 m of alternating fluvial sands and gravels, and fluvial sands. The basal heights of both the Terrace 3 and 2 deposits in GCZ 3c indicate that they are the lateral equivalent of terraces identified in the western Arun Valley in GCZ 6a (**Figure 12**).

Terrace 1

6.9.21 Terrace 1 deposits only occurred in GCZ 6c. These consisted of up to 4.80 m of gravelly sands containing angular, sub-angular and sub-rounded flint and sandstone clasts.

Holocene alluvial deposits

6.9.22 The Pleistocene terrace deposits in this zone are overlain by Holocene alluvial sediments which correspond with lateral continuation of Phase 3b and 3c of the late Pleistocene/earlier Holocene alluvial stratigraphy identified in GCZ 6b (see above).

Holocene colluvial deposits

6.9.23 As in GCZs 6a and 6b, the latest sediments identified in this zone consist of clays, principally considered to be Holocene colluvial deposits (see above).

Archaeological evidence

6.9.24 A single trial pit was in this zone (**Figure 17**). No archaeology was identified during monitoring of this trial pit.

6.9.25 A small number of artefacts were recovered by the GI engineer from the hand dug starter pit from BH231 (GCZ 6a). In line with the WSI (HE551523-BAM-HER-ZZ-SP-AG-0001) the starter pits were not subject to archaeological monitoring. However, the GI log for BH231 has been reviewed and the artefacts recovered assessed.

6.9.26 The deposits from which the artefacts were recovered comprised brownish grey and brown mottled gravelly medium sandy clay containing possible calcined organic material. This description is suggestive of the fill of an archaeological feature.

6.9.27 The artefacts from the possible feature fill comprise 2 plain body sherds (31 g) of Roman wheel made, sandy grey ware pottery. Both are freshly broken

but do not re-join each other although they probably do derive from the same vessel. This is likely to have been a large, thick-walled (8-10 mm thick) storage jar. Vessels such as these span the mid/late 2nd-4th centuries AD and were commonly made in the Alice Holt kilns on the Surrey/Hampshire border (Lyne and Jefferies 1979: 38-51; classes 1A, 1C, 4 and 10), although given the variability inherent within sandy grey ware fabrics even from a single kiln, a more local source cannot be ruled out.

6.9.28 The evidence suggests the starter pit for BH231 encountered an archaeological feature of possible Roman date.

Palaeoenvironmental samples

6.9.29 Fifty-one palaeoenvironmental samples were taken from interventions across GCZ 6b and 6c (**Table 11**). These samples are from throughout the late Pleistocene and Holocene alluvial sequence, as well as from selected units of the earlier Pleistocene terraces.

6.9.30 These samples are suitable for assessing the palaeoenvironmental potential of these deposits and may include material suitable for dating (principally short-lived plant remains from organic Holocene deposits suitable for AMS radiocarbon dating).

Table 11 Palaeoenvironmental samples from GI interventions in GCZ 6b and 6c

GI Ref.	GCZ	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH213	6b	1017	0.5	92132	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	1018	0.5	92133	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10019	0.5	92134	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10020	0.5	92134	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10021	0.5	92134	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10022	0.5	92135	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10023	0.5	92135	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH213	6b	10024	0.5	92136	Sandy silty clay	Alluvium (?Phase 3b)	Microfauna, pollen

GI Ref.	GCZ	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH213	6b	10025	0.5	92136	Sandy silty clay	Alluvium (?Phase 3b)	Microfauna, pollen
BH213	6b	10026	0.5	92137	Sandy silty clay	Alluvium (?Phase 3b)	Microfauna, pollen
BH213	6b	10027	0.5	92137	Sandy silty clay	Alluvium (?Phase 3b)	Microfauna, pollen
BH213	6b	10028	0.5	92137	Sandy silty clay	Alluvium (?Phase 3b)	Microfauna, pollen
BH213	6b	10029	0.5	92138	Silty clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH213	6b	10030	0.5	92138	Silty clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH213	6b	10031	0.5	92139	Silty clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH213	6b	10032	0.5	92139	Silty clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH213	6b	10033	0.5	92139	Silty clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH213	6b	10034	0.5	921410	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH213	6b	10035	0.5	921411	Sandy gravel	Alluvium (Phase 1)	Microfauna
BH213	6b	10036	0.5	92112	Sand	Alluvium (Phase 1)	Microfauna
BH245A	6b	100	0.5	24503	Silty sand	Alluvium (Phase 3b)	Microfauna
BH245A	6b	101	0.5	24503	Silty sand	Alluvium (Phase 3b)	Microfauna
BH245A	6b	102	0.5	24503	Silty sand	Alluvium (Phase 3b)	Microfauna
BH245A	6b	109	0.5	24504	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen

GI Ref.	GCZ	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH245A	6b	103	0.5	24505	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH245A	6b	105	0.5	24506	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH245A	6b	106	0.5	24507	Peat	Alluvium (Phase 2)	Pollen, organic material, C14 dating
BH245A	6b	107	0.5	24507	Peat	Alluvium (Phase 2)	Pollen, organic material, C14 dating
BH245A	6b	108	0.5	24508	Silty clay	Alluvium (Phase 2)	Microfauna, pollen
BH245A	6b	104	0.5	24509	Sandy clay	Alluvium (Phase 1)	Microfauna, pollen
BH245A	6b	110	0.5	24511	Silty clay	?Alluvium (Phase 1)	Microfauna, pollen
BH251	6b	69	0.5	925110	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH251	6b	70	0.5	925110	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH251	6b	71	0.5	925111	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH251	6b	72	0.5	925111	Sandy clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH251	6b	73	0.5	925111	Sandy clay	Alluvium (?Phase 3a)	Microfauna, pollen
BH255	6c	60	0.5	925503	Sandy clay	Alluvium (Phase 3c)	Microfauna, pollen
BH255	6c	61	0.5	925504	Sandy clay	Alluvium (Phase 3c)	Microfauna, pollen
BH255	6c	62	0.5	925505	Clayey sand	Alluvium (Phase 3b)	Microfauna, pollen

GI Ref.	GCZ	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH255	6c	63	0.5	925507	Sandy clay	Alluvium (Phase 3b)	Microfauna, pollen
BH255	6c	64	0.5	925509	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH255	6c	65	0.5	925509	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH259	6c	42	0.5	925901	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH259	6c	43	0.5	925901	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH259	6c	44	0.5	925903	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH259	6c	45	0.5	925903	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH259	6c	46	0.5	925903	Silty clay	Alluvium (Phase 3a)	Microfauna, pollen
BH222	6c	1038	0.5	92223	Silty clay	Alluvium (Phase 3c)	Microfauna, pollen
BH222	6c	1039	0.5	92225	Silty clay	Terrace 3	Microfauna
BH259	6c	47	0.5	925903	Sand	Terrace 2	Microfauna
BH259	6c	48	0.5	925903	Clayey sand	Terrace 2	Microfauna

6.10 GCZ 7

Introduction

6.10.1 GCZ 7 is located east of the Arun Valley and is bisected by the Bognor Regis to London railway line (**Figure 17**). Nine interventions were in this zone.

6.10.2 GCZ 7 is defined by the presence of Pleistocene raised beach deposits with a basal elevation of approximately 4.00 m OD (**Figures 11** and **14 – 15**). These deposits represent the lateral equivalent of those in GCZs 3c, the intervening sediments being truncated and removed by the incision of the Arun Valley during subsequent periods. A palaeo-cliff line separating

these deposits from those at a higher elevation in GCZ 9 is located between WS201 and WS202 (**Figures 14 – 15**).

Stratigraphic evidence

Raised beach

6.10.3 The raised beach deposits in GCZ 7 comprised up to 6.0 m of sands and gravels, sands and clays, over London Clay bedrock. Although truncated in places by overlying Head deposits, a stratigraphy comprising a basal gravel composed of sub-angular and sub-round flint clasts, overlain by marine sands and sandy clays, was observed. This stratigraphy is similar to that of the raised beach sequences found across GCZs 3a and 3b and is potentially indicative of marine sands and gravels overlain by clays formed during marine regression. The presence of beach gravels at the base of the sequence is indicative of proximity to the palaeo-cliff line, which can be identified at the eastern margin of the zone (**Figure 18**).

Head

6.10.4 The raised beach deposits in GCZ 7 are overlain by Head deposits. These consist of up to 2.00 m of brown slightly gravelly clays and sands, which often transitioned to a clayey angular gravel at the base. Some stratigraphy was apparent suggestive of several phases of Head deposition. They likely reflect deposition through slope processes initiated by solifluction, and they may be decalcified.

Archaeological evidence

6.10.5 One trial pit was in this zone (**Figure 17**); no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.10.6 Six palaeoenvironmental samples were taken from two interventions in GCZ 7 (**Table 12**). These samples are principally from the raised beach sequence and may be suitable for assessing the palaeoenvironmental potential of these deposits.

Table 12 Palaeoenvironmental samples from GI interventions in GCZ 7

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH225	1040	0.5	92252	Gravelly sand	Raised Beach	Microfauna
BH225	1041	0.5	92252	Gravelly sand	Raised Beach	Microfauna
BH225	1042	0.5	92252	Gravelly sand	Raised Beach	Microfauna

BH225	1043	0.5	92253	Clay	Raised Beach	Microfauna, pollen
WS263	30	0.5	82636	Sand	Raised Beach	Microfauna
WS263	31	0.5	82636	Sandy gravel	Raised Beach	Microfauna

6.11 GCZ 8

Introduction

6.11.1 No GI works were carried in this zone, however, BGS borehole records are available (**Figure 17**), which are sufficient to characterise the Quaternary deposits present. The sediments present include fluvial sands and gravels mapped by the BGS as Terrace 4 of the Arun.

Stratigraphic evidence

Terrace 4

6.11.2 The BGS borehole logs record 2.50 m of fluvial sands and gravels. In one intervention (TQ00NW45), these overlay London Clay Formation bedrock. However, in a second (TQ00NW47) they were found above 0.50 m of laminated sandy clays, above London Clay. These laminated clays may be truncated marine deposits; significantly the basal height of these potential marine sediments is at 12.40 m OD, which would be consistent with those in GCZ 9 (see below).

6.11.3 Deposits belonging to Terrace 4 of the Arun were investigated through a single test pit at Upper Broomhurst Farm by the “The Palaeolithic Archaeology of the Sussex/Hampshire Coastal Corridor” Project (PASHCC) which recorded 3 m of fluvial sands and gravels (Bates et al. 2007; 2010). Although no coordinates are available for this test pit, the farm buildings ate Upper Broomhurst Farm are located to the east of this zone, and this test pit may have been within GCZ 8.

6.12 GCZ 9

Introduction

6.12.1 GCZ 9 is located east of the Bognor Regis to London railway line, and extends along the current A27 from Crossbush roundabout, eastwards (**Figure 17**). Twenty-one interventions were in this zone.

6.12.2 Raised beach deposits with a basal elevation of approximately 14.00 – 12.00 m OD extend across the zone (**Figure 15**). These deposits represent a higher, older raised beach sequence than that located to the west in GCZ 7. They were underlain by London Clay bedrock and overlain by Head.

6.12.3 A palaeo-cliff line associated with this older raised beach sequence is identifiable which forms the boundary between GCZ 9 and GCZ 10, located to the north (**Figure 16** and **18b**).

Stratigraphic evidence

Raised beach

6.12.4 The raised beach deposits in this zone divided into two lithologically distinct groups. Those to the east (BH227 – WS218; see **Figure 17**) consisted of sandy clays over marine sands, with a flint gravel dominated by sub-rounded flint clasts at the base of the sequence, above London Clay bedrock. These sediments were up to 3.70 m thick and are indicative of marine transgression and subsequent regression. The marine sequences in the east of the zone (WS204 – WS207; see **Figure 17**) comprised up to 4.00 m of silty clays, with sand lenses, over London Clay; these silty clays may be stratigraphically equivalent to the upper sandy clays present in the eastern sequences.

Head

6.12.5 As with the other raised beach sequences across the Scheme, those in GCZ 9 were overlain by Head. The Head was often less than one 1.00 m thick, but sometimes extending to 2.00 m, and comprised brown sandy, sometimes gravelly, clays; they may be decalcified.

Archaeological evidence

6.12.6 Five trial pits were in this zone (**Figure 17**); no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.12.7 Fourteen palaeoenvironmental samples were taken from four interventions in GCZ 9 (**Table 13**). These samples are mostly from the raised beach sequence and are suitable for assessing the palaeoenvironmental potential of these deposits.

Table 13 Palaeoenvironmental samples from GI interventions in GCZ 9

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH227	8	0.5	922706	Silty clay	Raised Beach	Microfauna, pollen
BH227	9	0.5	922706	Silty clay	Raised Beach	Microfauna, pollen
BH227	10	0.5	922706	Silty clay	Raised Beach	Microfauna, pollen

GI Ref.	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Purpose
BH227	11	0.5	922706	Silty clay	Raised Beach	Microfauna, pollen
BH227	12	0.5	922706	Silty clay	Raised Beach	Microfauna, pollen
BH228	6	0.5	922801	Silty clay	Raised Beach	Microfauna, pollen
BH228	7	0.5	922803	Silty clay	Raised Beach	Microfauna, pollen
BH229	1	0.5	922901	Clayey sand	Raised Beach	Microfauna, pollen
BH229	2	0.5	922905	Sand	Raised Beach	Microfauna
BH229	3	0.5	922906	Sandy clay	Raised Beach	Microfauna, pollen
BH229	4	0.5	922909	Gravelly silty clay	Raised Beach	Microfauna
BH229	5	0.5	922909	Silty clay	Raised Beach	Microfauna, pollen
WS214	1007	0.5	82145	Sandy clay	? Head	Microfauna
WS214	1008	0.5	82146	Clayey sand	Raised Beach	Microfauna, pollen

6.13 GCZ 10

Introduction

6.13.1 GCZ 10 straddles the current A27 at, and north of, Crossbush roundabout (**Figure 17**). Nine interventions were in this zone.

6.13.2 The Quaternary deposits in this zone comprised Head, which mantled a London Clay bedrock topographic high, which overlooks the raised beach sequence in GCZ 9 to the south (**Figure 16**).

Stratigraphic evidence

Head

6.13.3 The Head deposits in this zone were up to approximately 3.00 m thick and comprised grey-brown mottled silty clays; they are lithologically distinct

from the Head sediments overlying the raised beach deposits in other others. This distinction likely reflects the sediments in GCZ 10 that primarily derive directly from the London Clay bedrock, that was weathered and reworked downslope through solifluction during cold periods of the Pleistocene. The deposits could, however, include allochthonous sediments, such as windblown material.

Archaeological evidence

6.13.4 No trial pits were in this zone and no archaeology was identified during monitoring.

Palaeoenvironmental samples

6.13.5 No deposits with significant palaeoenvironmental potential were identified during monitoring of GI interventions in this zone, and no samples were taken.

7. Discussion and conclusions

7.1 Introduction

7.1.1 No significant archaeology was identified during monitoring of GI works. However, the monitoring has enabled the Quaternary stratigraphy present across the route to be modelled, which enables initial assessment of these sediment's archaeological and geoarchaeological potential.

7.1.2 Pleistocene deposits are present across the Scheme, whilst Holocene sediments are largely confined to the Arun Valley, and the Binsted and Tortington Rifes. Monitoring of GI has enabled an initial chronostratigraphic framework for the Quaternary landscape evolution across Scheme to be produced (**Table 14**). This encompasses at least three, and possibly four, periods of Middle Pleistocene near-shore marine and estuarine sedimentation belonging to the Sussex and Hampshire coastal plain raised beaches, four Middle and Upper Pleistocene terraces of the River Arun, and extensive Holocene alluvial sequences in the Arun and tributaries.

Table 14 Initial chronostratigraphic framework for Quaternary landscape evolution across the Scheme

Geological period	Age (Ka)	Marine Isotope Stage (MIS)	Deposits	GCZ where potentially present
Holocene	11.7 – present	1	Colluvium Binsted Rife alluvial deposits Tortington Rife alluvial deposits Arun Holocene alluvial deposits	 GCZ 4 GCZ 5 GCZ 6a, 6b and 6c
Late Pleistocene	26 – 11.7	2	? Arun late Pleistocene alluvial deposits (basal channel) ?Head	GCZ 6b
	57 – 26	3	? Arun Terrace 1 – 3 ? Head	GCZ 6a and 6b
	72 – 37	4		
	116 – 72	5d – 5a	? Arun Terrace 1 – 3 ? Head	GCZ 6a and 6b

Geological period	Age (Ka)	Marine Isotope Stage (MIS)	Deposits	GCZ where potentially present
	130 – 116	5e		
Middle Pleistocene	191 – 130	6	? Arun Terrace 1 – 3 ? Head	GCZ 6a and 6b
	243 – 191	7	Brighton/Norton Raised Beach	GCZ 3a, 3b and 3c GCZ 7
			Arun Terrace 4	GCZ 8
			? Aldingbourne Raised Beach	GCZ 2 GCZ 9
	300 – 243	8	? Head	
	337 – 300	9	? Aldingbourne Raised Beach	GCZ 2 GCZ 9
	374 – 337	10	? Head	
	424 – 374	11	? Aldingbourne Raised Beach	GCZ 2 GCZ 9
	478 – 424	12	? Head	
	676 – 478	16 – 13	Westbourne/Arundel Raised Beach	GCZ 1

7.1.3 Modelling the GI data has enabled a Geoarchaeological Landscape Characterisation (GLC) of the Scheme to be produced which subdivides the areas investigated by the GI into Geoarchaeological Characterisation Zones (GCZs) based on variation in the Quaternary sediments.

7.1.4 Although the specific archaeological and geoarchaeological potential of the different Quaternary sedimentary units identified during monitoring is currently uncertain and will likely require direct archaeological and geoarchaeological evaluation, dating and palaeoenvironmental assessment to fully quantify, the Geoarchaeological Landscape Characterisation (GLC) produced for the Scheme allows a baseline

assessment of archaeological and geoarchaeological potential of the deposits within each zone to be developed.

7.1.5 The Quaternary deposits present in each of the ten Geological Characterisations Zones (GCZs) of the GLC, their archaeological and geoarchaeological context, and their possible archaeological and palaeoenvironmental potential, are discussed below

7.2 GCZ 1

7.2.1 GCZ 1 contains the highest and oldest raised beach deposits present in the Scheme. Based on their basal elevation (26 m OD), these sediments most likely equate to the Westbourne/Arundel Raised Beach, although they are located south of the current mapped extent of these deposits and at a slightly higher elevation (Roberts and Pope 2018).

7.2.2 The nearest deposits currently correlated with the Westbourne/Arundel Raised Beach are located 300 m to the north-east at Gaston Farm, where silty marine sands are recorded beneath Head and overlying chalk bedrock at 30 m OD (Roberts and Pope 2018).

7.2.3 There exists a possibility that the raised beach deposits in GCZ 1 belong to a period of marine transgressions and regressions that post-date the Westbourne/Arundel Raised Beach. If this were the case, this period would also predate the deposits of the Aldingbourne Beach found at a lower elevation to the south in GCZ 2 (21 – 15 m OD), which would mean that these sediments belong to a previously unidentified intervening raised beach sequence.

7.2.4 If the raised beach deposits in this zone belong to Westbourne/Arundel Raised Beach, the sediments may be stratigraphy equivalent with the Slindon Sand (see section 3.3). This suggests that they data to MIS 13 (524 – 474 Ka) and that they have the potential to contain Lower Palaeolithic archaeology.

7.2.5 The raised beach sediments in GCZ 1 may contain palaeoenvironmental evidence, including microfossils. These datasets are key for establishing the environmental context of the sediments and correlating them with the Pleistocene raised beach sequence of the Sussex and Hampshire coastal plain and, potentially, with specific units of the West/Arundel Raised Beach.

7.2.6 The raised beach sediments in GCZ 1 are overlain by shallow Head sequences lacking stratigraphy. They represent sediments which have potentially been cryoturbated and reworked through solifluction during multiple Pleistocene cold stages post-dating MIS 13. Their lack of thickness and stratigraphy suggests that they are unlikely to include deposits belonging to a single, discrete period of Pleistocene, or to bury stable landsurfaces. Consequently, although they could contain Palaeolithic archaeology, this is likely to be reworked.

7.3 GCZ 2

7.3.1 This zone provides a transect which cuts through a raised beach sequence with a basal bedrock height of 21 – 15 m OD. Based on these heights and previous mapping (Bates et al. 2010, Roberts and Pope 2018), these sediments can be equated to the Aldingbourne Beach. The data suggests that the palaeo-cliff line that separates these deposits from the earlier Westbourne/Arundel Raised Beach may be close to the current A27 (**Figure 18**).

7.3.2 The archaeological potential of deposits associated with the Aldingbourne Beach, is poorly understood, and especially so in this area. Previous investigations carried out further west in the Chichester area, indicate that deposits equated with the Aldingbourne Beach include sediments which aggraded in MIS 7 (243 – 191 Ka; Bates et al. 2000, Bates et al. 2010). However, it is uncertain if all deposits ascribed to the Aldingbourne Raised Beach date to MIS 7, or if they also include evidence of earlier marine transgressions and regressions, possibly within MIS 11 (424 – 374 Ka) or MIS 9 (337 – 300 Ka).

7.3.3 The basal units of the raised beach sequences in GCZ 2 were only encountered in the deepest interventions. Consequently, details on the full depth of the stratigraphy is limited. However, at least three potential phases of deposition were identified:

- ? Phase 1: orangish brown very sandy clays
- Phase 2: marine sands and gravels likely reflective marine transgression
- Phase 3: grey sandy silty clays, including laminated units, likely deposited during marine regression

7.3.4 It is notable that in one intervention (BH302), a storm beach within Phase 2 was recorded; this may indicate that there is complexity in the system which may be the result of changing sea level or local palaeogeographic changes.

7.3.5 The raised beach sediments included near-shore marine deposits (Phase 2) and possibly estuarine/intertidal, deposits (Phase 3). This is reminiscent of the Slindon Sands and Silts of the earlier West/Arundel Raised Beach (see section 4.3), which indicates that the Phase 3 laminated silts may have significant potential to contain minimally disturbed Palaeolithic archaeology (see section 4).

7.3.6 Establishing the specific Palaeolithic archaeological potential of these deposits is dependent on their age and the environmental and landscape context within which individual sedimentary units were deposited. The deposits are suitable for luminescence dating, whilst they may preserve palaeoenvironmental datasets, particularly microfossils, which could provide this environmental and landscape context. Any palaeoenvironmental evidence present may also provide chronological information.

7.3.7 The raised beach sequences are overlain by Head deposits up to 5 m thick, likely deposited through solifluction processes during cold periods of the Pleistocene. These deep occurrences of Head exhibited clear stratigraphy, which may be indicative of multiple and discrete phases of deposition. Such Head sequences have significant potential to bury stable horizons associated with contemporary Palaeolithic archaeology, as well as artefacts reworked within the Head.

7.3.8 The Head sequences in this zone include chalky, calcareous sediments, which could preserve palaeoenvironmental evidence (vertebrate remains and molluscs) demonstrative of landscape conditions and environments.

7.3.9 To the south of the zone, at Walberton, excavations identified evidence of in-situ activity dating from the Early to Middle Neolithic through to the Roman period (ASE 2021). This included Early to Middle Neolithic pits and post holes, Middle to Late Bronze Age field boundaries, Middle Iron Age trackways and enclosures, a Late Iron Age burial with weapons (dated to first half of 1st century AD) and extensive evidence of Roman features, including a corn-dryer.

7.3.10 The archaeological features were all cut into deposits described as “flint gravels with occasional patches of mottled mid-brown-yellow clay silt” and “mid to light yellow clay (Brickearth)”. The former was interpreted as a “Raised Marine Deposit” and latter erroneously related to the Palaeogene London Clay Formation.

7.3.11 The descriptions of these deposits indicate that they both belong to Head sequences, equivalent to those in GCZ 2. The gravellier units described at Walberton were in the north of the site, closest to GCZ 2, and are likely to be directly equivalent with the gravelly Head identified in GI across GCZ 2.

7.3.12 The finer-grained material identified further south at Walberton likely reflects colluvial and/or aeolian deposition of finer-grained Head deposits (often referred to as Head-Brickearth), and may be equivalent to similar finer grained sediments identified in the top of Head sequences in the south of GCZ 2 (see section 6.3)

7.3.13 The fact that these deposits are cut by features dating to the Early to Middle Neolithic indicates that the top of the Head sequences in the area are at least early Holocene in age. Dating these Head sequences would help to establish their specific archaeological potential; sandy horizons within the Head in this zone are suitable for luminescence dating.

7.4 GCZs 3a – 3c

7.4.1 These zones traverse raised beach deposits with basal heights of 8 – 4 m OD, which suggests that they belong to the Brighton/Norton Beach. They are separated from raised beach sediments in GCZ 2 by a clear palaeo-cliff line and from each other by later valleys of the Binsted and Tortington Rifes.

7.4.2 The location of the palaeo-cliff line separating the Brighton/Norton Raised Beach from the earlier Aldingbourne Raised Beach is apparent in the GI data at the northern limit of GCZ 3a (see **Figure 18**). An Electrical Resistivity Tomography (ERT) transect (Magnitude Surveys Ltd) suggests changes in bedrock heights in the London Clay Formation indicative of the continuation of this palaeo-cliff line further to the west (ERT Line 1; **Figure 18**).

7.4.3 The stratigraphy observed within the raised beach sediments in GCZs 3a – 3c broadly conforms with that of outcrops of the Brighton/Norton Beach in the Chichester area (Bates 1998, Bates et al. 2000). In GCZs 3a and 3b, located close to the palaeo-cliff line, a stratigraphy of marine sands and gravels, overlain by laminated, potentially estuarine, clays and sands was observed. Further south, in GCZ 3c, only the lower marine sands and gravels occur.

7.4.4 Although relatively little Palaeolithic archaeology has currently been identified from within the Brighton-Norton Beach, a late MIS 7/6 age indicates equivalence with the British early Middle Palaeolithic, and there is potential for the estuarine sediments in these sequences to contain evidence of contemporary early Middle Palaeolithic activity. The deposits of the Brighton/Norton Beach in GCZs 3a, 3b and 3c contain units suitable for luminescence dating, which would assist in establishing a firmer chronological framework for these deposits and to establish their archaeological potential.

7.4.5 Deposits of the Brighton-Norton Beach have consistently been shown to be fossiliferous (Bates 1998, Bates et al. 2010); however, these studies have been focussed in areas where these sediments overlie chalk bedrock, rather than the Palaeogene sediments beneath GCZs 3a – 3c. Nevertheless, the raised beach deposits within GCZ 3a, 3b and 3c have potential to preserve palaeoenvironmental evidence, including microfossils, which could assist in establishing the depositional and environmental context of these deposits, and their archaeological potential.

7.4.6 Deep Head sequences, up to 6.50 m thick, overlie the raised beach sequences in GCZ 3a and the west of GCZ 3b. These likely reflect deposition during cold periods of the Pleistocene, with the primary process of deposition likely to be solifluction. These sequences exhibited stratigraphy, indicating at least three discrete and chronologically separate phases of Head deposition.

7.4.7 These deep Head sequences have the potential to bury stable horizons associated with cotemporary Palaeolithic archaeology, and to contain reworked artefacts within the Head. As they overlie raised beach sediments thought to date to MIS 7, they are most likely to contain contemporary Middle Palaeolithic, or later, archaeology. Establishing chronology for these Head sequences is required to consider their archaeological potential in detail. Sandy units within the Head are suitable luminescence dating. Lower units within these deeper Head sequences included chalky, calcareous

horizons, which could preserve molluscs and vertebrate faunas indicative of landscape and environmental conditions.

7.4.8 In the east of GCZ 3b and across GCZ 3c, the Head sequences overlying the raised beach deposits are generally much shallower and lack stratigraphy. This indicates that they may have been cryoturbated and reworked through solifluction multiple times during the Pleistocene cold periods that post-date MIS 7. Consequently, although they may contain reworked archaeology, they are less likely than the deeper sequences in GCZ 3a and the west of 3b to reflect discrete periods of Head accumulation and to bury stable horizons associated with contemporary Palaeolithic archaeology.

7.5 GCZ 4

7.5.1 GCZ 4 is defined by the Binsted Rife. This valley has been incised through, and post-dates, the Brighton-Norton Raised Beach (<MIS 7; 190 Ka).

7.5.2 Relatively thin sequences of Head (< 1.20 m thick) occurred along the edges of the rife. This Head likely post-dates the incision of the rife and probably comprises colluvial sediments of late Pleistocene and/or early Holocene date.

7.5.3 The GI demonstrated that the Binsted Rife in this zone contains relatively shallow (up to 1.35 m) alluvial sequences. Although currently undated, these alluvial sediments are likely to principally be Holocene, although a thin basal high energy gravel (0.10 m) may be late Pleistocene and relate to the initial downcutting that formed the rife.

7.5.4 The Head and alluvium may have potential to contain/mask archaeology, most likely of Holocene date. Although reworked organic material occurred within the alluvium the palaeoenvironmental and dating potential of these relatively shallow minerogenic sequences is generally low.

7.6 GCZ 5

7.6.1 Up to 8.50 m of Quaternary sediments were identified within the Tortington Rife. Currently these lack chronology. However, the rife itself clearly post-dates the Brighton/Norton Raised beach through which it is incised (<MIS 7; 190 Ka).

7.6.2 GI monitoring has demonstrated that Pleistocene deposits in the rife are confined to relatively shallow Head deposits on the upper valley slopes and, potentially, basal gravelly sandy clays recorded at the base of the sequences infilling the valley. This indicates that, in its current form, the Tortington Rife is likely to be a product of down-cutting in the late Pleistocene, with a basal fill reflecting high energy fluvial deposition and with Head being deposited on the valley sides through solifluction. The Palaeolithic archaeological potential of the shallow Head sequence and the high energy fluvial deposits in the valley is likely to be limited to reworked material.

7.6.3 The Holocene alluvial deposits within the Tortington Rife consisted of silty clays. The lower Holocene alluvial units contain reworked organic fragments, however, the palaeoenvironmental and dating potential of this organic material is limited. These silts may contain microfossils and potentially pollen that could assist in establishing the environmental context and degree tidal influence on the deposition of these sediments.

7.6.4 The alluvial sediments may have potential to preserve archaeological layers and/or features dating from the Final Upper Palaeolithic/early Mesolithic onwards. However, the lack of chronology prevents detailed consideration of its archaeological potential. Given the lack of peats preserving datable organic material, opportunities for directly dating the Holocene alluvial sediments within GCZ 5 may be limited.

7.7 GCZs 6a – 6c

7.7.1 These zones cross the valley of the River Arun. At this point the valley dissects and truncates sediments of the Brighton/Norton Raised Beach (GCZs 3c and 7), indicating that the current valley post-dates MIS 7 (<190 Ka).

7.7.2 Monitoring of GI has identified previous unrecognised Pleistocene terraces of the River Arun located beneath Holocene alluvium. Whilst six terraces of the upper Arun have been mapped by the BGS (BGS online viewer), an absence of terraces of the Arun in the lower reaches south of Arundel has been noted (Bates et al. 2007). This monitoring of GI has demonstrated that, rather than being absent, terraces are preserved beneath the floodplain south of Arundel.

7.7.3 Three buried terraces have been identified, two in GCZ 5a and three in GCZ5c. Additionally, a remnant outcrop of terrace deposits mapped by the BGS as Terrace 4 of the Arun occur with GCZ 8, which seemingly pre-dates the Brighton/Norton Beach, and post-date an earlier raised beach sequence identified in GCZ 9 (see below). Based on this new data a new scheme for terrace development in the lower Arun can be proposed and is outlined in **Table 15**.

Table 15 Revised terrace stratigraphy for the lower River Arun

Terrace	Raised beach	Basal height (m OD)	MIS	Notes
Terrace 6		-	>MIS 7	Not preserved – removed by later marine erosion
Terrace 5		-	>MIS 7	Not preserved – removed by later marine erosion
	? Aldingbourne	14.00 – 12.00	? early MIS 7	

Terrace	Raised beach	Basal height (m OD)	MIS	Notes
Terrace 4		12.00 – 13.00	? MIS 7	Only preserved in GCZ 8 between ? Aldingbourne and Brighton-Norton beaches; removed by later marine erosion to south
	Brighton/Norton	4.00	late MIS 7 / MIS 6	
Terrace 3		-10.00	MIS 6 – 2	Beneath Holocene alluvium
Terrace 2		-16.00	MIS 6 – 2	Beneath Holocene alluvium
Terrace 1		-21.00	MIS 6 – 2	Beneath Holocene alluvium

7.7.4 Terrace 3 of the Arun has been identified and is well preserved in GCZ 6a and 6c. The archaeological potential of this terrace is unknown as is its specific age. The terrace post-dates the Brighton/Norton Beach and is therefore likely to be younger than MIS 7. Dependant on the age of the terrace, it may, therefore, have the potential to preserve later Middle Palaeolithic archaeology. Sandy units were present within the Terrace 3 deposits, which would be suitable for luminescence dating, The Terrace 3 deposits in GIs principally comprised sand and gravels, which have low palaeoenvironmental potential. However, some silty clay units were identified in GCZ 6c, which may have potential to preserve microfossils.

7.7.5 Terrace 2 was similarly identified in both GCZ 6a and 6c but is best preserved in the latter. The age of the terrace is unknown; however, the terrace stratigraphy demonstrates it is younger than Terrace 3. Although the archaeological potential of Terrace 2 is unknown, based on the terrace's position within the terrace stratigraphy, if it did preserve contemporary archaeology, it would most likely be of late Middle Palaeolithic date. Dating these deposits is required in order refine understanding of archaeological potential. Fluvial sand units occur with Terrace 2 deposits in GCZ 6c, which are datable through luminescence. The Terrace 2 sediments encountered during GI monitoring have generally low palaeoenvironmental potential, however, some fluvial sand units were observed that could contain microfossils

7.7.6 Due to both the geometry of the valley and subsequent erosion, Terrace 1 is confined to GCZ 6c. Although undated, given its position within the terrace stratigraphy, it is likely to be mid Devensian or late Devensian in age (c. 100 –30 Ka). This would suggest that any contemporary

archaeology it contained would be late Middle Palaeolithic or early Upper Palaeolithic date. The Terrace 1 deposits encountered consisted of gravelly sands, which contained units which may be suitable for luminescence dating. No Terrace 1 sediments with significant palaeoenvironmental potential were identified during monitoring.

7.7.7 likely correspond to sands and gravels of the terrace sequence, which are overlain by alluvial sediments. Areas of higher resistance are also recorded to c. 5m depth, which are suggested to reflect “granular superficial deposits ….mapped [as} Raised Marine deposits” (Magnitude Surveys 2022). The GI data demonstrates that this upper area of higher resistance

7.7.8 The lower Arun preserves extensive alluvial sequences which post-date the Pleistocene terraces, with more than 30 m of such sediments recorded in GCZ 6b during monitoring. However, the age of the deposits within these sequences, and the environmental and landscape conditions they reflect, is currently poorly understood.

7.7.9 The earliest units of these alluvial sequences identified during GI monitoring consisted of clayey sands over a fluvial coarse flint gravel, infilling a channel(s) of restricted lateral extent. These sediments were likely deposited towards the end of the Pleistocene, immediately following the maximum phase of fluvial down-cutting, which incised the current buried valley. This period of maximum incision likely occurred under cold conditions in a landscape with restricted vegetation cover.

7.7.10 The deposits infilling this channel(s) are overlain by peat. Given its stratigraphic position, this peat may have formed during the early Holocene. The only early Holocene peats currently identified associated with the Arun occur within the now submerged, offshore continuation of the lower Arun Valley (Gupta et al. 2004; 2007, Bayliss et al. 2007), and are dated to between 11,300–9750 cal. BP, suggesting a Mesolithic date.

7.7.11 The peat located in GCZ 5b is overlain by laminated silts and clays, and sand, which may reflect mudflats and filled channels. These sediments may indicate increasing tidal influence.

7.7.12 The peats and overlying laminated silts and sands indicate that the lower units of the Holocene alluvial sequence in GCZ 5b have significant potential for assessing regional sea level rise and changing environmental conditions during the early Holocene. The peats have significant potential to preserve palaeoenvironmental evidence, including organic preservation, and may preserve material suitable for radiocarbon dating.

7.7.13 The overlying laminated silts and clays have potential to preserve micropaleontological remains (ostracods, foraminifera and diatoms), which may be informative on environmental change and tidal influences associated with changing sea levels. Chronology for the laminated clays and silts, and associated sands, could potentially be provided by luminescence dating.

7.7.14 Should the basal channel fill prove to be late Pleistocene in date and the overlying peat dated to the early Holocene, these deposits in GCZ 6b may have potential to contain Final Upper Palaeolithic and/or Mesolithic archaeology.

7.7.15 The laminated silts and sands are overlain by alluvial sediments, which encompass an increasingly wider area overtime, with these later sediments extending across GCZ 6a, 6b and 6c. The broad stratigraphy to emerge from GI monitoring is indicative of major sandy channel fills towards centre of floodplain, with alluvial clays towards the floodplain margins. Changes within the sequence may be indicative of different depositional regimes, which are likely to include fluctuating tidal influence.

7.7.16 Organic material occurs in pockets within some of these later alluvial deposits, but this has limited palaeoenvironmental potential as it is likely to have been reworked. The deposits may preserve microfossils informative on depositional and environmental context. Luminesce dating could potentially provide chronology for these later Holocene sediments. These sediments could be associated with archaeology, particularly towards their changing lateral margins, and wetland-dryland interfaces. Establishing the age, deposition processes and environmental context for these deposits would enable their archaeological potential to be refined.

7.7.17 The alluvial sediments across GCZs 6a, 6b and 6c are overlain minerogenic clays considered to be deposited primarily through colluvial processes, related to Holocene landscape instability. They may, however, also include some overbank alluvial sediments. These sediments are relatively recent in age and reflect current conditions, with the River Arun confined to stable channels. These deposits have generally low archaeological and geoarchaeological potential but could potentially seal earlier archaeological layers and features.

7.7.18 An ERT transect has be carried within GCC 6c, east of the modern River (ERT Line 2; **Figure 18**). Errors apparent in the scaling on the pseudo-section prevent detailed comparison with the GI data. However, areas of higher resistance are recorded from 0-5m and 10-30m OD. The upper resistive material corresponds with clays that overlie sands of the Holocene alluvial sequences, whilst the lower restive sediments correspond with the surfaces of gravels and clay rich deposits of the Pleistocene terraces and the lower fills of the basal channel.

7.8 GCZ 7

7.8.1 This zone is located east of the Arun Valley and contains raised beach deposits with a basal height of 4.0 m OD. These deposits are the lateral eastwards continuation of the Brighton/Norton Beach (GCZs 3a, 3b and 3c). The incision of the Arun Valley through these marine deposits provides a chronological marker which demonstrates that the current lower Arun Valley was incised after MIS 7 (243 – 191 Ka).

7.8.2 The raised beach sequences in this zone are like those in GCZ 3a and east of GCZ 3b, with marine sands overlain by sandy clays that may relate to estuarine conditions during marine regression. Beach gravels were also identified at the base of the sequence. This similarity to sequences of the Brighton/Norton Beach monitored to the west is reflective of those in GCZ 7 being close to the palaeo-cliff line, which swings to the south in this area (**Figure 18).**

7.8.3 As with the broadly analogous sediments in GCZ 3a, 3b and 3c, the raised beach deposits in GCZ 7 have potential to preserve palaeoenvironmental evidence, including microfossils, and could be dated through luminescence. The presence of possible estuarine sediments also indicates potential to contain contemporary late Middle Palaeolithic archaeology.

7.8.4 The raised beach deposits in GCZ 7 were overlain by up to 2.00 m of Head. This Head may be decalcified and its palaeoenvironmental potential may, therefore, be low. However, the Head sequences did exhibit some stratigraphy, suggestive of discrete phase of accretion. This suggests some potential for stable horizons associated with contemporary Palaeolithic archaeology, as well as for reworked artefacts to have been captured within the Head.

7.9 GCZ 8

7.9.1 GCZ 8 contains fluvial sediments which are mapped by the BGS as Terrace 4 of the River Arun. Although not investigated as part of the GI program, historic borehole logs (BGS online viewer) have been assessed to characterise the deposits.

7.9.2 The Quaternary deposits recorded comprised 2.50 m of fluvial sands and gravels, which in one borehole (TQ00NW45) overlay 0.50 m of laminated sandy clays; these sandy clays are likely part of a raised beach sequence, which the fluvial deposits have truncated. The basal heights of these sandy clays suggest that they belong to the raised beach sediments present in GCZ 9, whilst both these sandy clays and fluvial sediments predate the deposits of the Brighton/Norton Raised Beach found in GCZ 7.

7.9.3 The potential significance of these fluvial sediments for understanding the chronology and landscape evolution of the raised beach deposits of the Sussex and Hampshire coastal plain has previously been recognised (Bridgland et al. 2004, Bates et al. 2010). As a result a test pit was excavated in these fluvial deposits at Upper Broomhurst Farm by “The Palaeolithic Archaeology of the Sussex/Hampshire Coastal Corridor” Project (PASHCC), recording 3 m of fluvial sands and gravels (Bates et al. 2007; 2010). Although no coordinates are available for this test pit, it is likely that the test pit was either located within GCZ 8, or an area immediately adjacent to it

7.9.4 Significantly, the PASHCC project obtained two OSL dates from the fluvial deposits, which indicate a MIS 7 date (243 – 191 Ka). Combined with evidence that suggests that the Brighton/Norton Beach may date to late

MIS 7, it is likely that Terrace 4 of the Arun reflects a period of low sea level within MIS 7, which was associated by a River Arun that extended across the coastal plain to the south of the Scheme, whilst the Brighton/Norton Beach reflects a subsequent marine transgression (Bates et al. 2010). The current monitoring indicates that this transgression removed all terraces of the Arun to the south of Arundel that predate Terrace 3, with the Terrace 4 outcrop in GCZ 8 representing the most southerly surviving remnant of this terrace (see **Table 15**).

7.9.5 The terrace deposits in GCZ 8 have been shown to have potential for luminescence dating, whilst likely marine deposits underlying the terrace are also suitable for dating with this technique. Dating these underlying marine sediments could be particularly significant as it may allow the chronological relationship between Terrace 4 and the raised beach sequence present in GCZ 9 to be established.

7.9.6 The sediments of Terrace 4 have potential to contain contemporary early Middle Palaeolithic archaeology, as well as archaeology reworked from earlier deposits. Based on review of the historic borehole logs and the test pit excavated by the PASHCC project, the palaeoenvironmental potential of these deposits is low.

7.10 GCZ 9

7.10.1 This zone is defined by two cliff palaeo cliff-lines that demarked two separate raised beaches (see **Figure 18**). To west, across GCZ 7, the raised beach sediments can be attributed to the Brighton/Norton Raised Beach; however, the stratigraphic attribution of those in GCZ 9 is less clear.

7.10.2 Raised beach deposits occur across GCZ 9 with basal heights of 14.00 – 12.00 m OD. The position of these deposits within the wider raised beach stratigraphic framework is uncertain. They clearly predate the deposits of the Brighton/Norton Beach in GCZ 7, and likely sediments of Terrace 4 of the Arun found in GCZ 8 (see above). This suggests they date to at least MIS 7 (243 – 191 Ka). They are also at a lower elevation than the Westbourne/Arundel Raised Beach and are therefore younger than MIS 13 (524 – 474 Ka). This stratigraphic position would perhaps imply that they belong to the Aldingbourne Beach (see Table 3). However, these beach sediments are at a lower basal elevation than outcrops of the Aldingbourne Beach located west of the Arun Valley (including those in GCZ 2; 21 – 15 m OD).

7.10.3 Considering the raised beach sediments in GCZ 9 in their wider context, their elevation conforms with sporadic outcrops of marine deposits west of the raised beach deposits of the Sussex and Hampshire coastal sequence, which are grouped as part of the ‘Cams Down Beach’ (Bates et al. 2010: Figure 9). The status and position of the ‘Cams Down Beach’ in the raised beach framework remains to be fully established.

7.10.4 As the basal heights of the raised beach deposits in GCZ 9 fall between deposits attributed to the Aldingbourne (GCZ 2) and Brighton/Norton

Raised Beach (GCZ 3a – c and GCZ 7). The raised beach deposits in GCZ 9 may belong to a period of sea-level transgression and regression between the two. Establishing chronology for these deposits may therefore have highly significant implications for understanding the Pleistocene raised beach sequence of Sussex and Hampshire as a whole, and Palaeolithic archaeological record of the region. Specifically, it may assist in resolving uncertainties regarding the age of different outcrops assigned to the Aldingbourne Beach (see **Table 3**).

7.10.5 The raised beach deposits in GCZ 9 may have potential to preserve contemporary Palaeolithic archaeology. Although the age of the deposits is uncertain, their stratigraphic position indicates that they are most likely to be broadly equivalent with the period associated with the early Middle Palaeolithic. The deposits include sediments suitable for luminescence dating. They also include units with the potential to preserve palaeoenvironmental evidence, particularly microfossils, which may allow the environmental and depositional context of these deposits to be reconstructed and compared with material from the Aldingbourne and Brighton/Norton Beaches.

7.10.6 The raised beach deposits in GCZ 9 are overlain by relatively shallow occurrences of Head (<1.00 m thick). This Head lacks stratigraphy, which along with the shallow depth implies it may reflect multiple periods of reworking during Pleistocene cold stage. The lithology of the Head also suggests that it may be decalcified. Consequently, the archaeological and geoarchaeological potential of the Head in GCZ 9 may be limited.

7.10.7 An ERT transect (Magnitude Surveys Ltd) carried out in this zone (ERT Line 2; **Figure 18**) and into GCZ 10 to the north. This identified changes in electrical conductivity suggested to be caused by an in-filled borehole. However, the location of the change in conductivity does not correspond with any GI data point but does correspond with the marine cliff line located at the northern boundary of GCZ 9. The increase in conductivity recorded in the ERT profile can therefore be attributed to the transition from the shallow Head sequences overlying London Clay bedrock in GCZ 10 to the Raised beach sequences overlying London Clay bedrock at greater depth in GCZ 9.

7.11 GCZ 10

7.11.1 Quaternary sediments in GCZ 10 comprised up to 3.00 m of fine-grained Head that directly overlies London Clay Formation bedrock; they were lithologically distinct from the Head deposits identified overlying the raised beach deposits. The sediments likely primarily derive from the London Clay bedrock, which has been weathered and reworked downslope through solifluction during cold periods of the Pleistocene. The palaeoenvironmental potential of these sediments may be limited, as they may be decalcified. It is unclear if these sediments contain evidence for distinct phases of deposition, or if they are a product of repeated reworking. Consequently, their Palaeolithic archaeological potential is uncertain. There are currently

no chronological controls which would aid dating of these deposits. The sediments are, however, suitable for luminescence.

7.12 Baseline assessment of archaeological and geoarchaeological potential

7.12.1 The GLC produced through monitoring of GI has enables a baseline assessment of the archaeological and geoarchaeological potential of Quaternary deposits present each GCZ to be provided. This summarised in **Table 16.**

7.12.2 An archaeological and palaeoenvironmental 'potential' rating has been assigned to deposits in each GCZ, representing a measure of probability. This has been determined via the application of professional judgement, informed by the evidence from the results of GI monitoring within the Scheme boundary and consideration of equivalent deposits in the surrounding study area. 'Potential' is expressed on a four-point scale, assigned in accordance with the following criteria:

- High Situations where evidence is known or strongly suspected to be present within deposits and which are likely to be well preserved.
- Moderate Includes cases where there are grounds for believing that evidence may be present, but for which conclusive evidence is not currently available. This category is also applied in situations in which material are likely to be present, but also where their state of preservation may have been compromised.
- Low Circumstances where the available information indicates that evidence is unlikely to be present, or that their state of preservation is liable to be severely compromised.
- Unknown Cases where currently available information does not provide sufficient evidence on which to provide an informed assessment regarding the potential for material to be present.

Table 16 Baseline assessment of archaeological and geoarchaeological potential of Quaternary deposits

GCZ	Deposits	Age (Ka)	Marine Isotope Stage (MIS)	Arch. potential	Palaeoenviro. potential
1	?Westbourne/ Arundel Beach	676 – 478	16 – 13	? High	Moderate
	Head	<478	<13	Low	Low
2	Aldingbourne Beach	? 243 – 191	? 7	Moderate	Moderate

GCZ	Deposits	Age (Ka)	Marine Isotope Stage (MIS)	Arch. potential	Palaeoenviro. potential
	Head	? <191	? <7	Moderate	Moderate for calcareous units
3a	Brighton/Norton Beach	243 – 191	7	Moderate	Moderate
	Head	? <191	? <7	Moderate	Moderate for calcareous units
4	Brighton/Norton Beach	243 – 191	7	Moderate	Moderate
	Head	26 – 11.7	? 2	Low	Low
	Alluvium	<11.7	1	Unknown	Low
3b	Brighton/Norton Beach	243 – 191	7	Moderate	Moderate
	Head	? <191	? <7	Moderate in west Low in east	Moderate for calcareous units Low
5	Basal channel fill	26 – 11.7	? 2	Low	Low
	Head	26 – 11.7	? 2	Low	Low
	Alluvium	<11.7	1	Unknown	? Moderate
	Colluvium	<11.7	1	Low, but could seal underlying archaeology	Low
3c	Brighton/Norton Beach	243 – 191	7	Moderate	Moderate
	Head	? <191	? <7	Low	Low

GCZ	Deposits	Age (Ka)	Marine Isotope Stage (MIS)	Arch. potential	Palaeoenviro. potential
6a	Arun Terrace 3	<191 – >26	<6 – >2	Moderate	? Moderate – Low
	Arun Terrace 2	<191 – >26	<6 – >2	Moderate	? Moderate – Low
	Alluvium	<11.7	1	Unknown	? Moderate
	Colluvium	<11.7	1	Low, but could seal underlying archaeology	Low
6b	Basal channel(s)	26 – 11.7	? 2	Unknown	Moderate
	Peat	?11.7 – 9	? early 1	Moderate	? High
	Alluvium	<11.7	1	Unknown	? Moderate
	Colluvium	<11.7	1	Low, but could seal underlying archaeology	Low
6c	Arun Terrace 3	<191 – >26	<6 – >2	Moderate	? Moderate – Low
	Arun Terrace 2	<191 – >26	<6 – >2	Moderate	? Moderate – Low
	Arun Terrace 1	<191 – >26	<6 – >2	Moderate	? Low
	Alluvium	<11.7	1	Unknown	? Moderate
	Colluvium	<11.7	1	Low, but could seal underlying archaeology	Low
7	Brighton/Norton Beach	243 – 191	7	Moderate	Moderate
	Head	? <191	? <7	? Moderate	Low

GCZ	Deposits	Age (Ka)	Marine Isotope Stage (MIS)	Arch. potential	Palaeoenviro. potential
8	? Aldingbourne Beach	? 243 – 191	? 7	Moderate	Moderate
	Arun Terrace 4	243 – 191	7	Moderate	Low
9	? Aldingbourne Beach	? 243 – 191	? 7	Moderate	Moderate
	Head	? <191	? <7	Low	Low
10	Head	?	?	Unknown	? Low

8. Recommendations

8.1 Introduction

8.1.1 Monitoring of GI and subsequent deposit modelling and geoarchaeological landscape characterisation has allowed a baseline assessment of archaeological and geoarchaeological potential of the Quaternary deposits present across the Scheme to be developed. Pleistocene deposits with Palaeolithic archaeological and geoarchaeological potential occur in most zones. Holocene deposits occur within the valleys of the Binsted Rife, Tortington Rife and Arun, which include deeply buried sediments, which may have archaeological and geoarchaeological potential.

8.1.2 To fully established the risk of the Scheme impacting on deposits containing archaeological evidence which may contribute to national (EH 2008) and regional (SERF 2019) research frameworks, purposive archaeological and geoarchaeological works are likely to be required. The requirements and scope of these works can be guided and targeted by this baseline assessment and palaeoenvironmental assessment of samples recovered from key deposits during monitoring. Recommendations for further works are outlined below.

8.2 Initial palaeoenvironmental assessment

8.2.1 Further assessment of the palaeoenvironmental potential of Quaternary deposits is likely to be required to consider the risk of the Scheme impacted on sediments containing significant environmental datasets. Such evidence may inform on changing physical and environmental conditions, providing an important environmental context for past human settlement of the landscape, including evidence for past land-use. During monitoring, samples suitable for initial palaeoenvironmental were obtained from Quaternary deposits. Assessment of selected samples is therefore recommended.

8.2.2 The principal aim of this assessment would be to determine the preservation potential for key palaeoenvironmental remains and, where possible, the age of deposits. For suitable organic deposits (principally the peats identified in the Arun Valley in GCZ 6b and 6c) AMS radiocarbon dating on short-lived plant remains is recommended.

8.2.3 The results of initial palaeoenvironmental assessment would inform the need for and scope of subsequent analysis and help to target and refine further specific sampling for palaeoenvironmental and dating samples.

8.3 Palaeolithic test pitting evaluation

8.3.1 Monitoring of GI has demonstrated that a key risk to the Scheme is impacting on deposits containing significant Palaeolithic archaeology. A baseline assessment has been produced which has demonstrated that Pleistocene deposits with possible Palaeolithic archaeological potential are present across the Scheme (raised beach deposits, terraces of the River

Arun and Head). A targeted program of Palaeolithic evaluation is likely to be required to establish the archaeological potential of key Pleistocene sediments highlighted in this assessment. The principal aim of this evaluation should be to establish the potential for archaeology to be present, and to establish the age and depositional processes of sediments, in order assess the significance of any archaeology in relation to national and regional research questions and priorities.

8.3.2 The most effective method for carrying of this evaluation would be through a program of archaeological and geoarchaeological test pitting designed and carried out by a suitably qualified Palaeolithic archaeological and geoarchaeological specialist. As part of this test pitting, additional limited and targeted geoarchaeological boreholes may be required to investigate sediments below the depths obtainable through test pits (generally to a maximum depth of 4.00 m bgl).

8.4 Geoarchaeological sampling

8.4.1 Targeted geoarchaeological sampling may be required to recover samples for palaeoenvironmental assessment and dating. It is recommended that the requirements and scope of such sampling are directed by the results of initial palaeoenvironmental assessment of samples taken during GI monitoring (see above).

8.4.2 The most effective method of carry out any purposive sampling required would be through a program of targeted geoarchaeological boreholes.

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10. Relevant Legislation, and Standards and Guidance

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Appendix A Trial pit tables

A.1.1 Phase 2

Trial Pit No 202	Length 5.00 m	Width 0.70 m	Depth 1.30m
Easting 496636.20	Northing 106728.92	m OD 26.96	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2020		Topsoil	Soft dark brown sandy silty clay. Sand is fine to coarse. Rare sub-angular to sub-rounded fine to coarse chalk and flint <50 mm. Common fine rootlets. **Abrupt contact**	0.00-0.25
2021		Colluvium	Soft mid brownish grey mottled orangish brown clay. Frequent rootlets. Rare fine sub-angular to sub-rounded siltstone <3 mm. Rare partings <1 mm of fine grey silt. **Diffuse contact**	0.25-1.00
2022		Alluvium	Soft light brownish grey mottled orangish brown clayey fine to medium sand. Rare fine rootlets. **Abrupt contact**	1.00-1.20
2023		Alluvium	Soft dark bluish grey locally orangish brown clayey fine to medium sand.	1.20-1.30+

Trial Pit No 203	Length 5.00 m	Width 0.70 m	Depth 4.50m
Easting 496711.05	Northing 106806.39	m OD 30.57	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2030		Topsoil	Soft light brownish grey sandy clayey silt. Sand is fine to coarse. Rare fine rootlets. Very rare angular to sub-rounded fine to coarse flint <50 mm. **Abrupt contact**	0-0.20
2031		Subsoil	Soft heterogeneous brownish orange very sandy gravelly clay. Sand is fine to coarse. Gravel is common sub-angular to sub-rounded fine to coarse flint <60 mm. Mixed with soft light grey gravelly sandy silty clay. Sand is fine. Gravel is moderate sub-angular to sub-rounded fine to coarse flint <60 mm. **Abrupt contact**	0.20-0.35
2032		Head	Soft mid brownish orange clayey sand and gravel with medium flint cobble content <100 mm. Sand is fine to coarse. Gravel is abundant angular to sub-rounded fine to coarse flint <60 mm. **Abrupt contact**	0.35-1.90
2033		Possible Raised Beach Deposits	Soft extremely thinly laminated mid greyish brown mottled mid orange brown and light grey slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is sparse sub-angular to sub-rounded fine to medium flint <20 mm. Frequent lenses <150 mm of dark grey oxidised variable fine to coarse or fine sand. **Abrupt contact**	1.90-2.40
2034		London Clay	Firm locally extremely thinly laminated gleyed dark bluish grey and bluish grey slightly sandy clay. Sand is fine to coarse. Frequent lenses <35 mm and partings of fine grey sand. From 4.00 m bgl, common lithorelicts <50 mm.	2.40-4.50+

Trial Pit No 204	Length 3.00 m	Width 0.70 m	Depth 4.50m
Easting 502508.00	Northing 106008.00	m OD 16.88	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
20401		Topsoil	Dark reddish brown fine sandy silty clay loam. <1% fine to coarse (5-50mm) sub-angular, sub-rounded and rounded flint clasts. Poorly sorted. Structureless. Poorly consolidated. **Sharp horizontal contact**	0.00-0.30
20402		Head	Light greyish yellow and brownish red mottled silty clay. <1% fine to coarse angular and sub-angular flint clasts. Poorly sorted. Common manganese flecks. Structureless. Well consolidated. **Sharp undulating contact**	0,30-0.50
20403		Possible Head	Light greyish yellow and light greyish green mottled fine sandy clay. With patches of reddish yellow clayey medium sand.<1% fine to coarse (5-50mm) angular flint clasts. Poorly sorted. Structureless Well consolidated. **Diffuse undulating contact**	0.50-1.40
20404		Possible Raised Beach Deposits	Light greyish blue and greyish brown mottled silty clay. Very coarse angular mud stone band at 3.5mbgl. Common manganese flecks. Structureless. Well consolidated.	1.40-4.50+

Trial Pit No 204A	Length 3.00 m	Width 0.70 m	Depth 4.50m
Easting 502453.14	Northing 105988.98	m OD 15.02	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
20410		Topsoil	Soft mid grey brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <60 mm. Frequent fine roots and rootlets. **Abrupt contact**	0.00-0.25
20411		Head	Soft light orangish brown mottled light grey sandy slightly gravelly clay. Sand is fine to coarse. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <60 mm. From 0.60 m becomes silty. **Undulating contact**	0.25-1.00
20412		Possible Raised Beach Deposits	Mid brownish orange slightly gravelly fine to coarse sand. Gravel is rare sub-angular to rounded fine to coarse flint <60 mm. **Sharp contact**	1.00-2.00
20413		Possible Raised Beach Deposits	Soft light bluish grey mottled orangish brown silty clay. **Diffuse contact**	1.00-1.80
20414		Possible Raised Beach Deposits	Firm mid bluish grey mottled greyish brown silty clay. Rare rootlets. Rare fine to medium lithorelicts <30 mm. **Diffuse contact**	1.80-3.00
20415		Weathered London Clay	Firm dark greyish blue mottled dark grey brown silty clay. Very common fine to coarse lithorelicts <40 mm. **Diffuse contact.**	3.00-3.60
20416		London Clay	Firm very dark greyish blue fissured silty clay. With rare pockets of orange brown silt. Sparse fine to coarse lithorelicts <70 mm. Fissured are extremely closely to very closely spaced, planar, and rough. At 4.30 m bgl a fossilized pyrite module.	3.60-4.50+

Trial Pit No 205	Length 5.00 m	Width 0.70 m	Depth 4.50 m
Easting 502532.00	Northing 105960.00	m OD 16.21	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2051		Topsoil	Soft dark orangish brown slightly sandy silty clay. Sand is fine to coarse. Frequent fine rootlets. **Abrupt contact**	0.00–0.30
2052		Subsoil	Soft orangish brown sandy gravelly clay. Sand is fine to coarse. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <60 mm. **Diffuse contact**	0.30–0.40
2053		Possible Head	Soft mid orangish brown mottled bluish grey silty sandy gravelly clay. Sand is fine to coarse. Gravel is moderate angular to sub-rounded fine to coarse flint <60 mm. Rare fine rootlets. **Diffuse contact**	0.40–1.50
2054		Possible Head	Soft mid orangish brown clayey gravelly fine to coarse sand. Gravel is very common angular to rounded fine to coarse flint with frequent rounded flint cobbles <120 mm. **Sharp contact**	1.50–1.90
2055		Possible Raised Beach Deposits	Possibly weathered London clay. Firm dark orangish brown mottled bluish grey clay. Occasional rootlets and black organic material. Pockets of orange silt and rare lithorelicts. **Abrupt contact**	1.90–4.10
2056		London Clay	London clay. Firm dark brownish grey mottled bluish grey weathered clay. Occasional rootlets and lithorelicts. From 4.40 m bgl becomes dark bluish grey with larger lithorelicts.	4.10–4.50+

Trial Pit No 206	Length 4.70 m	Width 0.70 m	Depth 4.50 m
Easting 502581.00	Northing 106006	m OD 18.28	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2061		Topsoil	Soft. Light brown slightly sandy silty clay. Sand is fine to coarse. Common rootlets. **Abrupt contact**	0.00-0.20
2062		Subsoil	Soft light orangish brown mottled light grey silty gravelly clay. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <50 mm. **Diffuse contact**	0.20-0.35
2063		Possible Head	Soft orangish brown mottled grey sandy gravelly clat=y. Sand is fine to coarse. Gravel is moderate sub-rounded to well rounded fine to coarse flint with medium cobble content <120 mm. Pockets and partings of orange silt. Contains 2064. **Diffuse contact**	0.35-2.10
2064		Possible Head	Band of mid orangish brown gravelly fine to coarse sand. Gravel is abundant sub-rounded to well rounded fine to coarse flint with a medium cobble content <100 mm. **Abrupt contact**	1.30-2.00
2065		Possible Raised Beach Deposits	Firm mid to stiff bluish grey mottled light brown clay. Rare pockets of mid brownish orange fine sand/silt. **Diffuse contact**	2.10-3.30
2066		Possible Raised Beach Deposits	Firm dark brownish grey mottled bluish grey clay. Rare pockets of mid orangish brown fine to coarse sand and silt.	3.30-4.50+

Trial Pit No 207	Length 5.50 m	Width 0.70 m	Depth 4.50 m
Easting 502597.00	Northing 105949.00	m OD 16.42	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2071		Topsoil.	Soft dark brownish grey slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is rare sub-angular to sub-rounded fine to coarse flint and chalk <50 mm. Frequent fine rootlets. **Abrupt contact**	0.00-0.20
2072		Head	Soft light brownish orange mottled bluish grey sandy slightly gravelly clay. Sand is fine to coarse. Gravel is moderate sub-angular to rounded fine to coarse flint <60 mm. **Abrupt contact**	0.20-0.50
2073		Head	Soft light brownish grey mottled mid orangish brown silty clay. Rare fine rootlets. **Diffuse contact**	0.50-1.40
2074		Possible London Clay	Firm, orangish brown mottled bluish grey silty clay. Common pockets of angular to sub-angular fine to coarse mudstone <60 mm with oxidation staining on surfaces. Very low cobble content of angular mudstone <140 mm. **Diffuse contact**	1.40-2.00
2075		London Clay	Firm mid to dark bluish grey clay. Very common lithorelicts. **Diffuse contact**	2.00-2.80
2076		London Clay	Firm mid bluish grey fissured clay. Frequent pockets and partings of fine orangish brown silt. Fissured are extremely closely to very closely spaced. Rare fine sugary selenite crystals. From 3.70 m bgl rare angular to sub-angular fine to coarse claystone <60 mm. **Abrupt contact**	2.80-4.00
2077		London Clay	Firm dark bluish grey fissured, weathered clay. Recovered as gravel. Frequent mid brown orange staining on fissure edges. Rare selenite crystals.	4.00-4.50+

Trial Pit No 208	Length 4.70 m	Width 0.70 m	Depth 4.50 m
Easting 502680.00	Northing 105973.00	m OD 17.52	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
2081		Topsoil	Soft dark brownish grey slightly gravelly silty clay. Gravel is sparse angular to sub-rounded fine to coarse flint <60 mm and rare sub-angular to sub-rounded fine to coarse chalk <50 mm. Frequent fine roots and rootlets. **Abrupt contact**	0.00-0.30
2082		Head.	Soft light brownish orange mottled light grey slightly gravelly clay. Gravel is sparse sub-angular to sub-rounded fine to coarse flint and chalk <50 mm. **Abrupt contact**	0.30-0.60
2083		Possible Raised Beach Deposits	Soft light brownish grey mottled brownish orange, gravelly silty clay. Rare pockets of mid orangish brown fine to medium sand. Gravel is rare sub-angular to sub-rounded fine to coarse flint <60 mm. **Diffuse contact**	0.60-1.25
2084		Possible Raised Beach Deposits	Soft light bluish grey clay. Clay is extremely closely to very closely fissured. At 1.40-1.45 m bgl band of mid orange brown silt (not continuous throughout pit). Sparse sugary selenite crystals below 2.00 m. **Diffuse contact**	1.25-3.00
2085		London Clay	Dark bluish brown clay. Unconsolidated. Oxidised. Rare iron staining. Brown oxidation staining on fissure edges. Recovered as loose clay gravel fragments <70 mm. Abundant selenite crystals and orangish brown oxidisation staining along fissured. Pockets of yellow silt. From 4.00 m bgl pockets of fine grey sand and abundant lithorelicts <60 mm. **Abrupt contact**	3.00-4.40

2086		London Clay	Firm very dark bluish grey clay. Fissured. Recovered as large angular fragments.	4.40-4.50+

10.1.1

A.1.2 Phase 3

Trial Pit No 301	Length 4.50 m	Width 0.70 m	Depth 3.40 m
Easting 496636.20	Northing 106728.92	m OD 26.96	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
30101		Topsoil	Dark grey brown gravelly silty clay. Gravel is very common angular to sub-rounded fine to coarse flint <50 mm. Soft. **Sharp contact**	0.00–0.30
30102		Head	Soft mid brownish yellow mottled orangish brown slightly gravelly silty clay. Gravel is rare sub-angular to sub-rounded fine to coarse flint <60 mm. **Abrupt contact**	0.30–1.10
30103		Head	Dense mid brownish orange clayey gravel. Gravel is near complete angular to sub-rounded fine to coarse flint <60 mm. **Abrupt contact**	1.10–2.00
30104		Raised Beach Deposits	Firm bedded mid grey mottled orangish brown sandy clay. Sand is fine to coarse. Rare angular to sub-rounded fine to medium ironstone <20 mm. Rare needs of fine sub-angular to rounded flint gravel. <5 mm.	2.00-3.40+

Trial Pit No 302	Length 5.00 m	Width 0.70 m	Depth 3.50 m
Easting 496711.05	Northing 106806.39	m OD 30.57	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
30201		Topsoil	Soft dark grey brown gravelly silty clay. Gravel is abundant angular to sub-rounded fine to coarse flint <60 mm. Sparse fine roots and rootlets. **Sharp contact**	0.00–0.30
30202		Head	Dense mid brownish yellow silty clayey gravel. Gravel is near complete angular to sub-rounded fine to coarse flint <60 mm. **Diffuse contact**	0.30–0.90
30203		Head	Dense mid brownish orange clayey gravel. Gravel is near complete angular to sub-rounded fine to coarse flint <60 mm.	0.90–3.50+

Trial Pit No 303	Length 4.00 m	Width 0.70 m	Depth 3.00 m
Easting 496897.32	Northing 106645.48	m OD 24.47	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
30301		Topsoil	Soft dark grey brown gravelly silty clay. Gravel is very common angular to sub-angular fine to coarse flint <60 mm. Bioturbated. **Abrupt contact**	0.00–0.40
30302		Head	Mid yellowish brown slightly clayey gravel. Gravel is super abundant to near complete angular to sub-rounded fine to coarse flint <60 mm. **Diffuse contact**	0.40–1.20
30303		Head	Dark orangish brown clayey gravel. Gravel is super abundant to near complete angular to sub-rounded fine to coarse flint <60 mm with a low cobble content <150 mm.	1.20–3.00+

Trial Pit No 304	Length 4.50 m	Width 0.70 m	Depth 3.60 m
Easting 496968.43	Northing 106578.74	m OD 27.32	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
30401		Topsoil	Soft dark grey brown gravelly silty clay. Gravel is very common angular to sub-rounded fine to coarse flint <60 mm. Rare fine roots and rootlets. **Sharp contact**	0–0.30
30402		Head	Dense mid yellowish brown slightly clayey gravel. Gravel is super abundant to near complete angular to sub-rounded fine to coarse flint <60 mm with very rare cobble content <100 mm. **Diffuse contact**	0.30–0.70
30403		Head	Dense mid orangish brown clayey gravel. Gravel is near complete angular to sub-rounded fine to coarse flint with a low cobble content <150 mm. **Sharp contact**	0.70–2.40
30404		Raised Beach Deposits	Light to mid grey clay. Rare beds of yellowish brown medium to coarse sand. Common angular to sub-rounded fine to medium black ironstone <20 mm. **Sharp contact**	2.40–2.60
30405		Raised Beach Deposits	Light yellowish brown mottled mid orange medium to coarse sand. Very rare rounded fine to medium flint <20 mm. Rare beds of mid grey clay containing sparse rounded fine ironstone <10 mm.	2.60–3.60+

Trial Pit No 310	Length 4.00 m	Width 1.00 m	Depth 3.30 m
Easting 497608.52	Northing 106315.44	m OD 21.58	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31001		Topsoil	Firm grey brown silty clay loam, occasional small <30mm sub-angular flint inclusions, blocky structure.	0.00–0.30
31002		Head	Dense light red brown sub-angular to sub-rounded flint gravel in a sandy clay matrix, poorly sorted	0.30–1.60
31003		Possible Raised Beach Deposits	Poorly sorted sub-angular to sub-rounded flint gravel, in a light brown silty sandy clay matrix	1.60–3.30+

Trial Pit No 312	Length 3.00 m	Width 0.60 m	Depth 2.70 m
Easting 498759.53	Northing 105574.52	m OD 11.65	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31201		Topsoil	Dark to mid grey silty clay loam (soft) with sparse sub-angular to rounded flint gravels (<30mm). **Diffuse contact**	0.00–0.15
31202		Subsoil	Mid to pale grey silty clay loam (soft) with sparse sub-angular to rounded flint gravels (<40mm). **Abrupt contact**	0.15–0.30
31203		Head	Pale yellowish brown silty clay (firm to soft) with occasional sub-angular to sub-rounded flint gravels to pebbles (<50mm). **Abrupt contact**	0.30–0.50
31204		Head	Mid orange brown clay silt (firm to stiff) with occasional to moderate sub-angular to sub-rounded flint gravels to pebbles (<80mm). **Diffuse contact**	0.50–0.80
31205		Head	Mid orange brown clay silt (firm to stiff) with near complete sub-angular to sub-rounded flint pebbles to nodules (<120 mm). Some iron stone and becomes greyish brown with depth. Iron stone / manganese at base. **Sharp contact**	0.80–2.00
31206		Head	Mid yellowish brown to orange brown clay (stiff) with very fine sand content and blue grey mottling. **Diffuse contact**	2.00–2.40
31207		Possible Raised Beach Deposits	Mid brown to orange brown fine grained sand (firm to soft) with blue grey mottling. Very diffuse horizon with above.	2.40–2.70+

Trial Pit No 313	Length 3.00 m	Width 0.60 m	Depth 3.40 m
Easting 498420.94	Northing 105711.86	m OD 12.72	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31301		Topsoil	Mid to dark brownish grey silty clay loam (soft) with occasional sub-angular to sub-rounded flint pebbles (<60mm). **Sharp contact**	0–0.30
31302		Head	Mid yellowish brown silty clay (soft to firm) with occasional to moderate sub-angular to sub-rounded flint pebbles to nodules (<150mm). **Sharp contact**	0.30–0.80
31303		Head	Mid orange brown silty clay (firm to stiff) with near complete sub-angular to sub-rounded flint gravels to nodules (<100mm). **Sharp contact**	0.80–2.60
31304		Head	Mid yellowish brown clay silt (stiff). Sharp horizon with above. **Abrupt contact**	2.60–2.90
31305		Possible Raised Beach Deposits	Mid orange brown sand with high clay content (firm to soft).	2.90–3.40+

Trial Pit No 314	Length 3.00 m	Width 0.60 m	Depth 3.50 m
Easting 498625.90	Northing 105605.34	m OD 11.81	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31401		Topsoil	Mid brownish grey silty clay loam (soft) with sparse sub-angular to sub-rounded flint pebbles (<40mm). **Diffuse contact**	0.00–0.16
31402		Subsoil	Mid grey silty clay loam (soft) with occasional sub-angular to sub-rounded flint pebbles (<40mm). **Sharp contact**	0.16–0.32
31403		Head	Pale brown silty clay (soft) with abundant sub-angular to sub-rounded flint pebbles to nodules (<200mm). **Abrupt contact**	0.32–0.70
31404		Head	Mid orange brown silty clay (firm) with occasional to moderate sub-angular to sub-rounded flint gravels to pebbles (<100mm). **Abrupt contact**	0.70–1.00
31405		Head	Mid orange brown silty clay with near complete sub-angular to sub-rounded flint pebbles to nodules (<150mm). Becomes more nodular with depth. Sparse manganese / iron stone. **Sharp contact**	1.00–2.20
31406		Possible Raised Beach Deposits	Mid orange brown clay silt (firm to stiff) with blue grey mottling and manganese staining. **Abrupt contact**	2.20–2.50
31407		Possible Raised Beach Deposits	Mid brown fine grained sand (soft) with manganese staining.	2.50–3.50+

Trial Pit No 315	Length 3.00 m	Width 0.60 m	Depth 3.10 m
Easting 498862.89	Northing 105555.08	m OD 11.04	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31501		Topsoil	Mid to pale grey silty clay loam (firm to soft) with occasional sub-angular to sub-rounded flint pebbles (<40mm). **Diffuse contact**	0–0.20
31502		Subsoil	Pale grey silty clay (firm) with occasional to moderate sub-angular to sub-rounded flint pebbles (<40mm). **Sharp contact**	0.20–0.45
31503		Head	Mid orange brown silty clay (firm) with moderate to abundant sub-angular to sub-rounded flint pebbles to nodules (<100mm). Patches of mid grey silty clay with no inclusions. **Diffuse contact**	0.45–1.00
31504		Head	Mid orange brown silty clay (firm) with near complete sub-angular to rounded flint gravels (<60mm). **Sharp contact**	1.00–1.60
31505		Possible Raised Beach Deposits	Mid orange brown fine grained sand (soft) with pale blue grey mottling. No inclusions apart from very rare manganese / iron staining. Becomes greyish brown with depth. Sharp horizon with above.	1.60–3.10+

Trial Pit No 317	Length 3.00 m	Width 0.60 m	Depth 3.20 m
Easting 499062.15	Northing 105518.68	m OD 10.14	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31701		Topsoil	Mid grey silty clay (firm) with occasional to frequent sub-angular to sub-rounded flint pebbles (<60mm). **Diffuse contact**	0–0.20
31702		Subsoil	Mid to pale grey silty clay (firm) with sparse sub-angular to sub-rounded flint pebbles (<40mm). **Sharp contact**	0.20–0.40
31703		Head	Pale to mid yellowish brown to greyish brown silty clay loam (firm to soft) with occasional to frequent patches of rounded to sub-angular flint gravels to nodules (<100mm) and manganese flecks. **Sharp contact**	0.40–0.70
31704		Head	Mid orange brown to mid greyish brown silty clay (firm) with near complete sub-angular to sub-rounded flint gravels to pebbles (<40mm). Sparse manganese at base. **Sharp contact**	0.70–1.40
31705		Possible Raised Beach Deposits	Mid to pale yellowish brown fine grained clay sand (soft). No coarse components and becomes more greyish brown with depth. Sharp horizon with above.	1.40–3.20+

Trial Pit No 318	Length 3.00 m	Width 0.60 m	Depth 2.90 m
Easting 499139.45	Northing 105489.81	m OD 9.99	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31801		Topsoil	Mid grey silty clay (firm) with occasional to frequent sub-angular to sub-rounded flint pebbles (<50mm). **Diffuse contact**	0.00–0.16
31802		Subsoil	Pale grey silty clay (firm) with occasional sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.16–0.30
31803		Head	Mid to pale yellowish brown silty clay loam (firm to soft) with occasional patches of sub-rounded to angular flint gravels (<30mm) and manganese. **Sharp contact**	0.30–0.70
31804		Possible Raised Beach Deposits	Pale to mid yellowish brown fine grained clay sand with pale bluish grey mottling (soft to firm). No coarse components and becomes almost liquefied towards base.	0.70–2.90+

Trial Pit No 319	Length 4.00 m	Width 1.00 m	Depth 2.50 m
Easting 499230.93	Northing 105465.32	m OD 9.26	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
31901		Topsoil	Dark grey brown silty clay loam, granular blocky structure. **Abrupt contact**	0.00–0.20
31902		Subsoil	Firm grey brown silty clay loam, blocky structure. **Diffuse contact**	0.20–0.50
31903		Made Ground	Dark yellow brown clayey sand, occasional / common small chalk inclusions with occasional modern inclusions of iron and brick fragments etc. **Sharp contact**	0.50–1.00
31904		Possible Raised Beach Deposits	Light yellow brown slightly silty sand, sand is fine, becoming yellow grey brown with depth, heavy oxidation with no visible structure.	1.00–2.50+

Trial Pit No 320		Length 2.50 m	Width 0.60 m	Depth 1.50 m
Easting 499741.11		Northing 105536.17	m OD 7.17	
Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth bgl**
32001		Topsoil	Mid greyish brown silty sandy loam (soft) with occasional to frequent sub-angular to sub-rounded flint pebbles (<40mm). Burnt flint noted but not retained. **Diffuse contact**	0.00–0.30
32002		Subsoil	Mid grey silty sandy clay (firm) with mid yellowish brown mottling. Occasional sub-angular to sub-rounded flint pebbles (<40mm). **Sharp contact**	0.30–0.45
32003		Possible Raised Beach Deposits	Mid yellowish brown coarse sand with clay content (soft) with occasional to sparse sub-angular to rounded flint nodules (<200mm). Occasional manganese and patches of pale grey blue sand.	0.45–1.20
32004		Possible Raised Beach Deposits	Mid brown coarse grained sand (soft) with occasional to sparse sub-angular to sub-rounded flint pebbles to nodules (<80mm).	1.20-1.50+

Trial Pit No 321	Length 3.00 m	Width 0.60 m	Depth 4.00 m
Easting 499859.47	Northing 105516.38	m OD 8.81	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
32101		Topsoil	Mid to dark brown silty sandy loam (soft) with occasional to moderate angular to sub-rounded flint pebbles (<80mm). Burnt flint noted but not recovered. **Diffuse contact**	0–0.30
32102		Subsoil	Mid greyish brown silty clay (firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.30–0.65
32103		Possible Raised Beach Deposits	Mid yellowish brown medium to fine grained sand (loose to firm) with pockets of manganese and sparse sub-angular to sub-rounded flint pebbles (<50mm). Patches of firm pale blue to mid brown clay sand appearing at 1.50m. **Sharp contact**	0.65–1.80
32104		Possible Raised Beach Deposits	Mid grey coarse sand (soft) with lenses of manganese. Lenses of pale blue to mid brown clay sand. Sharp horizon with above.	1.80–2.50+

Trial Pit No 323	Length 3.00 m	Width 0.60 m	Depth 4.00 m
Easting 499937.18	Northing 105514.41	m OD 8.87	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
32301		Topsoil	Mid to dark grey silty sandy loam (soft) with common angular to sub-rounded flint pebbles (<80mm). Burnt flint noted but not retained. **Diffuse contact**	0.00–0.30
32302		Subsoil	Mid brown silty clay loam (soft to firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.30–0.40
32303		Possible Raised Beach Deposits	Pale yellowish brown silty sand (soft to loose) with sparse sub-angular to sub-rounded flint gravels (<40mm). **Abrupt contact**	0.40–1.30
32304		Possible Raised Beach Deposits	Mid yellowish brown clay silt (firm) with pale blue grey lenses. **Sharp contact**	1.30–1.60
32305		Raised Beach Deposits	Raised beach deposit? Mid to pale yellowish brown medium to coarse sand (loose) with sparse sub-angular to sub-rounded flint gravels (<40mm) and occasional black flecks. Band of dark grey to black silty sand (coarse) with abundant angular to sub-rounded flint and iron stone gravels (<60mm) at 2.10-2.40m.	1.60–2.40+

Trial Pit No 324	**Length 3.00 m**	**Width 0.60 m**	**Depth 1.30 m**
Easting 500012.01	**Northing 105504.77**	**m OD 8.76**	

Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth bgl**
32401		Topsoil	Dark greyish brown silty clay loam (soft) with occasional angular to sub-rounded flint pebbles (<60mm). Burnt flint and CBM noted but not retained. **Diffuse contact**	0.00–0.30
32402		Subsoil	Mid brown silty clay (soft to firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.30–0.45
32403		Possible Raised Beach Deposits	Mid yellowish brown silty clay (firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). Slight sand content and sparse manganese.	0.45-1.30+

Trial Pit No 325	Length 2.00 m	Width 0.60 m	Depth 2.20 m
Easting 500060.15	Northing 105537.74	m OD 8.68	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
32501		Topsoil	Mid brownish grey silty clay loam (soft) with occasional angular to sub-rounded flint pebbles (<60mm). CBM and burnt flint noted but not retained. **Diffuse contact**	0.00–0.30
32502		Subsoil	Mid greyish brown silty clay (firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.30–0.45
32503		Raised Beach Deposits	Mid yellowish brown silty clay with slight sand content (firm). Patches of pale bluish grey to grey silty clay present with manganese within. Sparse angular to sub-rounded flint pebbles (<100mm).	0.45–1.40
32504		Raised Beach Deposits	Pale yellowish grey coarse grained sand (loose) with common sub-angular to rounded flint gravels to pebbles (<100mm). Band of dark grey to black silty sand (coarse and loose) with abundant angular to sub-rounded flint gravels (<40mm) between 1.90 and 2.00m.	1.40–2.20+

Trial Pit No 327		Length 3.00 m	Width 0.60 m	Depth 2.50 m
Easting 500158.93		Northing 105545.90	m OD 8.79	
Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth bgl**
32701		Topsoil	Turf. Mid greyish brown silty loam (soft) with rare sub-angular to sub-rounded flint pebbles (<30mm) and common rooting. **Diffuse contact**	0.00–0.10
32702		Topsoil	Mid greyish brown silty clay loam (firm) with sparse sub-angular to sub-rounded flint pebbles (<50mm). **Diffuse contact**	0.10–0.30
32703		Subsoil	Mid brown silty clay (firm) with rare sub-angular to sub-rounded flint pebbles (<40mm). **Abrupt contact**	0.30–0.50
32704		Head	Pale to mid yellowish brown silty clay (firm) with sparse to rare sub-angular to sub-rounded flint pebbles (<50mm). **Sharp contact**	0.50–1.10
32705		Head	Mid yellowish brown silty sandy clay (firm to soft) with common to abundant sub-angular to rounded flint pebbles to nodules (<200mm). **Sharp contact**	1.10–1.50
32706		Possible Raised Beach Deposits	Mid to pale yellowish brown coarse grained sand (soft to loose) with occasional to common sub-angular to rounded flint gravels to pebbles (<100mm). Band of dark grey to black silty sand (coarse and loose) with abundant angular to sub-rounded flint gravels (<40mm) between 2.00 and 2.10m.	1.50-2.50+

Trial Pit No 329	Length 2.00 m	Width 0.50 m	Depth 3.10 m
Easting 500298.01	Northing 105542.00	m OD 9.18	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
32901		Plough soil	Dark reddish brown clayey silt. <1% fine to coarse angular, sub-angular and sub-rounded flint clasts. Poorly sorted. Structureless. Poorly consolidated. **Sharp horizontal contact**	0.00-0.40
32902		Head Deposits	Mid reddish brown clayey silt. <1% fine to coarse (5-50mm) sub-angular and sub-rounded flint clasts. Poorly sorted. Structureless. Moderately consolidated. **Sharp sub-horizontal contact**	0.40-1.10
32903		Raised Beach Deposits	Mid-light brownish red gravelly silty clay. <40% fine to very coarse (5-120mm) angular, sub-angular and nodular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	1.10-1.50
32904		Raised Beach Deposits	Mid-light brownish red gravelly clayey coarse to medium sand. <40% fine to very coarse (5-120mm) angular, sub-angular, sub-rounded, rounded and nodular flint clasts. Poorly sorted. Possible coarse horizontal bedding. Poorly consolidated.	1,50-3.10+

Trial Pit No 333	Length 4.00 m	Width 1.00 m	Depth 3.50 m
Easting 497871.75	Northing 106141.37	m OD 19.34	

Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth bgl
33301		Topsoil	Firm slightly gravelly silty clay, gravels are flint sub-angular (<30mm).	0.00–0.20
33302		Subsoil	Firm brown slightly sandy silty clay.	0.20–0.90
33303		Head	Firm orange brown slightly gravelly silty clay, gravels sub-angular / sub-rounded poorly sorted flint.	0.90–1.60
33304		Head	Stiff orange mottled grey gravelly clay. gravels sub-angular / sub-rounded poorly sorted flint.	1.60–2.80
33305		Head	Stiff grey gravelly silty clay, gravels sub-angular / sub-rounded poorly sorted flint.	2.80–3.50+

Trial Pit No 334		Length 3.00 m	Width 0.60 m	Depth 2.80 m
Easting 499031.04		Northing 105421.42	m OD 9.97	
Context Number	**Fill Of/Filled With**	**Interpretative Category**	**Description**	**Depth bgl**
33401		Topsoil	Mid grey silty clay (firm) with occasional to moderate sub-angular to sub-rounded flint pebbles (<40mm). **Sharp contact**	0.00–0.30
33402		Head	Pale yellowish brown silty clay (firm) with patches of pale whitish grey silty clay which contained abundant sub-rounded to sub-angular flint gravels to nodules (<60mm) and rare iron stone. **Sharp contact**	0.30–0.50
33403		Head	Mid yellowish brown silty clay (firm) with abundant to near complete sub-angular to sub-rounded flint gravels (<0.08) and patches of manganese / iron stone. **Sharp contact**	0.50–1.00
33404		Possible Raised Beach Deposits	Mid orange brown fine grained sand (soft) with pale yellow mottling and iron staining. No coarse components.	1.00–2.80+

Appendix B Borehole tables

B.1.1 Phase 2

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH213
Coordinates (NGR) X: 501209.00	Coordinates (NGR) Y: 105690.00	Level (top): 1.57 m OD
Length: -	Width: -	Depth: 43.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
92130	Hand dug pit – not monitored.		0.00-1.20	1.57-0.37	
92131	Very soft mid grey and mid brown mottled sandy silty clay. Sand is fine. Sparse pockets <30 mm of orangish brown silty clay.	Colluvium	1.20-1.70	0.37--0.13	
92132	Very soft dark grey locally black mottled light grey sandy silty clay. Sand is fine. Strong organic odour. Rare fine to coarse <60 mm bivalve shells. Below 2.50 m bgl localised thin laminations of clay and fine sand. Below 2.90 m bgl rare black partially decomposed plant matter <20 mm.	Alluvium	1.70-3.20	-0.13--1.63	1017
	Core loss		3.20-3.50	-1.63--1.93	
92133	Very soft dark grey locally black mottled light grey sandy silty clay. Sand is fine. Strong organic odour. Rare pockets <80 mm of soft brown mottled grey silty clay.	Alluvium	3.50-4.25	-1.93--2.68	1018
92134	Very soft grey sandy silty clay. Sand is fine. Rare whole white mollusc shells <10 mm. Strong organic odour. Below 6.85 m bgl abundant dark grey to black organic matter and white shell fragments.	Alluvium	4.25-7.25	-2.68--5.68	1019, 1020, 1021
92135	Soft dark grey locally mottled black possibly organic sandy silty clay. Sand is fine. Strong organic odour. Abundant brown partially decomposed organic matter <60 mm. Abundant soft white fine shell fragments <20 mm. From 7.40 m bgl rare partially decomposed dark brown wood fragments <70 mm.	Alluvium	7.25-7.90	-5.68--6.33	1022, 1023

92136	Soft locally very soft mid grey possibly thinly laminated sandy silty clay. Sand is fine. Slight organic odour. Between 10.75 and 10.90 m bgl there was a mid grey clayey fine sand. Possibly representing a sand channel.	Alluvium	7.90-11.75	-6.33--10.18	1024, 1025
92137	Very soft very dark grey locally black sandy silt/clay. Sand is fine to coarse. Strong organic odour. Below 14.10 m bgl occasional lenses <80 mm of light grey fine sand. Rare soft white shell fragments <60 mm.	Alluvium.	11.75-14.75	-10.18--13.18	1026, 1027, 1028
92138	Very soft locally soft black mottled very dark grey silty clay. Strong organic odour. Localised fissures infilled with brownish grey clay. Below 16.75 m bgl becomes mottled grey with rare lenses <8 mm of light grey silty clay.	Alluvium	14.75-17.20	-13.18--15.63	1029, 1030
92139	Very soft mid to dark grey silty clay. Slight organic odour. Localised fissures infilled with mid brownish grey silty clay. Diffuse contact. Below 22.55 m bgl randomly orientated fissures with localised light grey fine sand.	Alluvium	17.20-25.35	-15.63--23.78	1031, 1032, 1033
921310	Soft dark grey locally mottled mid grey silty clay. Rare suspected fissures. Rare pockets <60 mm of light grey fine sands. At 25.60 m bgl <50 mm suspected black organic matter. 25.90 m bgl suspected fissures infilled with soft brownish grey slightly sandy silty clay. Sand is fine. Below 26.85 m bgl becoming gravelly with rare sub-angular to sub-rounded medium to coarse flint <60 mm.	Alluvium	25.35-26.85	-23.78--25.28	1034
	Core loss.		26.85-28.65	-25.28--27.08	

921311	Mid greenish grey slightly clayey sandy gravel. Sand is fine to coarse. Gravel is abundant angular to sub-rounded fine to coarse flint and sandstone <60 mm. Band <70 mm thick of greenish grey/red gravelly sandy clay. Below 28.80 m bgl becoming predominantly sub-angular medium to coarse flint <60 mm. 29.45 m bgl one sub-rounded cobble of flint <110 mm. Core loss from 29.45 to 29.95 m bgl.	Channel fill	28.65-29.95	-27.08--28.38	1035
921312	Dense mid greenish grey speckled black and white fine to medium sand,	Channel fill	29.95-30.30	-28.38--28.73	1036
921313	Stiff clay. Cores below this point not observed	Lambeth group	30.30-43.00	-28.78--41.43	
921314	Chalk	Chalk	43.00+	-41.43+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH222
Coordinates (NGR) X: 501982.00	Coordinates (NGR) Y: 105932.00	Level (top): 1.55 m OD
Length: -	Width: -	Depth: 22.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
92220	Hand dug pit – not monitored.		0.00-1.20	1.55-0.35	
92221	Very soft mid brown mottled grey slightly sandy silty clay. Sand is fine to coarse. Abundant fine rootlets. Suspected abundant fissures infilled with soft grey clay. Abrupt contact. 1.85-1.95 m bgl abundant white molluscs and bivalves. Shell fragments <30 mm. Below 2.00 m bgl becomes predominantly grey with frequent pockets of dark brown silty clay <70 mm.	Colluvium	1.20-2.10	0.35--0.55	1037
92223	Very soft grey silty clay. Frequent pockets of (possibly thinly laminated) black organic material <10 mm. Very rare soft white shell fragments <18 mm. Slight organic odour. Abrupt contact. At 4.55 m bgl; dark brown spongy amorphous peat. Between 4.65 m and 4.85 m bgl; becoming dark grey and very sandy with abundant black to dark brown spongy amorphous and fibrous peats <50 mm. At 4.95 m bgl one black rounded coarse flint <60 mm.	Alluvium	2.10-5.00	-0.55--3.45	1038
92224	Assessed zone of core loss. Recovered SPT samples from 6.50, 7.25 and 8.00 m bgl indicate the zone is comprised of: Medium dense mid greenish grey to mid orangish brown possibly thinly laminated slightly clayey sand and gravel. Sand is fine to coarse. Gravel is very common sub-angular to rounded fine to coarse flint <60 mm.	River Terrace Deposits	5.00-8.60	-3.45--7.05	

92225	Medium dense to dense mid orangish brown and mid greenish grey interbedded silty clay, sand/gravel. Sand is fine to coarse. Gravel is abundant sub-angular to well-rounded fine to coarse black flint <60 mm and rare cream to light brown sandstone <40 mm. Below 8.85 m bgl becomes clayey with increased gravel content. 9.60 m bgl one cobble of flint <110 mm. Between 9.50 and 9.80 m bgl recovered as sub-angular to well-rounded fine to coarse black flint and sandstone <60 mm. Core lost from 9.80 to 10.25 m bgl.	River Terrace Deposits	8.60-10.25	-7.05--8.70	1039
92226	Core loss. Driller's log records SPT at 10.25 m recovered Lambeth Group.	Lambeth Group	10.25-11.80	-8.70--10.25	
92227	Very stiff fissured mid red mottled grey and yellowish brown silty CLAY. Possibly localised laminations and purple mottling. Abrupt contact. Below 15.30 m bgl becomes predominantly brown with red, purple and grey mottling. Below 15.50 m bgl thinly laminated Below 20.00 m bgl becomes red and grey mottled brown with yellow clay. Below 21.30 m bgl becomes predominantly grey and yellowish brown mottled with frequent pockets of dark grey fine sandy silt.	Lambeth Group	11.80-22.00+	-10.25--20.45+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH225
Coordinates (NGR) X: 502216.04	Coordinates (NGR) Y: 105989.52	Level (top): 8.31 m OD
Length: -	Width: -	Depth: 30.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
92250	Hand dug pit – not monitored.		0.00-1.20	8.31-7.11	
92251	Soft mid orange brown mottled light grey gravelly very sandy clay. Sand is fine to coarse. Gravel is moderate angular to sub-angular fine to coarse flint <60 mm. Below 1.94 m becoming predominantly light brownish grey and stiff to firm.	Head	1.20-2.73	7.11-5.58	
92252	Medium dense mid orangish brown clayey gravelly fine to coarse sand. Gravel is very common angular to sub-angular fine to coarse flint <60 mm. Gravel occurs within sand and in bands of coarse gravels with very little matrix.	Possible Raised Beach Deposits	2.73-4.60	5.58-3.71	1040-1042
92253	Firm, thinly laminated mid greyish brown clay and mid brownish orange silt with occasional dark iron staining.	Raised Beach Deposits	4.60-4.80	3.71-3.51	1043
92254	Firm dark grey sandy silty clay. Sand is fine to coarse. Frequent lenses, pockets and partings <8 mm of fine grey sand. Very rare sub-rounded to rounded fine to coarse claystone and pyrite <40 mm.	London Clay	4.80-6.00+	3.51-2.31+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH227
Coordinates (NGR) X: 502771.30	Coordinates (NGR) Y: 105883.21	Level (top): 16.85 m OD
Length: -	Width: -	Depth: 11.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
922700	Hand dug pit – not monitored.		0.00-1.20	16.85-15.65	
922701	Fine to medium (5-30mm) angular and sub-angular gravels in a light reddish brown silty clay matrix. Occasional manganese/iron stone fragments/ flecks. Poorly sorted. Structureless. Well consolidated.	Head	1.20-2.00	15.65-14.85	
922702	Medium to coarse (20-80mm) rounded and sub-rounded flint gravels. No visible matrix. Moderately sorted, structureless. Poorly consolidated.	Possible Raised Beach Deposits	2.00-2.20	14.85-14.65	
922704	Fine to coarse (5-50mm) angular, sub-angular and sub-rounded flint gravels in a greyish brown medium sandy clay matrix. Poorly sorted. Structureless. Poorly consolidated.	Possible Raised Beach Deposits	2.20-2.60	14.65-14.25	
922705	Mid-light brownish red and bluish grey mottled silty clay. <1% fine to medium (5-20mm) angular flint clasts. Poorly sorted. Common manganese flecks. Structureless. Well consolidated.	Possible Raised Beach Deposits	2.60-2.75	14.25-14.10	8
	Core loss.		2.75-3.50	14.10-13.35	
922706	Light brownish red and bluish grey mottled fine sandy silty clay. No visible clasts. Occasional manganese flecks. Occasionally laminated. More so with depth. Well consolidated.	Possible London Clay	3.50-6.00	13.35-10.85	9, 10,11, 12
922707	Clay	London Clay	6.00-11.00+	10.85-5.85+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH228
Coordinates (NGR) X: 502808.35	Coordinates (NGR) Y: 105857.89	Level (top): 16.89 m OD
Length: -	Width: -	Depth: 11.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
922800	Hand dug pit – not monitored.		**0.00-2.70**	**16.89-14.19**	
922801	Mid-light yellowish red and brownish grey mottled fine sandy silty clay. No apparent clasts. Structureless. Well consolidated.	Raised Beach Deposits	2.70-3.00	14.19-13.89	6
922802	Coarse (30-70mm) rounded, sub-rounded and sub-angular gravels. No clear matrix. Moderately sorted . Poorly consolidated.	Raised Beach Deposits	3.00-3.95	13.89-12.94	
922803	Mid greyish brown silty clay. No apparent clasts (poor recovery) structureless. Moderately consolidated.	Raised Beach Deposits	3.95-4.10	12.94-12.79	7
	Core loss.		4.10-5.00	12.79-11.89	
922804	Clay.	London Clay	5.00-11.00+	11.89-5.89+	

Site Code: 245561	Site Name: A27 Arundel Bypass GI	Borehole ID: BH229
Coordinates (NGR) X: 502819.67	Coordinates (NGR) Y: 105847.09	Level (top): 17.08 m OD
Length: -	Width: -	Depth: 12.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
922900	Hand dug pit – not monitored.		0.00-1.70	12.00-10.30	
922901	Mid-light brownish red clayey medium sand with patches of greyish green medium sandy clay. No apparent clasts. Poorly consolidated.	Raised Beach Deposits	1.70-2.20	10.30-9.80	1
922902	Light greyish green and mid reddish brown mottled medium sandy clay. <10% fine to coarse (10-60mm) rounded and sub-rounded flint clasts. Poorly sorted. Moderately consolidated.	Raised Beach Deposits	2.20-2.30	9.80-9.70	
922903	Mid brownish red gravelly coarse sand. <10% fine to coarse (10-50mm) angular and sub-angular flint clasts. Occasional manganese flecks. Poorly sorted. Poorly consolidated.	Raised Beach Deposits	2.45-2.70	9.70-9.45	
922904	Light brownish red clayey medium sand. No visible clasts. Occasional manganese flecks.	Raised Beach Deposits	3.15-3.35	9.45-9.25	
	Core loss.		3.35-3.85	9.25-8.75	
922905	Mid-dark brownish red coarse sand. No apparent inclusions. 50% manganese/organic staining?. Poorly consolidated.	Raised Beach Deposits	3.85-4.00	8.75-8.60	2
922906	Mid brownish red medium sandy clay with occasional patches of silty fine sand. <1% fine to medium (10-50mm) rounded and sub-angular flint. Common fine manganese flecks. Structureless. Moderately consolidated.	Raised Beach Deposits	4.00-4.45	8.60-8.15	3
922907	Mid reddish brown and greyish brown mottled medium sandy clay . <1% fine to medium (5-40mm) angular flint clasts. Poorly sorted. Well consolidated. Structureless.	Raised Beach Deposits	4.45-5.15	8.15-7.45	

922908	Fine to coarse (5-50mm) angular and sub-angular flint gravels in a mid-reddish grey coarse sand matrix. Moderately-well sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	5.15-5.25	7.45-7.35	
922909	Mid reddish brown gravelly silty clay. <20% medium to coarse (20-60mm) angular and sub-angular flint clasts poorly sorted. Occasional manganese flecks. Structureless. Moderately consolidated.	Raised Beach Deposits	5.25-5.60	7.35-7.00	4
922910	Fine to coarse (10-70mm) angular and sub-angular flint gravels in a very coarse sandy clay matrix. Moderately sorted. Structureless. Well consolidated.	Raised Beach Deposits	5.60-6.00	7.00-6.60	
922911	Mid reddish brown silty clay. Occasional patches of greyish green fine sand. No apparent clasts. Occasional manganese flecks, Structureless. Well consolidated.	Raised Beach Deposits	6.00-8.50	6.60-4.10	5
922912	Clay.	London Clay	8.50-12.00+	4.10-0.60+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH231
Coordinates (NGR) X: 500629.67	Coordinates (NGR) Y: 105625.23	Level (top): 2.34 m OD
Length: -	Width: -	Depth: 14.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
923101	Greyish brown gravelly medium sandy clay. Fine to coarse (25-85mm)sub-rounded flint clasts. Common rooting. Occasional CBM Taken from starter pit engineer logs.	Topsoil	0.00-0.30	2.34-2.04	
923102	Brownish grey and brown mottled gravelly medium sandy clay. Fine to coarse angular and sub-angular flint clasts. Possible organic material (burned?). Two ceramic fragments. Taken from starter pit engineer logs.	Possible feature fill	0.30-0.95	2.04-1.39	
	Not observed		0.95-2.00	1.39-0.34	
923103	Mid brownish red and bluish grey mottled medium silty clay. No visible clasts. Rare rooting. Structureless. Well consolidated.	Alluvium	2.00-2.60	0.34--0.26	
923104	Mid brownish red and brownish grey mottled silty medium sandy clay. 10% fine to very coarse (5-120mm) angular, sub-angular and nodular flint clasts. Poorly sorted. Structureless. Well consolidated.	Alluvium	2.60-4.00	-0.26--1.66	
923105	Mid reddish brown fine sandy silty clay. <1% fine (2-5mm) sub-angular flint clasts. Structureless. Moderately consolidated.	Alluvium	4.00-5.00	-1.66--2.66	
923106	Mid reddish brown fine sandy silty clay, 5% fine to coarse (5-50mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Well consolidated.	Alluvium	5.00-5.50	-2.66--3.16	
	Core loss.		5.50-7.00	-3.16--4.66	
923107	Mid brownish grey silty fine sandy clay. No visible clasts. Structureless.	Alluvium	7.00-7.75	-4.66--5.41	

	Core loss.		7.75-9.25	-5.41--6.91	
923108	Medium to coarse (20-70mm) angular and sub-angular flint gravels. No recovered matrix. Moderately sorted. Structureless. Poorly consolidated.	River Terrace Deposits	9.25-9.55	-6.91--7.21	
923109	Dark grey silty clay. Very well consolidated.	London Clay	9.55-14.50+	-7.21--12.16+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH233
Coordinates (NGR) X: 500735.92	Coordinates (NGR) Y: 105641.52	Level (top): 1.14 m OD
Length: -	Width: -	Depth: 11.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
923300	Hand dug pit – not monitored.		0.00-1.20	1.14--0.06	
923301	Mid greyish brown silty clay. No visible clasts. Occasional rooting. Moderately consolidated. Structureless.	Colluvium	1.20-1.70	-0.06--0.56	
923302	Mid brownish grey silty clay. No visible clasts. Structureless. Moderately consolidated. 4.00m: becoming very slightly fine sandy silty clay.	Alluvium	1.70-6.10	-0.56--4.96	
923303	Mid yellowish brown coarse sand. No visible clasts. Structureless. Poorly consolidated.	River Terrace Deposits	6.10-9.00	-4.96--7.86	
	Core loss.		6.50-7.00	-7.86--8.36	
923303	Mid yellowish brown coarse sand. No visible clasts. Structureless. Poorly consolidated	River Terrace Deposits	7.00-8.50	-8.36--9.86	
	Core loss.		8.50-9.00	-9.86--10.36	
923304	Sub-rounded and rounded coarse (50-100mm) flint gravels in a mid-yellowish brown coarse sand matrix. No visible structure. Poorly consolidated. Very poor recovery.	River Terrace Deposits	9.00-10.00	-10.36--11.36	
923305	Clay.	London Clay	10.00-11.50+	-11.36--12.86+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** BH236
Coordinates (NGR) X: 500875.28	**Coordinates (NGR) Y:** 105669.33	**Level (top):** 1.47 m OD
Length: -	**Width:** -	**Depth:** 11.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
923600	Hand dug pit – not monitored.		**0.00-1.20**	**1.47-0.27**	
923601	Mid brownish grey with occasional brownish red mottling silty clay. No visible clasts. Structureless. Moderately consolidated. 4.00: becoming darker and less mottled. Very occasional shell fragments.	Alluvium	1.20-5.90	0.27--4.43	
	Core loss.		5.90-6.60	-4.43--5.13	
923602	Mid brownish grey silty clay. No visible clasts. No visible structure (poor recovery). Moderately consolidated	River Terrace Deposits	6.60-7.00	-5.13--5.53	
	Core loss.		7.00-9.00	-5.53--7.53	
923603	Fine to coarse sub-rounded, rounded and nodular flint gravels with no recovered matrix. Poorly sorted. Structureless. Poorly consolidated.	River Terrace Deposits	9.00-10.00	-7.53--8.53	
923604	Clay.	London Clay	10.00-11.50+	-8.53--10.53+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH241
Coordinates (NGR) X: 501082.21	Coordinates (NGR) Y: 105721.02	Level (top): 1.83 m OD
Length: -	Width: -	Depth: 17.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
924100	Hand dug pit – not monitored.		0.00-1.20	1.83-0.63	
924101	Mid-light brownish grey silty clay. Occasional Fe mottling. No visible clasts. No visible structure.	Alluvium	1.20-2.50	0.63--0.67	
924102	Mid-light brownish grey silty clay with brownish red mottling. Occasional rooting. No visible clasts. Moderately consolidated. Structureless.	Alluvium.	3.20-6.20	-0.67--3.67	
924103	Mid-dark brownish grey silty clay. Occasional fine shell fragments. No visible clasts. Structureless. Moderately consolidated.	Alluvium.	7.00-11.40	-3.67--8.07	
924104	Dark brownish grey medium sandy clay. No visible clasts. No visible structure. Moderately consolidated.	Alluvium	11.40-12.00	-8.07--9.67	
924105	Light greyish white clayey coarse sand. 10% fine (5-15mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	River Terrace Deposits	12.00-12.30	-9.67--9.97	
	Core loss.		12.30-14.50	-9.97--12.17	
924106	Light bluish grey and brownish red mottled clay. No visible clasts. Structureless. Well consolidated.	Lambeth Group	14.50-17.50+	-12.17--15.17+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH245A
Coordinates (NGR) X: 501273.92	Coordinates (NGR) Y: 105764.85	Level (top): 1.62 m OD
Length: -	Width: -	Depth: 31.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
24500	Hand dug pit – not monitored.		**0.00-2.50**	**1.62--0.88**	
24501	Grey black slightly silty sand.	Alluvium	2.50-4.75	-0.88--3.13	
24502	Core loss.		4.75-10.00	-3.13--8.38	
24503	Dark grey brown slightly silty sand, no visible structure. Heavily disturbed	Alluvium	10.00-22.00	-8.38--20.38	100, 101, 102
24504	Grey finely laminated with occasional fine organic fragments	Alluvium	22.00-23.50	-20.38--21.88	109
24505	Dark grey very slightly sandy silty clay, no visible structure. Sand is fine. Very disturbed.	Alluvium	23.50-25.00	-21.88--23.38	103
24506	Dark grey finely laminated silty clay.	Alluvium	25.00-25.50	-23.38--24.88	105
24507	Very dark brown/black compressed friable peat.	Peat	25.50-26.10	-24.88--25.48	106, 107
24508	Dark grey finely laminated silty clay.	Alluvium	26.10-26.50	-25.48--25.88	108
24509	Dark grey silty sandy clay no visible structure.	Alluvium	26.50-29.50	-25.88--28.88	104
24510	Large <0.06m poorly sorted flint gravel	Alluvium	29.50-30.00	-28.88--29.38	
24511	Compact dark brown silty clay appears to have a blocky granular structure.	Possible Lambeth Group	30.00-30.20	-29.38--29.58	110
24512	Stiff, mottled clay.	Lambeth Group	30.20-31.00+	-29.59--30.38	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH251
Coordinates (NGR) X: 501535.93	Coordinates (NGR) Y: 105825.77	Level (top): 1.63 m OD
Length: -	Width: -	Depth: 35.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
925100	Hand dug pit – not monitored.		0.00-1.20	**1.63-0.43**	
925101	Mid greenish grey clayey fine sand. No visible clasts. Structureless. Poorly consolidated.	Colluvium	1.20-2.20	0.43--0.57	
	Core loss.		2.20-2.50	-0.57--0.87	
925102	Mid greenish grey fine sandy clay. No visible clasts. Structureless. Moderately consolidated.	Alluvium	2.50-3.20	-0.87--1.57	
	Core loss.		3.20-4.00	-1.57--2.37	
925103	Mid greenish grey clayey fine sand to fine sandy clay. No visible clasts. Structureless. Poorly consolidated.	Alluvium	4.00-8.30	-2.37--6.67	
925104	Mid-dark greenish grey fine to medium sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium	8.30-8.50	-6.67--6.87	
	Core loss.		8.50-10.80	-6.87--9.17	
925105	Mid-dark greenish grey fine to medium sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium	10.80-11.00	-9.17--9.37	
	Core loss.		11.00-11.50	-9.37--9.87	
925106	Mid greenish grey medium sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium	11.50-12.50	-9.87--10.87	
	Core loss.		12.50-13.00	-10.87--11.37	
925107	Mid greenish grey medium sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium	13.00-14.10	-11.37--12.47	
	Core loss.		14.10-14.50	-12.47--12.87	
925108	Mid greenish grey medium sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium.	14.50-19.00	-12.87--17.37	
925109	Mid-dark greyish brown coarse sand. No visible clasts. Occasional fine shell fragments. Structureless. Poorly consolidated.	Alluvium	19.00-19.20	-17.37--17.57	

925110	Dark greenish grey silty clay. No visible clasts. Occasional fine decayed organic fibres. Structureless. Well consolidated.	Alluvium	19.20-20.10	-17.57--18.47	69, 70
925111	Dark greenish grey silty clay. No visible clasts. Occasional fine decayed organic fibres. Structureless. Well consolidated.	Alluvium	20.50-21.50	-18.47--19.47	71
925112	Dark greenish grey fine to medium sandy clay. Occasional-common decayed organic material/fibres. No visible clasts. Rare fine shell fragments. Structureless. Moderately consolidated.	Alluvium	22.00-23.50	-19.47--20.97	71, 72
925113	Coarse (80-120mm) sub-rounded and rounded flint gravels. No visible matrix (poor recovery). No visible structure. Poorly consolidated. Very poor recovery.	Alluvium	25.00-26.20	-20.97--22.17	
925114	Stiff mottled clay.	Lambeth Group	26.20-26.50+	-22.17--22.47+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH255
Coordinates (NGR) X: 501712.02	Coordinates (NGR) Y: 105867.93	Level (top): 1.65 m OD
Length: -	Width: -	Depth: 22.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
925500	Hand dug pit – not monitored.		0.00-1.20	1.65-0.45	
925501	Mid-light brownish green fine sandy clay to clayey fine sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium.	1.20-1.50	0.45-0.15	
925502	Mid greyish green fine sandy clay to clayey fine sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium.	1.50-2.20	0.15--0.55	
925503	Mid-light brownish green fine sandy clay to clayey fine sand. No visible clasts. Structureless. Poorly consolidated.	Alluvium	2.50-2.80	-0.55--0.85	60
	Core loss.		2.80-4.00	-0.85--2.05	
925504	Mid greyish green fine sandy clay to clayey fine sand. No visible clasts. Structureless. Poorly consolidated. Sand becoming coarser with depth. are fine shell fragments towards base of deposit.	Alluvium.	4.00-6.30	-2.05--4.35	61
925505	Dark greyish green fine to medium sandy clay to clayey fine to medium sand. Rare fine shell fragments. Structureless. Poorly consolidated very poor recovery.	Alluvium	7.00-8.50	-4.35--5.85	62
	Core loss.		8.50-10.00	-5.85--7.35	
925506	Dark brownish green fine sandy clay. No visible inclusions. Poorly consolidated.	Alluvium	10.00-13.90	-7.35--11.25	
	Core loss.		13.90-14.00	-11.25--11.35	
925507	Dark greyish green fine to medium sandy clay. Occasional fine to medium shell fragments.	Alluvium.	14.00-14.50	-11.35--11.85	63
	Core loss.		14.50-14.80	-11.85--12.15	
925508	Dark brownish green fine sandy clay. No visible inclusions. Poorly consolidated.	Alluvium	14.80-16.00	-12.15--13.35	

925509	Dark greyish green silty clay. No visible clasts. Common fine to medium shell fragments. Finely laminated. Becoming more coarsely laminated with depth and inter bedded with decayed pseudo fibrous organic material. (No true peat formation.). Becoming fine sandy at base of deposit.	Possible Alluvium	16.00-17.15	-13.35--14.50	64, 65
625510	Dark greyish brown gravelly silty clay. 1% fine to coarse (5-50mm) angular and sub-angular flint clasts. Poorly sorted. Structureless, moderately consolidated. One coarse (140mm) rounded flint cobble at base of deposit.	River Terrace Deposits	17,50-17.75	-14.75--14.75	
	Core loss.		17.75-19.50	-14.75--16.50	
925511	Dark greyish brown gravelly coarse sand. 5% fine to coarse (5-50mm) angular, sub-angular and sub-rounded flint and sandstone clasts. Poorly sorted. Structureless. Poorly consolidated. Very poor recovery.	River Terrace Deposits	19.50-19.75	-16.50--16.75	
925512	Light greyish brown fine to coarse sandy gravelly clay. 1% fine to coarse (5-50mm) angular and sub-angular flint and sandstone clasts. Poorly sorted. Moderately consolidated.	River Terrace Deposits	20.15-20.35	-16.75--16.95	66
925513	Light greyish brown silty clay. 1% fine angular calcareous stone clasts. Laminated with lignite bands well consolidated.	Lambeth Group	20.35-21.20	-16.95--17.80	67
925514	Light grey and reddish brown mottled clay. No visible clasts. Structureless. Well consolidated.	Lambeth Group.	21.20-22.00+	-17.80--18.60+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH259
Coordinates (NGR) X: 501873.81	Coordinates (NGR) Y: 105901.13	Level (top): 0.71 m OD
Length: -	Width: -	Depth: 14.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
925900	Hand dug pit – not monitored.		0.00-1.20	0.71--0.49	
925901	Dark greenish grey silty clay. No visible clasts. No visible structure. Poorly consolidated. Rare decayed fine organic fragments. Occasional fine shell fragments concentrated towards base of deposit.	Alluvium	1.20-4.25	-0.49--3.54	42, 43
925902	Fine to coarse (10-50mm) angular, sub-angular and sub-rounded gravel in a dark greenish grey silty clay matrix. Moderately sorted. Structureless. Poorly consolidated.	Alluvium	4.25-4.45	-3.54--3.74	
925903	Dark greenish grey and bluish grey mottled silty clay. No visible clasts. Rare fine shell fragments. No visible structure. Poorly consolidated.	Alluvium	4.45-4.60	-3.74--3.89	
	Core loss.		4.60-5.50	-3.89--4.79	
925903	Dark greenish grey and bluish grey mottled silty clay. No visible clasts. Rare fine shell fragments. No visible structure. Poorly consolidated.	Alluvium	5.50-9.50	-4.79--8.79	44, 45, 46
925904	Medium to coarse (20-90mm) angular, sub-angular, sub-rounded and rounded gravels. No recovered matrix. Moderately sorted. Structureless.	River Terrace Deposits	9.50-10.25	-8.79--9.54	
	Core loss.		10.25-11.00	-9.54--10.29	
925905	Light yellowish grey medium sand. No visible clasts. No visible structure. Poorly consolidated.	River Terrace Deposits	11.00-11.40	-10.29--10.69	47
925906	Light yellowish grey and reddish brown mottled clayey fine sand, <20% medium to coarse (20-100mm) rounded and angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	River Terrace Deposits	11.40-11.75	-10.69--11.04	48
	Core loss.		11.75-12.50	-11.04--11.79	

925907	Light yellowish grey medium sand clast free. Structureless. Poorly consolidated.	River Terrace Deposits	12.50-13.80	-11.79--13.09	
925908	Clay.	London Clay	13.80-14.00+	-13.09--13.29+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH261
Coordinates (NGR) X: 502018.10	Coordinates (NGR) Y: 105939.97	Level (top): 1.53 m OD
Length: -	Width: -	Depth: 15.10 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
926100	Hand dug pit – not monitored.		0.00-1.20	1.53-0.33	
926101	Mid greyish brown and brownish red mottled silty clay. No visible clasts. Structureless. Poorly consolidated.	Head	1.80-2.92	0.33--0.79	49, 50
	Core loss.		2.93-3.50	-0.79--1.36	
926102	Mid-dark brownish grey silty clay. <1% fine to coarse (5-50mm) sub-angular and angular flint clasts. Poorly sorted. Poorly consolidated. Structureless.	Possible Head	3.50-5.70	-1.36--3.56	51, 52, 53
	Core loss.		5.70-6.50	-3.56--4.36	
926103	Mid-dark brownish grey silty clay. <1% fine to medium (5-20mm) sub-angular and angular flint clasts. Moderately sorted. Structureless moderately consolidated.	Possible Head	6.50-6.80	-4.36--4.66	54
926104	Light bluish grey and red mottled clay. No visible clasts. Structureless. Well consolidated.	Lambeth Group	6.80-15.50+	-4.66--13.36+	

Site Code: 245561	Site Name: A27 Arundel	Borehole ID: WS214
Coordinates (NGR) X: 502907.31	Coordinates (NGR) Y: 105840.35	Level (top): 17.35 m OD
Length: -	Width: -	Depth: 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
82141	Soft dark grey brown slightly gravelly silty clay. Gravel is sparse angular fine to medium flint <20 mm.	Topsoil	0.00-0.10	17.35-17.25	
82142	Soft mid brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is common angular to sub-rounded fine to coarse flint <60 mm with rare brick fragments.	Made Ground	0.10-0.50	17.25-16.85	
82143	Soft mid yellowish brown sandy gravelly clay. Mottled grey and orangish brown. Sand is fine to coarse. Gravel is moderate sub-angular to rounded fine to coarse flint <60 mm. Speckles of black organic fragments.	Head	0.50-1.00	16.85-16.35	
82144	Mid brownish orange clayey slightly gravelly fine to medium sand. Gravel is sparse angular to sub-rounded fine to coarse flint <60 mm. Rare black organic fragments.	Head	1.00-1.20	16.35-16.15	
82145	Soft mid orangish brown slightly sandy clay. Sand is fine to coarse. Rare pockets of black sandy organic matter.	Head	1.20-4.00	16.15-12.35	1007
82146	Mid yellowish brown clayey fine to coarse sand.	Raised Beach Deposits	4.00-4.70	12.35-11.65	1008
82147	Soft brown sandy clay. Sand is fine to coarse.	Raised Beach Deposits	4.70-5.00+	11.65-11.35+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS263
Coordinates (NGR) X: 502218.97	Coordinates (NGR) Y: 105975.00	Level (top): 8.00 m OD
Length: -	Width: -	Depth: 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
82631	Soft mid grey brown slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is sparse angular to sub-rounded fine to coarse flint <50 mm. Common fine roots and rootlets.	Topsoil.	0.00-0.30	8.00-7.70	
82632	Soft mid yellowish brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <60 mm.	Head	0.30-1.20	7.70-6.80	
82633	Soft light brown slightly sandy clay. Sand is fine to coarse. Rare fine to medium angular to sub-angular flint <20 mm. Pockets of light grey sandy clay.	Head	1.20-1.90	6.80-6.10	
82634	Mid brown fine to coarse sand.	Head	1.90-2.20	6.10-5.80	
82635	Soft light brown slightly sandy clay. Sand is fine to coarse. Rare fine to medium angular to sub-angular flint <20 mm. Pockets of light grey sandy clay.	Head	2.20-2.80	5.80-5.20	
82636	Mid yellowish brown slightly clayey slightly gravelly fine to coarse sand. Rare sub-angular to sub-rounded fine to coarse flint <50 mm.	Raised Beach Deposits	2.80-3.70	5.20-4.30	1009
82637	Mid brown sandy gravel. Sand is fine to coarse. Gravel is super abundant sub-angular to sub-rounded fine to coarse flint <50 mm and rare sub-angular to sub-rounded fine to medium quartzite <20 mm. Predominantly fine gravels.	Raised Beach Deposits	3.70-5.00+	4.30-3.00+	1010

B.1.2 Phase 3

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH301
Coordinates (NGR) X: 496559.15	Coordinates (NGR) Y: 106919.42	Level (top): 30.88 m OD
Length: -	Width: -	Depth: 5.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
30100	Hand dug pit – not monitored.		0.00-1.20	30.88-29.68	
30101	Stiff orange grey sandy clay, heavy Fe mottling. No visible structure Very disturbed due to GI sampling.	Raised Beach Deposits	1.20-3.20	29.68-27.68	
30102	Orange mottled soft grey silty clay. No visible structure. Very disturbed due to GI sampling.	Raised Beach Deposits	3.20-4.20	27.68-26.68	
30103	Stiff orange sand, occasional large <88mm sub-rounded flint cobbles. No visible structure. Very disturbed due to GI sampling.	Raised Beach Deposits	4.20-5.00	26.68-25.88	
30104	Very stiff red brown mottled grey clay with occasional large flint <70mm sub-angular flint inclusions.	Lambeth Group	5.00-5.50+	25.88-25.38+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH302
Coordinates (NGR) X: 496607.59	Coordinates (NGR) Y: 106821.01	Level (top): 28.11 m OD
Length: -	Width: -	Depth: 35.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
93020	Hand dug pit – not monitored.		0.00-1.20	28.11-26.91	
93021	Medium dense to dense mid orangish brown mottled greenish brown clayey sandy gravel. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse flint <60 mm with low cobble content <100 mm. From 2.65 to 2.95 m bgl frequent sub-rounded cobbles <100 mm.	Head	1.20-4.60	26.91-23.51	
93022	Loose slightly gravelly medium to coarse sand. Gravel is rare Sub-angular to rounded fine to medium flint <20 mm. Very well sorted.	Raised Beach Deposits	4.60-5.20	23.51-22.91	1059
93023	Large cobbles.	Raised Beach Deposits	5.20-5.40	22.91-22.71	
93024	Orange brown very sandy clay. Not present. Information from drillers log.	Raised Beach Deposits.	5.40-7.30	22.71-20.81	
93025	Grey sandy clay. Not present. Information from drillers log.	Lambeth Group	7.30-7.50	20.81-20.61	
93026	Loose mid Bluish grey mottled light grey thinly laminated silty fine to coarse sand. with frequent lignite fragments.	Lambeth Group	7.50-9.90+	20.61-18.21+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH309
Coordinates (NGR) X: 497573.15	Coordinates (NGR) Y: 106345.09	Level (top): 22.61 m OD
Length: -	Width: -	Depth: 14.05 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
30900	Hand dug pit – not monitored.		0.00-1.20	22.61-21.41	
30901	Light red brown stiff slightly sandy silty clay, occasional fine <20m sub-angular flint gravel.	Head	1.20-2.00	21.41-20.61	
30902	Dense poorly sorted clayey flint gravel, gravel clasts are sub-angular	Head	2.00-2.20	20.61-20.41	
	Core loss.		2.20-2.65	20.41-19.96	
30903	Sub-angular to sub-rounded poorly sorted flint gravel in a light brown slightly sandy silty clay matrix.	Head	2.20-3.20	19.96-18.96	
30904	Firm light yellow brown sand; occasional coarse sand/fine gravel, no visible structure.	Raised Beath Deposits	3.20-4.20	18.96-17.96	
	Core loss.		4.20-7.40	17.96-14.76	
30905	Clay.	London Clay	7.40+	14.76+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH328
Coordinates (NGR) X: 499523.84	Coordinates (NGR) Y: 105501.55	Level (top): 1.44 m OD
Length: -	Width: -	Depth: 13.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
932800	Hand dug pit – not monitored.		0.00-1.20	**1.44-0.24**	
932801	Light brownish grey and reddish brown mottled silty clay. No visible clasts. Structureless. Moderately consolidated.	Alluvium	1.20-2.20	0.24--0.76	80, 81
932802	Mid brownish grey silty clay. No visible inclusions. Structureless. Moderately consolidated.	Alluvium	2.20-6.30	-0.76--4.86	82, 83, 84, 85, 86, 87
932803	Mid-dark brownish grey silty clay. Common wood fragments. Possible drilling through decayed tree? Structureless. Moderately consolidated.	Alluvium	6.30-6.50	-4.86--5.06	88
932804	Mid-dark grey silty clay. Occasional fine shell fragments. Occasional degraded organics. No visible clasts. Structureless. Moderately consolidated.	Alluvium	6.50-8.10	-5.06--6.66	89, 90, 91
932805	Dark greyish black silty clay. No visible clasts. Occasional degraded plant material, (wood?). Occasional rootlets. Structureless. Well consolidated.	Alluvium	8.10-8.30	-6.66--6.86	92, 93
932806	Mid brownish grey silty clay. Occasional degraded plant material (roots?). Structureless. Poorly consolidated.	Alluvium	8.30-8.60	-6.86--7.16	94
932807	Clay.	London Clay	8.60-9.50+	-7.16--8.06+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** BH329
Coordinates (NGR) X: 499564.26	**Coordinates (NGR) Y:** 105512.41	**Level (top):** 1.65 m OD
Length: -	**Width:** -	**Depth:** 14.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
932900	Hand dug pit – not monitored.		0.00-1.20	**1.65-0.45**	
932901	Mid-light bluish grey and brownish red mottled silty clay. No visible clasts. Structureless. Moderately consolidated. Rare grass fibres (probable drilling disturbance).	Alluvium	1.20-2.20	**0.45--0.55**	
	Core loss.		2.20-3.00	**-0.55--1.35**	
932902	Mid-light bluish grey and brownish red mottled silty clay. No visible clasts. Structureless. Moderately consolidated. Rare grass fibres (probable drilling disturbance) .	Alluvium	3.00-3.20	**-1.35--1.55**	
932903	Mid greenish grey silty clay. No visible clasts. Structureless. Poorly consolidated. Faint organic smell. Occasional rooting.	Alluvium	3.20-3.70	**-1.55--2.05**	
932904	Dark greenish grey silty clay. No visible clasts. Rare fine shell fragments. Structureless. Poorly consolidated. Faint organic smell. Occasional rooting.	Alluvium	4.20-8.40	**-2.05--6.25**	
932905	Fibrous organic deposit. No matrix. Possible wood fragment.	Alluvium	8.40-8.50	-6.25--6.35	
932906	Dark greenish grey silty clay. No visible clasts. Rare fine shell fragments. Structureless. Poorly consolidated. Faint organic smell. Occasional rooting.	Alluvium	8.50-8.70	-6.35--6.55	
932907	Dark greenish grey gravelly coarse sandy clay. <30% fine to medium (5-30mm) rounded (tertiary?), sub-angular and angular flint clasts.<1% fine (5-10mm) rounded sandstone clasts. Poorly sorted. Structureless. Poorly consolidated.	Alluvium	8.70-9.00	-6.55--6.85	
932908	Clay	London Clay	9.00-14.50+	-6.85--12.35+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH339
Coordinates (NGR) X: 499041.98	Coordinates (NGR) Y: 105516.95	Level (top): 10.34 m OD
Length: -	Width: -	Depth: 20.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
933901	Hand dug pit – not monitored.		0.00-1.20	10.34-9.14	
933902	Medium to coarse (10-50mm) angular flint gravels in a dark reddish brown silty clay matrix. Poorly sorted. Structureless. Poorly consolidated.	Head	1.20-1.40	9.14-8.94	
933903	Mid-light reddish brown medium sand. <1% fine to medium angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	?Raised Beach Deposits	1.40-4.20	8.94-6.14	
933904	Mid reddish brown medium sand. No visible clasts. No visible structure (poor recovery) poorly consolidated	?Raised Beach Deposits	4.80-5.20	6.14-5.74	
933905	Mid reddish brown gravelly coarse sand. 10% fine to coarse (5-100mm) angular and sub-angular flint clasts. Poorly sorted. Poorly consolidated.	?Raised Beach Deposits	5.20-5.60	5.74-5.34	
933906	Clay.	London Clay	5.60-20.50+	5.34--9.56+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: BH340
Coordinates (NGR) X: 499043.87	Coordinates (NGR) Y: 105488.39	Level (top): 10.23 m OD
Length:	Width:	Depth: 10.40m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
34001	No recovery due to open hole drilling; no sample retention.		0.00 - 6.80	10.23-3.43	
	Top of London Clay at 6.80.	London Clay	6.80+	3.43+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS303
Coordinates (NGR) X: 496564.41	**Coordinates (NGR) Y:** 106955.18	**Level (top):** 31.56 m OD
Length: -	**Width:** -	**Depth:** 3.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
830300	Hand dug pit – not monitored.		0.00-1.00	**31.56-30.56**	
830301	Fine to coarse (5-70mm) angular flint gravels in a reddish brown coarse sand matrix. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	1.00-2.05	30.56-29.51	
830302	Mid reddish brown and brownish grey mottled clayey silt to clayey fine sand. Occasional Fe concretions. <1% fine to medium (10-40mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	2.20-3.00+	29.51-28.71+	95, 96

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS304
Coordinates (NGR) X: 496616.94	Coordinates (NGR) Y: 106791.96	Level (top): 27.61 m OD
Length: -	Width: -	Depth: 6.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
83040	Hand dug pit – not monitored.		0.00-1.20	27.61-26.41	
83041	Firm dark orangish brown gravelly silty CLAY. Gravel is abundant angular to sub-rounded fine to coarse flint <60 mm. Sparse flecks of manganese. Band of light grey silty clay 2.40-2.45 m bgl.	Head	1.20-2.90	26.41-24.71	
	Core loss.		2.90-3.00	24.71-24.61	
83042	Firm dark brown grey gravelly silty clay. Gravel is very common angular to sub-rounded fine to medium flint <10 mm.	Head	3.00-3.05	24.61-24.56	
83043	Stiff light grey mottled light brown Clay. Rare fine laminations of mid brown clay. Very rare manganese flecks.	Raised Beach Deposits	3.05-3.45	24.56-24.16	
83044	Light grey mottled orangish brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is moderate sub-angular to rounded fine to coarse flint <40 mm with very rare rounded coarse quartzite <30 mm. Rare pockets of mid brownish orange fine to coarse sand.	Raised Beach Deposits	3.45-3.75	24.16-23.86	1046
83045	Light brownish grey slightly gravelly fine to coarse sand. Gravel is sparse rounded fine to medium flint <20 mm. Possible black organic fine fragments.	Raised Beach Deposits	3.75-5.00	23.86-22.61	1047, 1048, 1049
83046	Light orangish brown fine to coarse sand. Heavily disturbed by geotechnical sampling.	Raised Beach Deposits	5.00-5.90	22.61-21.71	1050
83047	Light greyish brown slightly sandy silty clay. Sand is fine to coarse. Soft.	Raised Beach Deposits	5.90-6.00+	21.71-21.61+	1051

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS305
Coordinates (NGR) X: 496635.84	Coordinates (NGR) Y: 106764.77	Level (top): 27.55 m OD
Length: -	Width: -	Depth: 5.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
83050	Hand dug pit – not monitored.		0.00-1.20	27.55-26.35	
83051	Firm to stiff dark orangish brown very gravelly silty clay. Gravel is abundant to near complete angular to sub-rounded fine to coarse flint <60 mm. Poorly sorted inclusions.	Head	1.20-2.60	26.35-24.95	
83052	Firm Light brownish grey gravelly silty clay. Gravel is very common angular to sub-rounded fine to coarse flint <50 mm and sparse sub-angular to sub-rounded fine to medium chalk <20 mm. Rare manganese staining.	Head	2.60-2.90	24.95-24.65	
83053	Dark brown mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is very common angular to sub-rounded fine to medium flint <20 mm.	Head	2.90-3.40	24.65-24.15	
83054	Firm light grey mottled light brownish grey silty clay.	Raised Beach Deposits	3.40-3.90	24.15-23.65	
83055	Firm mid brownish orange mottled light grey slightly sandy clay. Sand is fine to coarse. Rare sub-angular to rounded medium to coarse flint <40 mm found at base of deposit, although these may have been forced down by SPT.	Raised Beach Deposits	3.90-4.55	23.65-23.00	
83056	Mid brownish orange mottled light grey slightly clayey fine to coarse sand. Heavily disturbed by geotechnical sampling.	Raised Beach Deposits	4.55-4.80	23.00-22.65	1044
83057	Light grey mottled orange fine to coarse sand. Very rare sub-rounded fine to medium flint <20 mm.	Raised Beach Deposits	4.80-5.45+	22.65-22.00+	1045

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS306B
Coordinates (NGR) X: 496675.13	Coordinates (NGR) Y: 106835.92	Level (top): 31.19 m OD
Length: -	Width: -	Depth: 5.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
30600	Hand dug pit – not monitored.		0.00-0.96	**31.19-30.23**	
30601	Very stiff red brown sandy clay with abundant poorly sorted sub-angular and sub-rounded flint gravels.	Head	0.96 - 2.00	30.23-29.19	
30602	Compact un sorted sub-angular flint gravels in a light brown sandy clay matrix with occasional Fe mottling.	Head	2.00 - 4.00	29.19-27.19	
30603	Compact un sorted sub-angular flint gravels in a orange brown sandy clay matrix with occasional Fe mottling.	Head	4.00 - 5.50+	27.19-25.69+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS308
Coordinates (NGR) X: 496749.98	Coordinates (NGR) Y: 106754.72	Level (top): 28.20 m OD
Length: -	Width: -	Depth: 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
83080	Hand dug pit – not monitored.		0.00-1.20	28.20-27.00	
83081	Stiff mid orangish brown gravelly clay. Gravel is abundant angular to sub-rounded fine to coarse flint <60 mm.	Head	1.20-1.75	27.00-26.45	
83082	Dense mid orangish brown clayey gravel. Gravel is super abundant to near complete angular to sub-rounded fine to coarse flint <60 mm.	Head	1.75-3.50	26.45-24.70	
83083	Firm mid to dark grey mottled brown laminated slightly sandy silty clay. Sand is fine to medium. Laminations are thin.	Raised Beach Deposits	3.50-4.60	24.70-23.60	1052
83084	Mid orangish brown mottled light grey clayey sand. Sand is fine to coarse. Very rare sub-angular to rounded fine to coarse flint <40 mm.	Raised Beach Deposits	4.60-5.00+	23.60-23.20+	1053

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS311
Coordinates (NGR) X: 496846.78	Coordinates (NGR) Y: 106645.99	Level (top): 27.36 m OD
Length: -	Width: -	Depth: 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
83110	Hand dug pit – not monitored.		0.00-1.20	27.36-26.16	
83111	Medium dense mid orangish brown clayey gravel. Gravel is super abundant to near complete angular to sub-rounded fine to coarse flint <60 mm.	Head	1.20-2.64	26.16-24.72	
83112	Firm mid brown grey locally orangish brown sandy gravelly clay. Sand is fine to medium. Gravel is sparse sub-angular to sub-rounded fine to coarse flint <40 mm. Frequent pockets of black and brown sandy clayey organic debris.	Head	2.64-2.90	24.72-24.46	1054
83113	Mid orangish brown slightly clayey gravelly fine to coarse sand. Gravel is sparse sub-angular to rounded fine to coarse flint <40 mm.	Raised Beach Deposits	2.90-3.21	24.46-24.15	1055
83114	Soft light brownish grey locally yellowish brown sandy silty clay. Sand is fine to medium.	Raised Beach Deposits	3.21-3.85	24.15-23.51	1056
83115	Loose Yellowish brown locally orangish brown locally clayey silty fine sand.	Raised Beach Deposits	3.85-5.00+	23.51-22.36+	1057, 1058

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS318
Coordinates (NGR) X: 497125.47	Coordinates (NGR) Y: 106427.67	Level (top): 22.71 m OD
Length: -	Width: -	Depth: 3.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
831800	Hand dug pit – not monitored.		0.00-1.20	**22.71-21.51**	
831801	Light greyish green and reddish brown mottled silty clay. No visible clasts. Structureless. Well consolidated. Occasional rootlets and rooting. Slight disturbance at top of deposit from recovery.	Raised Beach Deposits	1.20-1.50	21.51-21.21	36
831802	Light greyish green fine sandy clay. No visible clasts. Coarse laminations towards contact with 831803. Moderately consolidated.	Raised Beach Deposits	1.50-1.80	21.21-20.91	37
831803	Mid-light brownish red silty fine sand.<1% fine to medium (5-20mm) angular, sub-angular and sub-rounded flint clasts (rare but becoming more frequent with depth). Poorly sorted. No visible structure. Poorly consolidated.	Raised Beach Deposits	1.80-3.45+	20.91-19.26+	38, 39

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS319
Coordinates (NGR) X: 497209.10	**Coordinates (NGR) Y:** 106411.28	**Level (top):** 21.93 m OD
Length: -	**Width:** -	**Depth:** 3.70 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
831900	Hand dug pit – not monitored.		0.00-1.20	**21.93-20.73**	
831901	Fine to coarse (5-60mm) angular flint gravels in a dark reddish brown silty clay matrix. Poorly sorted. Structureless. Poorly consolidated.	Head	1.20-1.80	20.73-20.13	
831902	Mid brownish red silty fine sand. <1% fine to coarse (5-40mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	1.80-3.70+	20.13-18.43+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS320
Coordinates (NGR) X: 497209.93	Coordinates (NGR) Y: 106370.93	Level (top): 20.66 m OD
Length: -	Width: -	Depth: 8.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
83200	Hand dug pit – not monitored.		0.00-1.20	**20.66-19.46**	
83201	Mid brownish red gravelly silty clay. 30% fine to coarse (5-100mm) angular, sub-angular, sub-rounded and nodular flint clasts. Poorly sorted. Structureless. Poorly consolidated. Becoming slightly sandy (coarse) with depth.	Head	1.20-3.00	19.46-17.66	
83202	Light reddish brown clayey fine sand. No visible clasts. No visible structure. Moderately consolidated.	Raised Beach Deposits	3.00-3.60	17.66-17.06	55
83203	Dark greyish brown clay. No visible clasts. Well consolidated.	Weathered London Clay	3.60-4.00	17.06-16.66	
83204	Dark brownish grey clay. No visible clasts. Well consolidated.	London Clay	4.50-5.00+	16.66-16.16+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS322
Coordinates (NGR) X: 497352.49	Coordinates (NGR) Y: 106337.17	Level (top): 20.35 m OD
Length: -	Width: -	Depth: 6.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
832200	Hand dug pit – not monitored.		0.00-1.20	**20.35-19.15**	
832201	Dark reddish brown silty gravelly clay. <40% fine to medium (5-30mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated. Gravel becomes slightly less frequent with depth and more well consolidated.	Head	1.20-3.20	19.15-17.15	
832202	Mid-light brownish grey gravelly fine sandy clay. <5% fine to medium (5-20mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Head	3.20-3.60	17.15-16.75	56
832203	Mid-dark reddish brown clay. No visible clasts. Possible laminations. Very well consolidated.	Weathered London Clay	3.60-3.90	16.75-16.45	57
832204	Dark brownish grey clay. No visible clasts. No apparent structure. Well consolidated.	London Clay	3.90-4.00+	16.45-15.95+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS324
Coordinates (NGR) X: 497444.64	Coordinates (NGR) Y: 106301.39	Level (top): 20.52 m OD
Length: -	Width: -	Depth: 6.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
832400	Hand dug pit – not monitored.		0.00-1.20	**20.52-19.32**	
832401	Mid-dark reddish brown silty clay. <1% fine to medium (5-20mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Well consolidated.	Head	1.20-1.70	19.32-18.82	
832402	Mid-dark reddish brown silty gravelly clay. <40% fine to coarse (5-70mm) angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Head	1.70-5.60	18.82-14.92	
832403	Mid-light greyish red fine sandy clay to clayey fine sand. No visible clasts. No apparent structure. Poorly consolidated.	Raised Beach Deposits	5.60-6.00+	14.92-14.52+	58

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS326
Coordinates (NGR) X: 497733.95	Coordinates (NGR) Y: 106303.83	Level (top): 20.02 m OD
Length: -	Width: -	Depth: 5.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
832600	Hand dug pit – not monitored.		0.00-1.20	**20.02-18.82**	
832601	Mid reddish brown silty clay. <1% fine to medium (5-30mm) angular flint clasts. Poorly sorted. No visible structure. Well consolidated.	Head	1.20-1.60	18.82-18.42	
832602	Dark reddish brown silty gravelly clay. <40% fine to coarse (5-40mm) angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Head	1.60-2.45	18.42-17.57	
832603	Mid-dark reddish brown very fine sandy silty clay. No visible clasts. Possible coarse laminations.	Possible Raised Beach Deposits	2.45-4.00	17.57-16.02	14, 15, 16, 17
	Core loss.		4.00 - 4.50	16.02-15.52	
832604	Dark bluish grey silty clay. Clast free. No visible structure. Very well consolidated.	London Clay	4.50-5.45	15.52-14.57+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS327
Coordinates (NGR) X: 497747.16	Coordinates (NGR) Y: 106272.12	Level (top): 19.74 m OD
Length: -	Width: -	Depth: 9.10 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
823700	Hand dug pit – not monitored.		0.00-1.20	**19.74-18.54**	
823701	Light brownish white calcareous gravelly silty clay. <40% fine to coarse (5-50mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Head	1.20-4.30	18.54-15.44	18, 19, 20, 21
823702	Dark reddish brown silty gravelly clay. <40% fine to coarse (5-40mm) angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Head	4.30-5.50	15.44-14.24	
823703	Mid-light reddish brown silty clay. <1% fine (5-10mm) angular flint clasts. Poorly sorted. Possible fine laminations. Well consolidated.	Raised Beach Deposits	5.50-6.60	14.24-12.14	22, 23
823704	Mid reddish brown silty clay gravels. <80% fine to medium (5-20mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	7.00-7.50	12.14-11.64	
823705	Mid-light yellowish red silty fine sand. No visible clasts. Possible fine laminations. Poorly consolidated.	Raised Beach Deposits	7.50-7.65	11.64-11.49	24
823706	Core loss.		7.65-8.00	11.49-11.14	
823707	Mid-dark reddish brown gravelly silty clay. <20% fine (2-10mm) angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Raised Beach Deposits	8.00-8.10	11.14-11.04	
823708	Mid yellowish brown fine sandy silty clay. <1% fine to medium (5-20mm) angular flint clasts. Poorly sorted. Possible coarse laminations. Poorly consolidated.	Raised Beach Deposits	8.10-8.50	11.04-10.64	25
	Core loss.		8.50-9.10	10.64-10.04+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS329
Coordinates (NGR) X: 497701.83	**Coordinates (NGR) Y:** 106213.01	**Level (top):** 18.73 m OD
Length: -	**Width:** -	**Depth:** 2.80 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
832900	Hand dug pit – not monitored.		0.00-1.20	**18.73-17.53**	
832901	Fine to coarse (5-50mm) angular flint gravels in a light brownish grey silty clay matrix. Poorly sorted. Structureless. Poorly consolidated.	Head	1.20-2.80+	17.53-15.93+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS334
Coordinates (NGR) X: 497886.98	Coordinates (NGR) Y: 106115.97	Level (top): 17.04 m OD
Length: -	Width: -	Depth: 2.50 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
33400	Hand dug pit – not monitored.		0.00-1.20	**17.04-15.84**	
33401	Dense light brown sub-angular flint gravel (<30mm). Sandier from 1.65 - 1.90 m, sand is fine and slightly clayey	Head	1.20-2.00	15.84-15.04	
33402	Dense poorly sorted flint gravel in a slightly clayey light brown sand matrix.	Head	2.00-2.50+	15.04-14.54+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS340
Coordinates (NGR) X: 498204.37	**Coordinates (NGR) Y:** 105890.48	**Level (top):** 7.28 m OD
Length: -	**Width:** -	**Depth:** 10.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
34000	Hand dug pit – not monitored.		0.00 - 1.20	**7.28-6.08**	
34001	Stiff yellow brown silty sand, no visible structure, homogenous throughout.	Alluvium	1.20 - 3.00	6.08-4.28	
34002	Very stiff grey brown clay.	London Clay	3.00 - 4.00+	4.28-3.28+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS346
Coordinates (NGR) X: 498368.04	Coordinates (NGR) Y: 105769.10	Level (top): 10.73 m OD
Length: -	Width: -	Depth: 4.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
34600	Hand dug pit – not monitored.		0.00 - 1.20	**10.73-9.53**	
34601	Firm light brown Silty clay with occasional sub-angular and sub-rounded flint gravels.	Head	1.20 - 2.00	9.53-8.73	
34602	Abundant poorly sorted flint gravels sub-angular and sub-rounded in a stiff orange brown silty clay matrix	Head	2.00 - 2.30	8.73-8.43	
34603	Stiff gravelly clay.	Head	2.30 - 2.68	8.43-8.05	
24604	Silty sand.	Raised Beach Deposits	2.68 – 4.45+	8.05-6.28+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS356
Coordinates (NGR) X: 498857.02	**Coordinates (NGR) Y:** 105529.17	**Level (top):** 10.92 m OD
Length: -	**Width:** -	**Depth:** 3.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
35600	Hand dug pit – not monitored.		0.00 - 1.20	**10.92-9.72**	
35601	Verry stiff yellow brown sandy clay with abundant poorly sorted sub-angular flint gravels.	Head	1.20 - 2.00	9.72-8.92	
35602	Firm orange brown silty sand, no visible structure.	Raised Beach Deposits	2.00 - 3.45+	8.92-7.47+	

Site Code: **245561**	**Site Name:** **A27 Arundel Bypass**	**Borehole ID:** **WS361**
Coordinates (NGR) X: **499159.52**	**Coordinates (NGR) Y:** **105552.62**	**Level (top):** **9.94 m OD**
Length: **-**	**Width:** **-**	**Depth:** **4.00 m**

Context Number	**Description**	**Interpretation**	**Depth m bgl**	**Depth m OD**	**Samples**
836100	Hand dug pit – not monitored.		0.00 - 1.20	**9.94-8.74**	
836101	Material pushed down core.		1.20-1.50	**8.74-8.44**	
836102	Mid-light brownish red medium sand. No visible clasts. Structureless. Poorly consolidated. Disturbed.	Raised Beach Deposits	1.50-4.00+	8.44-5.94+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS362
Coordinates (NGR) X: 499162.22	**Coordinates (NGR) Y:** 105467.62	**Level (top):** 10.00 m OD
Length: -	**Width:** -	**Depth:** 4.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
36200	Hand dug pit – not monitored.		0.00 - 1.20	**10.00-8.80**	
36201	Stiff orange mottled grey silty clay, Sub-angular flint gravels at top. (Disturbed by SPT at top).	Raised Beach Deposits	1.20-1.52	8.80-8.48	
36202	Firm yellow brown sand no visible structure becoming light brown with depth.	Raised Beach Deposits	1.52-2.00	8.48-8.00	
36203	Firm light brown sand no visible structure.	Raised Beach Deposits	2.00-4.00+	8.00-6.00+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS363
Coordinates (NGR) X: 499267.94	**Coordinates (NGR) Y:** 105485.52	**Level (top):** 9.10 m OD
Length: -	**Width:** -	**Depth:** 3.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
86300	Hand dug pit – not monitored.		0.00 - 1.20	**9.10-7.90**	
86301	Mid reddish brown silty medium to fine sand. No visible clasts. No visible structure. Poorly consolidated. Poor recovery.	Raised Beach Deposits	1.20-3.00+	7.90-6.10+	97, 98, 99

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS364
Coordinates (NGR) X: 499348.58	Coordinates (NGR) Y: 105481.92	Level (top): 7.81 m OD
Length: -	Width: -	Depth: 3.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836400	Hand dug pit – not monitored.		0.00 - 1.20	**7.81-6.61**	
836401	Light brownish red and bluish grey mottled fine sandy clay to clayey fine sand. No visible clasts. No visible structure. Poorly consolidated.	Raised Beach Deposits	1.20-1.70	6.61-6.11	
836402	Mid reddish brown fine to medium sand, becoming coarser with depth. No visible clasts. No visible structure. Poorly consolidated.	Raised Beach Deposits	1.70-2.50	6.11-5.31	
836403	Mid-dark greyish brown medium to coarse sand. 1% fine to medium (5-30mm) sub-angular and sub-rounded flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	2.50-2.70	5.31-5.11	
836404	Clay.	London Clay	2.70-3.00+	5.11-4.81+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS365
Coordinates (NGR) X: 499395.13	Coordinates (NGR) Y: 105483.60	Level (top): 6.79 m OD
Length: -	Width: -	Depth: 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836500	Hand dug pit – not monitored.		0.00 - 1.20	**6.79-5.59**	
836501	Light reddish yellow silty medium sand. <1% fine (5-10mm) sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Raised Beach Deposits	1.20-1.60	5.59-5.19	
836502	Mid brownish red clayey medium to coarse sand. <1% fine to medium (5-30mm) sub-angular flint clasts. Poorly sorted. Structureless. Moderately consolidated.	Possible Raised Beach Deposits	1.60-1.90	5.19-4.89	
836503	Clay.	London Clay	1.90-5.00+	4.89-1.79+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS367
Coordinates (NGR) X: 499700.25	**Coordinates (NGR) Y:** 105500.88	**Level (top):** 6.50 m OD
Length: -	**Width:** -	**Depth:** 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836700	Hand dug pit – not monitored.		0.00 - 1.20	**6.50-5.30**	
836701	Dark reddish brown gravelly coarse sand. <10% fine to medium (5-30mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Head	1.20-1.60	5.30-4.90	26
836702	Mid reddish brown medium sandy clay. <1% medium (10-30mm) sub-angular and sub-rounded flint clasts. Poorly sorted. Structureless. Well consolidated.	Head	1.60-2.00	4.90-4.50	27
836703	Dark bluish grey silty clay. Clast free. No visible structure. Very well consolidated.	London Clay	2.00-5.00+	4.50-1.50+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS368
Coordinates (NGR) X: 499756.96	Coordinates (NGR) Y: 105505.19	Level (top): 7.61 m OD
Length: -	Width: -	Depth: 4.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836800	Hand dug pit – not monitored.		0.00 - 1.20	**7.61-6.41**	
836801	Light yellowish red medium to coarse sand. <1% fine (2-10mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated. -abrupt contact-	Possible Head	1.20-1.60	6.41-6.01	28
836802	Dark greyish brown gravelly coarse sand. <5% fine to coarse (5-40mm) angular, sub-angular and sub-rounded flint clasts. Poorly sorted. Structureless. Poorly consolidated. -sharp contact-	Possible Head	1.60-2.20	6.01-5.41	29
836803	Mid-light greyish brown fine sandy clay. <1% fine to coarse angular, sub-angular and sub-rounded flint clasts. Poorly sorted. Possible coarse laminations. Moderately consolidated, -sharp contact-	Possible Head	2.20-2.80	5.41-4.81	30
836804	Dark bluish grey silty clay. Clast free. No visible structure. Very well consolidated.	London Clay	2.80-4.00+	4.81-3.61+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS369
Coordinates (NGR) X: 499856.13	**Coordinates (NGR) Y:** 105492.12	**Level (top):** 8.75 m OD
Length: -	**Width:** -	**Depth:** 4.70 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836900	Hand dug pit – not monitored.		0.00 - 1.20	**8.75-7.55**	
836901	Mid reddish brown silty medium sand with occasional fine sandy clay pockets. <1% fine to coarse (5-40mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	1.20-1.60	7.55-7.15	31
836902	Mid-dark greyish brown silty coarse sand. <1% fine to coarse (5-40mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	1.60-3.85	7.15-4.90	32,33
836903	Mid greyish brown medium sand. <1% fine (5-10mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	3.85-4.20	4.90-4.55	34
836904	Dark bluish grey silty clay. Clast free. No visible structure. Very well consolidated.	London Clay	4.20-4.70+	4.55-4.05+	

Site Code: 245561	**Site Name:** A27 Arundel Bypass	**Borehole ID:** WS371
Coordinates (NGR) X: 499904.97	**Coordinates (NGR) Y:** 105533.42	**Level (top):** 8.92 m OD
Length: -	**Width:** -	**Depth:** 5.00 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
836900	Hand dug pit – not monitored.		0.00 - 1.20	**8.92-7.72**	
837101	Mid brownish red medium-coarse sand. No visible clasts. Structureless. Poorly consolidated.	Possible Head	1.20-1.65	7.72-7.27	
837102	Mid-dark greyish brown coarse sand <1% fine to medium (5-30mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	1.65-2.20	7.27-6.72	
837103	Mid-light greyish yellow medium-coarse sand. <1% fine (5-10mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	2.20-3.50	6.72-5.42	
837104	Mid-dark greyish brown gravelly coarse sand. <20% fine to medium (5-20mm) angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Possible Head	3.50-3.80	5.42-5.12	
837105	Mid reddish brown silty clay. No visible clasts (sand present from upper deposit due to recovery). Possible coarse laminations at contact with London clay. Well consolidated.	Possible weathered London Clay	3.80-3.90	5.12-5.02	
837106	Clay.	London Clay	3.90-5.00+	5.02-3.92+	

Site Code: 245561	Site Name: A27 Arundel Bypass	Borehole ID: WS372
Coordinates (NGR) X: 499968.02	Coordinates (NGR) Y: 105497.18	Level (top): 8.86m OD
Length: -	Width: -	Depth: 4.45 m

Context Number	Description	Interpretation	Depth m bgl	Depth m OD	Samples
837200	Hand dug pit – not monitored.		0.00 - 1.20	**8.86-7.66**	
837201	Light brownish red with occasional grey mottled. silty fine sandy clay. No visible clasts. Common manganese flecks? Possible coarse laminations. Well consolidated.	Raised Beach Deposits	1.20-2.00	**7.66-6.86**	59
834202	Dark reddish brown gravelly coarse sand with rare coarse sandy clay pockets. <5% fine to medium (5-30mm) angular and sub-angular flint clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	2.00-3.00	6.86-5.86	
834203	Dark greyish brown coarse sand. <1% fine to medium (5-30mm) angular flint clasts. 1% fine to medium (5-30mm) sub-angular and sub-rounded sandstone clasts. Poorly sorted. Structureless. Poorly consolidated.	Raised Beach Deposits	3.50-4.00	5.86-5.36	
	Core loss.		4.00-4.45+	5.36-4.91+	

10.1.2

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First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: SCHEME LOCATION

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	08/02/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:30,000	Volume NA

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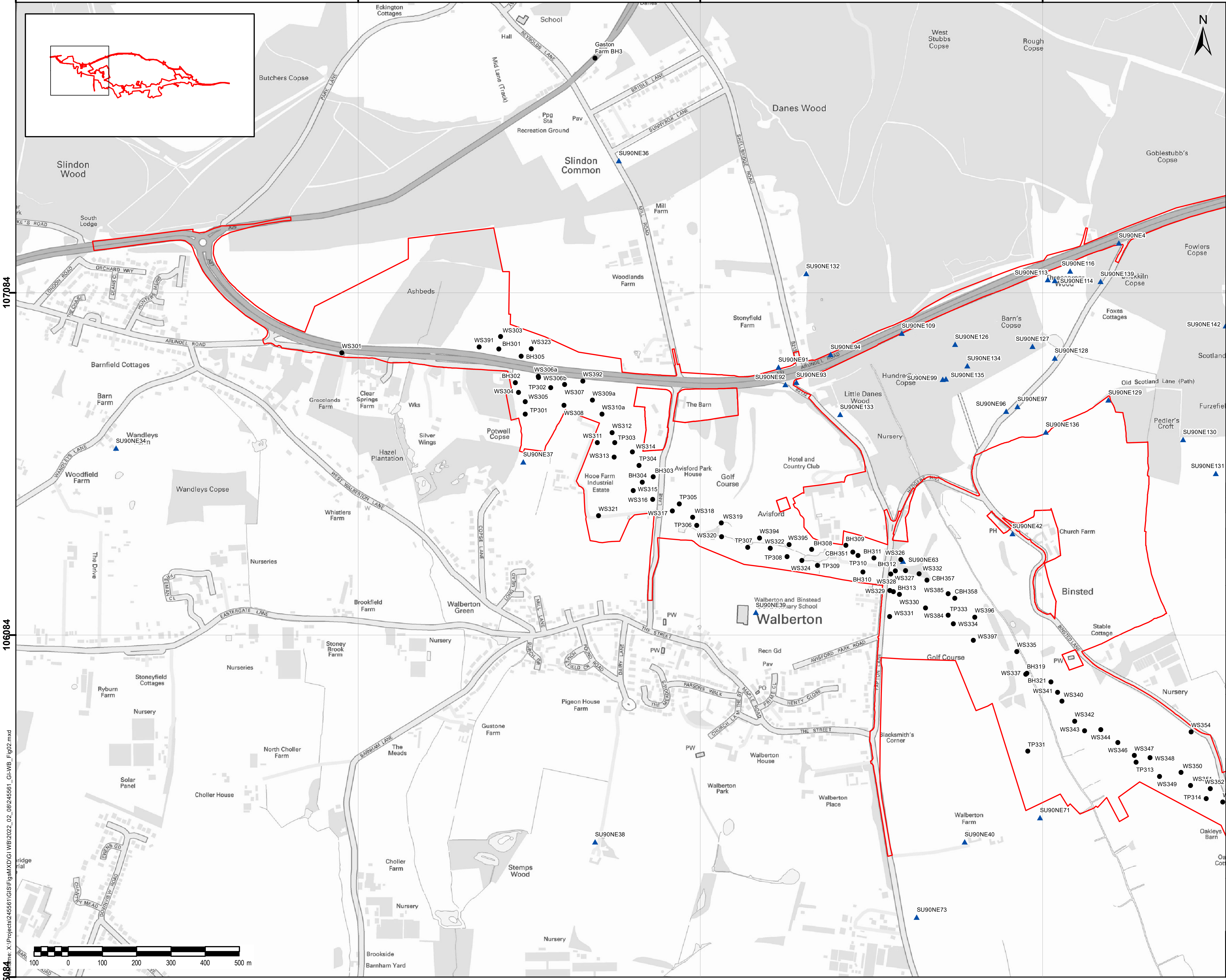

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Danes Wood
Walberton
Binsted
Avisford
Barnfield Cottages
Barn Farm
Woodfield Farm
Wandleys Copse
Hazel Plantation
Potwell Copse
Hoe Farm Industrial Estate
Avisford Park House
Golf Course
Hotel and Country Club
Little Danes Wood
Church Farm
Nursery
Nurseries
Walberton Green
Brookfield Farm
Stoney Brook Farm
Pigeon House Farm
Gustone Farm
The Meads
North Choller Farm
Choller House
Choller Farm
Stemps Wood
Walberton House
Walberton Park
Walberton Place
Walberton Farm
Blacksmith's Corner
Stable Cottage
Oakleys Barn
Woodlands Farm
Stonyfield Farm
Ashbeds
Mill Farm
Recreation Ground
School
Gaston Farm BH3
Butchers Copse
West Stubbs Copse
Rough Copse
Goblestubb's Copse
Fowlers Copse
Barn's Copse
Foxes Cottages
Pedler's Croft
The Barn
Silver Wings
Whistlers Farm
Graceland Farm
Clear Springs Farm
Ryburn Farm
Stoneyfield Cottages
Solar Panel
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EASTERGATE LANE
THE STREET
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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES

First issue	KF	AS	08/02/22	Suffix

Purpose of issue
XXX

Client
NATIONAL HIGHWAYS
Bridge House
1 Walnut Tree Close
Guildford
Surrey

Working on behalf of
national highways

Project Title
A27 ARUNDEL BYPASS

Drawing Title
FIGURE 2A GI INTERVENTIONS AND BGS BOREHOLE RECORDS

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.	Suitability
245561-2	
Scale @ A3 1:10,000	Volume NA

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- BGS BOREHOLES

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 2B GI INTERVENTIONS AND BGS BOREHOLE RECORDS

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2
Suitability:
Scale @ A3: 1:10,000
Volume: NA

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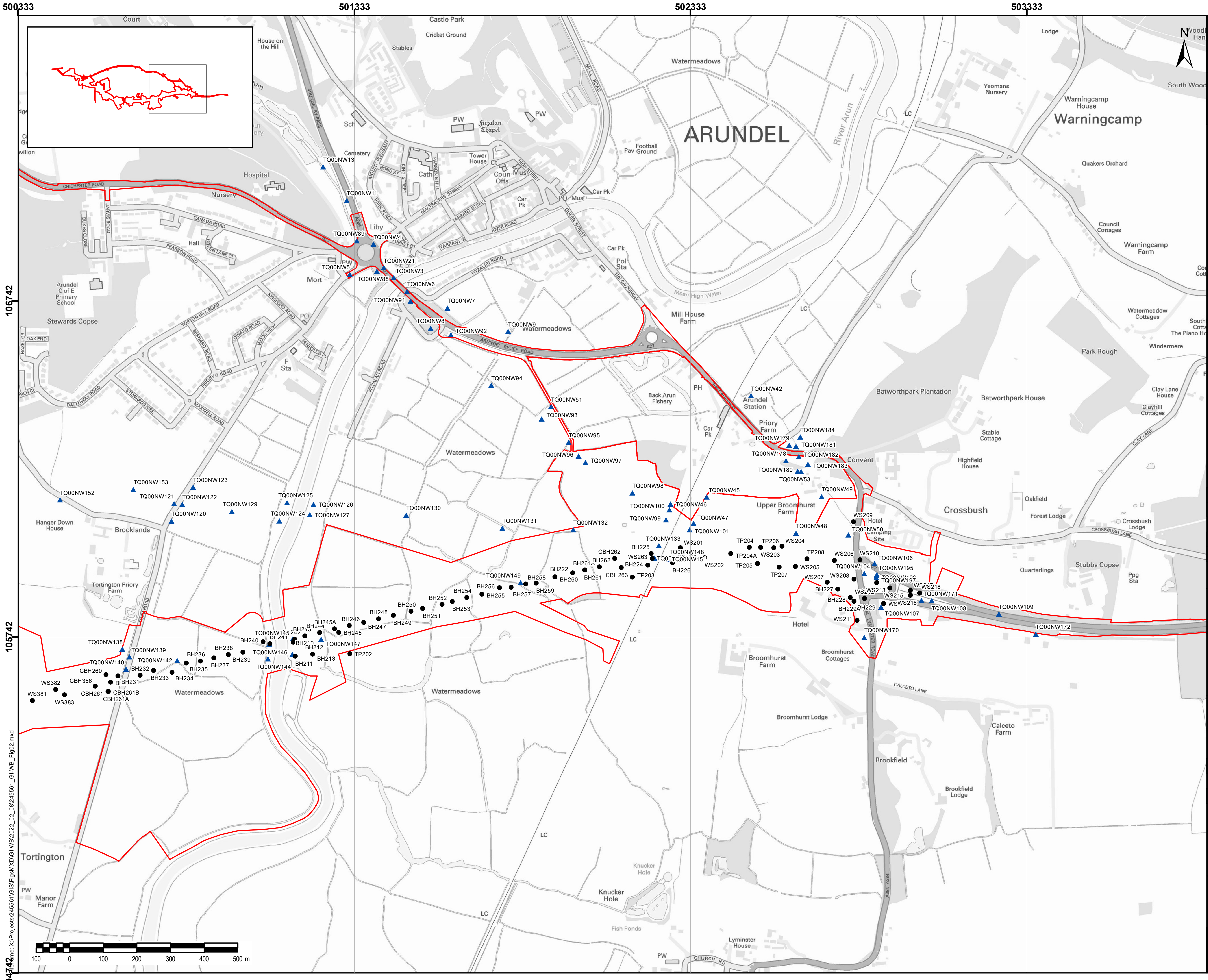

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- BGS BOREHOLES

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Purpose of issue: XXX

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Bridge House
1 Walnut Tree Close
Guildford
Surrey

Working on behalf of national highways

Project Title

A27 ARUNDEL BYPASS

Drawing Title

FIGURE 2C GI INTERVENTIONS AND BGS BOREHOLE RECORDS

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability

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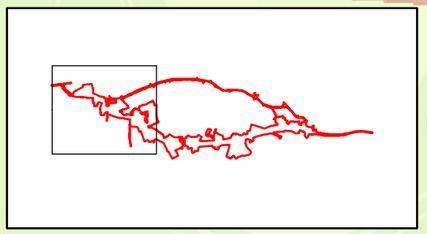

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- BGS BOREHOLES

SOLID GEOLOGY

- LAMBETH GROUP
- LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION, NEWHAVEN CHALK FORMATION, CULVER CHALK FORMATION AND PORTSDOWN CHALK FORMATION (UNDIFFERENTIATED)
- LONDON CLAY FORMATION
- SPETISBURY CHALK MEMBER
- TARRANT CHALK MEMBER

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 3A SOLID GEOLOGY

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2
Suitability:
Scale @ A3: 1:10,000
Volume: NA

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Goblestubb's Copse, Park Farm, Cricket Hill Farm, The Plantation, Arundel Court, House on the Hill, Park Bottom, Arundel Arboretum, The Arundel Lodge, Cricket Ground, Cricket Ground Pavilion, The Waterwoods, Trout Fishery, Scotland Barn, Fowlers Copse, Brickiln Piece, Paine's Wood, Windhers Copse, Havenwood Park, Singer's Piece, Foxes Cottages, Barn's Copse, Scotland, Furzefield Copse, Pedler's Croft, Old Scotland Lane (Path), Pinewoods, Binsted Wood, Ash Piece, Tortington Common, Arundel C of E Primary School, Stewards Copse, Hospital, Nursery, Hall, Mort, Watermeadows, Broad Green Cottages, New Barn, Tortington Priory Farm, Brooklands, Hanger Down House, Binsted, Church Farm, Spinningwheel Copse, Stable Cottage, Golf Course, Shrine, Binstead Manor, Binsted Park, The Shaw, Kents Cottage, Lake Copse, Manor House, Nursery, Mill Ball, Walberton Farm, Oakleys Barn, Oakley Cottage, Fairmile Farm, Kennels, Slate Barn Farm, Equine Centre, Tortington Manor, Goose Green, Grove Cottages, Grove Lodge, Orchard Cottage, Tortington, The Withy Beds, Church Cottages, Manor Farm

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- BGS BOREHOLES

SOLID GEOLOGY

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- LONDON CLAY FORMATION
- SPETISBURY CHALK MEMBER
- TARRANT CHALK MEMBER

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 3B SOLID GEOLOGY

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:10,000	Volume NA

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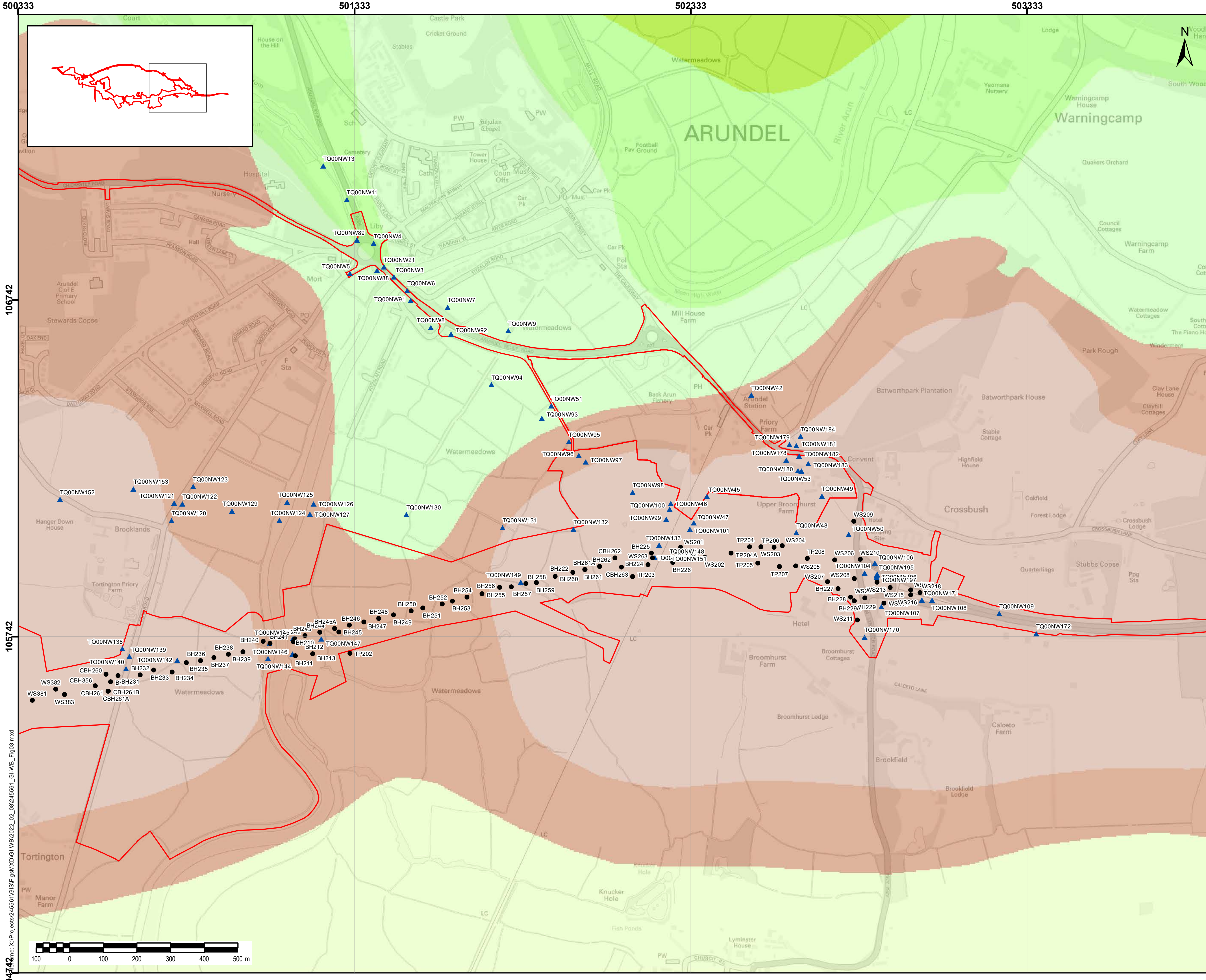

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	First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 3C SOLID GEOLOGY

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability

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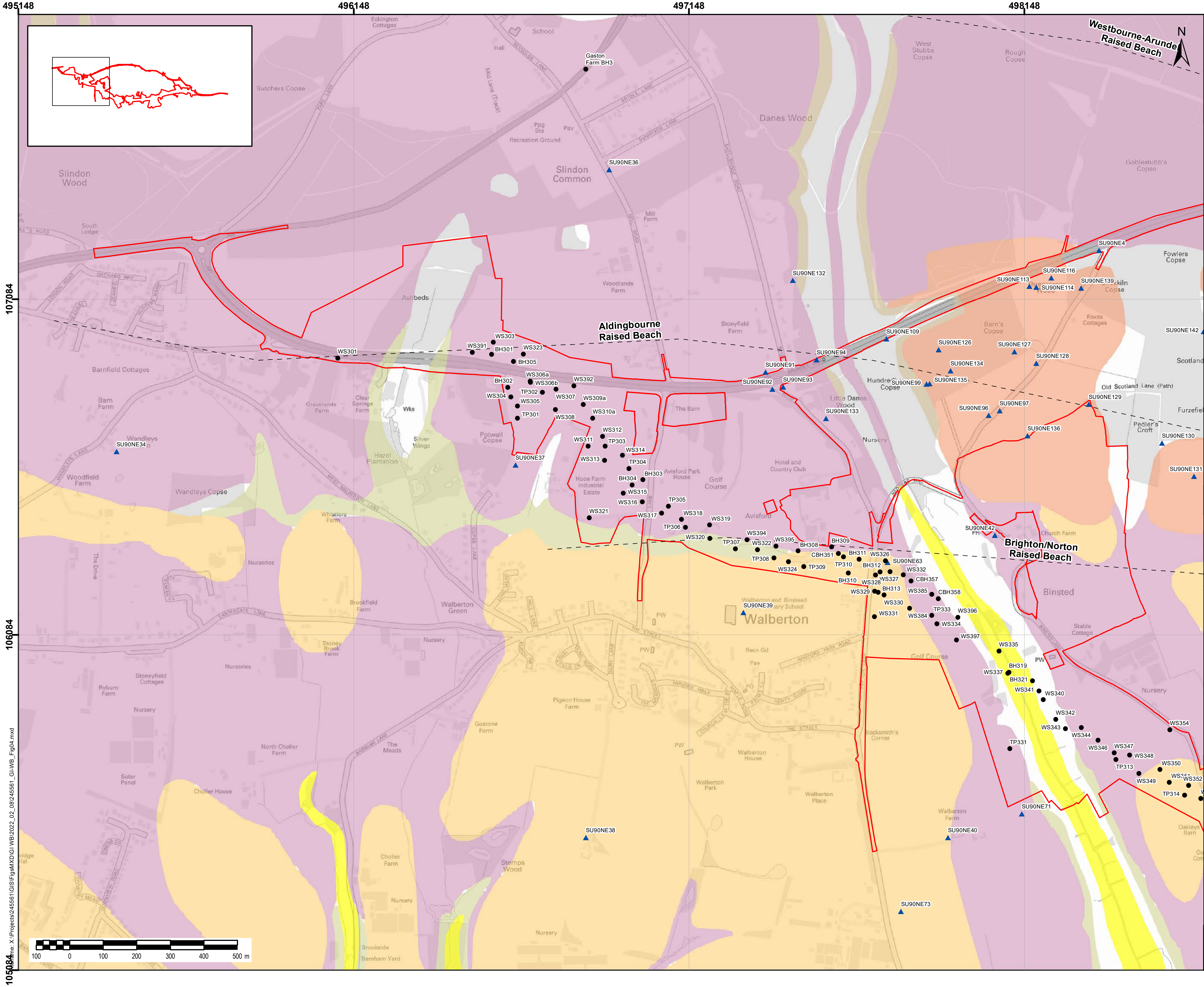

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Aldingbourne Raised Beach
Brighton/Norton Raised Beach
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Slindon Common
Danes Wood
Walberton
Binsted
Ashbeds
Barnfield Cottages
Woodlands Farm
Stonyfield Farm
Aviford
Hotel and Country Club
Golf Course
Wandleys Copse
Hazel Plantation
Potwell Copse
The Barn
Little Danes Wood
Church Farm
Nursery
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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- PROJECTED RAISED BEACH CLIFF LINES

SUPERFICIAL GEOLOGY

- ALLUVIUM
- HEAD
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED BEACH DEPOSITS, 2 - SAND AND GRAVEL
- RAISED STORM BEACH DEPOSITS, 2 - GRAVEL
- RIVER TERRACE DEPOSITS

First issue | KF | AS | 08/02/22 | Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of national highways

Project Title

A27 ARUNDEL BYPASS

Drawing Title

FIGURE 4A
SUPERFICIAL GEOLOGY AND MAPPED LOCATION OF PLEISTOCENE RAISED BEACH CLIFF LINES
(ROBERTS AND POPE 2018)

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability

Scale @ A3 1:10,000 | Volume NA

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Drawing Number
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Location | Type | Role | Number

Rev P??.?

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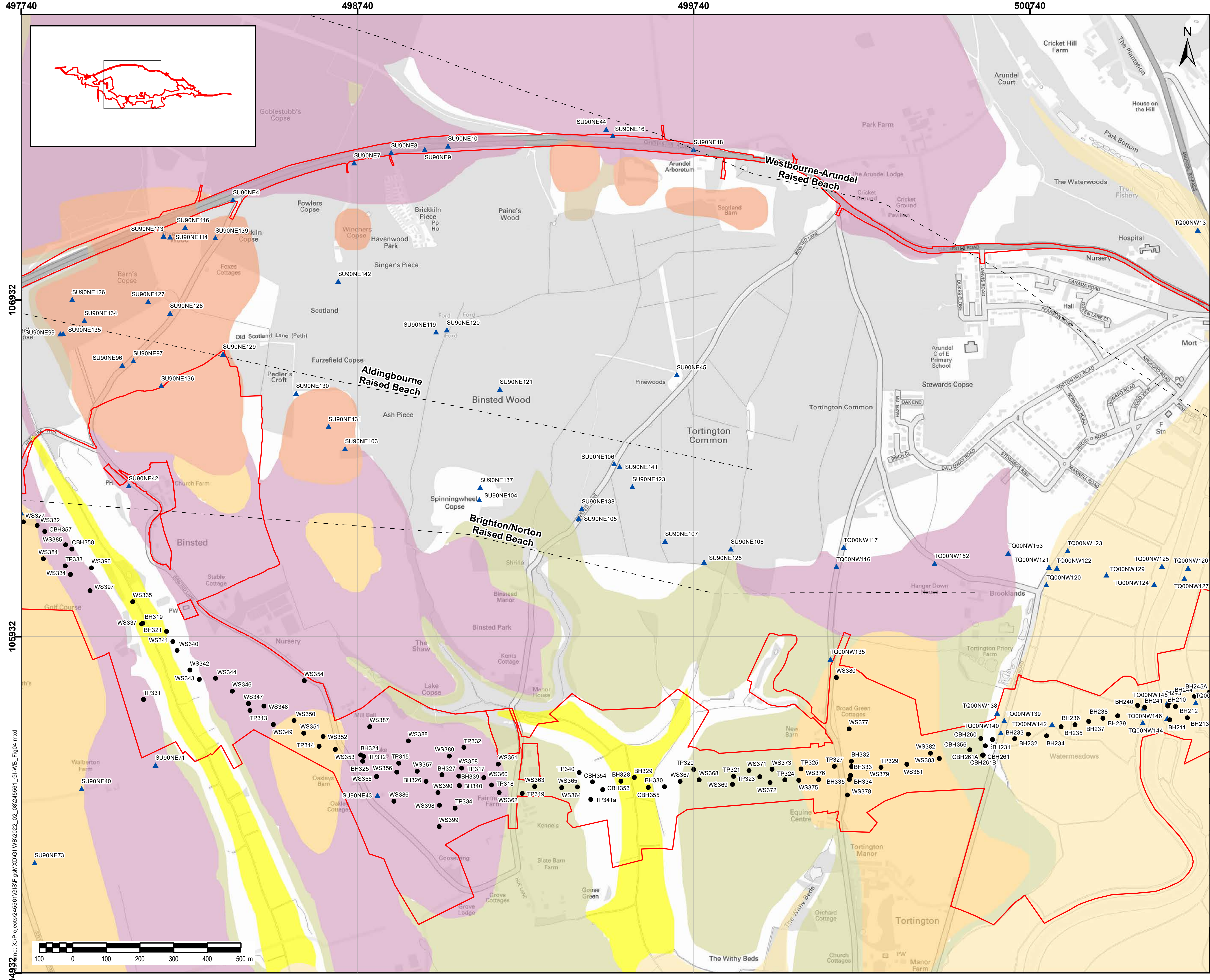

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Arundel Court
Park Farm
The Waterwoods
Hospital
Nursery
Fowlers Copse
Brickkiln Piece
Paine's Wood
Havenwood Park
Singer's Piece
Scotland
Furzefield Copse
Ash Piece
Spinningwheel Copse
Pinewoods
Stewards Copse
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Brooklands
Binsted Park
Binsted Manor
Church Farm
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Golf Course
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Tortington Priory Farm
Tortington Manor
Equine Centre
Kennels
Slate Barn Farm
Goose Green
Grove Cottages
Grove Lodge
Church Cottages
Manor Farm
Orchard Cottage
Broad Green Cottages
New Barn
Lake Copse
The Shaw
Kents Cottage
Oakleys Barn
Fairmile Farm
Mill Ball
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Barn's Copse
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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- PROJECTED RAISED BEACH CLIFF LINES

SUPERFICIAL GEOLOGY

- ALLUVIUM
- CLAY-WITH-FLINTS FORMATION
- HEAD
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED BEACH DEPOSITS, 2 - SAND AND GRAVEL
- RAISED MARINE DEPOSITS
- RAISED STORM BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED STORM BEACH DEPOSITS, 2 - GRAVEL
- RIVER TERRACE DEPOSITS

First issue	KF / AS	08/02/22	Suffix	

Purpose of issue: XXX

Client
NATIONAL HIGHWAYS
Bridge House
1 Walnut Tree Close
Guildford
Surrey

Working on behalf of national highways

Project Title

A27 ARUNDEL BYPASS

Drawing Title

FIGURE 4B SUPERFICIAL GEOLOGY AND MAPPED LOCATION OF PLEISTOCENE RAISED BEACH CLIFF LINES (ROBERTS AND POPE 2018)

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability

Scale @ A3 1:10,000 | Volume NA

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Highways England PIN | Originator | Volume
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Location | Type | Role | Number

Rev P??.?

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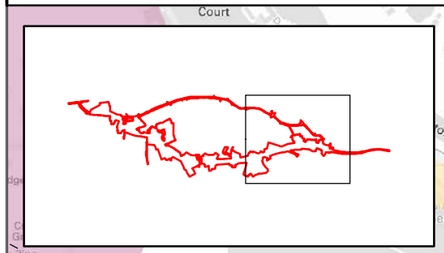

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- PROJECTED RAISED BEACH CLIFF LINES

SUPERFICIAL GEOLOGY

- ARUN TERRACE DEPOSITS, 2 MEMBER - SAND AND GRAVEL
- ARUN TERRACE DEPOSITS, 3 MEMBER - SAND AND GRAVEL
- ARUN TERRACE DEPOSITS, 4 MEMBER - SAND AND GRAVEL
- HEAD
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED MARINE DEPOSITS
- RAISED STORM BEACH DEPOSITS, 2 - GRAVEL
- RIVER TERRACE DEPOSITS

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 4C SUPERFICIAL GEOLOGY AND MAPPED LOCATION OF PLEISTOCENE RAISED BEACH CLIFF LINES (ROBERTS AND POPE 2018)

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:10,000	Volume NA

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Location | Type | Role | Number

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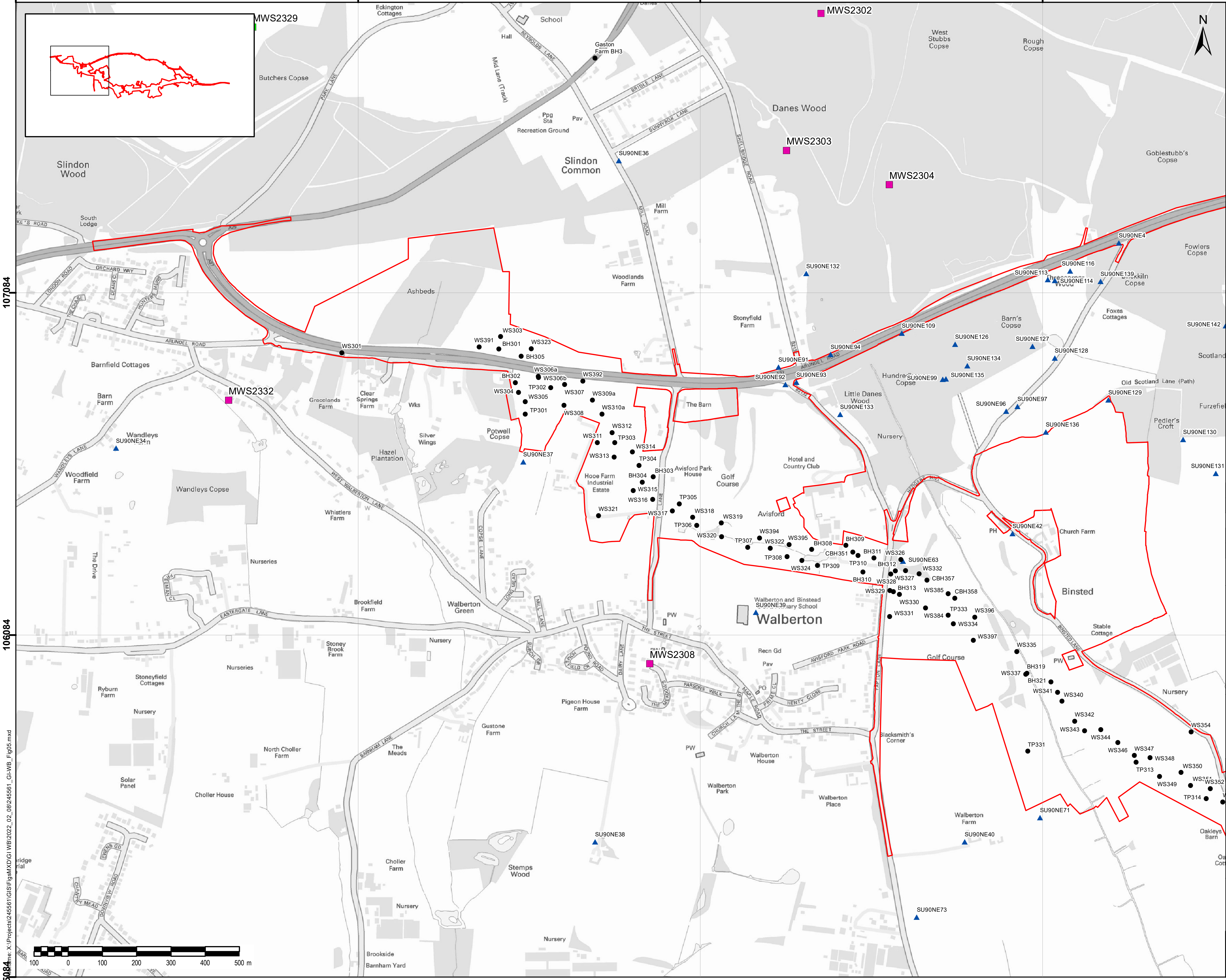
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Danes Wood
Butchers Copse
Recreation Ground
School
Gaston Farm BH3
Woodlands Farm
Ashbeds
Stonyfield Farm
West Stubbs Copse
Rough Copse
Goblestubb's Copse
Fowlers Copse
Barn's Copse
Foxes Cottages
Barnfield Cottages
Barn Farm
Woodfield Farm
Wandleys Copse
Gracelands Farm
Clear Springs Farm
Silver Wings
Hazel Plantation
Potwell Copse
Whistlers Farm
Hooe Farm Industrial Estate
Avisford Park House
Golf Course
Hotel and Country Club
The Barn
Little Danes Wood
Nursery
Avisford
Church Farm
Binsted
Stable Cottage
Walberton
Walberton Green
Brookfield Farm
Stoney Brook Farm
Stonefield Cottages
Ryburn Farm
Nurseries
Pigeon House Farm
Gustone Farm
North Choller Farm
The Meads
Solar Panel
Choller House
Choller Farm
Stemps Wood
Walberton House
Walberton Park
Walberton Place
Walberton Farm
Blacksmith's Corner
Oakleys Barn
Brookside
Barnham Yard
Pedler's Croft
Scotland
Furzefield
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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES

HER FINDSPOTS

- PALAEOLITHIC
- MESOLITHIC

First issue	KF AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 5A PALAEOLITHIC AND MESOLITHIC HER FINDSPOTS

Designed	Drawn	Checked	Approved	Date
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Internal Project No. 245561-2 | Suitability

Scale @ A3 1:10,000 | Volume NA

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Drawing Number
Highways England PIN | Originator | Volume
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Location | Type | Role | Number

Rev P??.?

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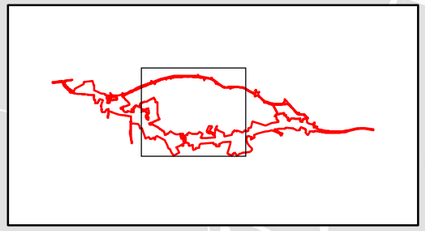

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES

HER FINDSPOTS

- PALAEOLITHIC
- MESOLITHIC

First issue	KF / AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 5B PALAEOLITHIC AND MESOLITHIC HER FINDSPOTS

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2
Suitability:
Scale @ A3: 1:10,000
Volume: NA

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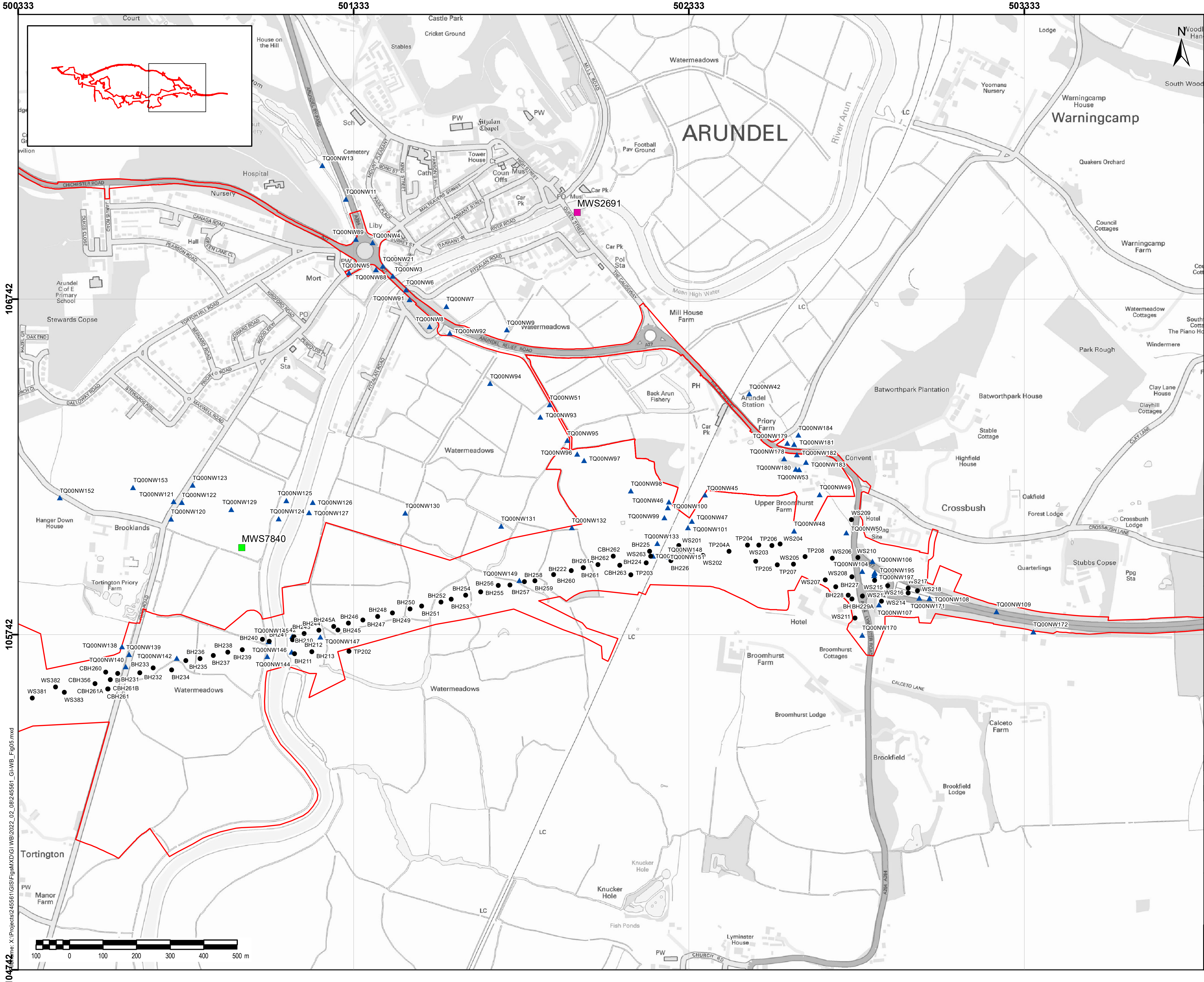
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Tortington
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House on the Hill
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Lodge
Yeomans Nursery
Warningcamp House
South Wood
River Arun
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CANADA ROAD
PEARSON ROAD
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Watermeadow Cottages
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Park Rough
Batworthpark Plantation
Batworthpark House
Clay Lane House
Clayhill Cottages
Back Arun Fishery
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Arundel Station
Priory Farm
Stable Cottage
Highfield House
Convent
Oakfield
Forest Lodge
Upper Broomhurst Farm
Hotel
Crossbush Lodge
CROSSBUSH LANE
Quarterlings
Stubbs Copse
Hanger Down House
Brooklands
Tortington Priory Farm
Watermeadows
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KEY

ORDER LIMITS BOUNDARY

GI LOCATIONS

BGS BOREHOLES

HER FINDSPOTS

PALAEOLITHIC

MESOLITHIC

First issue	KF AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of national highways

Project Title

A27 ARUNDEL BYPASS

Drawing Title

FIGURE 5C PALAEOLITHIC AND MESOLITHIC HER FINDSPOTS

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability

Scale @ A3 1:10,000 | Volume NA

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Drawing Number
Highways England PIN | Originator | Volume
HE?????? -??? -???-
??_??_??_?? -?? -?? -????
Location | Type | Role | Number

Rev P??.?

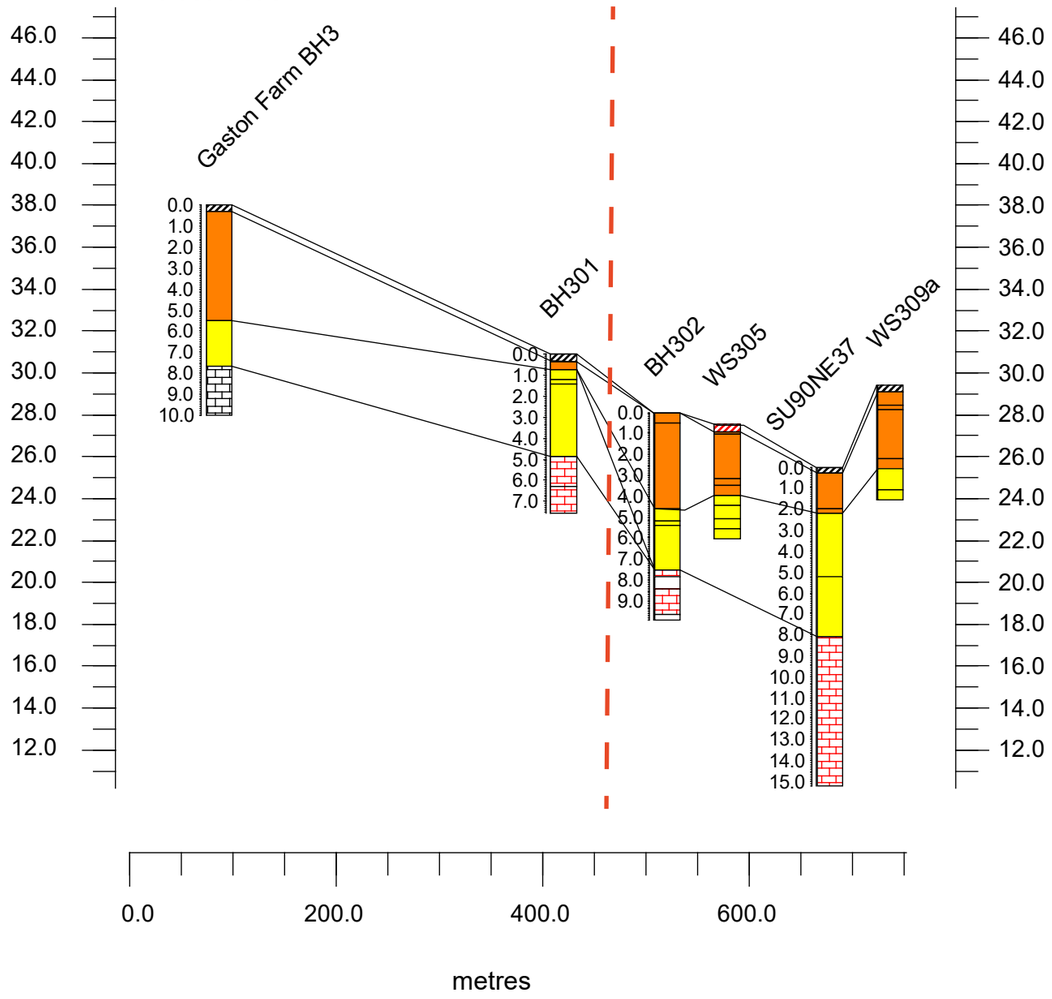
North

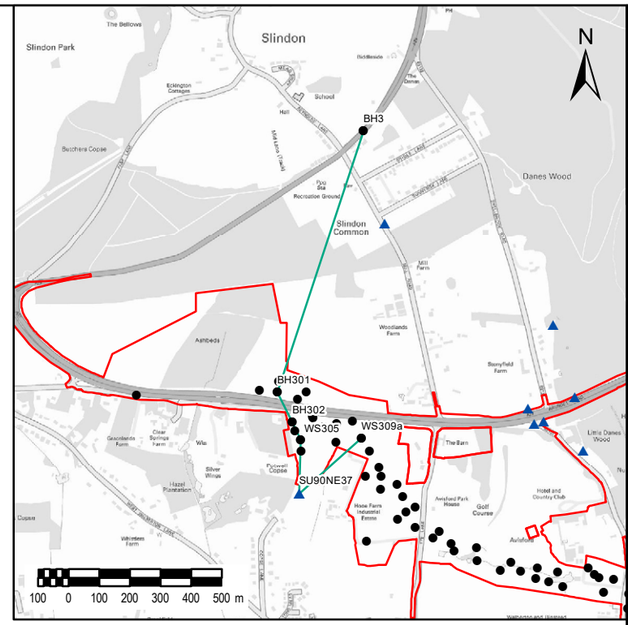
South

Westbourne/
Arundel
Raised Beach

? Westbourne/
Arundel
Raised Beach

Aldingbourne
Raised Beach





Stratigraphy

- Topsoil/Subsoil
- Made Ground
- Head Deposits
- Raised Beach Deposits
- Lambeth Group (Woolwich and Reading)
- Chalk

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 6 TRANSECT 1

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:20,000	Volume NA

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Drawing Number Highways England PIN	Originator	Volume	Rev
HE??????	-???	-???-	P??.?
??_??_??_??	-??	-?? -????	
Location	Type	Role Number	

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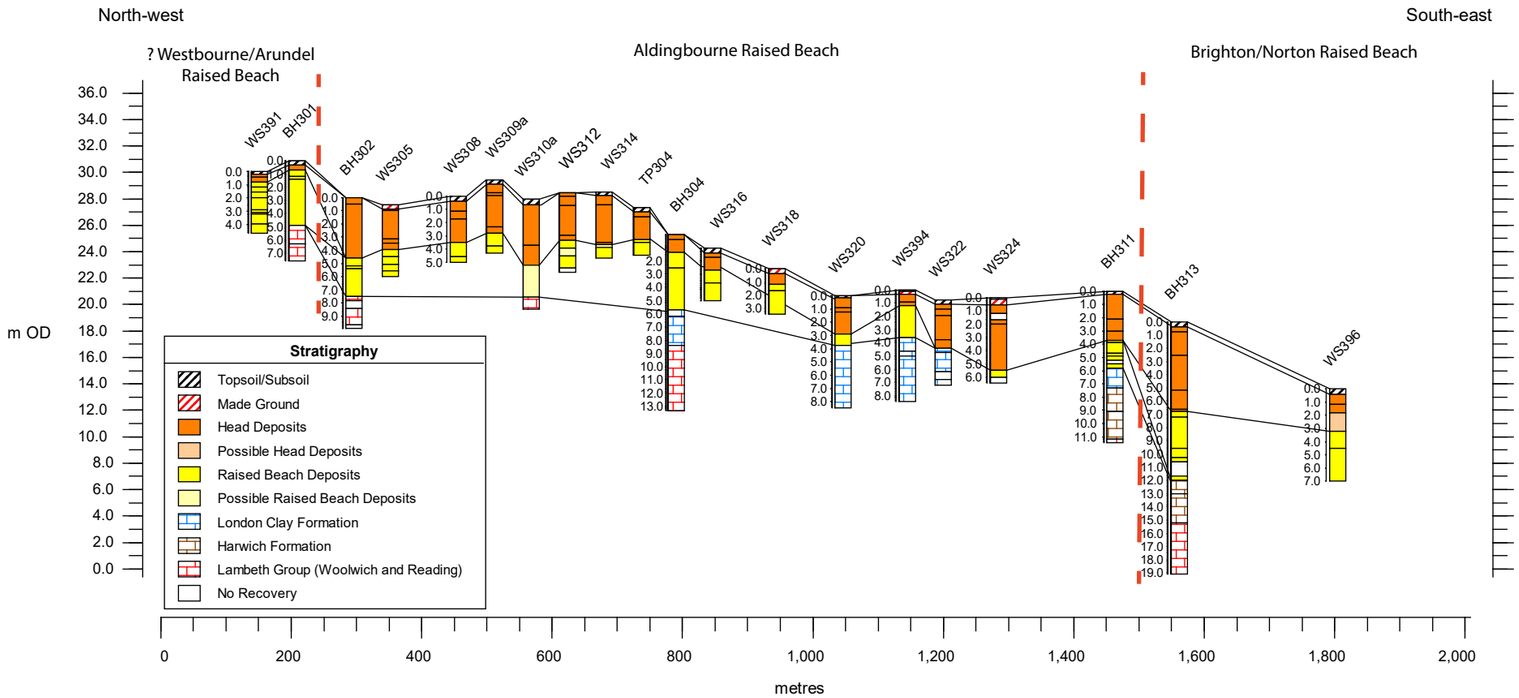

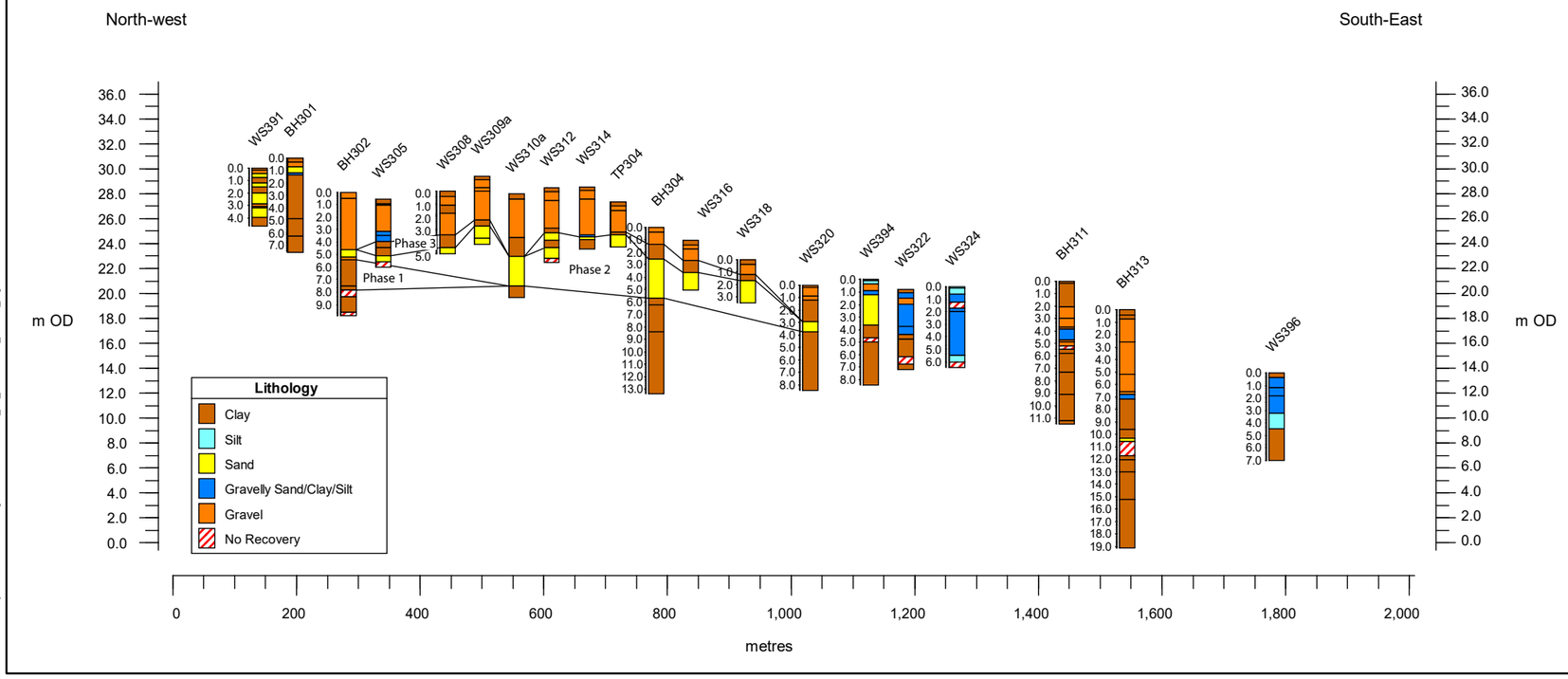

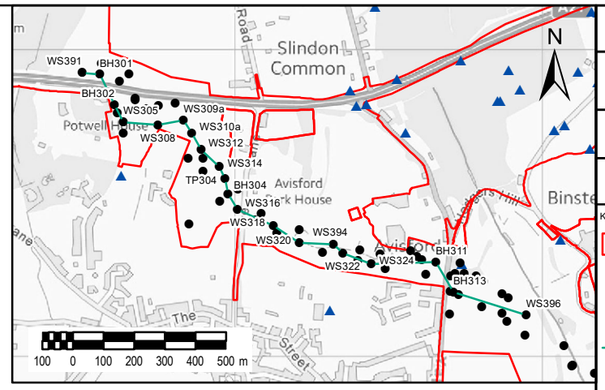

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

First issue	KF / AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 7 TRANSECT 2

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:20,000	Volume NA

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Drawing Number: Highways England PIN | Originator | Volume
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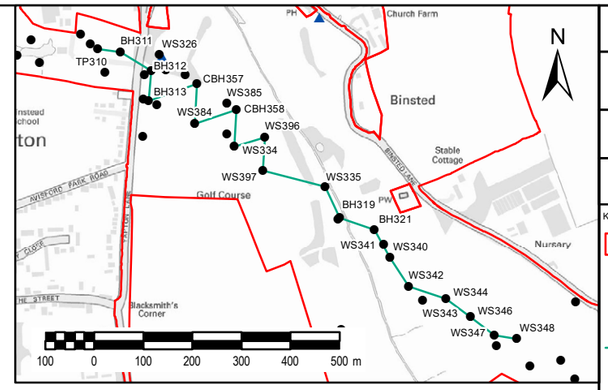
Location | Type | Role | Number

Rev: P??.?

Filename : X:\Projects\245561\GIS\Figs\MXD\GI WB\2022_02_08\245561_GI-WB_Fig07.mxd



North-west

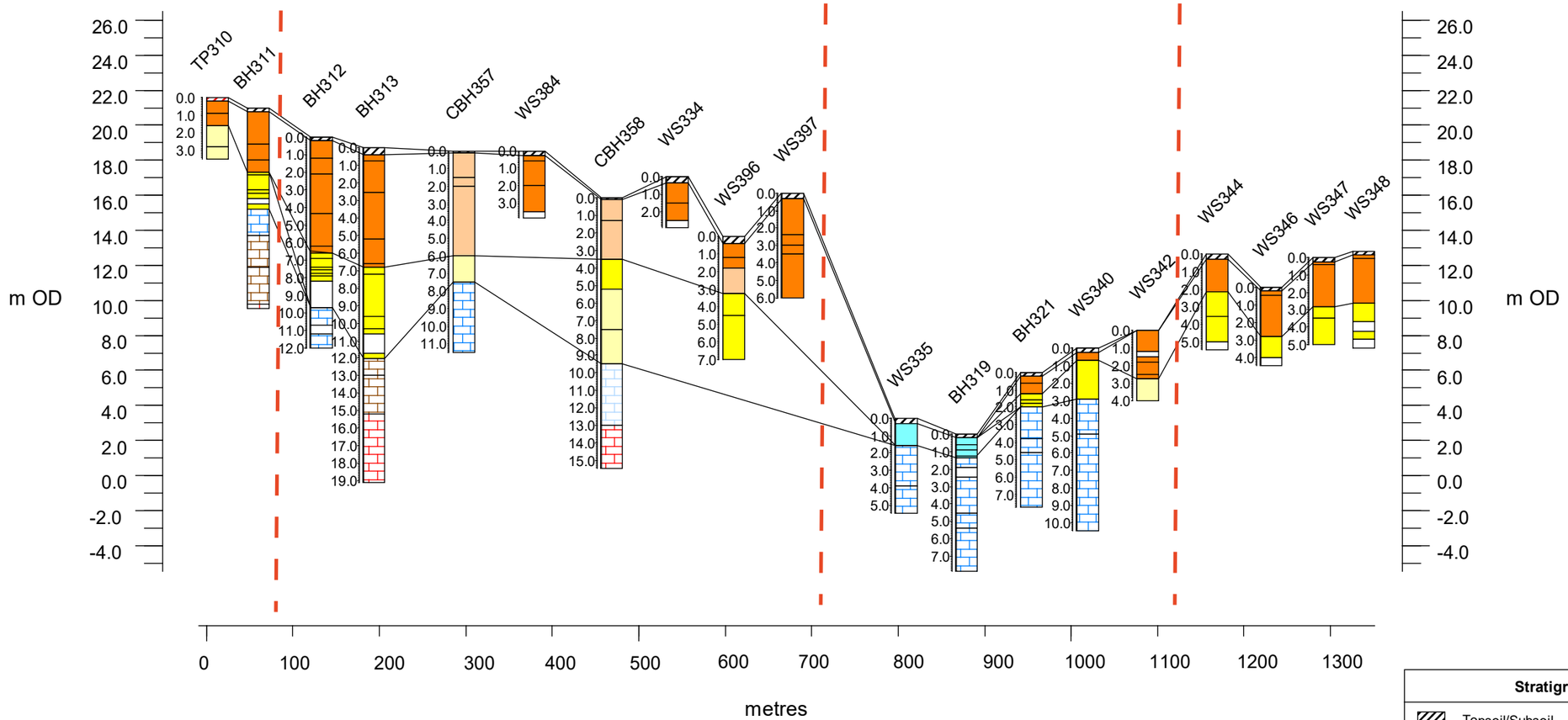
South-east

Aldingbourne Raised Beach

Brighton/Norton Raised Beach

Binsted Rife

Brighton/Norton Raised Beach



Stratigraphy

- Topsoil/Subsoil
- Alluvium
- Head Deposits
- Possible Head Deposits
- Raised Beach Deposits
- Possible Raised Beach Deposits
- London Clay Formation
- Harwich Formation
- Lambeth Group (Woolwich and Reading)
- No Recovery

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IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROPRIATE METHOD STATEMENT

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 8 TRANSECT 3

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2

Suitability:

Scale @ A3: 1:12,500

Volume: NA

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Location | Type | Role | Number

Rev: P??.?

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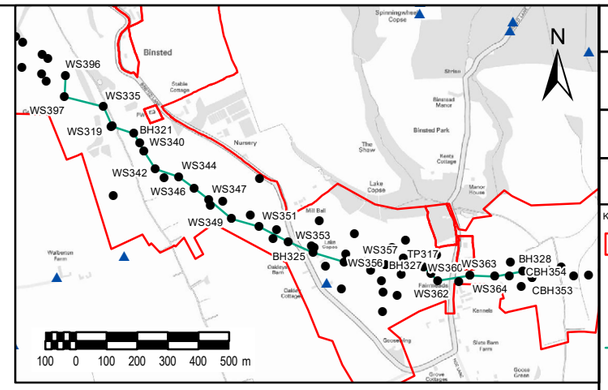


North-west-west

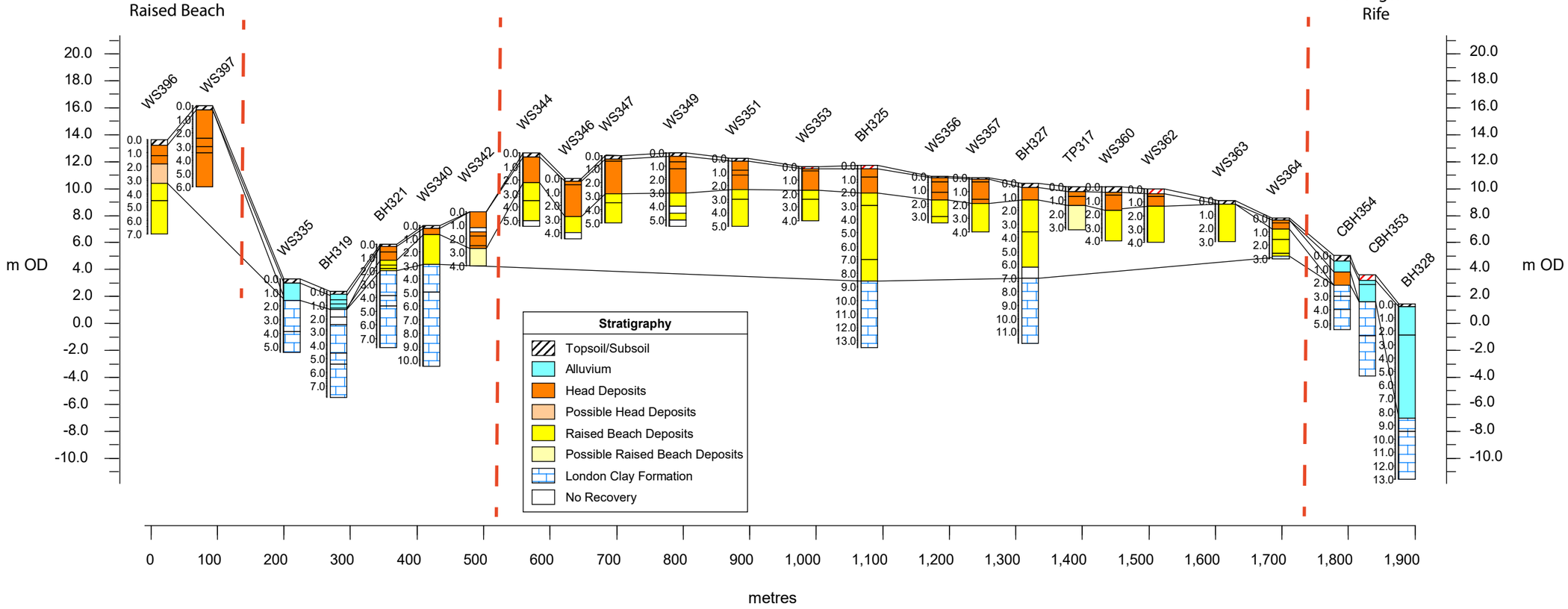
South-east-east

Brighton/Norton Raised Beach

Binsted Rife

Brighton/Norton Raised Beach

Tortington Rife



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF / AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 9 TRANSECT 4

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:20,000	Volume NA

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Drawing Number Highways England PIN	Originator	Volume		Rev
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Location	Type	Role	Number	

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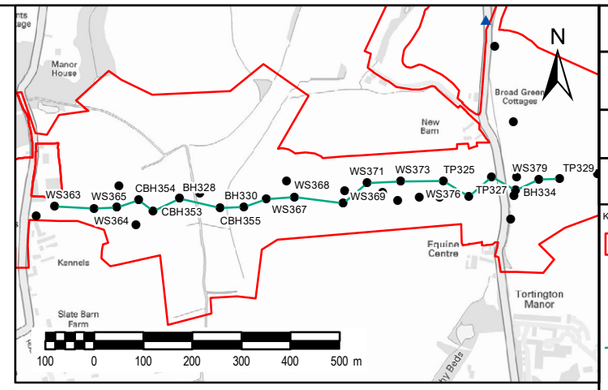


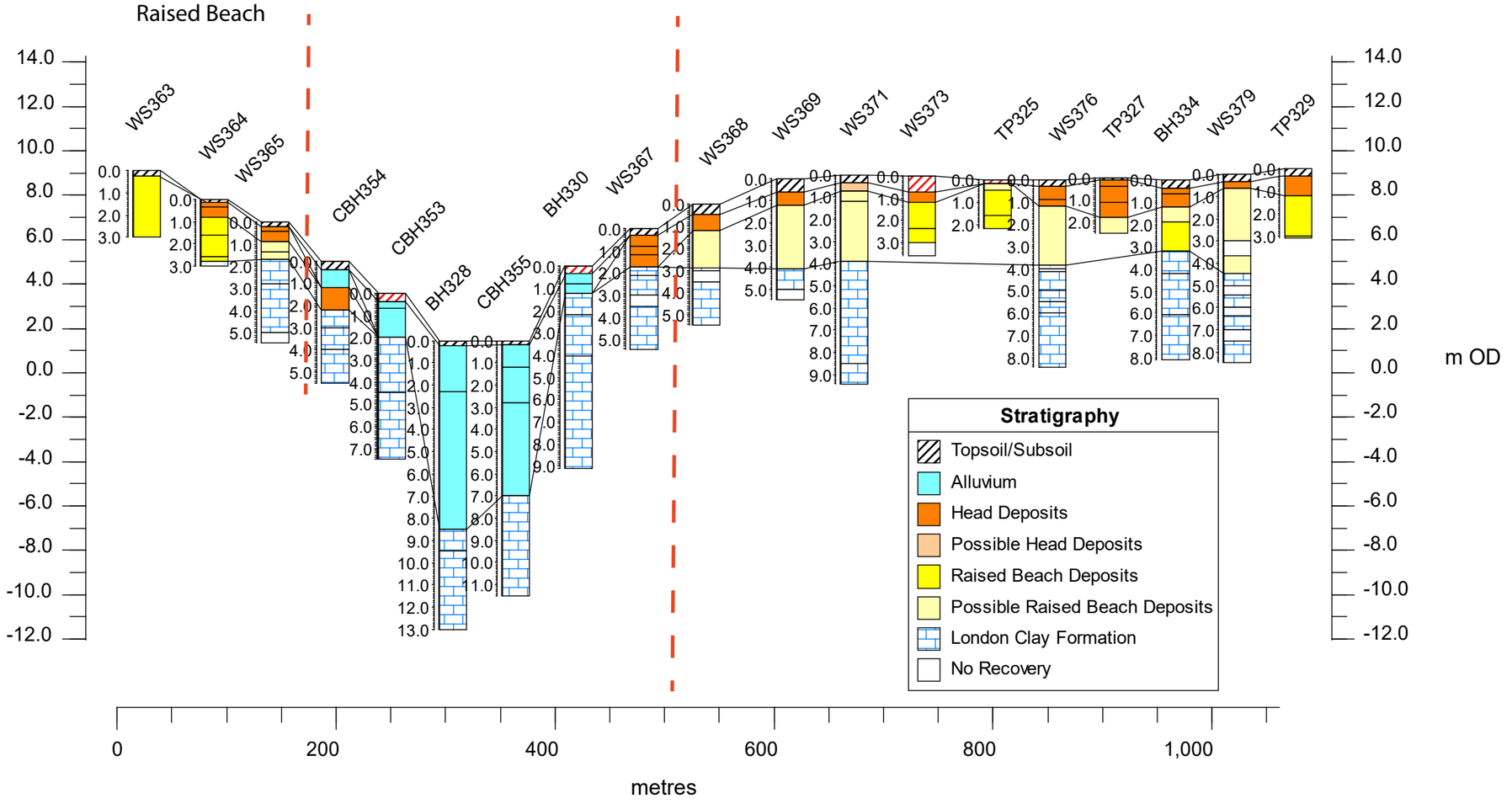
West

East

Brighton/Norton Raised Beach

Tortington Rife

Brighton/Norton Raised Beach



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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF / AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 10 TRANSECT 5

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:12,500	Volume NA

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Location | Type | Role | Number

Rev P??.?

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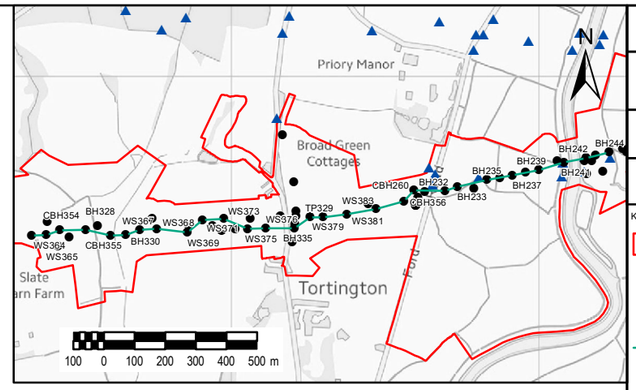


West

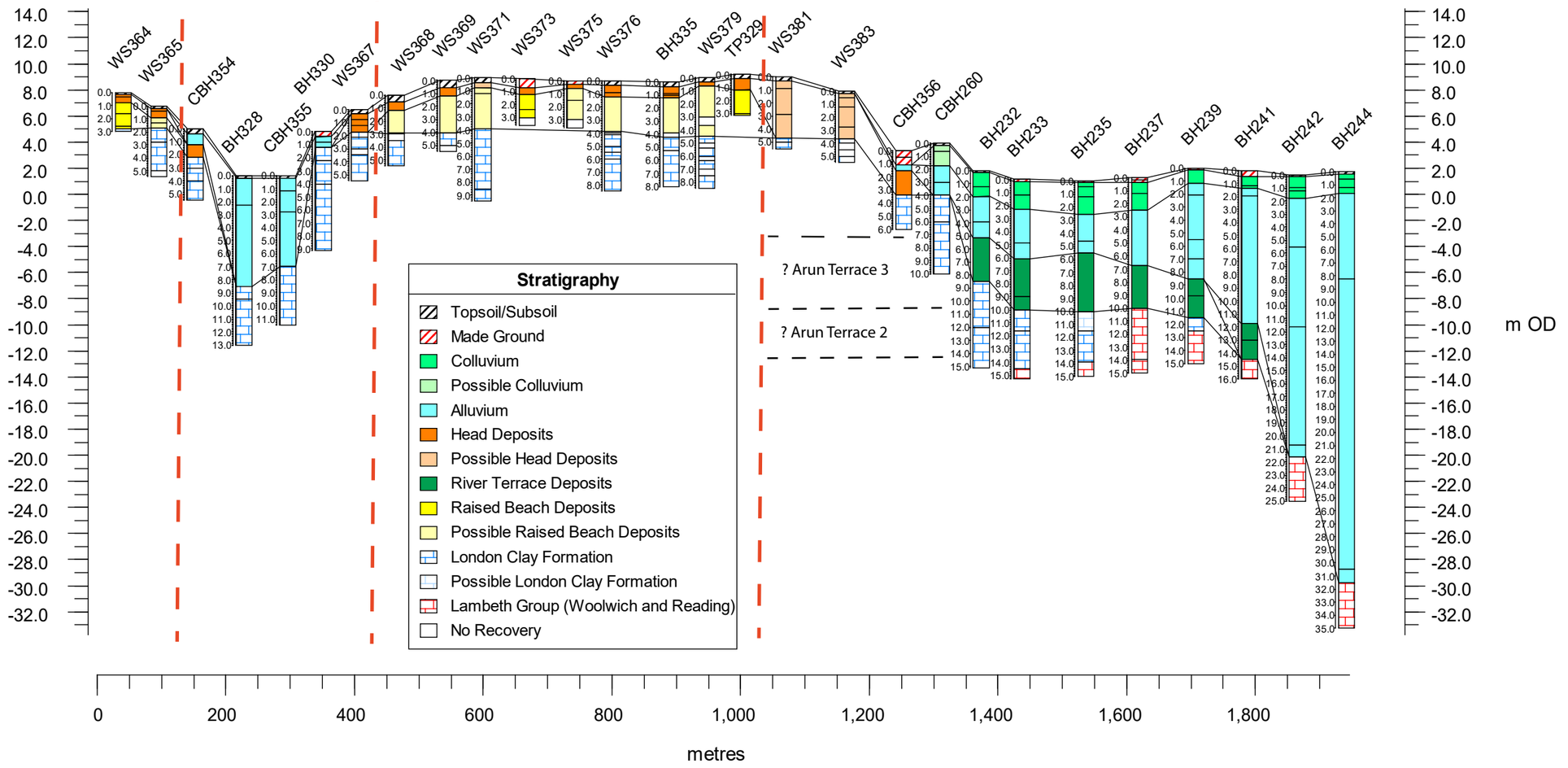
East

Brighton/Norton Raised Beach

Tortington Rife

Brighton/Norton Raised Beach

Arun Valley



Stratigraphy

- Topsoil/Subsoil
- Made Ground
- Colluvium
- Possible Colluvium
- Alluvium
- Head Deposits
- Possible Head Deposits
- River Terrace Deposits
- Raised Beach Deposits
- Possible Raised Beach Deposits
- London Clay Formation
- Possible London Clay Formation
- Lambeth Group (Woolwich and Reading)
- No Recovery

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 11 TRANSECT 6

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2

Suitability:

Scale @ A3: 1:20,000

Volume: NA

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Location | Type | Role | Number

Rev: P??.?

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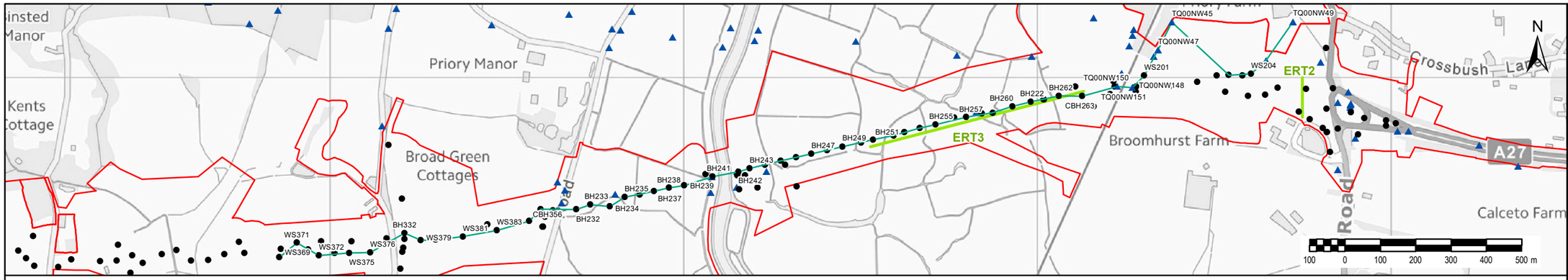


West

Brighton/Norton Raised Beach

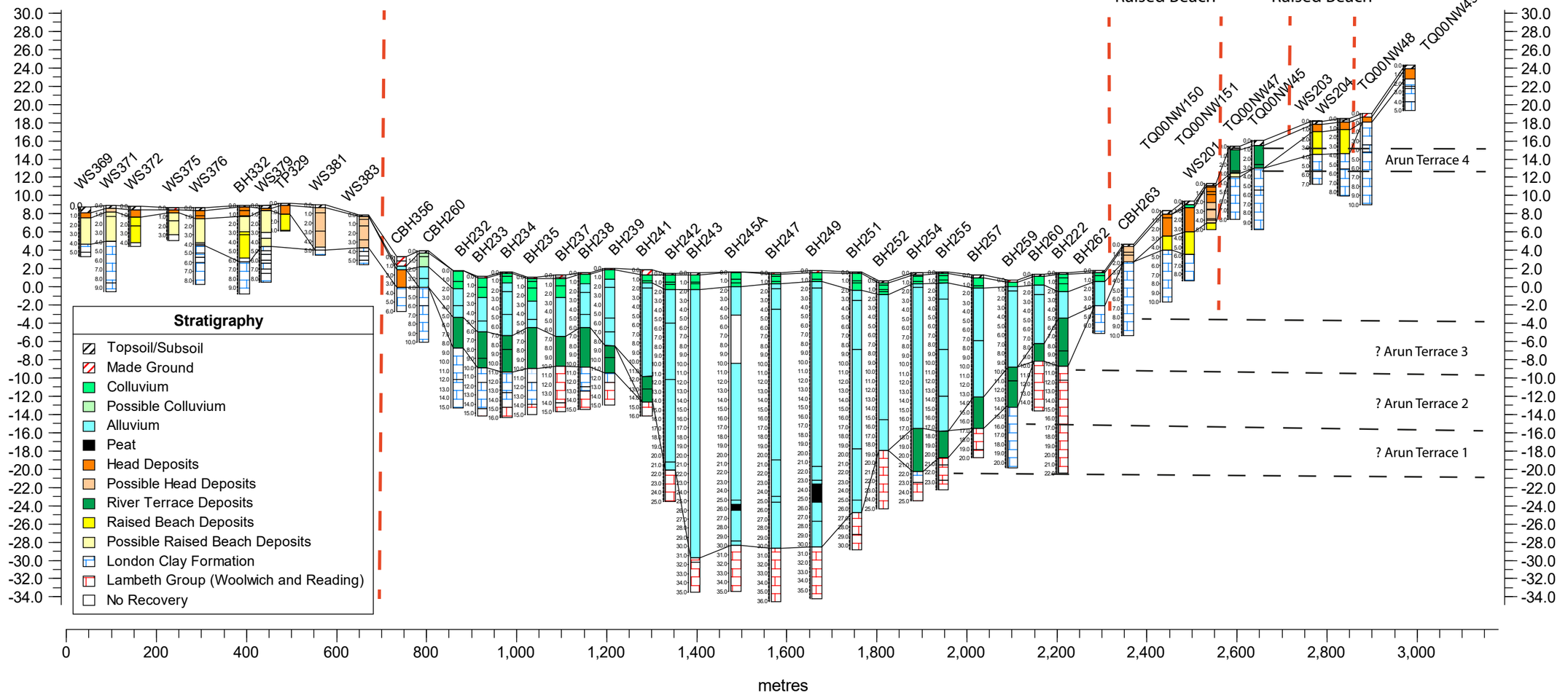
Arun Valley

Brighton/Norton Raised Beach

? Aldingbourne Raised Beach

East

m OD



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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- MAGNITUDE SURVEYS ERT SURVEY LINES
- TRANSECT LOCATION

First issue	KF AS	08/02/22	Suffix	

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 12 TRANSECT 7

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2
Suitability:
Scale @ A3: 1:12,500
Volume: NA

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Highways England PIN | Originator | Volume
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Location | Type | Role | Number

Rev: P??.?

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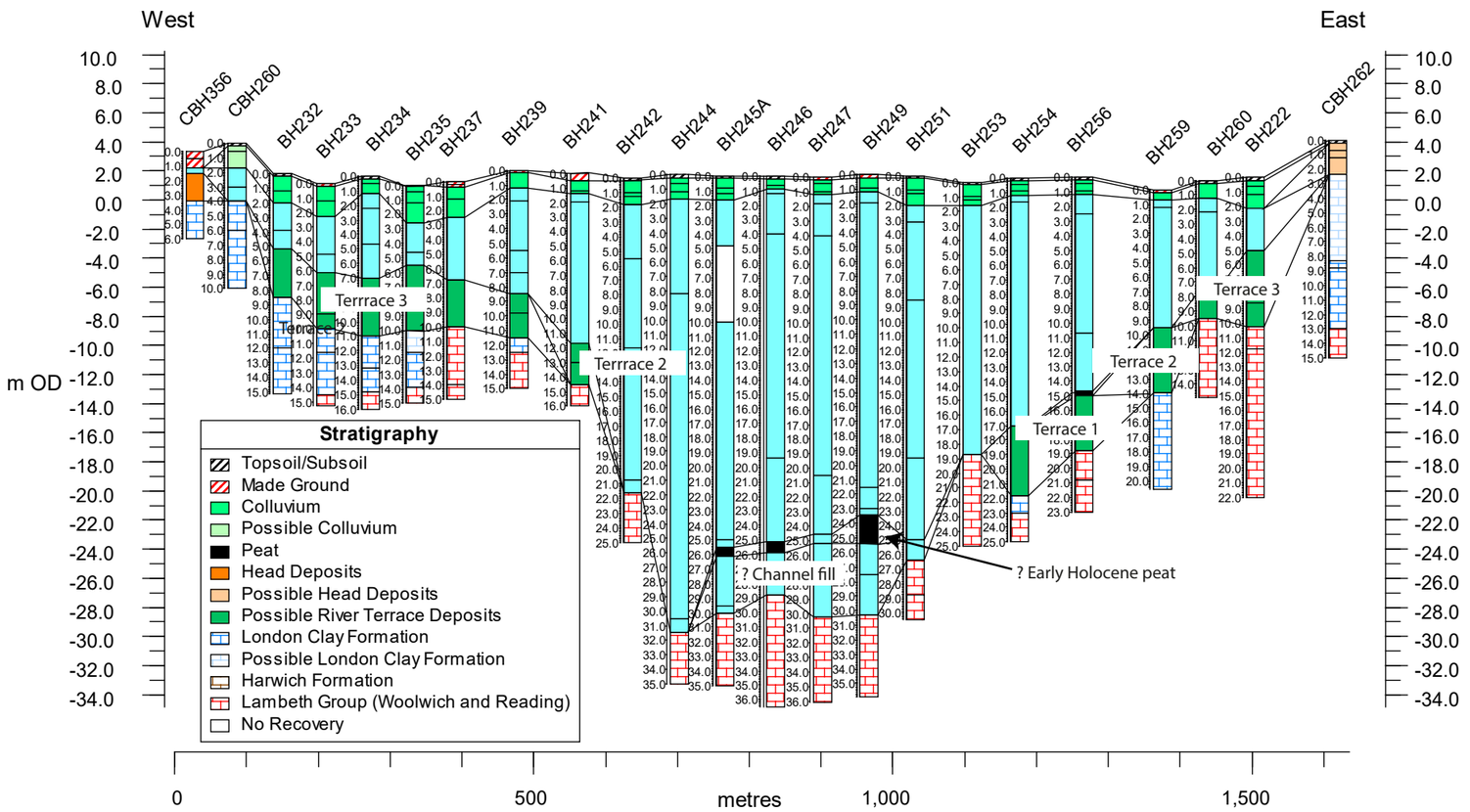

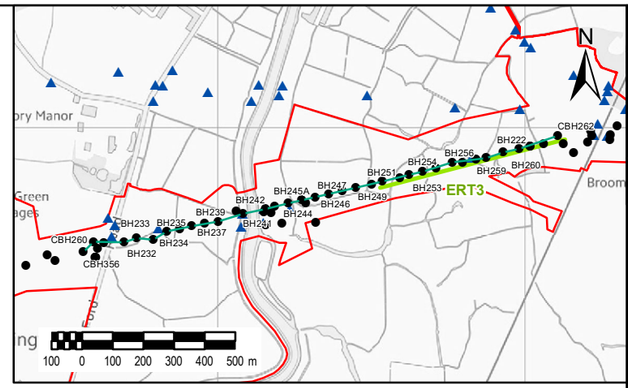

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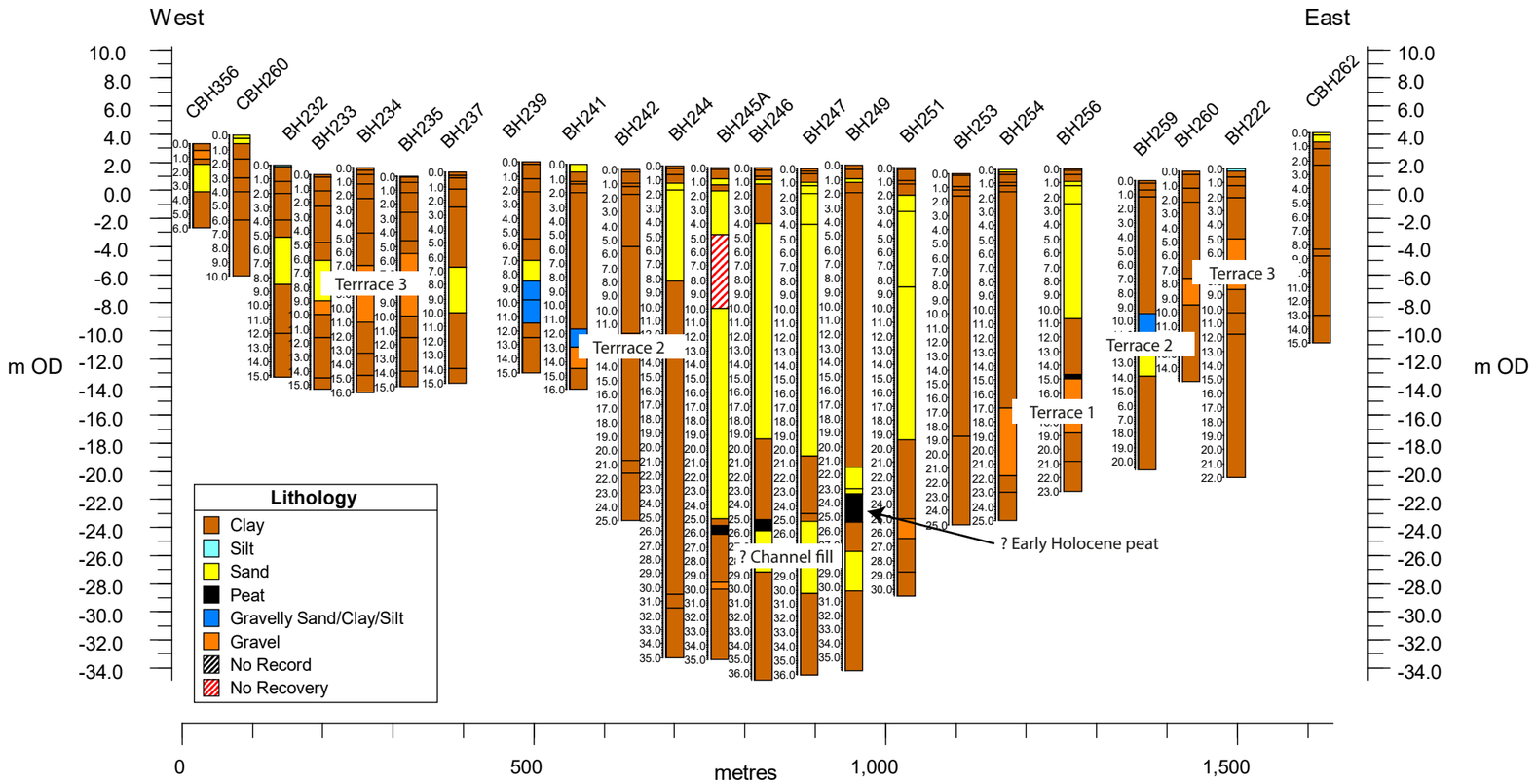

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- MAGNITUDE SURVEYS ERT SURVEY LINES
- TRANSECT LOCATION

First issue	KF AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 13 TRANSECT 8

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2

Suitability:

Scale @ A3: 1:20,000

Volume: NA

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Location	Type	Role Number	

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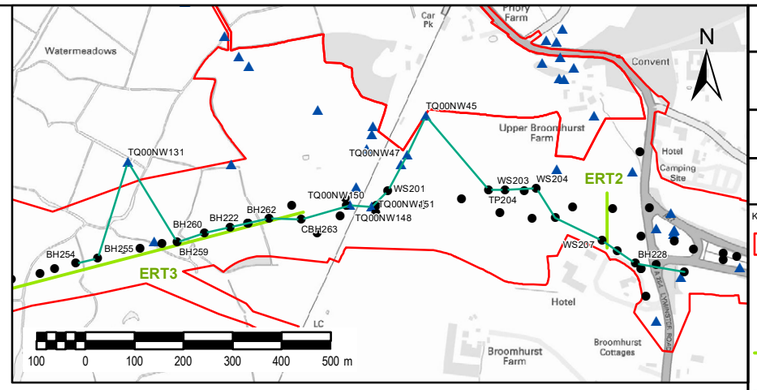

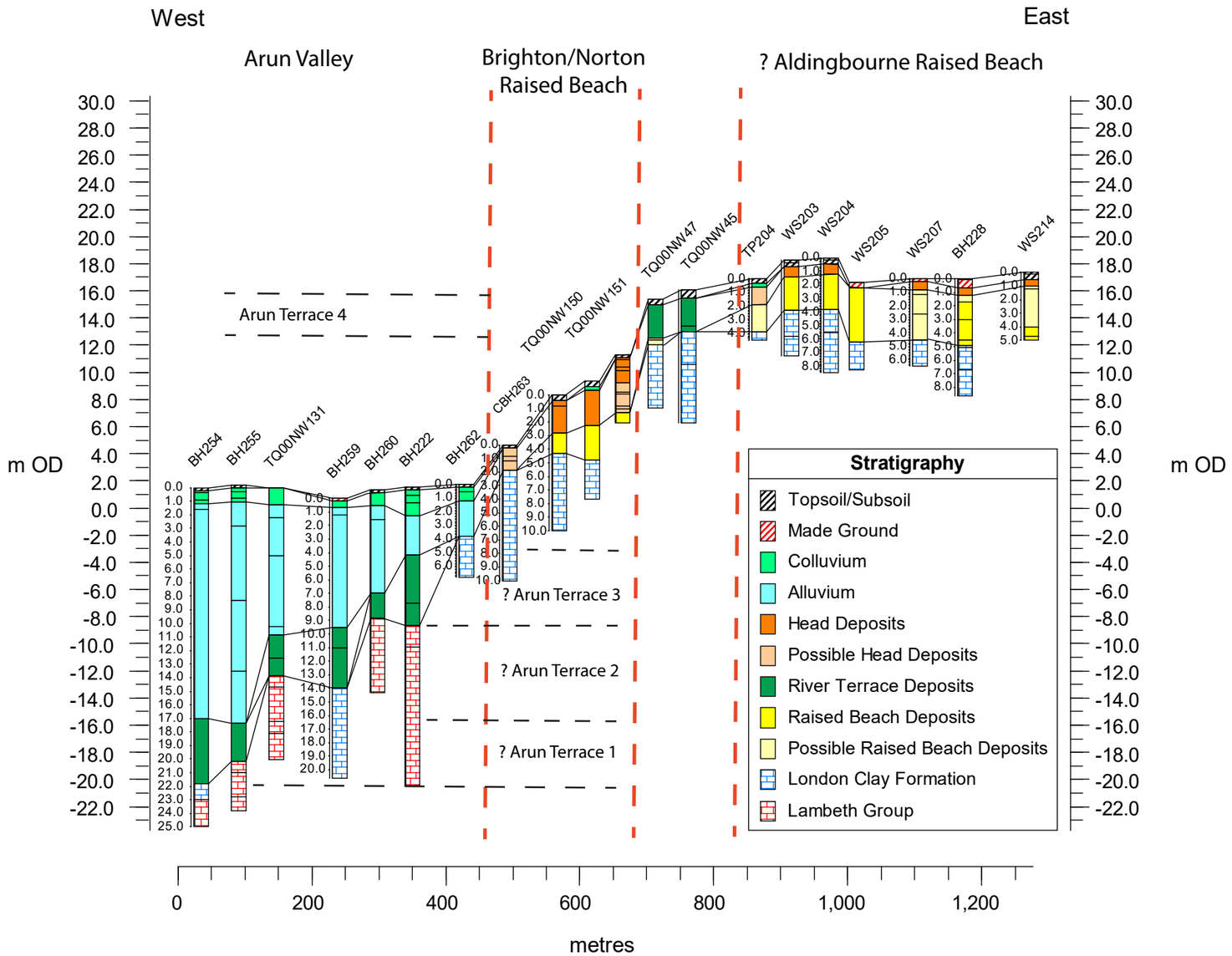

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- MAGNITUDE SURVEYS ERT SURVEY LINES
- TRANSECT LOCATION

First issue	KF / AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 14 TRANSECT 9

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:12,500	Volume NA

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Drawing Number Highways England PIN	Originator	Volume	Rev
HE??????	-???	-???-	P??.?
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Location	Type	Role Number	

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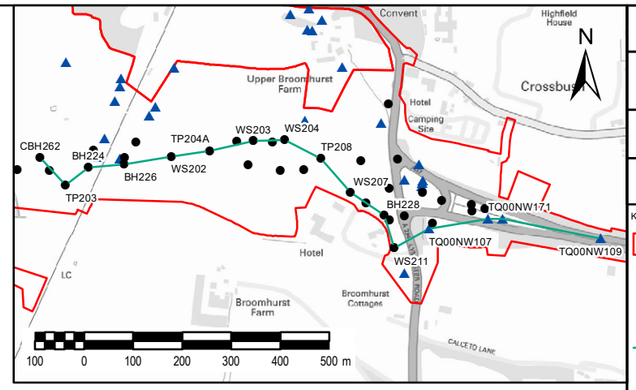
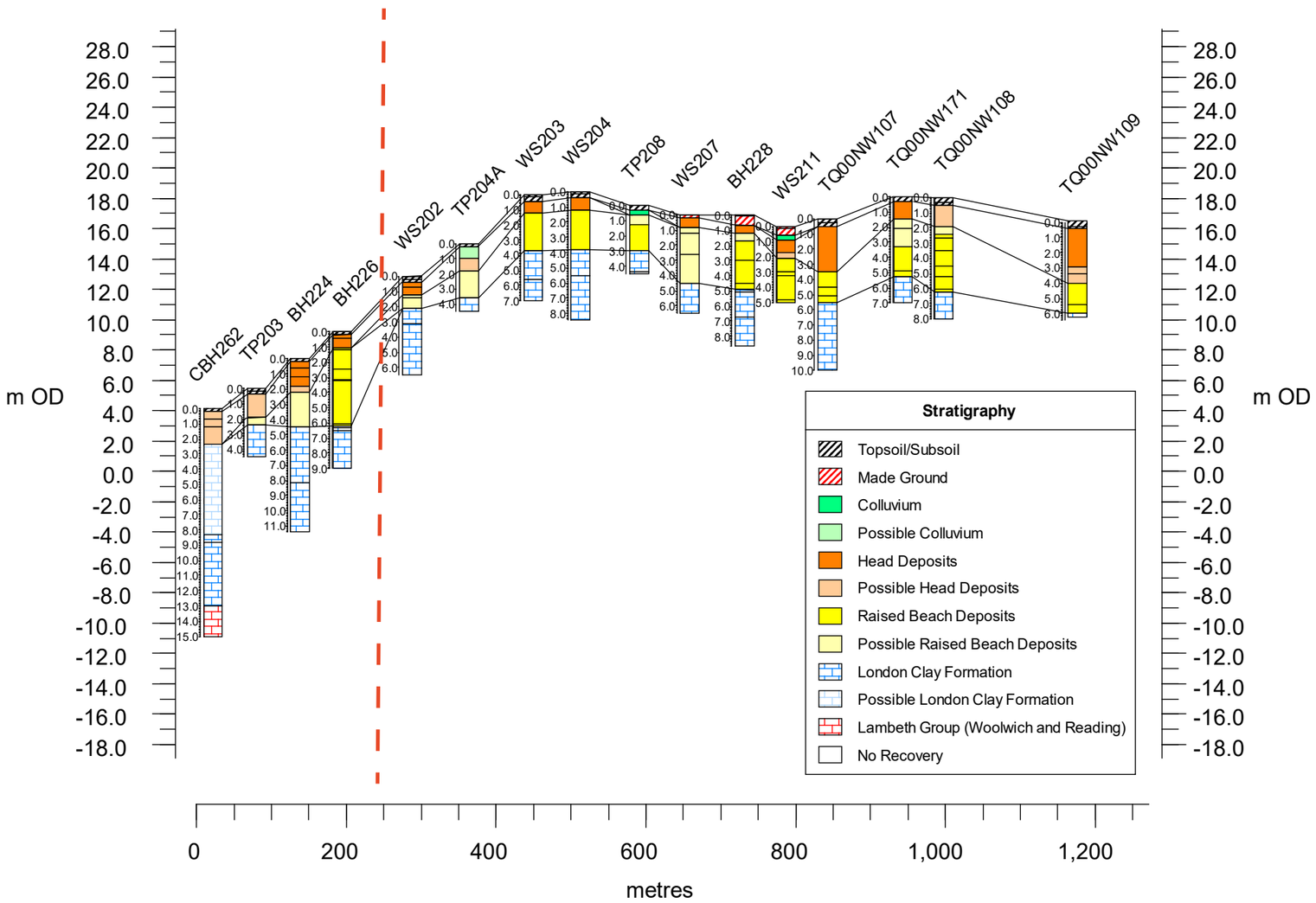


West

Brighton/Norton Raised Beach

? Aldingbourne Raised Beach

East



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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF AS	08/02/22	Suffix	

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 15 TRANSECT 10

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No.: 245561-2
Suitability:
Scale @ A3: 1:12,500
Volume: NA

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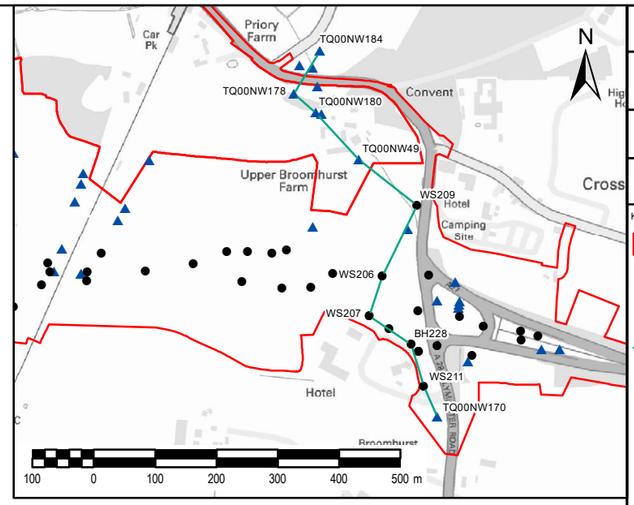
Location | Type | Role | Number

Rev: P??.?

Filename : X:\Projects\245561\GIS\FigsMXD\GI WB\2022_02_08\245561_GI-WB_Fig15.mxd

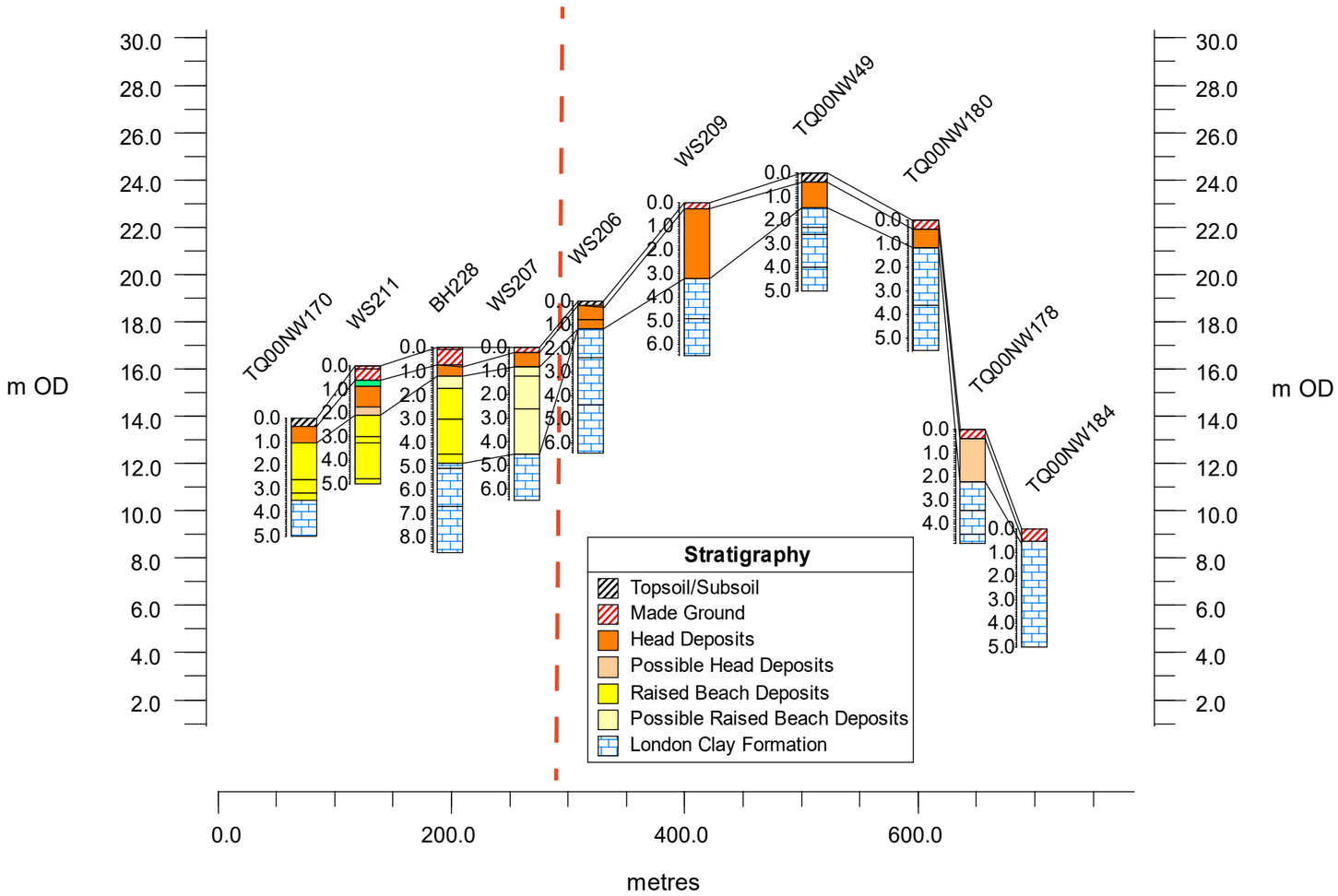


South

North

Head

? Aldingbourne Raised Beach



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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- TRANSECT LOCATION

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 16 TRANSECT 11

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2	Suitability
Scale @ A3 1:10,000	Volume NA

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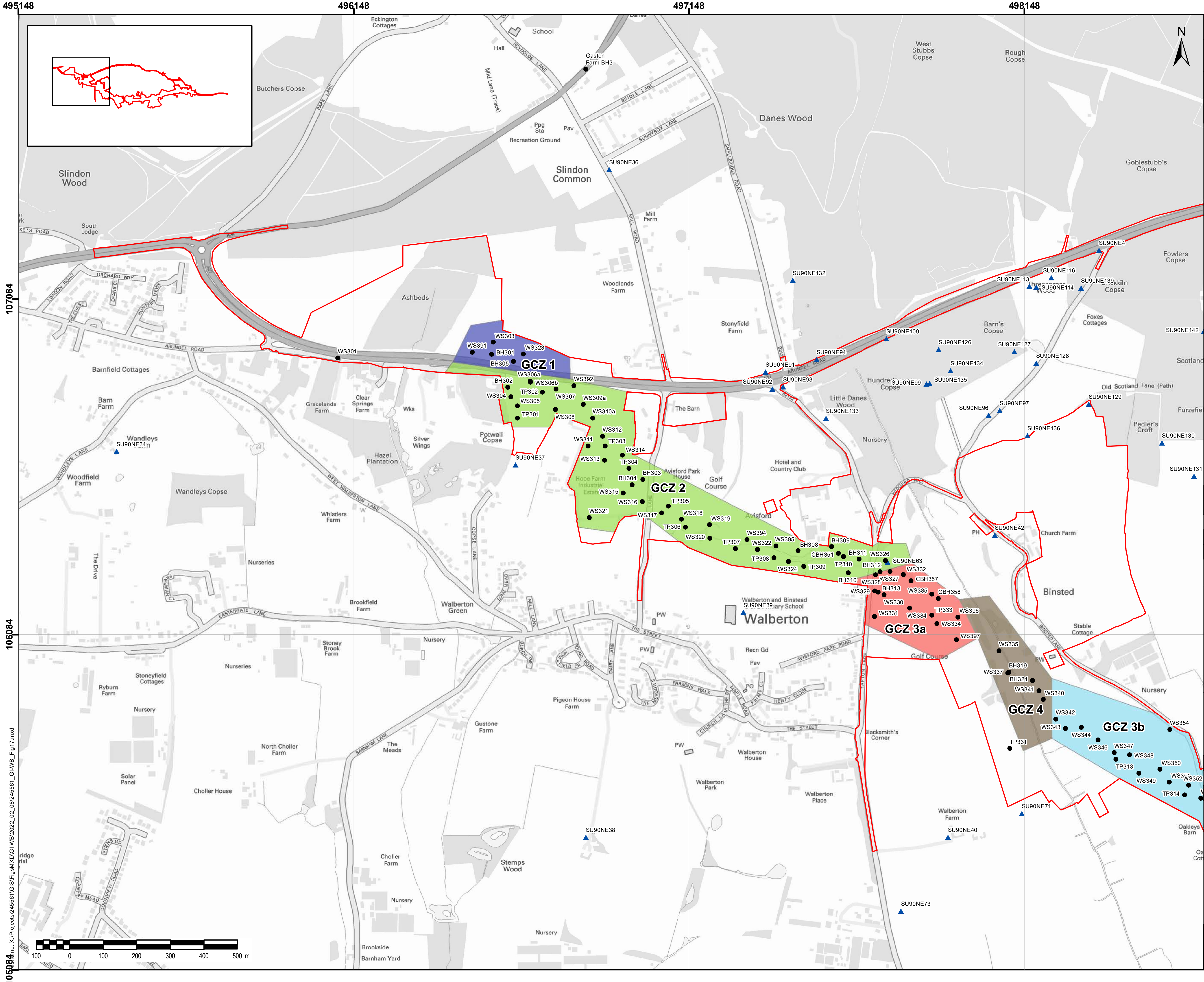

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES

GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

- GCZ 1
- GCZ 2
- GCZ 3A
- GCZ 3B
- GCZ 4

First issue | KF AS | 08/02/22

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS
Bridge House
1 Walnut Tree Close
Guildford
Surrey

Working on behalf of national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 17A GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	27/06/2022

Internal Project No. 245561-2 | Suitability
Scale @ A3 1:10,000 | Volume NA

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Location | Type | Role | Number
Rev P??.?

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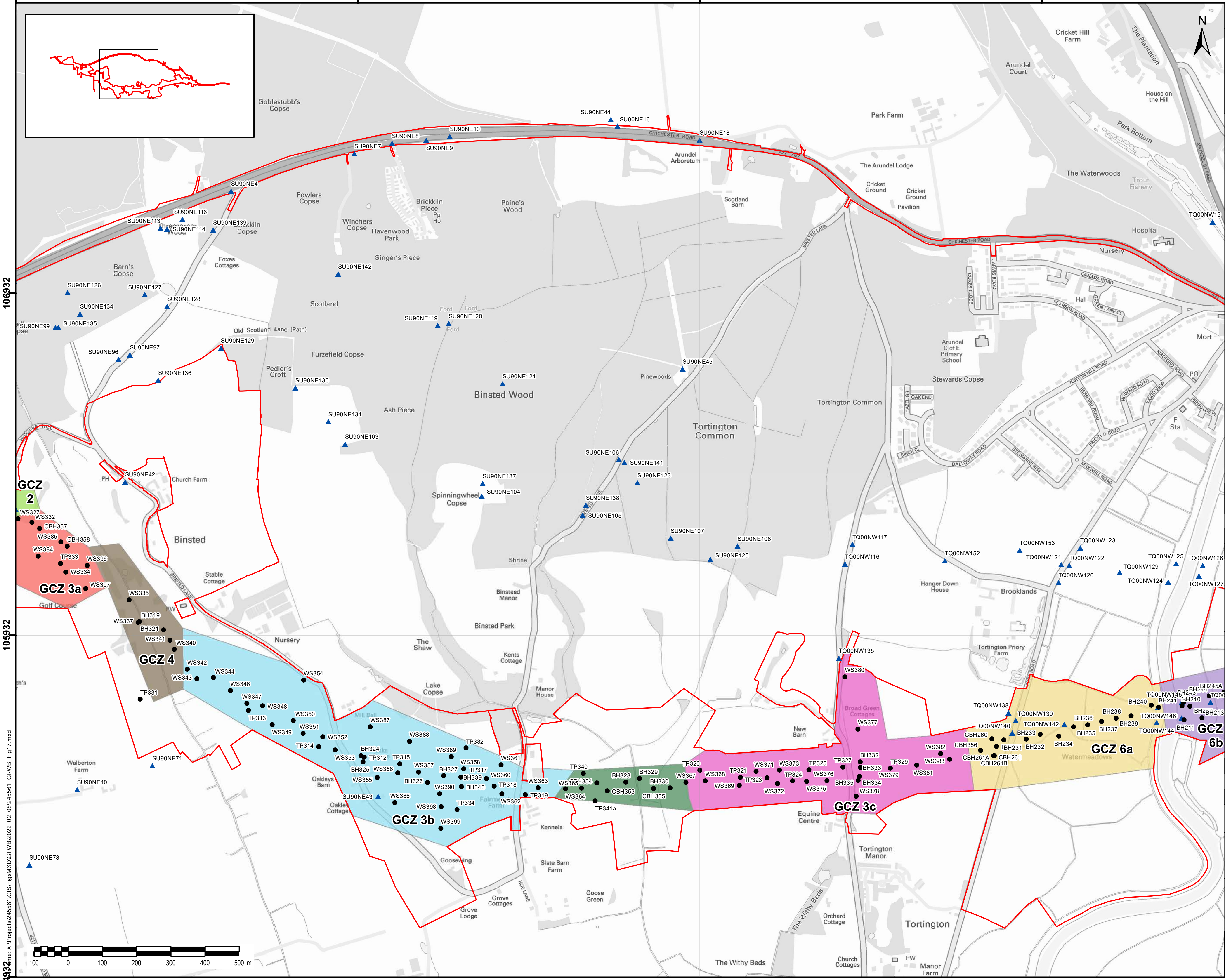

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EXCEPTIONAL RISKS RELATING TO THE WORKS ASSOCIATED WITH THIS DRAWING ARE IDENTIFIED BELOW

KEY

- ORDER LIMITS
- GI LOCATIONS
- BGS BOREHOLES

GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

- GCZ 2
- GCZ 3A
- GCZ 3B
- GCZ 3C
- GCZ 4
- GCZ 5
- GCZ 6A
- GCZ 6B

First issue	KF AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS
Bridge House
1 Walnut Tree Close
Guildford
Surrey

Working on behalf of national highways

Project Title

A27 ARUNDEL BYPASS

Drawing Title

FIGURE 17B GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

Designed	Drawn	Checked	Approved	Date
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Internal Project No. 245561-2 | Suitability

Scale @ A3 1:10,000 | Volume NA

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Location | Type | Role | Number

Rev P??.?

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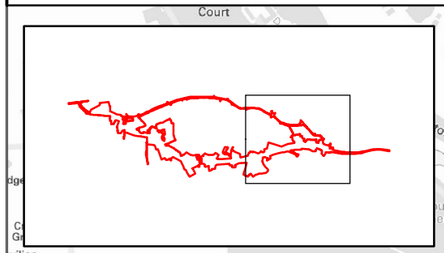

GCZ 3c
GCZ 6a
GCZ 6b
GCZ 6c
GCZ 7
GCZ 8
GCZ 9
GCZ 10

100 0 100 200 300 400 500 m

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES

GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

- GCZ 3C
- GCZ 6A
- GCZ 6B
- GCZ 6C
- GCZ 7
- GCZ 8
- GCZ 9
- GCZ 10

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 17C GEOARCHAEOLOGICAL CHARACTERISATION ZONES (GCZS)

Designed	Drawn	Checked	Approved	Date
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Location | Type | Role | Number

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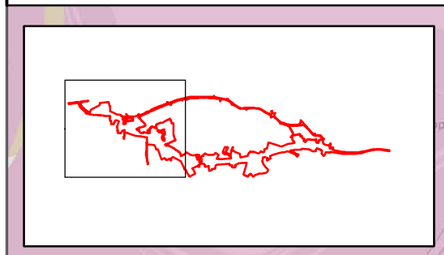

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- MAGNITUDE SURVEYS ERT SURVEY LINES
- UPDATED RAISED BEACH CLIFF LINES

SUPERFICIAL GEOLOGY

- ALLUVIUM
- HEAD
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED BEACH DEPOSITS, 2 - SAND AND GRAVEL
- RAISED STORM BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED STORM BEACH DEPOSITS, 2 - GRAVEL
- RIVER TERRACE DEPOSITS

First issue	KF AS		08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title: FIGURE 18A UPDATED MAPPING OF PLEISTOCENE RAISED BEACH CLIFF LINES

Designed	Drawn	Checked	Approved	Date
NA	KF	AS	AS	28/06/2022

Internal Project No.: 245561-2
Suitability:
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Volume: NA

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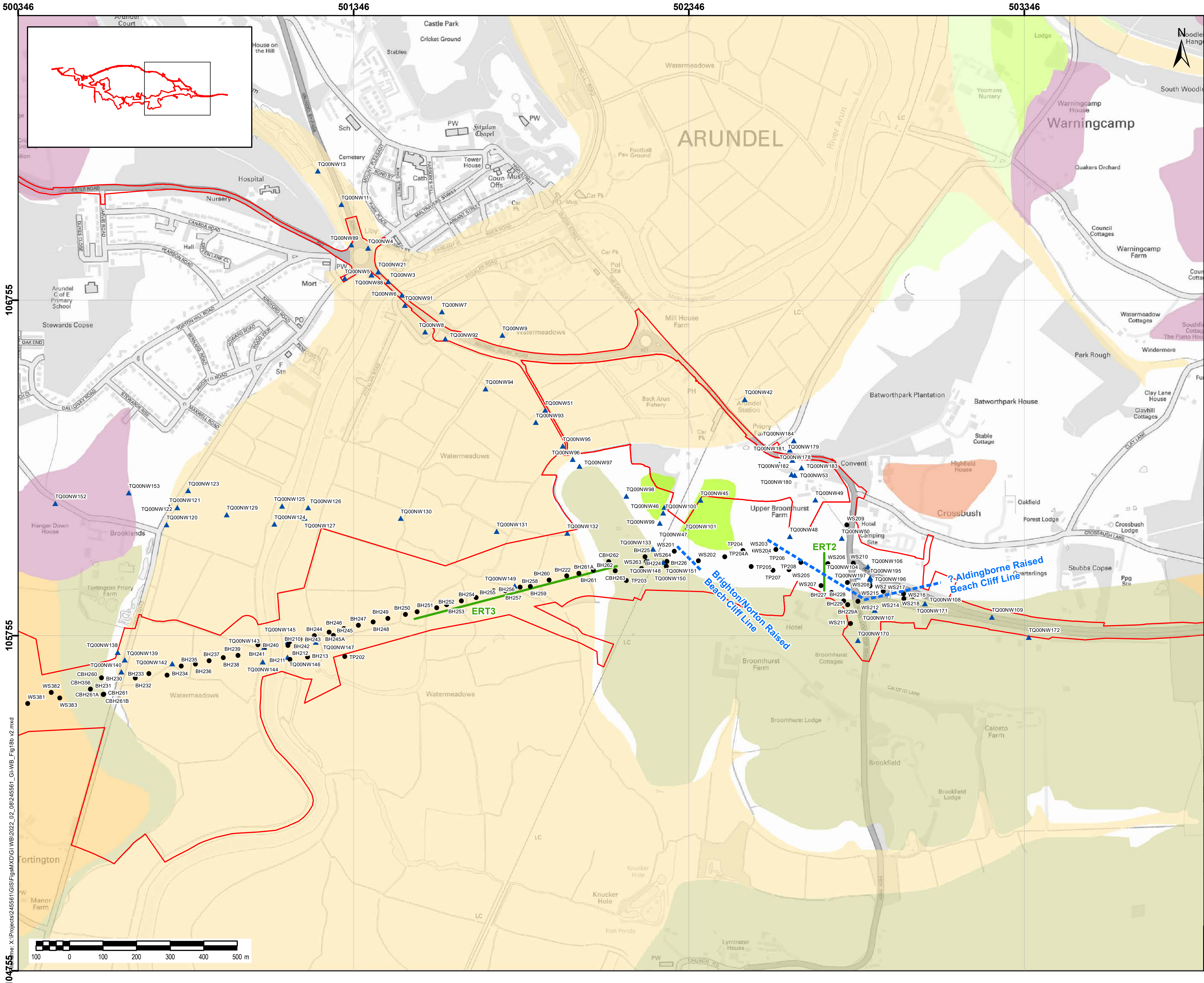

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KEY

- ORDER LIMITS BOUNDARY
- GI LOCATIONS
- BGS BOREHOLES
- MAGNITUDE SURVEYS ERT SURVEY LINES
- UPDATED RAISED BEACH CLIFF LINES

SUPERFICIAL GEOLOGY

- ARUN TERRACE DEPOSITS, 2 MEMBER - SAND AND GRAVEL
- ARUN TERRACE DEPOSITS, 3 MEMBER - SAND AND GRAVEL
- ARUN TERRACE DEPOSITS, 4 MEMBER - SAND AND GRAVEL
- HEAD
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED MARINE DEPOSITS
- RAISED STORM BEACH DEPOSITS, 2 - GRAVEL
- RIVER TERRACE DEPOSITS

First issue	KF	AS	08/02/22	Suffix

Purpose of issue: XXX

Client: NATIONAL HIGHWAYS, Bridge House, 1 Walnut Tree Close, Guildford, Surrey

Working on behalf of: national highways

Project Title: A27 ARUNDEL BYPASS

Drawing Title:

FIGURE 18B UPDATED MAPPING OF PLEISTOCENE RAISED BEACH CLIFF LINES

Designed	Drawn	Checked	Approved	Date
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Location | Type | Role | Number
Rev P??.?

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